

**SECTION II**  
MATERIALS

2025

ASME Boiler and  
Pressure Vessel Code  
An International Code

**Part D**  
Properties (Customary)

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AN INTERNATIONAL CODE

# 2025 ASME Boiler & Pressure Vessel Code

2025 Edition

July 1, 2025

## II MATERIALS

### Part D

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## Properties (Customary)

ASME Boiler and Pressure Vessel Committee  
on Materials



The American Society of  
Mechanical Engineers

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## FOREWORD\*

In 1911, The American Society of Mechanical Engineers established the Boiler and Pressure Vessel Committee to formulate standard rules for the construction of steam boilers and other pressure vessels. In 2009, the Boiler and Pressure Vessel Committee was superseded by the following committees:

- (a) Committee on Power Boilers (I)
- (b) Committee on Materials (II)
- (c) Committee on Construction of Nuclear Facility Components (III)
- (d) Committee on Heating Boilers (IV)
- (e) Committee on Nondestructive Examination (V)
- (f) Committee on Pressure Vessels (VIII)
- (g) Committee on Welding, Brazing, and Fusing (IX)
- (h) Committee on Fiber-Reinforced Plastic Pressure Vessels (X)
- (i) Committee on Nuclear Inservice Inspection (XI)
- (j) Committee on Transport Tanks (XII)
- (k) Committee on Overpressure Protection (XIII)
- (l) Technical Oversight Management Committee (TOMC)

Where reference is made to “the Committee” in this Foreword, each of these committees is included individually and collectively.

The Committee’s function is to establish rules of safety relating to pressure integrity. The rules govern the construction\*\* of boilers, pressure vessels, transport tanks, and nuclear components, and the inservice inspection of nuclear components and transport tanks. For nuclear items other than pressure-retaining components, the Committee also establishes rules of safety related to structural integrity. The Committee also interprets these rules when questions arise regarding their intent. The technical consistency of the Sections of the Code and coordination of standards development activities of the Committees is supported and guided by the Technical Oversight Management Committee. The Code does not address other safety issues relating to the construction of boilers, pressure vessels, transport tanks, or nuclear components, or the inservice inspection of nuclear components or transport tanks. Users of the Code should refer to the pertinent codes, standards, laws, regulations, or other relevant documents for safety issues other than those relating to pressure integrity and, for nuclear items other than pressure-retaining components, structural integrity. Except for Sections XI and XII, and with a few other exceptions, the rules do not, of practical necessity, reflect the likelihood and consequences of deterioration in service related to specific service fluids or external operating environments. In formulating the rules, the Committee considers the needs of users, manufacturers, and inspectors of components addressed by the Code. The objective of the rules is to afford reasonably certain protection of life and property, and to provide a margin for deterioration in service to give a reasonably long, safe period of usefulness. Advancements in design and materials and evidence of experience have been recognized.

The Code contains mandatory requirements, specific prohibitions, and nonmandatory guidance for construction activities and inservice inspection and testing activities. The Code does not address all aspects of these activities and those aspects that are not specifically addressed should not be considered prohibited. The Code is not a handbook and cannot replace education, experience, and the use of engineering judgment. The phrase *engineering judgment* refers to technical judgments made by knowledgeable engineers experienced in the application of the Code. Engineering judgments must be consistent with Code philosophy, and such judgments must never be used to overrule mandatory requirements or specific prohibitions of the Code.

The Committee recognizes that tools and techniques used for design and analysis change as technology progresses and expects engineers to use good judgment in the application of these tools. The designer is responsible for complying with Code rules and demonstrating compliance with Code equations when such equations are mandatory. The Code

\* The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI’s requirements for an ANS. Therefore, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Code.

\*\* *Construction*, as used in this Foreword, is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and overpressure protection.



neither requires nor prohibits the use of computers for the design or analysis of components constructed to the requirements of the Code. However, designers and engineers using computer programs for design or analysis are cautioned that they are responsible for all technical assumptions inherent in the programs they use and the application of these programs to their design.

The rules established by the Committee are not to be interpreted as approving, recommending, or endorsing any proprietary or specific design, or as limiting in any way the manufacturer's freedom to choose any method of design or any form of construction that conforms to the Code rules.

The Committee meets regularly to consider revisions of the rules, new rules as dictated by technological development, Code cases, and requests for interpretations. Only the Committee has the authority to provide official interpretations of the Code. Requests for revisions, new rules, Code cases, or interpretations shall be addressed to the staff secretary in writing and shall give full particulars in order to receive consideration and action (see the Correspondence With the Committee page). Proposed revisions to the Code resulting from inquiries will be presented to the Committee for appropriate action. The action of the Committee becomes effective only after confirmation by ballot of the Committee and approval by ASME. Proposed revisions to the Code approved by the Committee are submitted to the American National Standards Institute (ANSI) and published at <http://go.asme.org/BPVCPublicReview> to invite comments from all interested persons. After public review and final approval by ASME, revisions are published at regular intervals in Editions of the Code.

The Committee does not rule on whether a component shall or shall not be constructed to the provisions of the Code. The scope of each Section has been established to identify the components and parameters considered by the Committee in formulating the Code rules.

Questions or issues regarding compliance of a specific component with the Code rules are to be directed to the ASME Certificate Holder (Manufacturer). Inquiries concerning the interpretation of the Code are to be directed to the Committee. ASME is to be notified should questions arise concerning improper use of the ASME Single Certification Mark.

When required by context in the Code, the singular shall be interpreted as the plural, and vice versa.

The words "shall," "should," and "may" are used in the Code as follows:

- *Shall* is used to denote a requirement.
- *Should* is used to denote a recommendation.
- *May* is used to denote permission, neither a requirement nor a recommendation.

# STATEMENT OF POLICY ON THE USE OF THE ASME SINGLE CERTIFICATION MARK AND CODE AUTHORIZATION IN ADVERTISING

ASME has established procedures to authorize qualified organizations to perform various activities in accordance with the requirements of the ASME Boiler and Pressure Vessel Code. It is the aim of the Society to provide recognition of organizations so authorized. An organization holding authorization to perform various activities in accordance with the requirements of the Code may state this capability in its advertising literature.

Organizations that are authorized to use the ASME Single Certification Mark for marking items or constructions that have been constructed and inspected in compliance with the ASME Boiler and Pressure Vessel Code are issued Certificates of Authorization. It is the aim of the Society to maintain the standing of the ASME Single Certification Mark for the benefit of the users, the enforcement jurisdictions, and the holders of the ASME Single Certification Mark who comply with all requirements.

Based on these objectives, the following policy has been established on the usage in advertising of facsimiles of the ASME Single Certification Mark, Certificates of Authorization, and reference to Code construction. The American Society of Mechanical Engineers does not “approve,” “certify,” “rate,” or “endorse” any item, construction, or activity and there shall be no statements or implications that might so indicate. An organization holding the ASME Single Certification Mark and/or a Certificate of Authorization may state in advertising literature that items, constructions, or activities “are built (produced or performed) or activities conducted in accordance with the requirements of the ASME Boiler and Pressure Vessel Code,” or “meet the requirements of the ASME Boiler and Pressure Vessel Code.” An ASME corporate logo shall not be used by any organization other than ASME.

The ASME Single Certification Mark shall be used only for stamping and nameplates as specifically provided in the Code. However, facsimiles may be used for the purpose of fostering the use of such construction. Such usage may be by an association or a society, or by a holder of the ASME Single Certification Mark who may also use the facsimile in advertising to show that clearly specified items will carry the ASME Single Certification Mark.

## STATEMENT OF POLICY ON THE USE OF ASME MARKING TO IDENTIFY MANUFACTURED ITEMS

The ASME Boiler and Pressure Vessel Code provides rules for the construction of boilers, pressure vessels, and nuclear components. This includes requirements for materials, design, fabrication, examination, inspection, and stamping. Items constructed in accordance with all of the applicable rules of the Code are identified with the ASME Single Certification Mark described in the governing Section of the Code.

Markings such as “ASME,” “ASME Standard,” or any other marking including “ASME” or the ASME Single Certification Mark shall not be used on any item that is not constructed in accordance with all of the applicable requirements of the Code.

Items shall not be described on ASME Data Report Forms nor on similar forms referring to ASME that tend to imply that all Code requirements have been met when, in fact, they have not been. Data Report Forms covering items not fully complying with ASME requirements should not refer to ASME or they should clearly identify all exceptions to the ASME requirements.

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| E. Alexis, <i>Chair</i>           | J. F. Grubb      |
| S. Guzey, <i>Vice Chair</i>       | S. Krishnamurthy |
| J. A. A. Morrow, <i>Secretary</i> | D. L. Kurle      |
| L. F. Campbell                    | R. W. Mikitka    |
| H. Chen                           | P. K. Rai        |
| M. Ghorashi                       | M. Wadkinson     |
| D. S. Griffin                     |                  |

**Subgroup on Ferrous Specifications (BPV II)**

|                                |                                      |
|--------------------------------|--------------------------------------|
| K. M. Hottle, <i>Chair</i>     | Y.-J. Kim                            |
| A. Appleton, <i>Vice Chair</i> | W. C. Mack                           |
| C. Hyde, <i>Secretary</i>      | J. Nickel                            |
| D. Amire-Brahimi               | D. Poweleit                          |
| G. Cuccio                      | R. Rezaeifar                         |
| O. Elkadim                     | R. Schmidt                           |
| D. Fialkowski                  | E. Uptis                             |
| J. Grimm                       | L. Watzke                            |
| J. F. Grubb                    | C. Meloy, <i>Contributing Member</i> |
| D. S. Janikowski               |                                      |

**Subgroup on International Material Specifications (BPV II)**

|                                |                                           |
|--------------------------------|-------------------------------------------|
| P. Chavdarov, <i>Chair</i>     | D. O. Henry                               |
| M. Ishikawa, <i>Vice Chair</i> | W. M. Lundy                               |
| C. Zhou, <i>Secretary</i>      | F. Zeller                                 |
| A. Chaudouet                   | T. F. Miskell, <i>Contributing Member</i> |
| H. Chen                        | E. Uptis, <i>Contributing Member</i>      |
| A. F. Garbolevsky              |                                           |

**Subgroup on Nonferrous Alloys (BPV II)**

|                                 |                                          |
|---------------------------------|------------------------------------------|
| J. Robertson, <i>Chair</i>      | R. Rezaeifar                             |
| W. MacDonald, <i>Vice Chair</i> | E. Shapiro                               |
| R. M. Beldyk                    | J. Shubilla                              |
| J. M. Downs                     | R. C. Sutherland                         |
| H. Dutta                        | R. Wright                                |
| J. F. Grubb                     | S. Yem                                   |
| J. A. Hall                      | D. B. Denis, <i>Contributing Member</i>  |
| D. Maitra                       | D. T. Peters, <i>Contributing Member</i> |
| D. W. Rahoi                     |                                          |

**Subgroup on Physical Properties (BPV II)**

|                               |                                         |
|-------------------------------|-----------------------------------------|
| P. K. Rai, <i>Chair</i>       | P. K. Lam                               |
| S. Neilsen, <i>Vice Chair</i> | D. W. Rahoi                             |
| D. Chandiramani               | E. Shapiro                              |
| H. Eshraghi                   | D. K. Verma                             |
| J. F. Grubb                   | S. Yem                                  |
| B. F. Hantz                   | D. B. Denis, <i>Contributing Member</i> |
| R. D. Jones                   |                                         |

**Subgroup on Strength, Ferrous Alloys (BPV II)**

|                                |                                    |
|--------------------------------|------------------------------------|
| M. Ortolani, <i>Chair</i>      | F. Masuyama                        |
| S. Rosinski, <i>Vice Chair</i> | M. Osterfoss                       |
| L. S. Nicol, <i>Secretary</i>  | D. W. Rahoi                        |
| G. W. Galanes                  | M. Ueyama                          |
| J. A. Hall                     | F. Zeller                          |
| M. Ishikawa                    | F. Abe, <i>Contributing Member</i> |
| S. W. Knowles                  |                                    |



**Subgroup on Strength of Weldments (BPV II & BPV IX)**

|                                  |                                           |
|----------------------------------|-------------------------------------------|
| K. L. Hayes, <i>Chair</i>        | W. F. Newell, Jr.                         |
| G. W. Galanes, <i>Vice Chair</i> | J. A. Penso                               |
| S. H. Bowes, <i>Secretary</i>    | D. W. Rahoi                               |
| K. K. Coleman, <i>Chair</i>      | W. J. Sperko                              |
| M. Denault                       | J. P. Swezy, Jr.                          |
| D. W. Gandy                      | B. W. Roberts, <i>Contributing Member</i> |
| M. Ghahremani                    |                                           |

**China International Working Group (BPV II)**

|                             |                 |
|-----------------------------|-----------------|
| Sanjiang Liu, <i>Chair</i>  | C. Wang         |
| H. Zhang, <i>Vice Chair</i> | Jinguang Wang   |
| T. Xu, <i>Secretary</i>     | Jiongxiang Wang |
| W. Cai                      | Q.-J. Wang      |
| W. Fang                     | H.-C. Yang      |
| F. Kong                     | J. Yang         |
| H. Li                       | L. Yin          |
| J. Li                       | X.-H. Zhang     |
| Z. Rongcan                  | Y. Zhang        |
| S. Tan                      |                 |

**Working Group on Creep Strength Enhanced Ferritic Steels (BPV II)**

|                                  |                                           |
|----------------------------------|-------------------------------------------|
| M. Ortolani, <i>Chair</i>        | J. J. Sanchez-Hanton                      |
| G. W. Galanes, <i>Vice Chair</i> | J. A. Siefert                             |
| P. Becker, <i>Secretary</i>      | W. J. Sperko                              |
| S. H. Bowes                      | F. Zeller                                 |
| K. Kimura                        | F. Abe, <i>Contributing Member</i>        |
| M. Lang                          | K. K. Coleman, <i>Contributing Member</i> |
| S. Luke                          | J. M. Tanzosh, <i>Contributing Member</i> |
| F. Masuyama                      |                                           |
| T. Melfi                         |                                           |
| W. F. Newell, Jr.                |                                           |

**Working Group on Data Analysis and the Materials Properties Database (BPV II)**

|                                         |                                           |
|-----------------------------------------|-------------------------------------------|
| W. MacDonald, <i>Chair</i>              | D. Andrei, <i>Contributing Member</i>     |
| C. E. Rodrigues, <i>Staff Secretary</i> | J. Cameron, <i>Contributing Member</i>    |
| J. F. Grubb                             | G. W. Galanes, <i>Contributing Member</i> |
| F. Masuyama                             | W. C. Mack, <i>Contributing Member</i>    |
| S. Neilsen                              | D. T. Peters, <i>Contributing Member</i>  |
| M. Ortolani                             | W. Ren, <i>Contributing Member</i>        |
| R. C. Sutherlin                         | E. Shapiro, <i>Contributing Member</i>    |
| M. J. Swindeman                         |                                           |
| F. Abe, <i>Contributing Member</i>      |                                           |

**Task Group on Modernization of Materials Data (BPV II)**

|                                         |                                          |
|-----------------------------------------|------------------------------------------|
| C. E. Rodrigues, <i>Staff Secretary</i> | S. Neilsen                               |
| E. Alexis                               | L. S. Nicol                              |
| M. Brijlani                             | W. Ren                                   |
| D. B. Denis                             | J. C. Sowinski                           |
| G. W. Galanes                           | M. Wadkinson                             |
| J. A. Hall                              | J. Cameron, <i>Contributing Member</i>   |
| B. F. Hantz                             | J. F. Grubb, <i>Contributing Member</i>  |
| A. Hassan                               | W. Hoffelner, <i>Contributing Member</i> |
| W. MacDonald                            |                                          |

**COMMITTEE ON CONSTRUCTION OF NUCLEAR FACILITY COMPONENTS (BPV III)**

|                                      |                                         |
|--------------------------------------|-----------------------------------------|
| R. B. Keating, <i>Chair</i>          | K. Matsunaga                            |
| T. M. Adams, <i>Vice Chair</i>       | B. McGlone                              |
| D. E. Matthews, <i>Vice Chair</i>    | S. McKillop                             |
| A. Maslowski, <i>Staff Secretary</i> | J. B. McLean                            |
| A. Appleton                          | J. C. Minichiello                       |
| S. Asada                             | M. N. Mitchell                          |
| R. W. Barnes                         | T. Nagata                               |
| W. H. Borter                         | J. B. Ossmann                           |
| M. E. Cohen                          | S. Pellet                               |
| R. P. Deubler                        | E. L. Pleins                            |
| P. R. Donavin                        | W. J. Sperko                            |
| A. C. Eberhardt                      | Y. J. Wang                              |
| J. V. Gardiner                       | W. Windes                               |
| W. J. Geringer                       | C. Basavaraju, <i>Alternate</i>         |
| J. Grimm                             | T. P. Davis, <i>Contributing Member</i> |
| S. Hunter                            | T.-L. Sham, <i>Contributing Member</i>  |
| R. J. Jetter                         | C. T. Smith, <i>Contributing Member</i> |
| J. I. Kim                            | R. M. Jessee, <i>Honorary Member</i>    |
| G. H. Koo                            | E. B. Branch, <i>Honorary Member</i>    |
| D. W. Lewis                          | M. N. Bressler, <i>Honorary Member</i>  |
| M. A. Lockwood                       | G. D. Cooper, <i>Honorary Member</i>    |
| D. W. Mann                           | D. F. Landers, <i>Honorary Member</i>   |
| K. A. Manoly                         | C. Pieper, <i>Honorary Member</i>       |

**Executive Committee (BPV III)**

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|--------------------------------|----------------------------------|
| R. B. Keating, <i>Chair</i>    | K. A. Manoly                     |
| A. Maslowski, <i>Secretary</i> | D. E. Matthews                   |
| T. M. Adams                    | B. McGlone                       |
| T. P. Davis                    | S. McKillop                      |
| P. R. Donavin                  | J. B. McLean                     |
| D. W. Lewis                    | Yanli Wang                       |
| D. Mann                        | K. A. Kavanagh, <i>Alternate</i> |

**Latin America International Working Group (BPV III)**

|                                     |                  |
|-------------------------------------|------------------|
| M. F. Liendo, <i>Chair</i>          | A. J. Dall'Osto  |
| J. Fernández, <i>Vice Chair</i>     | J. I. Duo        |
| O. Martinez, <i>Staff Secretary</i> | M. M. Gamizo     |
| P. Yamamoto, <i>Secretary</i>       | I. M. Guerreiro  |
| E. H. Aldaz                         | I. A. Knorr      |
| G. O. Anteri                        | D. E. Matthews   |
| A. P. Antipasti                     | A. E. Pastor     |
| D. O. Bordato                       | M. Rivero        |
| G. Bourguigne                       | R. Taboada       |
| M. Brusa                            | O. A. Verastegui |
| A. Claus                            | M. D. Vigliano   |
| R. G. Cocco                         | M. Zunino        |

**China International Working Group (BPV III)**

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| Yong Wang, <i>Chair</i>     | C. Peiyin   |
| J. Gu, <i>Vice Chair</i>    | Z. Sun      |
| C. Jiang, <i>Vice Chair</i> | G. Tang     |
| H. Yu, <i>Secretary</i>     | L. Ting     |
| L. Feng                     | J. Wen      |
| L. Guo                      | F. Wu       |
| D. Kang                     | C. Yang     |
| Y. Li                       | P. Yang     |
| H. Lin                      | W. Yang     |
| Shenghua Liu                | H. Yin      |
| W. Liu                      | D. Yuangang |
| J. Ma                       | D. Zhao     |
| K. Mao                      | Z. Zhong    |
| D. E. Matthews              | Q. Zhou     |
| J. Ming                     | H. Zhu      |
| W. Pei                      |             |

**Korea International Working Group (BPV III)**

|                             |              |
|-----------------------------|--------------|
| G. H. Koo, <i>Chair</i>     | B. Lee       |
| O.-S. Kim, <i>Secretary</i> | D. Lee       |
| H. Ahn                      | D. W. Lee    |
| S. Cho                      | Sanghoon Lee |
| G.-S. Choi                  | Sungjae Lee  |
| M. Choi                     | S.-G. Lee    |
| M.-J. Choi                  | H. Lim       |
| S. Choi                     | I.-K. Nam    |
| J. Y. Hong                  | C.-K. Oh     |
| N.-S. Huh                   | C.-Y. Oh     |
| S. S. Hwang                 | E.-J. Oh     |
| C. Jang                     | C. Park      |
| I.-S. Jeong                 | H. Park      |
| S. H. Kang                  | Y.-H. Park   |
| J. Kim                      | Y. S. Pyun   |
| J. I. Kim                   | J. H. Seo    |
| J.-S. Kim                   | T. Shin      |
| M.-W. Kim                   | S. Song      |
| S.-S. Kim                   | T.-K. Song   |
| Y.-B. Kim                   | W. J. Sperko |
| Y.-S. Kim                   | J. S. Yang   |
| D. Kwon                     | O. Yoo       |

**European International Working Group (BPV III)**

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|--------------------------------|---------------|
| J. Wendt, <i>Chair</i>         | F. Juettemann |
| D. Koelbl, <i>Vice Chair</i>   | M. H. Koeppen |
| R. Gersinska, <i>Secretary</i> | C. Kuschke    |
| P. Ancion                      | H.-W. Lange   |
| P. R. Donavin                  | T. Ludwig     |
| R. Döring                      | M. Reichert   |
| C. G. Frantescu                | G. Roos       |
| T. Hantzka                     | J. Rudolph    |
| A. Huber                       | L. Sybertz    |
| R. E. Hueggenberg              | I. Tewes      |
| E. Iacopetta                   | R. Tiete      |
| A. Juengert                    | F. Wille      |

**Seismic Design Steering Committee (BPV III)**

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|----------------------------|-------------------------------------------|
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| K. Gresh, <i>Secretary</i> | M. Pérès                                  |
| C. Basavaraju              | K. Shibukuwa                              |
| D. Chowdhury               | F. G. Abatt, <i>Contributing Member</i>   |
| R. Döring                  | M. Arcaro, <i>Contributing Member</i>     |
| G. H. Koo                  | P. R. Donavin, <i>Contributing Member</i> |
| A. Maekawa                 |                                           |
| J. B. McLean               | R. W. Haupt, <i>Contributing Member</i>   |

**Task Group on Alternate Requirements (BPV III)**

|                                |                               |
|--------------------------------|-------------------------------|
| J. Wen, <i>Chair</i>           | K. A. Manoly                  |
| R. R. Romano, <i>Secretary</i> | D. E. Matthews                |
| T. Basso                       | S. McKillop                   |
| P. J. Coco                     | B. P. Nolan                   |
| P. R. Donavin                  | J. B. Ossmann                 |
| J. V. Gardiner                 | E. C. Renaud                  |
| F. Grant                       | M. A. Richter                 |
| J. Grimm                       | R. Summitt                    |
| R. S. Hill III                 | K. Voelsing                   |
| M. Kris                        | Yanli Wang                    |
| M. A. Lockwood                 | I. H. Tseng, <i>Alternate</i> |

**India International Working Group (BPV III)**

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| S. B. Parkash, <i>Chair</i>   | T. Mukherjee                |
| V. Sehgal, <i>Vice Chair</i>  | D. Narain                   |
| M. Brijlani, <i>Secretary</i> | A. D. Paranjpe              |
| S. Aithal                     | J. R. Patel                 |
| A. D. Bagdare                 | E. L. Pleins                |
| H. Dalal                      | S. Ponnappan                |
| S. K. Goyal                   | T. J. P. Rao                |
| D. Kulkarni                   | S. Singh                    |
| Raj Kumar                     | B. K. Sreedhar              |
| Ritesh Kumar                  | N. Mistry, <i>Alternate</i> |
| S. Kumar                      |                             |

**United Kingdom International Working Group (BPV III)**

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| P. M. James, <i>Chair</i>         | S. A. Jones                            |
| J. Emslie, <i>Vice Chair</i>      | B. McGlone                             |
| C. B. Carpenter, <i>Secretary</i> | B. Pellereau                           |
| T. Bann                           | E. I. S. Pendry                        |
| M. J. Chevalier                   | J. Randles                             |
| A. J. Cole-Baker                  | C. R. Schneider                        |
| M. Consonni                       | J. W. Stairmand                        |
| M. J. Crathorne                   | J. Sulley                              |
| P. Gill                           | J. Talamantes-Silva                    |
| G. Innes                          | A. J. Holt, <i>Contributing Member</i> |

**Special Working Group on New Plant Construction Issues (BPV III)**

|                                      |                                               |
|--------------------------------------|-----------------------------------------------|
| J. B. Ossmann, <i>Chair</i>          | Z. McLucas                                    |
| A. Maslowski, <i>Staff Secretary</i> | N. J. McTiernan                               |
| M. C. Buckley, <i>Secretary</i>      | K. Pigg                                       |
| M. Arcaro                            | E. L. Pleins                                  |
| K. Burnett                           | J. Pollak                                     |
| A. Cardillo                          | D. W. Sandusky                                |
| P. J. Coco                           | M. C. Scott                                   |
| K. Harris                            | R. R. Stevenson                               |
| E. Henry                             | H. Xu                                         |
| J. Honcharik                         | J. Yan                                        |
| M. Kris                              | J. C. Minichiello, <i>Contributing Member</i> |
| R. E. McLaughlin                     |                                               |
| A. McLendon                          |                                               |

**Special Working Group on Editing and Review (BPV III)**

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| D. E. Matthews, <i>Chair</i> | J. C. Minichiello |
| R. P. Deubler                | J. F. Strunk      |
| A. C. Eberhardt              | Yanli Wang        |
| S. Hunter                    | C. Wilson         |
| B. McGlone                   |                   |

**Special Working Group on HDPE Stakeholders (BPV III)**

|                                |                  |
|--------------------------------|------------------|
| S. Patterson, <i>Secretary</i> | J. E. O'Sullivan |
| M. Kuntz                       |                  |

**Special Working Group on Honors and Awards (BPV III)**

|                            |                   |
|----------------------------|-------------------|
| R. W. Barnes, <i>Chair</i> | D. E. Matthews    |
| A. Appleton                | J. C. Minichiello |
| R. M. Jessee               |                   |

**Special Working Group on International Meetings and IWG Liaisons (BPV III)**

|                                      |               |
|--------------------------------------|---------------|
| D. E. Matthews, <i>Chair</i>         | P. R. Donavin |
| A. Maslowski, <i>Staff Secretary</i> | E. L. Pleins  |
| R. W. Barnes                         | W. J. Sperko  |

**Joint ACI-ASME Committee on Concrete Components for Nuclear Service (BPV III)**

|                                     |                                           |
|-------------------------------------|-------------------------------------------|
| J. B. McLean, <i>Chair</i>          | J. S. Saini                               |
| L. J. Colarusso, <i>Vice Chair</i>  | J. F. Strunk                              |
| A. Dinizulu, <i>Staff Secretary</i> | G. Thomas                                 |
| S. Bae                              | A. Varma                                  |
| C. J. Bang                          | S. Wang                                   |
| A. C. Eberhardt                     | A. Istar, <i>Alternate</i>                |
| B. D. Hovis                         | A. Adediran, <i>Contributing Member</i>   |
| T. C. Inman                         | J.-B. Domage, <i>Contributing Member</i>  |
| C. Jones                            | P. S. Ghosal, <i>Contributing Member</i>  |
| T. Kang                             | M. R. Senecal, <i>Contributing Member</i> |
| N.-H. Lee                           | Z. Shang, <i>Contributing Member</i>      |
| S. Malushte                         | M. Sircar, <i>Contributing Member</i>     |
| J. A. Munshi                        | C. T. Smith, <i>Contributing Member</i>   |
| T. Muraki                           |                                           |

**Special Working Group on Modernization (SG Div 2) (BPV III)**

|                                 |                                         |
|---------------------------------|-----------------------------------------|
| A. Varma, <i>Chair</i>          | S. Wang                                 |
| J. B. McLean, <i>Vice Chair</i> | I. Zivanovic                            |
| J. S. Saini, <i>Vice Chair</i>  | R. Janowiak, <i>Contributing Member</i> |
| A. Adediran                     | F. Lin, <i>Contributing Member</i>      |
| S. Malushte                     | J. A. Pires, <i>Contributing Member</i> |

**Task Group on Steel-Concrete Composite Containments (SG Div 2) (BPV III)**

|                        |              |
|------------------------|--------------|
| A. Varma, <i>Chair</i> | J. B. McLean |
| R. Janowiak            | J. A. Pires  |
| S. Malushte            | J. S. Saini  |

**Working Group on Design (SG Div 2) (BPV III)**

|                         |                                                 |
|-------------------------|-------------------------------------------------|
| N.-H. Lee, <i>Chair</i> | S. Wang                                         |
| S. Bae                  | A. Istar, <i>Alternate</i>                      |
| L. J. Colarusso         | P. S. Ghosal, <i>Contributing Member</i>        |
| A. C. Eberhardt         | S.-Y. Kim, <i>Contributing Member</i>           |
| B. D. Hovis             | J. Kwon, <i>Contributing Member</i>             |
| T. C. Inman             | S. E. Ohler-Schmitz, <i>Contributing Member</i> |
| C. Jones                | B. B. Scott, <i>Contributing Member</i>         |
| J. A. Munshi            | Z. Shang, <i>Contributing Member</i>            |
| T. Muraki               | M. Shin, <i>Contributing Member</i>             |
| J. S. Saini             | M. Sircar, <i>Contributing Member</i>           |
| G. Thomas               |                                                 |

**Working Group on Materials, Fabrication, and Examination (SG Div 2) (BPV III)**

|                                 |                                             |
|---------------------------------|---------------------------------------------|
| C. Jones, <i>Chair</i>          | Z. Shang                                    |
| A. Eberhardt, <i>Vice Chair</i> | J. F. Strunk                                |
| C. J. Bang                      | I. Zivanovic                                |
| B. Birch                        | A. A. Aboelmagd, <i>Contributing Member</i> |
| J.-B. Domage                    | P. S. Ghosal, <i>Contributing Member</i>    |
| T. Kang                         |                                             |
| N.-H. Lee                       |                                             |

**Subcommittee on Design (BPV III)**

|                                 |                                                  |
|---------------------------------|--------------------------------------------------|
| P. R. Donavin, <i>Chair</i>     | M. N. Mitchell                                   |
| S. McKillop, <i>Vice Chair</i>  | B. Pellereau                                     |
| R. P. Deubler, <i>Secretary</i> | Yanli Wang                                       |
| T. P. Davis                     | W. F. Weitz                                      |
| M. A. Gray                      | C. Basavaraju, <i>Alternate</i>                  |
| R. I. Jetter                    | G. L. Hollinger, <i>Contributing Member</i>      |
| R. B. Keating                   | W. J. O'Donnell, Sr., <i>Contributing Member</i> |
| J. I. Kim                       | K. Wright, <i>Contributing Member</i>            |
| K. A. Manoly                    |                                                  |
| D. E. Matthews                  |                                                  |

**Subgroup on Component Design (SC-D) (BPV III)**

|                                |                                             |
|--------------------------------|---------------------------------------------|
| D. E. Matthews, <i>Chair</i>   | J. C. Minichiello                           |
| P. Vock, <i>Vice Chair</i>     | T. Mitsuhashi                               |
| D. Chowdhury, <i>Secretary</i> | D. Murphy                                   |
| D. J. Ammerman                 | T. M. Musto                                 |
| G. A. Antaki                   | T. Nagata                                   |
| J. J. Arthur                   | S. Pellet                                   |
| S. Asada                       | S. Willoughby-Braun                         |
| C. Basavaraju                  | C. Wilson                                   |
| N. A. Costanzo                 | T. M. Adams, <i>Contributing Member</i>     |
| R. P. Deubler                  | R. B. Keating, <i>Contributing Member</i>   |
| P. Hirschberg                  | O.-S. Kim, <i>Contributing Member</i>       |
| M. Kassir                      | R. J. Masterson, <i>Contributing Member</i> |
| D. Keck                        | H. S. Mehta, <i>Contributing Member</i>     |
| T. R. Liszkai                  | G. Z. Tokarski, <i>Contributing Member</i>  |
| K. A. Manoly                   | J. P. Tucker, <i>Contributing Member</i>    |
| R. Martin                      |                                             |
| K. R. May                      |                                             |

**Task Group on Pressurized Heavy Water Reactor (SG-CD) (BPV III)**

|                            |                 |
|----------------------------|-----------------|
| R. W. Barnes, <i>Chair</i> | E. L. Pleins    |
| M. Brijlani                | W. D. Reinhardt |
| D. E. Matthews             | C. A. Sanna     |
| B. McGlone                 | V. Sehgal       |
| J. B. Ossmann              | S. Singh        |
| S. B. Parkash              |                 |

**Task Group to Improve Section III/XI Interface (SG-CD) (BPV III)**

|                            |                     |
|----------------------------|---------------------|
| P. Vock, <i>Chair</i>      | C. A. Nove          |
| E. Henry, <i>Secretary</i> | T. Nuoffer          |
| G. A. Antaki               | J. B. Ossmann       |
| A. Cardillo                | A. T. Roberts III   |
| D. Chowdhury               | J. Sciulli          |
| J. Honcharik               | A. Udyawar          |
| J. Hurst                   | S. Willoughby-Braun |
| J. Lambin                  |                     |

**Working Group on Core Support Structures (SG-CD) (BPV III)**

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| R. Martin, <i>Chair</i>         | M. D. Snyder                            |
| R. Z. Ziegler, <i>Secretary</i> | R. O. Vollmer                           |
| G. W. Delpont                   | T. M. Wiger                             |
| L. C. Hartless                  | C. Wilson                               |
| D. Keck                         | Y. Wong                                 |
| T. R. Liszkai                   | K. Hsu, <i>Alternate</i>                |
| M. Nakajima                     | H. S. Mehta, <i>Contributing Member</i> |

**Working Group on Design of Division 3 Containment Systems (SG-CD) (BPV III)**

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| D. J. Ammerman, <i>Chair</i> | D. Siromani                                   |
| S. Klein, <i>Secretary</i>   | C. R. Sydnor                                  |
| J. Bignell                   | R. Sypulski                                   |
| G. Bjorkman                  | R. Williamson                                 |
| V. Broz                      | X. Zhai                                       |
| D. D. Imholte                | X. Zhang                                      |
| D. W. Lewis                  | J. Smith, <i>Alternate</i>                    |
| A. Rigato                    | J. C. Minichiello, <i>Contributing Member</i> |
| P. Sakalaukus, Jr.           |                                               |

**Working Group on HDPE Design of Components (SG-CD) (BPV III)**

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| M. Brandes      | K. A. Manoly             |
| J. R. Hebeisen  | D. P. Munson             |
| P. Krishnaswamy | R. Stakenborghs          |
| M. Kuntz        | B. Lin, <i>Alternate</i> |

**Working Group on Piping (SG-CD) (BPV III)**

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| G. A. Antaki, <i>Chair</i>    | W. F. Weitze                                  |
| S. Weindorf, <i>Secretary</i> | K. Hsu, <i>Alternate</i>                      |
| C. Basavaraju                 | R. B. Keating, <i>Contributing Member</i>     |
| J. Catalano                   | T. B. Littleton, <i>Contributing Member</i>   |
| C. M. Faidy                   | Y. Liu, <i>Contributing Member</i>            |
| R. G. Gilada                  | J. F. McCabe, <i>Contributing Member</i>      |
| M. A. Gray                    | J. C. Minichiello, <i>Contributing Member</i> |
| R. J. Gurdal                  | A. N. Nguyen, <i>Contributing Member</i>      |
| R. W. Haupt                   | M. S. Sills, <i>Contributing Member</i>       |
| A. Hirano                     | N. C. Sutherland, <i>Contributing Member</i>  |
| P. Hirschberg                 | G. Z. Tokarski, <i>Contributing Member</i>    |
| M. Kassir                     | E. A. Wais, <i>Contributing Member</i>        |
| D. Lieb                       | C.-I. Wu, <i>Contributing Member</i>          |
| M. Moenssens                  |                                               |
| I.-K. Nam                     |                                               |
| K. E. Reid II                 |                                               |
| B. Still                      |                                               |
| D. Vlaicu                     |                                               |

**Working Group on Pressure Relief (SG-CD) (BPV III)**

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| J. F. Ball, <i>Vice Chair</i>    | Y. Wong, <i>Alternate</i>                 |
| R. Krithivasan, <i>Secretary</i> | J. Yu, <i>Alternate</i>                   |
| J. W. Dickson                    | M. Brown, <i>Contributing Member</i>      |
| N. Hansing                       | S. T. French, <i>Contributing Member</i>  |
| S. Jones                         | S. Ruesenberg, <i>Contributing Member</i> |
| D. Miller                        |                                           |
| T. Patel                         |                                           |

**Working Group on Pumps (SG-CD) (BPV III)**

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| D. Chowdhury, <i>Chair</i>         | K. J. Noel                    |
| J. V. Gregg, Jr., <i>Secretary</i> | D. Skidmore                   |
| B. Busse                           | J. Sulley                     |
| R. Ibrahim                         | Y. Wong                       |
| T. Johnson                         | N. Chandran, <i>Alternate</i> |

**Working Group on Supports (SG-CD) (BPV III)**

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| N. A. Costanzo, <i>Chair</i>          | G. Z. Tokarski                              |
| U. S. Bandyopadhyay, <i>Secretary</i> | L. Vandersip                                |
| K. Avrithi                            | P. Wiseman                                  |
| N. M. Bisceglia                       | J. Bozga, <i>Alternate</i>                  |
| R. P. Deubler                         | R. J. Masterson, <i>Contributing Member</i> |
| N. M. Graham                          | R. Roche-Rivera, <i>Contributing Member</i> |
| Y. Matsubara                          | J. R. Stinson, <i>Contributing Member</i>   |
| S. Pellet                             |                                             |
| G. Thomas                             |                                             |

**Working Group on Valves (SG-CD) (BPV III)**

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| S. Jones, <i>Secretary</i> | H. O'Brien                |
| M. C. Buckley              | J. O'Callaghan            |
| N. Hansing                 | M. Rain                   |
| G. A. Jolly                | K. E. Reid II             |
| J. Lambin                  | J. Sulley                 |
| T. Lippucci                | Y. Wong, <i>Alternate</i> |

**Working Group on Vessels (SG-CD) (BPV III)**

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| D. Murphy, <i>Chair</i>               | M. C. Scott                               |
| S. Willoughby-Braun, <i>Secretary</i> | J. Shupert                                |
| J. J. Arthur                          | D. Vlaicu                                 |
| C. Basavaraju                         | C. Wilson                                 |
| M. Brijlani                           | R. Z. Ziegler                             |
| L. Constantinescu                     | M. R. Breach, <i>Alternate</i>            |
| J. I. Kim                             | B. Basu, <i>Contributing Member</i>       |
| D. E. Matthews                        | R. B. Keating, <i>Contributing Member</i> |
| T. Mitsuhashi                         | W. F. Weitze, <i>Contributing Member</i>  |
| T. J. Schrieffer                      |                                           |

**Subgroup on Design Methods (SC-D) (BPV III)**

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| P. R. Donavin, <i>Vice Chair</i> | P. Smith                                         |
| J. Wen, <i>Secretary</i>         | R. O. Vollmer                                    |
| K. Avrithi                       | W. F. Weitze                                     |
| M. A. Gray                       | Y. Wong, <i>Alternate</i>                        |
| J. V. Gregg, Jr.                 | S. R. Gosselin, <i>Contributing Member</i>       |
| K. Hsu                           | H. T. Harrison III, <i>Contributing Member</i>   |
| E. Isom                          | W. J. O'Donnell, Sr., <i>Contributing Member</i> |
| R. Kalnas                        | K. Wright, <i>Contributing Member</i>            |
| D. Keck                          |                                                  |
| J. I. Kim                        |                                                  |
| B. Pellereau                     |                                                  |

**Special Working Group on Computational Modeling for Explicit Dynamics (SG-DM) (BPV III)**

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| G. Bjorkman, <i>Chair</i>         | P. Sakalaukus, Jr.                       |
| D. J. Ammerman, <i>Vice Chair</i> | D. Siromani                              |
| V. Broz, <i>Secretary</i>         | C.-F. Tso                                |
| J. Bignell                        | M. C. Yaksh                              |
| S. Kuehner                        | U. Zencker                               |
| D. Molitoris                      | X. Zhang                                 |
| W. D. Reinhardt                   | M. R. Breach, <i>Contributing Member</i> |
| E. Rosvall                        | Y. Wong, <i>Contributing Member</i>      |

**Working Group on Design Methodology (SG-DM) (BPV III)**

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| B. Pellereau, <i>Chair</i>      | W. F. Weitze                                   |
| R. O. Vollmer, <i>Secretary</i> | J. Wen                                         |
| K. Avrithi                      | T. M. Wiger                                    |
| C. Basavaraju                   | J. Wu                                          |
| F. Berkepile                    | K. Hsu, <i>Alternate</i>                       |
| M. Cho                          | G. Banyay, <i>Contributing Member</i>          |
| D. Clarkson                     | D. S. Bartran, <i>Contributing Member</i>      |
| C. M. Faigy                     | R. D. Blevins, <i>Contributing Member</i>      |
| Y.-J. Gao                       | M. R. Breach, <i>Contributing Member</i>       |
| M. Kassir                       | H. T. Harrison III, <i>Contributing Member</i> |
| J. I. Kim                       | P. Hirschberg, <i>Contributing Member</i>      |
| T. R. Liszkai                   | S. McKillop, <i>Contributing Member</i>        |
| D. Lytle                        | A. Walker, <i>Contributing Member</i>          |
| K. Matsunaga                    | K. Wright, <i>Contributing Member</i>          |
| S. Ranganath                    |                                                |
| W. D. Reinhardt                 |                                                |
| S. Wang                         |                                                |

**Working Group on Environmental Fatigue Evaluation Methods (SG-DM) (BPV III)**

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| M. A. Gray, <i>Chair</i>       | B. Pellereau                               |
| W. F. Weitze, <i>Secretary</i> | T. Seppanen                                |
| S. Asada                       | D. Vlaicu                                  |
| K. Avrithi                     | K. Wang                                    |
| R. C. Cipolla                  | K. A. Manoly, <i>Alternate</i>             |
| T. M. Damiani                  | S. Cuvilliez, <i>Contributing Member</i>   |
| C. M. Faigy                    | T. D. Gilman, <i>Contributing Member</i>   |
| A. Hirano                      | S. R. Gosselin, <i>Contributing Member</i> |
| P. Hirschberg                  | Y. He, <i>Contributing Member</i>          |
| K. Hsu                         | H. S. Mehta, <i>Contributing Member</i>    |
| A. Morley                      | K. Wright, <i>Contributing Member</i>      |
| J.-S. Park                     |                                            |

**Working Group on Fatigue Strength (SG-DM) (BPV III)**

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| T. M. Damiani               | C. E. Hinnant, <i>Contributing Member</i>        |
| D. W. DeJohn                | P. Hirschberg, <i>Contributing Member</i>        |
| C. M. Faigy                 | S. H. Kleinsmith, <i>Contributing Member</i>     |
| P. Gill                     | S. Majumdar, <i>Contributing Member</i>          |
| R. J. Gurdal                | H. S. Mehta, <i>Contributing Member</i>          |
| K. Hsu                      | W. J. O'Donnell, Sr., <i>Contributing Member</i> |
| J. I. Kim                   | S. Ranganath, <i>Contributing Member</i>         |
| A. Morley                   | K. Wright, <i>Contributing Member</i>            |
| B. Pellereau                |                                                  |
| M. S. Shelton               |                                                  |
| I. Viscarra                 |                                                  |
| Yanli Wang                  |                                                  |
| W. F. Weitze                |                                                  |

**Working Group on Probabilistic Methods in Design (SG-DM) (BPV III)**

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| M. Golliet, <i>Chair</i>     | K. A. Manoly                               |
| R. Kalnas, <i>Vice Chair</i> | A. Morley                                  |
| G. Brouette                  | B. Pellereau                               |
| R. Fougereusse               | A. Weaver                                  |
| J. Hakii                     | M. Yagodich                                |
| E. Hanson                    | I. H. Tseng, <i>Alternate</i>              |
| D. O. Henry                  | K. Avrithi, <i>Contributing Member</i>     |
| A. Hirano                    | R. S. Hill III, <i>Contributing Member</i> |



**Subgroup on Containment Systems for Spent Nuclear Fuel and High-Level Radioactive Material (BPV III)**

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| D. J. Ammerman, <i>Vice Chair</i> | R. Sypulski                               |
| S. Klein, <i>Secretary</i>        | J. Wellwood                               |
| J. Bignell                        | X. J. Zhai                                |
| G. Bjorkman                       | X. Zhang                                  |
| V. Broz                           | J. Smith, <i>Alternate</i>                |
| D. D. Imholte                     | W. H. Borter, <i>Contributing Member</i>  |
| A. Rigato                         | E. L. Pleins, <i>Contributing Member</i>  |
| P. Sakalaukus, Jr.                | N. M. Simpson, <i>Contributing Member</i> |
| D. Siromani                       |                                           |

**Subgroup on Fusion Energy Devices (BPV III)**

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| T. P. Davis, <i>Chair</i>            | I. Kimihiro                                   |
| A. Maslowski, <i>Staff Secretary</i> | P. Mokaria                                    |
| M. Ellis, <i>Secretary</i>           | F. J. Schaaf, Jr.                             |
| L. Babu                              | P. Smith                                      |
| M. Bashir                            | Y. Song                                       |
| J. P. Blanchard                      | D. White                                      |
| B. R. Doshi                          | R. W. Barnes, <i>Contributing Member</i>      |
| L. El-Guebaly                        | W. K. Sowder, Jr., <i>Contributing Member</i> |
| R. Holmes                            |                                               |
| D. Johnson                           |                                               |

**Special Working Group on Fusion Stakeholders (SG-FED) (BPV III)**

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|-------------------------|-------------------|
| R. Holmes, <i>Chair</i> | S. S. Desai       |
| C. Barnes               | F. Deschamps      |
| R. W. Barnes            | M. Hua            |
| J. Brister              | S. Krishnan       |
| A. A. Campbell          | W. K. Sowder, Jr. |
| V. Chugh                | N. Young          |
| T. P. Davis             |                   |

**Working Group on General Requirements (SG-FED) (BPV III)**

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| P. Smith, <i>Chair</i> | B. McGlone                           |
| L. Babu                | P. Mokaria                           |
| T. P. Davis            | W. K. Sowder, Jr.                    |
| M. Ellis               | D. White, <i>Contributing Member</i> |

**Working Group on In-Vessel Components (SG-FED) (BPV III)**

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| M. Bashir, <i>Chair</i> | S. T. Madabusi |
| T. P. Davis             |                |

**Working Group on Magnets (SG-FED) (BPV III)**

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| D. S. Bartran | W. K. Sowder, Jr., <i>Contributing Member</i> |
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**Working Group on Materials (SG-FED) (BPV III)**

T. P. Davis

**Working Group on Vacuum Vessels (SG-FED) (BPV III)**

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| I. Kimihiro, <i>Chair</i> | D. Johnson |
| B. R. Doshi               |            |

**Subgroup on General Requirements (BPV III)**

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| B. McGlone, <i>Chair</i>      | L. Noyes                                        |
| A. McLendon, <i>Secretary</i> | E. C. Renaud                                    |
| V. Apostolescu                | T. N. Rezk                                      |
| A. Appleton                   | J. Rogers                                       |
| S. Bell                       | B. S. Sandhu                                    |
| G. Brouette                   | R. Spuhl                                        |
| P. J. Coco                    | J. L. Williams                                  |
| G. C. Deleanu                 | Y. Diaz-Castillo, <i>Alternate</i>              |
| N. DeSantis                   | J. DeKleine, <i>Contributing Member</i>         |
| O. Elkadim                    | S. F. Harrison, Jr., <i>Contributing Member</i> |
| J. V. Gardiner                | H. Michael, <i>Contributing Member</i>          |
| J. Grimm                      | D. J. Roszman, <i>Contributing Member</i>       |
| J. Harris                     | C. T. Smith, <i>Contributing Member</i>         |
| J. W. Highlands               | G. E. Szabatura, <i>Contributing Member</i>     |
| E. V. Imbro                   |                                                 |
| K. A. Kavanagh                |                                                 |
| Y.-S. Kim                     |                                                 |
| D. T. Meisch                  |                                                 |

**Working Group on General Requirements for Graphite and Ceramic Composite Core Components and Assemblies (SG-GR) (BPV III)**

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|------------------------------|--------------------------|
| W. J. Geringer, <i>Chair</i> | M. N. Mitchell           |
| A. Appleton                  | J. Potgieter             |
| J. R. Berry                  | E. C. Renaud             |
| A. A. Campbell               | S. Sekar                 |
| C. Cruz                      | R. Spuhl                 |
| Y. Diaz-Castillo             | W. Windes                |
| J. Lang                      | B. Lin, <i>Alternate</i> |

**Subgroup on High Temperature Reactors (BPV III)**

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|--------------------------|-----------------------------------------------|
| Yanli Wang, <i>Chair</i> | X. Wei                                        |
| N. Broom                 | W. Windes                                     |
| F. W. Brust              | R. Wright                                     |
| M. E. Cohen              | G. L. Zeng                                    |
| W. J. Geringer           | J. Bass, <i>Alternate</i>                     |
| B. F. Hantz              | P. Carter, <i>Contributing Member</i>         |
| M. Hiser                 | W. O'Donnell, Sr., <i>Contributing Member</i> |
| R. I. Jetter             | T.-L. Sham                                    |
| K. Kimura                | L. Shi, <i>Contributing Member</i>            |
| G. H. Koo                | R. W. Swindeman, <i>Contributing Member</i>   |
| W. Li                    |                                               |
| M. C. Messner            |                                               |

**Special Working Group on High Temperature Reactor Stakeholders (SG-HTR) (BPV III)**

|                           |                                        |
|---------------------------|----------------------------------------|
| M. E. Cohen, <i>Chair</i> | R. I. Jetter                           |
| M. C. Albert              | G. H. Koo                              |
| M. Arcaro                 | N. J. McTiernan                        |
| R. W. Barnes              | M. N. Mitchell                         |
| R. Bass                   | K. J. Noel                             |
| N. Broom                  | J. Roll                                |
| K. Burnett                | B. Song                                |
| A. A. Campbell            | Yanli Wang                             |
| V. Chugh                  | X. Wei                                 |
| W. Corwin                 | G. L. Zeng                             |
| G. C. Deleanu             | R. M. Iyengar, <i>Alternate</i>        |
| R. A. Fleming             | T. Asayama, <i>Contributing Member</i> |
| K. Harris                 |                                        |

**Task Group on Alloy 709 Code Case (SG-HTR) (BPV III)**

|                              |                                        |
|------------------------------|----------------------------------------|
| Yanli Wang, <i>Chair</i>     | W. J. Sperko                           |
| H. Mahajan, <i>Secretary</i> | R. Wright                              |
| R. I. Jetter                 | T.-L. Sham, <i>Contributing Member</i> |
| M. C. Messner                |                                        |

**Working Group on Allowable Stress Criteria (SG-HTR) (BPV III)**

|                                |                                             |
|--------------------------------|---------------------------------------------|
| R. Wright, <i>Chair</i>        | M. C. Messner                               |
| M. McMurtrey, <i>Secretary</i> | T. Patterson                                |
| R. W. Barnes                   | Yanli Wang                                  |
| R. Bass                        | X. Wei                                      |
| K. Kimura                      | R. M. Iyengar, <i>Alternate</i>             |
| W. Li                          | R. W. Swindeman, <i>Contributing Member</i> |
| D. Maitra                      |                                             |
| R. J. McReynolds               |                                             |

**Task Group on Class A Rewrite (SG-HTR) (BPV III)**

|                          |                 |
|--------------------------|-----------------|
| Yanli Wang, <i>Chair</i> | N. J. McTiernan |
| R. W. Barnes             | M. C. Messner   |
| M. E. Cohen              | T. Nguyen       |
| R. I. Jetter             | D. Pease        |
| H. Mahajan               | X. Wei          |
| S. McKillop              | J. Young        |

**Working Group on Analysis Methods (SG-HTR) (BPV III)**

|                              |                                              |
|------------------------------|----------------------------------------------|
| M. C. Messner, <i>Chair</i>  | X. Song                                      |
| H. Mahajan, <i>Secretary</i> | Yanli Wang                                   |
| R. Adibi-Asl                 | X. Wei                                       |
| R. W. Barnes                 | S. X. Xu                                     |
| J. A. Blanco                 | J. Young                                     |
| P. Carter                    | J. Bass, <i>Alternate</i>                    |
| R. I. Jetter                 | M. R. Breach, <i>Contributing Member</i>     |
| G. H. Koo                    | Y.-J. Gao, <i>Contributing Member</i>        |
| T. Nguyen                    | T. Hassan, <i>Contributing Member</i>        |
| M. Petkov                    | S. Krishnamurthy, <i>Contributing Member</i> |
| K. Pigg                      | M. J. Swindeman, <i>Contributing Member</i>  |
| H. Qian                      |                                              |
| T. Riordan                   |                                              |

**Task Group on Division 5 AM Components (SG-HTR) (BPV III)**

|                         |                           |
|-------------------------|---------------------------|
| R. Wright, <i>Chair</i> | T. Patterson              |
| R. W. Barnes            | E. C. Renaud              |
| F. W. Brust             | D. Rudland                |
| Z. Feng                 | B. Sutton                 |
| S. Lawler               | I. J. Van Rooyen          |
| X. Lou                  | Yanli Wang                |
| M. McMurtrey            | X. Wei                    |
| M. C. Messner           | R. Bass, <i>Alternate</i> |

**Working Group on Creep-Fatigue and Negligible Creep (SG-HTR) (BPV III)**

|                     |                           |
|---------------------|---------------------------|
| W. Li, <i>Chair</i> | M. McMurtrey              |
| J. Bass             | M. C. Messner             |
| C. M. Brusconi      | H. Qian                   |
| P. Carter           | R. Rajasekaran            |
| M. E. Cohen         | M. Shah                   |
| J. I. Duo           | Yanli Wang                |
| R. I. Jetter        | X. Wei                    |
| G. H. Koo           | J. Young                  |
| H. Mahajan          | R. Bass, <i>Alternate</i> |

**Task Group on Graphite Design Analysis (SG-HTR) (BPV III)**

|                       |              |
|-----------------------|--------------|
| A. Mack, <i>Chair</i> | P.-A. Juan   |
| J. Bass               | J. Potgieter |
| S. Baylis             | J. Quick     |
| G. Beirnaert          | M. Saitta    |
| O. Booler             | A. Walker    |

**Working Group on Nonmetallic Design and Materials (SG-HTR) (BPV III)**

|                                   |                                           |
|-----------------------------------|-------------------------------------------|
| W. Windes, <i>Chair</i>           | J. Parks                                  |
| W. J. Geringer, <i>Vice Chair</i> | K. Pigg                                   |
| J. Potgieter, <i>Secretary</i>    | J. Podhiny                                |
| G. Beirnaert                      | J. Roll                                   |
| A. A. Campbell                    | A. Tzelepi                                |
| C. Chen                           | A. Walker                                 |
| A. N. Chereskin                   | Yanli Wang                                |
| V. Chugh                          | G. L. Zeng                                |
| C. Contescu                       | J. Bass, <i>Alternate</i>                 |
| N. Gallego                        | A. Appleton, <i>Contributing Member</i>   |
| S. T. Gonczy                      | R. W. Barnes, <i>Contributing Member</i>  |
| K. Harris                         | S.-H. Chi, <i>Contributing Member</i>     |
| M. G. Jenkins                     | Y. Katoh, <i>Contributing Member</i>      |
| P.-A. Juan                        | J. B. Ossmann, <i>Contributing Member</i> |
| J. Lang                           |                                           |
| A. Mack                           | J. Quick, <i>Contributing Member</i>      |
| M. P. Metcalfe                    | M. Saitta, <i>Contributing Member</i>     |
| M. N. Mitchell                    |                                           |

**Task Group on High Temperature Piping Design (SG-HTR) (BPV-III)**

|                               |                                        |
|-------------------------------|----------------------------------------|
| G. A. Antaki, <i>Chair</i>    | H. Mahajan                             |
| S. Weindorf, <i>Secretary</i> | J. C. Minichiello                      |
| R. Adibi-Asl                  | D. Pease                               |
| T. D. Al-Shawaf               | Yanli Wang                             |
| D. Bankston, Jr.              | C. D. Weary                            |
| R. P. Deubler                 | T.-L. Sham, <i>Contributing Member</i> |
| R. I. Jetter                  |                                        |

**Subgroup on Materials, Fabrication, and Examination (BPV III)**

|                                  |                                          |
|----------------------------------|------------------------------------------|
| D. W. Mann, <i>Chair</i>         | M. Kris                                  |
| J. Grimm, <i>Vice Chair</i>      | T. Melfi                                 |
| J. B. Ossmann, <i>Vice Chair</i> | I.-K. Nam                                |
| S. Hunter, <i>Secretary</i>      | J. E. O'Sullivan                         |
| W. H. Borter                     | M. C. Scott                              |
| M. Brijlani                      | W. J. Sperko                             |
| G. R. Cannell                    | J. F. Strunk                             |
| A. Cardillo                      | W. Windes                                |
| S. Cho                           | R. Wright                                |
| P. J. Coco                       | H. Xu                                    |
| R. H. Davis                      | S. Yee                                   |
| D. B. Denis                      | J. Wise, Jr., <i>Alternate</i>           |
| B. D. Frew                       | S. Wolbert, Jr., <i>Alternate</i>        |
| D. W. Gandy                      | R. W. Barnes, <i>Contributing Member</i> |
| S. E. Gingrich                   | S. Levitus, <i>Contributing Member</i>   |
| M. Golliet                       | H. Michael, <i>Contributing Member</i>   |
| L. S. Harbison                   |                                          |

**Working Group on Advanced Manufacturing (SG-MFE) (BPV III)**

|                               |                                      |
|-------------------------------|--------------------------------------|
| D. W. Mann, <i>Chair</i>      | E. C. Renaud                         |
| D. W. Gandy, <i>Secretary</i> | W. J. Sperko                         |
| D. Chowdhury                  | J. F. Strunk                         |
| P. J. Coco                    | J. Sulley                            |
| B. D. Frew                    | S. Tate                              |
| J. Grimm                      | J. Wise                              |
| J. Lambin                     | S. Wolbert                           |
| T. Lippucci                   | H. Xu                                |
| T. Melfi                      | R. H. Davis, <i>Alternate</i>        |
| A. Mori                       | S. Malik, <i>Contributing Member</i> |

**Joint Working Group on HDPE (SG-MFE) (BPV III)**

|                                 |                                      |
|---------------------------------|--------------------------------------|
| M. Brandes, <i>Chair</i>        | K. Manoly                            |
| T. M. Musto, <i>Chair</i>       | D. P. Munson                         |
| J. B. Ossmann, <i>Secretary</i> | J. O'Sullivan                        |
| G. Brouette                     | V. Rohatgi                           |
| M. C. Buckley                   | F. Schaaf, Jr.                       |
| S. Choi                         | S. Schuessler                        |
| M. Golliet                      | R. Stakenborgs                       |
| J. Hebeisen                     | M. Troughton                         |
| J. Johnston, Jr.                | P. Vibien                            |
| P. Krishnaswamy                 | J. Wright                            |
| M. Kuntz                        | T. Adams, <i>Contributing Member</i> |
| B. Lin                          |                                      |

**COMMITTEE ON HEATING BOILERS (BPV IV)**

|                                          |                                          |
|------------------------------------------|------------------------------------------|
| M. Wadkinson, <i>Chair</i>               | J. A. Hall                               |
| J. L. Kleiss, <i>Vice Chair</i>          | M. Mengon                                |
| C. R. Ramcharran, <i>Staff Secretary</i> | Y. Teng                                  |
| B. Ahee                                  | D. Picart, <i>Delegate</i>               |
| L. Badziagowski                          | Y. R. Cho, <i>Alternate</i>              |
| T. L. Bedeaux                            | B. J. Iske, <i>Alternate</i>             |
| B. Calderon                              | T. Wagner, <i>Alternate</i>              |
| J. P. Chicoine                           | H. Michael, <i>Contributing Member</i>   |
| C. Dinic                                 | P. A. Molvie, <i>Contributing Member</i> |
| J. M. Downs                              |                                          |

**Executive Committee (BPV IV)**

|                                          |                |
|------------------------------------------|----------------|
| M. Wadkinson, <i>Chair</i>               | J. P. Chicoine |
| C. R. Ramcharran, <i>Staff Secretary</i> | J. A. Hall     |
| T. L. Bedeaux                            | J. L. Kleiss   |

**Subgroup on Cast Boilers (BPV IV)**

|                                          |                              |
|------------------------------------------|------------------------------|
| J. P. Chicoine, <i>Chair</i>             | J. L. Kleiss                 |
| J. M. Downs, <i>Vice Chair</i>           | M. Mengon                    |
| C. R. Ramcharran, <i>Staff Secretary</i> | B. J. Iske, <i>Alternate</i> |
| T. L. Bedeaux                            | T. Wagner, <i>Alternate</i>  |
| J. A. Hall                               |                              |

**Subgroup on Materials (BPV IV)**

|                                          |               |
|------------------------------------------|---------------|
| J. A. Hall, <i>Chair</i>                 | T. L. Bedeaux |
| J. M. Downs, <i>Vice Chair</i>           | Y. Teng       |
| C. R. Ramcharran, <i>Staff Secretary</i> | M. Wadkinson  |
| L. Badziagowski                          |               |

**Subgroup on Water Heaters (BPV IV)**

|                                          |                                          |
|------------------------------------------|------------------------------------------|
| J. L. Kleiss, <i>Chair</i>               | C. Dinic                                 |
| L. Badziagowski, <i>Vice Chair</i>       | M. Mengon                                |
| C. R. Ramcharran, <i>Staff Secretary</i> | Y. Teng                                  |
| B. Ahee                                  | B. J. Iske, <i>Alternate</i>             |
| M. Carlson                               | T. Wagner, <i>Alternate</i>              |
| J. P. Chicoine                           | P. A. Molvie, <i>Contributing Member</i> |

**Subgroup on Welded Boilers (BPV IV)**

|                                          |                                          |
|------------------------------------------|------------------------------------------|
| T. L. Bedeaux, <i>Chair</i>              | J. L. Kleiss                             |
| J. P. Chicoine, <i>Vice Chair</i>        | M. Mengon                                |
| C. R. Ramcharran, <i>Staff Secretary</i> | M. Wadkinson                             |
| B. Ahee                                  | M. Washington                            |
| E. Alexis                                | B. J. Iske, <i>Alternate</i>             |
| L. Badziagowski                          | M. J. Melita, <i>Alternate</i>           |
| B. Calderon                              | T. J. Wagner, <i>Alternate</i>           |
| M. Carlson                               | P. A. Molvie, <i>Contributing Member</i> |
| C. Dinic                                 |                                          |

**COMMITTEE ON NONDESTRUCTIVE EXAMINATION (BPV V)**

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| N. A. Finney, <i>Chair</i>               | P. Lang                                   |
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| C. R. Ramcharran, <i>Staff Secretary</i> | J. Schoneweis                             |
| D. Bajula                                | P. B. Shaw                                |
| P. L. Brown                              | C. Vorwald                                |
| M. A. Burns                              | M. Carlson, <i>Alternate</i>              |
| N. Carter                                | J. E. Batey, <i>Contributing Member</i>   |
| C. Emslander                             | T. Clausing, <i>Contributing Member</i>   |
| A. F. Garbolevsky                        | J. F. Halley, <i>Contributing Member</i>  |
| P. T. Hayes                              | R. W. Kruzic, <i>Contributing Member</i>  |
| G. W. Hembree                            | L. E. Mullins, <i>Contributing Member</i> |
| F. B. Kovacs                             | H. C. Graber, <i>Honorary Member</i>      |
| K. Krueger                               | T. G. McCarty, <i>Honorary Member</i>     |
| B. D. Laite                              |                                           |

**Executive Committee (BPV V)**

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| N. A. Finney, <i>Vice Chair</i>          | K. Krueger   |
| C. R. Ramcharran, <i>Staff Secretary</i> | B. D. Laite  |
| V. F. Godinez-Azcuaga                    | E. Peloquin  |
| P. T. Hayes                              | C. Vorwald   |
| G. W. Hembree                            |              |

**Subgroup on General Requirements/Personnel Qualifications and  
Inquiries (BPV V)**

|                               |                                              |
|-------------------------------|----------------------------------------------|
| C. Vorwald, <i>Chair</i>      | P. Lang                                      |
| K. Krueger, <i>Vice Chair</i> | T. R. Lerohl                                 |
| D. Bajula                     | C. May                                       |
| N. Carter                     | J. Schoneweis                                |
| P. Chavdarov                  | T. Clausing, <i>Contributing Member</i>      |
| C. Emslander                  | J. F. Halley, <i>Contributing Member</i>     |
| N. A. Finney                  | D. I. Morris, <i>Contributing Member</i>     |
| G. W. Hembree                 | J. P. Swezy, Jr., <i>Contributing Member</i> |
| F. B. Kovacs                  |                                              |

**Subgroup on Volumetric Methods (BPV V)**

|                                |                                           |
|--------------------------------|-------------------------------------------|
| C. May, <i>Chair</i>           | K. Krueger                                |
| P. T. Hayes, <i>Vice Chair</i> | N. Pasemko                                |
| P. L. Brown                    | E. Peloquin                               |
| N. A. Finney                   | J. Schoneweis                             |
| A. F. Garbolevsky              | C. Vorwald                                |
| V. F. Godinez-Azcuaga          | J. F. Halley, <i>Contributing Member</i>  |
| C. Hansen                      | R. W. Kruzic, <i>Contributing Member</i>  |
| R. W. Hardy                    | L. E. Mullins, <i>Contributing Member</i> |
| G. W. Hembree                  | C. Wassink, <i>Contributing Member</i>    |
| F. B. Kovacs                   |                                           |

**Working Group on Radiography (SG-VM) (BPV V)**

|                                   |                                            |
|-----------------------------------|--------------------------------------------|
| C. Vorwald, <i>Chair</i>          | B. D. Laite                                |
| D. M. Woodward, <i>Vice Chair</i> | T. R. Lerohl                               |
| D. Bajula                         | C. May                                     |
| P. L. Brown                       | R. J. Mills                                |
| C. Emslander                      | J. F. Molinaro                             |
| A. F. Garbolevsky                 | N. Pasemko                                 |
| R. W. Hardy                       | J. Schoneweis                              |
| G. W. Hembree                     | T. L. Clifford, <i>Contributing Member</i> |
| P. Howie                          | R. W. Kruzic, <i>Contributing Member</i>   |
| F. B. Kovacs                      |                                            |

**Working Group on Ultrasonics (SG-VM) (BPV V)**

|                              |                                           |
|------------------------------|-------------------------------------------|
| K. Krueger, <i>Chair</i>     | C. May                                    |
| D. Bajula, <i>Vice Chair</i> | E. Peloquin                               |
| D. Adkins                    | J. Schoneweis                             |
| C. T. Brown                  | D. Van Allen                              |
| C. Emslander                 | C. Vorwald                                |
| N. A. Finney                 | J. F. Halley, <i>Contributing Member</i>  |
| P. Furr                      | R. W. Kruzic, <i>Contributing Member</i>  |
| C. Hansen                    | P. Mudge, <i>Contributing Member</i>      |
| P. T. Hayes                  | L. E. Mullins, <i>Contributing Member</i> |
| G. W. Hembree                | M. J. Quarry, <i>Contributing Member</i>  |
| B. D. Laite                  | J. Vanvelsor, <i>Contributing Member</i>  |
| T. R. Lerohl                 |                                           |

**Special Working Group for Advance UT Techniques  
(WG-UT) (BPV V)**

|                                  |              |
|----------------------------------|--------------|
| K. Krueger, <i>Chair</i>         | P. Hayes     |
| J. Schoneweis, <i>Vice Chair</i> | B. D. Laite  |
| D. Bajula                        | T. R. Lerohl |
| C. David                         | E. Peloquin  |
| N. A. Finney                     | D. Tompkins  |
| P. Furr                          | D. Van Allen |
| J. Garner                        | C. Wassink   |
| C. Hansen                        |              |

**Working Group on Acoustic Emissions (SG-VM) (BPV V)**

|                                     |                    |
|-------------------------------------|--------------------|
| V. F. Godinez-Azcuaga, <i>Chair</i> | S. R. Doctor       |
| J. Catty, <i>Vice Chair</i>         | N. F. Douglas, Jr. |

**Working Group on Full Matrix Capture (SG-VM) (BPV V)**

|                                |                                           |
|--------------------------------|-------------------------------------------|
| E. Peloquin, <i>Chair</i>      | M. Lozev                                  |
| P. T. Hayes, <i>Vice Chair</i> | R. Nogueira                               |
| D. Bajula                      | D. Richard                                |
| J. Catty                       | M. Sens                                   |
| N. A. Finney                   | D. Tompkins                               |
| J. L. Garner                   | J. F. Halley, <i>Contributing Member</i>  |
| R. T. Grotenhuis               | L. E. Mullins, <i>Contributing Member</i> |
| G. W. Hembree                  | C. Wassink, <i>Contributing Member</i>    |
| K. Krueger                     |                                           |

**Subgroup on Inservice Examination Methods and Techniques  
(BPV V)**

|                                |                       |
|--------------------------------|-----------------------|
| P. T. Hayes, <i>Chair</i>      | V. F. Godinez-Azcuaga |
| E. Peloquin, <i>Vice Chair</i> | C. Hansen             |
| D. Bajula                      | G. W. Hembree         |
| R. Barker                      | K. Krueger            |
| R. J. Bunte                    | C. May                |
| M. A. Burns                    | N. Pasemko            |
| M. Carlson                     | D. D. Raimander       |
| T. Demmer                      | B. Ray                |
| N. Douglas, Jr.                | J. Schoneweis         |
| N. A. Finney                   | C. Vorwald            |

**Working Group on Assisted Analysis (SG-ISI) (BPV V)**

|                              |                 |
|------------------------------|-----------------|
| T. Demmer, <i>Chair</i>      | G. W. Hembree   |
| C. Hansen, <i>Vice Chair</i> | G. I. Kraljic   |
| J. Aldrin                    | G. M. Lozev     |
| J. Chen                      | R. S. F. Orozco |
| M. Elen                      | E. Peloquin     |
| N. A. Finney                 | T. Thulien      |
| V. F. Godinez-Azcuaga        | J. Williams     |
| R. T. Grotenhuis             | S. Zafar        |
| K. Hayes                     |                 |

**Working Group on Methods and Techniques (SG-ISI) (BPV V)**

|                                |               |
|--------------------------------|---------------|
| C. May, <i>Chair</i>           | P. T. Hayes   |
| R. J. Bunte, <i>Vice Chair</i> | K. Krueger    |
| D. Bajula                      | B. D. Laite   |
| R. Barker                      | G. Morais     |
| M. A. Burns                    | N. Pasemko    |
| M. Carlson                     | J. Schoneweis |
| J. Catty                       |               |

**Working Group on Supplemental Requirements for Corrosion and  
Other Damage Mechanisms (SG-ISI) (BPV V)**

|                               |             |
|-------------------------------|-------------|
| J. Schoneweis, <i>Chair</i>   | C. Hansen   |
| N. Pasemko, <i>Vice Chair</i> | P. T. Hayes |
| D. Bajula                     | K. Krueger  |
| R. Barker                     | E. Peloquin |
| N. A. Finney                  | I. Roux     |

**Subgroup on Surface Examination Methods (BPV V)**

|                           |                                           |
|---------------------------|-------------------------------------------|
| B. D. Laite, <i>Chair</i> | C. May                                    |
| D. Bajula                 | G. Morais                                 |
| R. Behe                   | J. Schoneweis                             |
| R. M. Beldyk              | P. B. Shaw                                |
| P. L. Brown               | R. Tedder                                 |
| N. Carter                 | C. Vorwald                                |
| C. Emslander              | D. M. Woodward                            |
| N. Farenbaugh             | T. Clausing, <i>Contributing Member</i>   |
| N. A. Finney              | J. F. Halley, <i>Contributing Member</i>  |
| A. F. Garbolevsky         | K. Hayes, <i>Contributing Member</i>      |
| G. W. Hembree             | R. W. Kruzic, <i>Contributing Member</i>  |
| K. Krueger                | L. E. Mullins, <i>Contributing Member</i> |
| T. R. Lerohl              | C. Wassink, <i>Contributing Member</i>    |

**Germany International Working Group (BPV V)**

|                                 |            |
|---------------------------------|------------|
| P. Chavdarov, <i>Chair</i>      | C. Kringe  |
| V. Pohl, <i>Vice Chair</i>      | S. Mann    |
| H.-P. Schmitz, <i>Secretary</i> | V. Reusch  |
| D. Kaiser                       | P. Van IJS |

**India International Working Group (BPV V)**

|                                  |                        |
|----------------------------------|------------------------|
| P. Kumar, <i>Chair</i>           | J. V. Muthukumaraswamy |
| A. V. Bhagwat, <i>Vice Chair</i> | A. Relekar             |
| V. Ligade, <i>Secretary</i>      | V. J. Sonawane         |
| S. Jobanputra                    | N. Suryawanshi         |
| D. Joshi                         | D. B. Tanpure          |
| G. R. Joshi                      |                        |

**Italy International Working Group (BPV V)**

|                                         |                                          |
|-----------------------------------------|------------------------------------------|
| D. D. Raimander, <i>Chair</i>           | E. Ferrari                               |
| O. Oldani, <i>Vice Chair</i>            | M. A. Grimoldi                           |
| C. R. Ramcharan, <i>Staff Secretary</i> | G. Luoni                                 |
| P. Campli, <i>Secretary</i>             | U. Papponetti                            |
| M. Agostini                             | P. Pedersoli                             |
| T. Aldo                                 | A. Veroni                                |
| F. Bresciani                            | M. Zambon                                |
| N. Caputo                               | G. Gobbi, <i>Contributing Member</i>     |
| M. Colombo                              | A. Gusmaroli, <i>Contributing Member</i> |
| P. L. Dinelli                           | G. Pontiggia, <i>Contributing Member</i> |
| F. Ferrarese                            |                                          |

**COMMITTEE ON PRESSURE VESSELS (BPV VIII)**

|                                     |                                               |
|-------------------------------------|-----------------------------------------------|
| S. C. Roberts, <i>Chair</i>         | J. P. Swezy, Jr.                              |
| M. D. Lower, <i>Vice Chair</i>      | S. Terada                                     |
| J. Oh, <i>Staff Secretary</i>       | E. Upitis                                     |
| S. J. Rossi, <i>Staff Secretary</i> | A. Viet                                       |
| S. R. Babka                         | K. Xu                                         |
| L. Bower                            | K. Oyamada, <i>Delegate</i>                   |
| P. Chavdarov                        | M. E. Papponetti, <i>Delegate</i>             |
| B. F. Hantz                         | G. Auriolles, Sr., <i>Contributing Member</i> |
| C. S. Hinson                        | R. J. Basile                                  |
| J. Hoskinson                        | A. Chaudouet, <i>Contributing Member</i>      |
| M. Kowalczyk                        | D. B. DeMichael, <i>Contributing Member</i>   |
| D. L. Kurle                         | K. T. Lau, <i>Contributing Member</i>         |
| R. Mahadeen                         | H. Michael, <i>Contributing Member</i>        |
| S. A. Marks                         | R. W. Mikitka, <i>Contributing Member</i>     |
| P. Matkovics                        | D. A. Swanson, <i>Contributing Member</i>     |
| D. T. Peters                        | G. G. Karcher, <i>Honorary Member</i>         |
| M. J. Pischke                       | U. R. Miller, <i>Honorary Member</i>          |
| M. D. Rana                          | T. P. Pastor, <i>Honorary Member</i>          |
| G. B. Rawls, Jr.                    | K. K. Tam, <i>Honorary Member</i>             |
| F. L. Richter                       |                                               |
| C. D. Rodery                        |                                               |
| J. C. Sowinski                      |                                               |
| D. Sronic                           |                                               |
| P. L. Sturgill                      |                                               |
| K. Subramanian                      |                                               |

**Executive Committee (BPV VIII)**

|                                     |                |
|-------------------------------------|----------------|
| M. D. Lower, <i>Chair</i>           | J. Hoskinson   |
| S. J. Rossi, <i>Staff Secretary</i> | P. Matkovics   |
| G. Auriolles, Sr.                   | S. C. Roberts  |
| C. W. Cary                          | J. C. Sowinski |
| P. Chavdarov                        | K. Subramanian |
| T. Halligan                         | K. Xu          |

**Subgroup on Design (BPV VIII)**

|                                 |                                               |
|---------------------------------|-----------------------------------------------|
| J. C. Sowinski, <i>Chair</i>    | S. Terada                                     |
| C. S. Hinson, <i>Vice Chair</i> | K. Xu                                         |
| S. R. Babka                     | K. Oyamada, <i>Delegate</i>                   |
| O. A. Barsky                    | M. E. Papponetti, <i>Delegate</i>             |
| M. Faulkner                     | G. Auriolles, Sr., <i>Contributing Member</i> |
| D. Francis                      | R. J. Basile, <i>Contributing Member</i>      |
| B. F. Hantz                     | D. Chandiramani, <i>Contributing Member</i>   |
| C. E. Hinnant                   | M. H. Jawad, <i>Contributing Member</i>       |
| S. Krishnamurthy                | P. K. Lam, <i>Contributing Member</i>         |
| D. L. Kurle                     | K. Mokhtarian, <i>Contributing Member</i>     |
| K. Kusu                         | C. D. Rodery, <i>Contributing Member</i>      |
| M. D. Lower                     | D. A. Swanson, <i>Contributing Member</i>     |
| R. W. Mikitka                   | K. K. Tam, <i>Contributing Member</i>         |
| B. Millet                       | E. Upitis, <i>Contributing Member</i>         |
| M. D. Rana                      |                                               |
| G. B. Rawls, Jr.                |                                               |
| S. C. Roberts                   |                                               |
| T. G. Seipp                     |                                               |
| D. Sronic                       |                                               |



**Working Group on Design-by-Analysis (BPV VIII)**

|                                |                                          |
|--------------------------------|------------------------------------------|
| B. F. Hantz, <i>Chair</i>      | S. Krishnamurthy                         |
| T. W. Norton, <i>Secretary</i> | C. Nadarajah                             |
| J. Bedoya                      | T. G. Seipp                              |
| A. Feller                      | M. Shah                                  |
| S. Guzey                       | S. Terada                                |
| C. E. Hinnant                  | D. A. Arnett, <i>Contributing Member</i> |
| S. Kataoka                     | A. Mann, <i>Contributing Member</i>      |
| S. Kilambi                     | K. Saboda, <i>Contributing Member</i>    |
| K. D. Kirkpatrick              |                                          |

**Task Group on Electrochemical Cell Stacks (TG-ECS) (BPV VIII)**

|                                          |                                             |
|------------------------------------------|---------------------------------------------|
| K. Xu, <i>Chair</i>                      | K. Choi, <i>Contributing Member</i>         |
| K. Quackenbush, <i>Vice Chair</i>        | L. T. Dalton, <i>Contributing Member</i>    |
| N. Barkley                               | M. Duda, <i>Contributing Member</i>         |
| E. Gadsby                                | R. Fournier, <i>Contributing Member</i>     |
| S. Goyette                               | E. Gernot, <i>Contributing Member</i>       |
| T. Halligan                              | S. Grimm, <i>Contributing Member</i>        |
| R. Kauer                                 | N. Hart, <i>Contributing Member</i>         |
| P. Matkovics                             | R. Müller, <i>Contributing Member</i>       |
| L. Moulthrop                             | P. K. Panigrahy, <i>Contributing Member</i> |
| J. Panicker                              | R. Robles, <i>Contributing Member</i>       |
| E. Prause                                | M. Stelzel, <i>Contributing Member</i>      |
| P. T. Shanks                             | M. Sweetland, <i>Contributing Member</i>    |
| S. Ulemek                                |                                             |
| E. Andrade, <i>Contributing Member</i>   |                                             |
| B. D. Carter, <i>Contributing Member</i> |                                             |

**Working Group on Elevated Temperature Design (BPV I and VIII)**

|                              |                                            |
|------------------------------|--------------------------------------------|
| C. Nadarajah, <i>Chair</i>   | C. T. McDaris                              |
| L. S. Tsai, <i>Secretary</i> | M. C. Messner                              |
| D. Anderson                  | M. N. Mitchell                             |
| D. Dewees                    | P. Prueter                                 |
| B. F. Hantz                  | A. Ramos                                   |
| R. I. Jetter                 | M. Rathinasabapathy                        |
| S. Kataoka                   | M. J. Swindeman                            |
| S. Krishnamurthy             | A. Mann, <i>Contributing Member</i>        |
| S. R. Kummari                | N. McMurray, <i>Contributing Member</i>    |
| T. Le                        | B. J. Mollitor, <i>Contributing Member</i> |
| B.-L. Lyow                   |                                            |

**Task Group on Fired Heater Pressure Vessels (BPV VIII)**

|                            |              |
|----------------------------|--------------|
| J. Hoskinson, <i>Chair</i> | P. T. Shanks |
| D. Nelson                  | E. Smith     |
| R. Robles                  | D. Srnic     |
| J. Rust                    |              |

**Subgroup on Fabrication and Examination (BPV VIII)**

|                                 |                                            |
|---------------------------------|--------------------------------------------|
| T. Halligan, <i>Chair</i>       | B. F. Shelley                              |
| D. I. Morris, <i>Vice Chair</i> | P. L. Sturgill                             |
| D. Smith, <i>Secretary</i>      | J. P. Swezy, Jr.                           |
| J. Lu                           | E. Uptis                                   |
| S. A. Marks                     | C. Violand                                 |
| O. Mulet                        | K. Oyamada, <i>Delegate</i>                |
| M. J. Pischke                   | W. J. Bees, <i>Contributing Member</i>     |
| M. J. Rice                      | L. F. Campbell, <i>Contributing Member</i> |
| J. Roberts                      | N. Carter, <i>Contributing Member</i>      |
| C. D. Rodery                    |                                            |

**Subgroup on Heat Transfer Equipment (BPV VIII)**

|                                       |                                               |
|---------------------------------------|-----------------------------------------------|
| P. Matkovics, <i>Chair</i>            | E. Smith                                      |
| L. Bower, <i>Vice Chair</i>           | A. M. Voytko                                  |
| T. Bunyarattaphantu, <i>Secretary</i> | R. P. Wiberg                                  |
| S. R. Babka                           | G. Auriolles, Sr., <i>Contributing Member</i> |
| J. H. Barbee                          | K. M. Chikhaliya, <i>Contributing Member</i>  |
| O. A. Barsky                          | J. Pasek, <i>Contributing Member</i>          |
| A. Chaudouet                          | D. Srnic, <i>Contributing Member</i>          |
| D. L. Kurlle                          | Z. Tong, <i>Contributing Member</i>           |
| R. Mahadeen                           |                                               |
| S. Mayeux                             |                                               |
| S. Neilsen                            |                                               |

**Subgroup on General Requirements (BPV VIII)**

|                                |                                             |
|--------------------------------|---------------------------------------------|
| J. Hoskinson, <i>Chair</i>     | J. Rust                                     |
| M. Faulkner, <i>Vice Chair</i> | P. T. Shanks                                |
| N. Barkley                     | J. C. Sowinski                              |
| T. P. Beirne                   | P. Speranza                                 |
| R. Darby                       | D. Srnic                                    |
| Z. Jakovljevic                 | D. B. Stewart                               |
| M. D. Lower                    | D. B. DeMichael, <i>Contributing Member</i> |
| T. Newman                      | T. P. Pastor, <i>Contributing Member</i>    |
| I. A. Powell                   | R. Robles, <i>Contributing Member</i>       |
| J. Qu                          | D. A. Swanson, <i>Contributing Member</i>   |
| G. B. Rawls, Jr.               | Y. Yang, <i>Contributing Member</i>         |
| F. L. Richter                  |                                             |
| S. C. Roberts                  |                                             |

**Working Group on Plate Heat Exchangers (BPV VIII)**

|                            |               |
|----------------------------|---------------|
| D. I. Morris, <i>Chair</i> | P. Matkovics  |
| S. R. Babka                | M. J. Pischke |
| V. Gudge                   | P. T. Shanks  |
| T. Halligan                | E. Smith      |
| Z. Jakovljevic             | D. Srnic      |

**Subgroup on High Pressure Vessels (BPV VIII)**

|                                     |                                           |
|-------------------------------------|-------------------------------------------|
| K. Subramanian, <i>Chair</i>        | F. W. Tatar                               |
| M. Sarzynski, <i>Vice Chair</i>     | S. Terada                                 |
| A. Dinizulu, <i>Staff Secretary</i> | Y. Xu                                     |
| L. P. Antalffy                      | A. M. Clayton, <i>Contributing Member</i> |
| N. Barkley                          | R. Cordes, <i>Contributing Member</i>     |
| J. Barlow                           | R. D. Dixon, <i>Contributing Member</i>   |
| R. C. Biel                          | J. Hademenos, <i>Contributing Member</i>  |
| P. N. Chaku                         | R. M. Hoshman, <i>Contributing Member</i> |
| L. Fridlund                         | F. Kirkemo, <i>Contributing Member</i>    |
| D. Fuenmayor                        | G. M. Mital, <i>Contributing Member</i>   |
| J. Gibson                           | M. Parr, <i>Contributing Member</i>       |
| R. T. Hallman                       | M. D. Rana, <i>Contributing Member</i>    |
| K. Karpanan                         | C. Tipple, <i>Contributing Member</i>     |
| A. K. Khare                         | K.-J. Young, <i>Contributing Member</i>   |
| G. T. Nelson                        | D. J. Burns, <i>Honorary Member</i>       |
| D. T. Peters                        | G. J. Mraz, <i>Honorary Member</i>        |
| E. D. Roll                          |                                           |
| J. R. Sims                          |                                           |
| E. Smith                            |                                           |

**Argentina International Working Group (BPV VIII)**

|                               |                                           |
|-------------------------------|-------------------------------------------|
| A. Dominguez, <i>Chair</i>    | M. A. Mendez                              |
| R. Robles, <i>Vice Chair</i>  | J. J. Monaco                              |
| G. Glissent, <i>Secretary</i> | C. Parente                                |
| A. Antipasti                  | M. A. A. Pipponzi                         |
| D. A. Bardelli                | L. C. Rigoli                              |
| R. A. Barey                   | A. Rivas                                  |
| O. S. Bretones                | D. Rizzo                                  |
| A. Burgueno                   | M. A. Sena                                |
| G. Casanas                    | G. Telleria                               |
| D. A. Del Teglia              | C. Alderetes, <i>Contributing Member</i>  |
| M. Favareto                   | D. H. Da Rold, <i>Contributing Member</i> |
| J. A. Labastidas              | J. C. Rubeo, <i>Contributing Member</i>   |
| F. P. Larrosa                 |                                           |

**China International Working Group (BPV VIII)**

|                            |               |
|----------------------------|---------------|
| X. Chen, <i>Chair</i>      | C. Miao       |
| B. Shou, <i>Vice Chair</i> | L. Sun        |
| Z. Fan, <i>Secretary</i>   | C. Wu         |
| Y. Chen                    | J. Xiaobin    |
| J. Cui                     | F. Xu         |
| R. Duan                    | G. Xu         |
| J.-G. Gong                 | F. Yang       |
| B. Han                     | Y. Yang       |
| J. Hu                      | Y. Yuan       |
| Q. Hu                      | Yanfeng Zhang |
| H. Hui                     | Yijun Zhang   |
| K. Li                      | S. Zhao       |
| D. Luo                     | J. Zheng      |
| Y. Luo                     | G. Zhu        |

**Subgroup on Materials (BPV VIII)**

|                                 |                                             |
|---------------------------------|---------------------------------------------|
| P. Chavdarov, <i>Chair</i>      | D. Pugh                                     |
| M. Kowalczyk, <i>Vice Chair</i> | D. W. Rahoi                                 |
| S. Kilambi, <i>Secretary</i>    | E. Upitis                                   |
| J. Cameron                      | K. Xu                                       |
| H. Dutta                        | M. Katcher, <i>Contributing Member</i>      |
| J. F. Grubb                     | R. C. Sutherlin, <i>Contributing Member</i> |
| D. Maitra                       |                                             |
| R. K. Patadia                   |                                             |

**Subgroup on Toughness (BPV VIII)**

|                                |                                              |
|--------------------------------|----------------------------------------------|
| K. Xu, <i>Chair</i>            | J. P. Swezy, Jr.                             |
| T. Halligan, <i>Vice Chair</i> | S. Terada                                    |
| T. Finn                        | E. Upitis                                    |
| C. S. Hinson                   | J. Vattappilly                               |
| S. Kilambi                     | K. Oyamada, <i>Delegate</i>                  |
| D. L. Kurle                    | L. Dong, <i>Contributing Member</i>          |
| T. Newman                      | S. Krishnamurthy, <i>Contributing Member</i> |
| J. Qu                          | D. A. Swanson, <i>Contributing Member</i>    |
| M. D. Rana                     |                                              |
| F. L. Richter                  |                                              |
| K. Subramanian                 |                                              |

**Germany International Working Group (BPV VIII)**

|                              |                |
|------------------------------|----------------|
| R. Kauer, <i>Chair</i>       | S. Krebs       |
| M. Sykora, <i>Vice Chair</i> | T. Ludwig      |
| A. Aloui                     | R. A. Meyers   |
| P. Chavdarov                 | H. Michael     |
| M. Delzeit                   | R. Müller      |
| A. Emrich                    | S. Reich       |
| C. Jaekel                    | A. Spangenberg |
| S. Jetzlsperger              | C. Stobbe      |
| D. Koelbl                    |                |

**India International Working Group (BPV VIII)**

|                                |                                       |
|--------------------------------|---------------------------------------|
| D. Chandiramani, <i>Chair</i>  | T. Mukherjee                          |
| D. Kulkarni, <i>Vice Chair</i> | P. C. Pathak                          |
| A. D. Dalal, <i>Secretary</i>  | D. Prabhu                             |
| P. Arulkumar                   | A. Sadasivam                          |
| P. Gandhi                      | M. P. Shah                            |
| U. Ganesan                     | Y. Z. Shaikh                          |
| S. K. Goyal                    | R. Tiru                               |
| V. Jayabalan                   | V. T. Valavan                         |
| V. K. Joshi                    | M. Sharma, <i>Contributing Member</i> |
| A. Kakumanu                    |                                       |

**Subgroup on Graphite Pressure Equipment (BPV VIII)**

|                            |               |
|----------------------------|---------------|
| C. W. Cary, <i>Chair</i>   | H. Lee, Jr.   |
| A. Viet, <i>Vice Chair</i> | S. Mehrez     |
| G. C. Becherer             | T. Rudy       |
| F. L. Brown                | A. A. Stupica |
| J. D. Clements             | J. Wince      |

**Italy International Working Group (BPV VIII)**

|                             |                                             |
|-----------------------------|---------------------------------------------|
| M. Millefanti, <i>Chair</i> | A. F. Magri                                 |
| P. Campli, <i>Secretary</i> | L. Moracchioli                              |
| P. Aliprandi                | P. Pacor                                    |
| A. Avogadri                 | S. Sarti                                    |
| A. Camanni                  | A. Teli                                     |
| M. Camposaragna             | N. Wagner                                   |
| N. Caputo                   | V. Calo, <i>Contributing Member</i>         |
| M. Colombo                  | G. Gobbi, <i>Contributing Member</i>        |
| P. Conti                    | A. Gusmaroli, <i>Contributing Member</i>    |
| D. Cortassa                 | G. Pontiggia, <i>Contributing Member</i>    |
| A. Fabiano                  | D. D. Raimander, <i>Contributing Member</i> |
| F. Finco                    |                                             |
| M. Guglielmetti             |                                             |

**COMMITTEE ON WELDING, BRAZING, AND FUSING (BPV IX)**

|                                    |                                              |
|------------------------------------|----------------------------------------------|
| M. J. Pischke, <i>Chair</i>        | E. G. Reichelt                               |
| P. L. Sturgill, <i>Vice Chair</i>  | M. J. Rice                                   |
| R. Rahaman, <i>Staff Secretary</i> | W. J. Sperko                                 |
| D. Barborak                        | J. P. Swezy, Jr.                             |
| M. Bernasek                        | A. D. Wilson                                 |
| M. A. Boring                       | L. Costa, <i>Delegate</i>                    |
| D. A. Bowers                       | D. Pojatar, <i>Delegate</i>                  |
| N. Carter                          | D. D. Raimander, <i>Delegate</i>             |
| J. G. Feldstein                    | A. Roza, <i>Delegate</i>                     |
| P. Gilston                         | M. Consonni, <i>Contributing Member</i>      |
| S. E. Gingrich                     | R. M. Jessee, <i>Contributing Member</i>     |
| K. L. Hayes                        | P. L. Van Fosson, <i>Contributing Member</i> |
| J. S. Lee                          | R. K. Brown, Jr., <i>Honorary Member</i>     |
| W. M. Lundy                        | M. L. Carpenter, <i>Honorary Member</i>      |
| D. W. Mann                         | B. R. Newmark, <i>Honorary Member</i>        |
| S. A. Marks                        | S. D. Reynolds, Jr., <i>Honorary Member</i>  |
| T. Melfi                           |                                              |
| W. F. Newell, Jr.                  |                                              |

**Special Working Group on Bolted Flanged Joints (BPV VIII)**

|                                 |                                           |
|---------------------------------|-------------------------------------------|
| W. Brown, <i>Chair</i>          | R. W. Mikitka                             |
| M. Osterfoss, <i>Vice Chair</i> | D. Nash                                   |
| D. Bankston, Jr.                | M. Ruffin                                 |
| C. W. Cary                      | M. Siddiqui                               |
| A. Chaudouet                    | E. Jamalyaria, <i>Contributing Member</i> |
| H. Chen                         | G. Van Zyl, <i>Contributing Member</i>    |
| D. Francis                      | J. Veiga, <i>Contributing Member</i>      |
| H. Lejeune                      | R. Wacker, <i>Contributing Member</i>     |
| A. Mann                         |                                           |
| W. McDaniel                     |                                           |

**Subgroup on Brazing (BPV IX)**

|                           |                  |
|---------------------------|------------------|
| S. A. Marks, <i>Chair</i> | M. J. Pischke    |
| E. W. Beckman             | P. L. Sturgill   |
| A. F. Garbolevsky         | J. P. Swezy, Jr. |
| N. Mohr                   |                  |

**Subgroup on General Requirements (BPV IX)**

|                               |                                           |
|-------------------------------|-------------------------------------------|
| N. Carter, <i>Chair</i>       | K. Meszaros                               |
| P. Gilston, <i>Vice Chair</i> | H. B. Porter                              |
| S. A. Marks, <i>Secretary</i> | D. Smith                                  |
| J. P. Bell                    | P. L. Sturgill                            |
| D. A. Bowers                  | J. P. Swezy, Jr.                          |
| T. Bunyarattaphantu           | E. W. Woelfel                             |
| M. Cox                        | L. Costa, <i>Delegate</i>                 |
| M. Heinrichs                  | E. W. Beckman, <i>Contributing Member</i> |
| R. M. Jessee                  | A. Davis, <i>Contributing Member</i>      |
| P. Matkovics                  | B. R. Newmark, <i>Honorary Member</i>     |
| W. May                        |                                           |

**Subgroup on Interpretations (BPV VIII)**

|                               |                                              |
|-------------------------------|----------------------------------------------|
| P. Matkovics, <i>Chair</i>    | D. T. Peters                                 |
| J. Oh, <i>Staff Secretary</i> | J. Qu                                        |
| S. R. Babka                   | F. L. Richter                                |
| L. Bower                      | S. C. Roberts                                |
| T. Bunyarattaphantu           | C. D. Rodery                                 |
| J. Cameron                    | T. G. Seipp                                  |
| C. W. Cary                    | E. Smith                                     |
| P. Chavdarov                  | J. C. Sowinski                               |
| M. Faulkner                   | K. Subramanian                               |
| T. Halligan                   | J. P. Swezy, Jr.                             |
| B. F. Hantz                   | A. Viet                                      |
| J. Hoskinson                  | K. Xu                                        |
| M. Kowalczyk                  | G. Auriolos, Sr., <i>Contributing Member</i> |
| D. L. Kurlie                  | R. J. Basile, <i>Contributing Member</i>     |
| K. Kescu                      | D. A. Swanson, <i>Contributing Member</i>    |
| M. D. Lower                   |                                              |
| S. A. Marks                   |                                              |
| D. I. Morris                  |                                              |

**Subgroup on Materials (BPV IX)**

|                           |                                           |
|---------------------------|-------------------------------------------|
| M. Bernasek, <i>Chair</i> | D. D. Raimander                           |
| T. Anderson               | A. Roza                                   |
| L. Constantinescu         | C. E. Sainz                               |
| E. Cutlip                 | P. L. Sturgill                            |
| S. E. Gingrich            | C. Zafir                                  |
| L. S. Harbison            | L. Costa, <i>Delegate</i>                 |
| M. James                  | V. G. V. Giunto, <i>Delegate</i>          |
| R. M. Jessee              | D. J. Kotecki, <i>Contributing Member</i> |
| T. Melfi                  | B. Krueger, <i>Contributing Member</i>    |
| S. D. Nelson              | W. J. Sperko, <i>Contributing Member</i>  |
| M. J. Pischke             | M. J. Stanko, <i>Contributing Member</i>  |

**Subgroup on Plastic Fusing (BPV IX)**

|                           |               |
|---------------------------|---------------|
| K. L. Hayes, <i>Chair</i> | M. J. Rice    |
| M. Brandes                | S. Schuessler |
| R. M. Jessee              | M. Troughton  |
| J. Johnston, Jr.          | C. Violand    |
| J. E. O'Sullivan          | E. W. Woelfel |
| E. G. Reichelt            | J. Wright     |

**Subgroup on Welding Qualifications (BPV IX)**

|                                 |                                             |
|---------------------------------|---------------------------------------------|
| T. Melfi, <i>Chair</i>          | M. J. Rice                                  |
| A. D. Wilson, <i>Vice Chair</i> | M. B. Sims                                  |
| K. L. Hayes, <i>Secretary</i>   | A. Spangenberg                              |
| M. Bernasek                     | W. J. Sperko                                |
| M. A. Boring                    | P. L. Sturgill                              |
| D. A. Bowers                    | J. P. Swezy, Jr.                            |
| R. Campbell                     | C. Violand                                  |
| R. B. Corbit                    | L. Costa, <i>Delegate</i>                   |
| L. S. Harbison                  | D. D. Raimander, <i>Delegate</i>            |
| M. Heinrichs                    | D. Chandiramani, <i>Contributing Member</i> |
| J. S. Lee                       | M. Consonni, <i>Contributing Member</i>     |
| W. M. Lundy                     | M. Dehghan, <i>Contributing Member</i>      |
| D. W. Mann                      | T. C. Wiesner, <i>Contributing Member</i>   |
| K. Meszaros                     |                                             |
| W. F. Newell, Jr.               |                                             |
| E. G. Reichelt                  |                                             |

**Argentina International Working Group (BPV IX)**

|                                        |               |
|----------------------------------------|---------------|
| A. Burgueno, <i>Chair</i>              | J. Caprarulo  |
| A. R. G. Frinchaboy, <i>Vice Chair</i> | M. Favareto   |
| R. Rahaman, <i>Staff Secretary</i>     | J. A. Gandola |
| M. D. Kuhn, <i>Secretary</i>           | M. A. Mendez  |
| P. J. Cabot                            | A. E. Pastor  |

**Germany International Working Group (BPV IX)**

|                                    |                                             |
|------------------------------------|---------------------------------------------|
| P. Chavadarov, <i>Chair</i>        | P. Müller                                   |
| R. Rahaman, <i>Staff Secretary</i> | S. Wegener                                  |
| P. Khwaja, <i>Secretary</i>        | J. Daldrup, <i>Contributing Member</i>      |
| B. Daume                           | E. Floer, <i>Contributing Member</i>        |
| D. Haase                           | A. Scherpenisse, <i>Contributing Member</i> |
| S. Krebs                           | K.-G. Toelle, <i>Contributing Member</i>    |
| T. Ludwig                          |                                             |

**Italy International Working Group (BPV IX)**

|                                    |                                          |
|------------------------------------|------------------------------------------|
| D. D. Raimander, <i>Chair</i>      | P. Pacor                                 |
| F. Ferrarese, <i>Vice Chair</i>    | G. Signoretta                            |
| R. Rahaman, <i>Staff Secretary</i> | V. Calo, <i>Contributing Member</i>      |
| P. Campli, <i>Secretary</i>        | G. Gobbi, <i>Contributing Member</i>     |
| M. Bernasek                        | A. Gusmaroli, <i>Contributing Member</i> |
| A. Camanni                         | G. Pontiggia, <i>Contributing Member</i> |
| M. Mandina                         | P. Siboni, <i>Contributing Member</i>    |
| A. S. Monastra                     |                                          |
| L. Moracchioli                     |                                          |

**Spain International Working Group (BPV IX)**

|                                    |                                          |
|------------------------------------|------------------------------------------|
| F. J. Q. Pandelo, <i>Chair</i>     | B. B. Miguel                             |
| F. Manas, <i>Vice Chair</i>        | A. D. G. Munoz                           |
| R. Rahaman, <i>Staff Secretary</i> | A. B. Pascual                            |
| F. R. Hermda, <i>Secretary</i>     | G. Gobbi, <i>Contributing Member</i>     |
| C. A. Celimendiz                   | R. G. Garcia, <i>Contributing Member</i> |
| M. A. F. Garcia                    |                                          |

**COMMITTEE ON FIBER-REINFORCED PLASTIC PRESSURE VESSELS (BPV X)**

|                                          |                                              |
|------------------------------------------|----------------------------------------------|
| J. L. Bustillos, <i>Chair</i>            | D. H. McCauley                               |
| D. Eisberg, <i>Vice Chair</i>            | N. L. Newhouse                               |
| C. R. Ramcharran, <i>Staff Secretary</i> | G. Ramirez                                   |
| A. L. Beckwith                           | J. R. Richter                                |
| B. R. Colley                             | B. F. Shelley                                |
| T. W. Cowley                             | G. A. Van Beek                               |
| I. L. Dinovo                             | S. L. Wagner                                 |
| J. Eihusen                               | D. O. Yancey, Jr.                            |
| K. L. Gilmore                            | P. H. Ziehl                                  |
| M. R. Gorman                             | D. H. Hodgkinson, <i>Contributing Member</i> |
| B. Hebb                                  | D. L. Keeler, <i>Contributing Member</i>     |
| L. E. Hunt                               |                                              |
| B. Linnemann                             |                                              |

**COMMITTEE ON NUCLEAR INSERVICE INSPECTION (BPV XI)**

|                                         |                                             |
|-----------------------------------------|---------------------------------------------|
| D. W. Lamond, <i>Chair</i>              | G. C. Park                                  |
| S. D. Kulat, <i>Vice Chair</i>          | D. A. Scarth                                |
| A. T. Roberts III, <i>Vice Chair</i>    | F. J. Schaaf, Jr.                           |
| D. Miro-Quesada, <i>Staff Secretary</i> | R. W. Swayne                                |
| M. L. Benson                            | S. Takaya                                   |
| C. T. Brown                             | A. Udyawar                                  |
| S. B. Brown                             | D. Vetter                                   |
| T. L. Chan                              | J. G. Weicks                                |
| R. C. Cipolla                           | M. Weis                                     |
| R. Clow                                 | B. K. Welch                                 |
| D. R. Cordes                            | Y.-K. Chung, <i>Delegate</i>                |
| H. Do                                   | C. Ye, <i>Delegate</i>                      |
| E. V. Farrell, Jr.                      | M. Homiack, <i>Alternate</i>                |
| M. J. Ferlisi                           | C. Latiolais, <i>Alternate</i>              |
| J. Hakii                                | R. O. McGill, <i>Alternate</i>              |
| M. L. Hall                              | T. J. Griesbach, <i>Contributing Member</i> |
| P. J. Hennessey                         | J. T. Lindberg, <i>Contributing Member</i>  |
| D. O. Henry                             | T. V. Vo, <i>Contributing Member</i>        |
| R. Hinkle                               | C. D. Cowfer, <i>Honorary Member</i>        |
| K. Hojo                                 | E. B. Gerlach, <i>Honorary Member</i>       |
| A. E. Keyser                            | R. E. Gimple, <i>Honorary Member</i>        |
| H. Malikowski                           | F. E. Gregor, <i>Honorary Member</i>        |
| S. L. McCracken                         | R. D. Kerr, <i>Honorary Member</i>          |
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| J. Nygaard                              | R. A. Yonekawa, <i>Honorary Member</i>      |
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| C. Gao                       | Q. W. Wang  |
| Y. Guanghua                  | Z. S. Wang  |
| Y. B. Guo                    | L. Xing     |
| Y. Hongqi                    | F. Xu       |
| D. R. Horn                   | S. X. Xu    |
| Y. Hou                       | Q. Yin      |
| Y. S. Li                     | Y. Zhe      |
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| J. Broussard                  | M. A. Richter                        |
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| T. Carraher                   | R. Sindelar                          |
| D. Dunn                       | M. Staley                            |
| N. Fales                      | J. Tatman                            |
| R. C. Folley                  | J. Wellwood                          |
| A. Gonzalez                   | K. A. Whitney                        |
| G. Grant                      | X. J. Zhai                           |
| B. Gutherman                  | P.-S. Lam, <i>Alternate</i>          |
| M. W. Joseph                  | G. White, <i>Alternate</i>           |
| M. Keene                      | H. Smith, <i>Contributing Member</i> |
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**Task Group on Mitigation and Repair of Spent Nuclear Fuel Canisters (WG-SNFS & TCS) (BPV XI)**

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| K. Dietrich             | M. Richter      |
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| N. Palm                      |              |

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| M. M. Farooq               | D. J. Shim                              |
| T. J. Griesbach            | A. Udyawar                              |
| K. Hojo                    | T. V. Vo                                |
| M. Kirk                    | G. M. Wilkowski                         |
| D. R. Lee                  | K. Hasegawa, <i>Contributing Member</i> |
| Y. S. Li                   | H. S. Mehta, <i>Contributing Member</i> |

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**Task Group on Inspectability (BPV XI)**

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| A. Cardillo                   | S. Matsumoto   |
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**Task Group on Evaluation of Beyond Design Basis Events (SG-ES) (BPV XI)**

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| P. R. Donavin              | K. Voelsing                             |
| R. G. Gilada               | G. M. Wilkowski                         |
| T. J. Griesbach            | F. G. Abatt, <i>Contributing Member</i> |
| M. Hayashi                 | H. S. Mehta, <i>Contributing Member</i> |
| K. Hojo                    |                                         |



**Working Group on Flaw Evaluation  
(SG-ES) (BPV XI)**

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| H. D. Chung                 | S. Noronha                              |
| N. G. Cofie                 | R. K. Qashu                             |
| M. A. Erickson              | D. A. Scarth                            |
| C. M. Faidy                 | W. L. Server                            |
| M. M. Farooq                | D. J. Shim                              |
| B. R. Ganta                 | S. Smith                                |
| R. G. Gilada                | M. Uddin                                |
| C. Guzman-Leong             | A. Udyawar                              |
| K. Hojo                     | T. V. Vo                                |
| F. Iwamatsu                 | M. Walter                               |
| S. Kalyanam                 | K. Wang                                 |
| Y. Kim                      | B. Wasiluk                              |
| V. Lacroix                  | G. M. Wilkowski                         |
| D. R. Lee                   | H. S. Mehta, <i>Contributing Member</i> |
| Y. S. Li                    |                                         |

**Working Group on Flaw Evaluation Reference Curves  
(SG-ES) (BPV XI)**

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| A. E. Freed                    | T. V. Vo                                |
| K. Hasegawa                    | G. White                                |
| K. Hojo                        | S. X. Xu                                |
| F. Iwamatsu                    | H. S. Mehta, <i>Contributing Member</i> |
| V. Lacroix                     |                                         |

**Working Group on High Temperature Flaw Evaluation  
(SG-ES) (BPV XI)**

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| P. Carter                      | D. A. Scarth              |
| K. Gresh                       | D. J. Shim                |
| S. Kalyanam                    | A. Udyawar                |
| B. Lin                         | X. Wei                    |
| B.-L. Lyow                     | S. X. Xu                  |
| M. C. Messner                  | J. Bass, <i>Alternate</i> |

**Working Group on Operating Plant Criteria (SG-ES) (BPV XI)**

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| M. A. Erickson               | W. L. Server                            |
| A. E. Freed                  | C. A. Tomes                             |
| T. J. Griesbach              | A. Udyawar                              |
| B. Hall                      | T. V. Vo                                |
| M. Hayashi                   | H. Q. Xu                                |
| R. Janowiak                  | M. Yamamoto                             |
| S. A. Kleinsmith             | E. Haywood, <i>Alternate</i>            |
| H. Kobayashi                 | H. S. Mehta, <i>Contributing Member</i> |
| A. D. Odell                  |                                         |

**Task Group on Appendix L (WG-OPC) (SG-ES) (BPV XI)**

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| C. Coleman                   | H. Park      |
| J. I. Duo                    | S. Ranganath |
| A. E. Freed                  | A. Scott     |
| M. A. Gray                   | D. J. Shim   |
| T. J. Griesbach              | S. Smith     |
| H. Nam                       | A. Udyawar   |
| A. Nana                      | T. V. Vo     |

**Working Group on Pipe Flaw Evaluation (SG-ES) (BPV XI)**

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| S. Kalyanam, <i>Secretary</i> | R. O. McGill                            |
| K. Azuma                      | G. A. Miessi                            |
| F. W. Brust                   | S. M. Parker                            |
| H. D. Chung                   | S. H. Pellet                            |
| R. C. Cipolla                 | D. Rudland                              |
| N. G. Cofie                   | C. J. Sallaberry                        |
| C. M. Faidy                   | W. L. Server                            |
| M. M. Farooq                  | D. J. Shim                              |
| B. R. Ganta                   | S. Smith                                |
| R. G. Gilada                  | M. F. Uddin                             |
| S. R. Gosselin                | A. Udyawar                              |
| C. E. Guzman-Leong            | T. V. Vo                                |
| K. Hasegawa                   | K. Wang                                 |
| K. Hojo                       | B. Wasiluk                              |
| D. N. Hopkins                 | G. M. Wilkowski                         |
| E. J. Houston                 | S. X. Xu                                |
| F. Iwamatsu                   | Y. Zou                                  |
| R. Janowiak                   | K. Gresh, <i>Alternate</i>              |
| Y. Kim                        | H. S. Mehta, <i>Contributing Member</i> |
| V. Lacroix                    |                                         |

**Task Group on Code Case N-513 (WG-PFE) (SG-ES) (BPV XI)**

|                                |              |
|--------------------------------|--------------|
| R. O. McGill, <i>Chair</i>     | R. Janowiak  |
| S. M. Parker, <i>Secretary</i> | M. Kassab    |
| G. A. Antaki                   | S. H. Pellet |
| R. C. Cipolla                  | D. Rudland   |
| M. M. Farooq                   | D. A. Scarth |
| K. Gresh                       | S. X. Xu     |
| E. J. Houston                  |              |

**Task Group on Evaluation Procedures for Degraded Buried Pipe  
(WG-PFE) (SG-ES) (BPV XI)**

|                            |              |
|----------------------------|--------------|
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| S. X. Xu, <i>Secretary</i> | M. Moenssens |
| F. G. Abatt                | R. M. Pace   |
| G. A. Antaki               | S. H. Pellet |
| R. C. Cipolla              | D. Rudland   |
| R. G. Gilada               | D. A. Scarth |
| R. Janowiak                |              |

**Task Group on Flaw Evaluation for HDPE Pipe  
(WG-PFE) (SG-ES) (BPV XI)**

|                           |              |
|---------------------------|--------------|
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| P. Krishnaswamy           | M. Troughton |
| C. Liu                    | R. Wolfe     |
| M. Moenssens              | J. Wright    |
| D. P. Munson              | S. X. Xu     |
| D. A. Scarth              |              |

**Subgroup on Nondestructive Examination (BPV XI)**

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| A. Bushmire                 | J. T. Lindberg               |
| T. L. Chan                  | F. J. Schaaf, Jr.            |
| D. R. Cordes                | D. R. Slivon                 |
| S. E. Cumblidge             | R. V. Swain                  |
| K. J. Hacker                | C. A. Nove, <i>Alternate</i> |

**Task Group on Nonmetallic Component Degradation and Failure Monitoring (SG-RIM) (BPV XI)**

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| A. Tzelepi, <i>Secretary</i> | W. J. Geringer |
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| S. Baylis                    | P.-A. Juan     |
| G. Beirnaert                 | J. Lang        |
| A. A. Campbell               | C. Marks       |
| C. Chen                      | J. Potgieter   |

**Working Group on Personnel Qualification and Surface Visual and Eddy Current Examination (SG-NDE) (BPV XI)**

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| D. Brown                      | C. Shinsky  |
| T. Cinson                     | R. Tedder   |
| S. E. Cumblidge               | T. Thulien  |
| N. Farenbaugh                 | J. T. Timm  |
| J. Harrison                   |             |

**ASME/JSME Joint Working Group on RIM Processes and System-Based Code (SG-RIM) (BPV XI)**

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| M. Hayashi                | D. Watanabe                            |
| S. Kalyanam               | H. Yada                                |
| D. R. Lee                 | K. Yamada                              |
| H. Machida                | T. Asayama, <i>Contributing Member</i> |
| M. Mallet                 | T. Lupold, <i>Contributing Member</i>  |
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**Working Group on Procedure Qualification and Volumetric Examination (SG-NDE) (BPV XI)**

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| D. R. Cordes                 | R. V. Swain              |
| K. J. Hacker                 | D. Van Allen             |
| R. E. Jacob                  | J. Williams              |
| W. A. Jensen                 | B. Lin, <i>Alternate</i> |

**Subgroup on Repair/Replacement Activities (BPV XI)**

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| S. B. Brown                          | G. C. Park       |
| R. Clow                              | A. Patel         |
| S. J. Findlan                        | R. A. Patel      |
| M. L. Hall                           | R. R. Stevenson  |
| R. Hinkle                            | R. W. Swayne     |
| J. Honcharik                         | J. G. Weicks     |
| A. B. Meichler                       |                  |

**Subgroup on Reliability and Integrity Management Program (BPV XI)**

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| M. T. Audrain                   | C. J. Sallaberry                       |
| N. Broom                        | F. J. Schaaf, Jr.                      |
| F. W. Brust                     | H. M. Stephens, Jr.                    |
| S. R. Doctor                    | R. W. Swayne                           |
| J. D. Fletcher                  | S. Takaya                              |
| J. T. Fong                      | C. Wax                                 |
| K. Harris                       | B. K. Welch                            |
| P. J. Hennessey                 | R. W. Youngblood                       |
| S. Kalyanam                     | B. Lin, <i>Alternate</i>               |
| D. R. Lee                       | V. Chugh, <i>Contributing Member</i>   |
| C. Mallet                       | R. Grantom, <i>Contributing Member</i> |
| R. J. McReynolds                | T. Lupold, <i>Contributing Member</i>  |

**Working Group on Design and Programs (SG-RRR) (BPV XI)**

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| R. A. Patel, <i>Secretary</i> | G. C. Park      |
| O. Bhatti                     | M. A. Pyne      |
| R. Clow                       | A. Rezaei       |
| R. R. Croft                   | R. R. Stevenson |
| E. V. Farrell, Jr.            | K. Sullivan     |
| K. Harris                     | R. W. Swayne    |
| H. Malikowski                 |                 |

**Task Group on Repair and Replacement Optimization (WG-D&P) (SG-RRR) (BPV XI)**

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|---------------------------------|-----------------|
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| S. J. Findlan, <i>Secretary</i> | D. Jacobs       |
| T. Basso                        | H. Malikowski   |
| R. Clow                         | G. C. Park      |
| K. Dietrich                     | A. Patel        |
| E. V. Farrell, Jr.              | R. R. Stevenson |
| M. J. Ferlisi                   | J. G. Weicks    |
| R. C. Folley                    |                 |

**Working Group on MANDE (SG-RIM) (BPV XI)**

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| M. Orihuela, <i>Vice Chair</i>    | D. O. Henry                           |
| M. Turnbow, <i>Secretary</i>      | R. J. McReynolds                      |
| T. Anselmi                        | R. Meyer                              |
| M. T. Audrain                     | K. Yamada                             |
| S. R. Doctor                      | T. Lupold, <i>Contributing Member</i> |
| N. A. Finney                      |                                       |

**Working Group on Nonmetals Repair/Replacement Activities  
(SG-RRR) (BPV XI)**

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|---------------------------------|------------------------------------------|
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| S. W. Choi                      | R. Stakenborghs                          |
| M. Golliet                      | P. Vibien                                |
| J. Johnston, Jr.                | M. P. Marohl, <i>Contributing Member</i> |
| T. M. Musto                     | A. Pridmore, <i>Contributing Member</i>  |

**Subgroup on Water-Cooled Systems (BPV XI)**

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| J. Collins                   | M. A. Pyne                              |
| H. Q. Do                     | H. M. Stephens, Jr.                     |
| K. W. Hall                   | M. Weis                                 |
| P. J. Hennessey              | B. K. Welch                             |
| A. Keller                    | I. A. Anchondo-Lopez, <i>Alternate</i>  |
| A. E. Keyser                 | Y.-K. Chung, <i>Contributing Member</i> |
| S. D. Kulat                  |                                         |

**Task Group on Repair by Carbon Fiber Composites  
(WG-NMRR) (SG-RRR) (BPV XI)**

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| D. Cimock                | N. Otten         |
| M. J. Constable          | A. Pridmore      |
| M. Elen                  | S. Rios          |
| M. Golliet               | J. Sealey        |
| P. Krishnaswamy          | R. Stakenborghs  |
| M. Kuntz                 | D. J. Swaim      |
| H. Lu                    | M. Tatkowski     |
| L. Nadeau                | M. F. Uddin      |
| C. A. Nove               | J. Wen           |

**Task Group on High Strength Nickel Alloys Issues (SG-WCS) (BPV XI)**

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|-----------------------------|----------------|
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| C. Waskey, <i>Secretary</i> | S. E. Marlette |
| T. Cinson                   | J. Robinson    |
| J. Collins                  | D. Van Allen   |
| O. Cruz                     | G. White       |
| K. Dietrich                 | K. A. Whitney  |

**Working Group on Containment (SG-WCS) (BPV XI)**

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| S. Walden, <i>Secretary</i> | P. C. Smith   |
| H. T. Hill                  | R. S. Spencer |
| S. Johnson                  | A. Staller    |
| A. E. Keyser                | J. Swan       |
| P. Lehniger                 | C. Tillotson  |
| J. A. Munshi                | G. Z. Wang    |
| S. Richter                  | M. Weis       |

**Working Group on Welding and Special Repair Processes  
(SG-RRR) (BPV XI)**

|                               |                  |
|-------------------------------|------------------|
| J. G. Weicks, <i>Chair</i>    | D. Jacobs        |
| G. T. Olson, <i>Secretary</i> | M. Kris          |
| D. Barborak                   | S. E. Marlette   |
| K. Dietrich                   | S. L. McCracken  |
| S. J. Findlan                 | L. A. Melder     |
| R. C. Folley                  | J. E. O'Sullivan |
| M. L. Hall                    | A. Patel         |
| J. Honcharik                  |                  |

**Working Group on Inspection of Systems and Components  
(SG-WCS) (BPV XI)**

|                           |               |
|---------------------------|---------------|
| H. Q. Do, <i>Chair</i>    | A. Keller     |
| M. Weis, <i>Secretary</i> | E. E. Keyser  |
| R. W. Blyde               | S. D. Kulat   |
| J. Collins                | E. Lantz      |
| M. J. Ferlisi             | J. C. Nygaard |
| M. L. Garcia Heras        | S. Orita      |
| K. W. Hall                | R. S. Spencer |
| E. Henry                  | M. Walter     |
| J. Howard                 | A. W. Wilkens |

**Task Group on Temper Bead Welding  
(WG-W&SRP) (SG-RRR) (BPV XI)**

|                             |                  |
|-----------------------------|------------------|
| S. J. Findlan, <i>Chair</i> | H. Kobayashi     |
| J. Tatman, <i>Secretary</i> | S. L. McCracken  |
| D. Barborak                 | N. Mohr          |
| D. Barton                   | G. T. Olson      |
| R. C. Folley                | J. E. O'Sullivan |
| J. Graham                   | A. Patel         |
| M. L. Hall                  | J. G. Weicks     |
| D. Jacobs                   |                  |

**Working Group on Pressure Testing (SG-WCS) (BPV XI)**

|                                |               |
|--------------------------------|---------------|
| S. A. Norman, <i>Chair</i>     | S. Levitus    |
| M. Moenssens, <i>Secretary</i> | R. A. Nettles |
| T. Anselmi                     | J. Swan       |
| A. Knighton                    | K. Whitney    |
| D. W. Lamond                   |               |

**Task Group on Weld Overlay (WG-W&SRP) (SG-RRR) (BPV XI)**

|                               |                |
|-------------------------------|----------------|
| S. L. McCracken, <i>Chair</i> | S. E. Marlette |
| S. Hunter, <i>Secretary</i>   | S. K. Min      |
| D. Barborak                   | G. T. Olson    |
| D. Barton                     | A. Patel       |
| S. J. Findlan                 | D. W. Sandusky |
| J. Graham                     | J. Tatman      |
| M. L. Hall                    | J. G. Weicks   |
| D. Jacobs                     |                |

**Working Group on Risk-Informed Activities (SG-WCS) (BPV XI)**

|                                   |               |
|-----------------------------------|---------------|
| M. A. Pyne, <i>Chair</i>          | J. T. Jewell  |
| S. T. Chesworth, <i>Secretary</i> | S. D. Kulat   |
| G. Brouette                       | D. W. Lamond  |
| R. Fougereousse                   | E. Lantz      |
| J. Hakii                          | P. J. O'Regan |
| K. W. Hall                        | N. A. Palm    |
| M. J. Homiack                     | S. E. Woolf   |

**Working Group on General Requirements (BPV XI)**

|                               |                             |
|-------------------------------|-----------------------------|
| D. Vetter, <i>Chair</i>       | A. Mills                    |
| S. E. Woolf, <i>Secretary</i> | G. Ramaraj                  |
| T. L. Chan                    | T. N. Rezk                  |
| P. J. Hennessey               | A. T. Roberts III           |
| R. Hinkle                     | B. K. Welch                 |
| K. A. Kavanagh                | B. Harris, <i>Alternate</i> |

**Subgroup on Nonmandatory Appendices (BPV XII)**

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| T. A. Rogers, <i>Chair</i>        | T. J. Rishel                         |
| S. Staniszewski, <i>Secretary</i> | R. C. Sallash                        |
| P. Chilukuri                      | D. G. Shelton                        |
| N. J. Paulick                     | Y. Doron, <i>Contributing Member</i> |
| M. Pitts                          |                                      |

**COMMITTEE ON TRANSPORT TANKS (BPV XII)**

|                               |                                       |
|-------------------------------|---------------------------------------|
| N. J. Paulick, <i>Chair</i>   | J. Roberts                            |
| M. D. Rana, <i>Vice Chair</i> | T. A. Rogers                          |
| J. Oh, <i>Staff Secretary</i> | R. C. Sallash                         |
| A. N. Antoniou                | M. Shah                               |
| K. W. A. Cheng                | S. Staniszewski                       |
| P. Chilukuri                  | A. P. Varghese                        |
| O. Mulet                      | R. Meyers, <i>Contributing Member</i> |
| M. Pitts                      |                                       |

**COMMITTEE ON OVERPRESSURE PROTECTION (BPV XIII)**

|                                         |                                                 |
|-----------------------------------------|-------------------------------------------------|
| B. K. Nutter, <i>Chair</i>              | J. F. Ball, <i>Contributing Member</i>          |
| A. Donaldson, <i>Vice Chair</i>         | R. W. Barnes, <i>Contributing Member</i>        |
| C. E. Rodrigues, <i>Staff Secretary</i> | R. D. Danzy, <i>Contributing Member</i>         |
| R. Antoniuk                             | J. Grace, <i>Contributing Member</i>            |
| T. P. Beirne                            | S. F. Harrison, Jr., <i>Contributing Member</i> |
| Joey Burgess                            | A. Hassan, <i>Contributing Member</i>           |
| D. B. DeMichael                         | P. K. Lam, <i>Contributing Member</i>           |
| J. W. Dickson                           | M. Mengon, <i>Contributing Member</i>           |
| B. Engman                               | J. Mize, <i>Contributing Member</i>             |
| K. R. May                               | M. Mullavey, <i>Contributing Member</i>         |
| D. Miller                               | J. Phillips, <i>Contributing Member</i>         |
| T. Patel                                | S. Ruesenberg, <i>Contributing Member</i>       |
| B. F. Pittel                            |                                                 |
| T. R. Tarbay                            | K. Shores, <i>Contributing Member</i>           |
| D. E. Tompkins                          | D. E. Tezzo, <i>Contributing Member</i>         |
| J. A. West                              | A. Wilson, <i>Contributing Member</i>           |
| M. Edwards, <i>Alternate</i>            |                                                 |

**Executive Committee (BPV XII)**

|                                  |                 |
|----------------------------------|-----------------|
| M. D. Rana, <i>Chair</i>         | M. Pitts        |
| N. J. Paulick, <i>Vice Chair</i> | T. A. Rogers    |
| J. Oh, <i>Staff Secretary</i>    | S. Staniszewski |
| P. Chilukuri                     |                 |

**Executive Committee (BPV XIII)**

|                                         |              |
|-----------------------------------------|--------------|
| A. Donaldson, <i>Chair</i>              | K. R. May    |
| B. K. Nutter, <i>Vice Chair</i>         | T. Patel     |
| C. E. Rodrigues, <i>Staff Secretary</i> | B. F. Pittel |
| T. Beirne                               |              |

**Subgroup on Design and Materials (BPV XII)**

|                            |                                                |
|----------------------------|------------------------------------------------|
| P. Chilukuri, <i>Chair</i> | A. P. Varghese                                 |
| K. W. A. Cheng             | K. Xu                                          |
| S. L. McWilliams           | D. K. Chandiramani, <i>Contributing Member</i> |
| N. J. Paulick              | Y. Doron, <i>Contributing Member</i>           |
| M. D. Rana                 | M. Pitts, <i>Contributing Member</i>           |
| T. J. Rishel               | D. G. Shelton, <i>Contributing Member</i>      |
| T. A. Rogers               | B. E. Spencer, <i>Contributing Member</i>      |
| R. C. Sallash              | J. Zheng, <i>Contributing Member</i>           |
| M. Shah                    |                                                |
| S. Staniszewski            |                                                |

**Subgroup on Design and Materials (BPV XIII)**

|                                       |                                          |
|---------------------------------------|------------------------------------------|
| T. Patel, <i>Chair</i>                | D. Miller                                |
| V. Kalyanasundaram, <i>Vice Chair</i> | T. R. Tarbay                             |
| A. Williams, <i>Secretary</i>         | J. A. West                               |
| T. K. Acharya                         | D. J. Azukas, <i>Contributing Member</i> |
| W. E. Chapin                          | R. D. Danzy, <i>Contributing Member</i>  |
| B. Joergensen                         | M. Mullavey, <i>Contributing Member</i>  |
| R. Krithivasan                        | G. Ramirez, <i>Contributing Member</i>   |
| J. Latshaw                            | S. Zalar, <i>Contributing Member</i>     |

**Subgroup on Fabrication, Inspection, and Continued Service (BPV XII)**

|                                |                                          |
|--------------------------------|------------------------------------------|
| M. Pitts, <i>Chair</i>         | J. Roberts                               |
| P. Chilukuri, <i>Secretary</i> | R. C. Sallash                            |
| K. W. A. Cheng                 | S. Staniszewski                          |
| Y. Doron                       | K. Mansker, <i>Contributing Member</i>   |
| M. Koprivnak                   | G. McRae, <i>Contributing Member</i>     |
| O. Mulet                       | T. A. Rogers, <i>Contributing Member</i> |
| T. J. Rishel                   |                                          |

**Subgroup on General Requirements (BPV XIII)**

|                            |                                           |
|----------------------------|-------------------------------------------|
| B. F. Pittel, <i>Chair</i> | D. E. Tezzo                               |
| J. Grace, <i>Secretary</i> | D. E. Tompkins                            |
| R. Antoniuk                | J. F. White                               |
| J. F. Ball                 | M. Edwards, <i>Alternate</i>              |
| Joey Burgess               | P. Chavdarov, <i>Contributing Member</i>  |
| John Burgess               | J. L. Freiler, <i>Contributing Member</i> |
| D. B. DeMichael            | G. D. Goodson, <i>Contributing Member</i> |
| A. Donaldson               | B. Joergensen, <i>Contributing Member</i> |
| S. T. French               | P. K. Lam, <i>Contributing Member</i>     |
| J. Horne                   | E. Pearson, <i>Contributing Member</i>    |
| R. Klimas, Jr.             | J. Phillips, <i>Contributing Member</i>   |
| Z. E. Kumana               | S. Ruesenberg, <i>Contributing Member</i> |
| D. Mainiero-Cessna         | S. Zalar, <i>Contributing Member</i>      |
| K. R. May                  |                                           |
| J. Mize                    |                                           |
| L. Moedinger               |                                           |
| M. Mullavey                |                                           |
| A. Peck                    |                                           |

**Subgroup on General Requirements (BPV XII)**

|                               |                                              |
|-------------------------------|----------------------------------------------|
| S. Staniszewski, <i>Chair</i> | T. J. Rishel                                 |
| A. N. Antoniou                | R. C. Sallash                                |
| P. Chilukuri                  | Y. Doron, <i>Contributing Member</i>         |
| J. L. Freiler                 | S. L. McWilliams, <i>Contributing Member</i> |
| O. Mulet                      |                                              |
| B. F. Pittel                  | T. A. Rogers, <i>Contributing Member</i>     |
| M. Pitts                      | D. G. Shelton, <i>Contributing Member</i>    |

**Subgroup on Nuclear (BPV XIII)**

|                                  |                                          |
|----------------------------------|------------------------------------------|
| K. R. May, <i>Chair</i>          | S. Jones                                 |
| J. F. Ball, <i>Vice Chair</i>    | D. Miller                                |
| R. Krithivasan, <i>Secretary</i> | T. Patel                                 |
| M. Brown                         | B. J. Yonsky                             |
| J. W. Dickson                    | J. Yu, <i>Alternate</i>                  |
| N. Hansing                       | S. T. French, <i>Contributing Member</i> |

**Subgroup on Testing (BPV XIII)**

|                                  |                                           |
|----------------------------------|-------------------------------------------|
| T. P. Beirne, <i>Chair</i>       | R. Lack, <i>Alternate</i>                 |
| J. W. Dickson, <i>Vice Chair</i> | M. Brown, <i>Contributing Member</i>      |
| C. Hofmeister, <i>Secretary</i>  | J. Mize, <i>Contributing Member</i>       |
| V. Chicola III                   | M. Mullavey, <i>Contributing Member</i>   |
| B. Engman                        | S. Ruesenberg, <i>Contributing Member</i> |
| R. J. Garnett                    | C. Sharpe, <i>Contributing Member</i>     |
| R. Houk                          | K. Shores, <i>Contributing Member</i>     |
| N. Jump                          | A. Strecker, <i>Contributing Member</i>   |
| B. K. Nutter                     | A. Wilson, <i>Contributing Member</i>     |
| J. R. Thomas, Jr.                |                                           |
| C. Bauer, <i>Alternate</i>       |                                           |

**COMMITTEE ON NUCLEAR CERTIFICATION (CNC)**

|                                   |                                                 |
|-----------------------------------|-------------------------------------------------|
| R. R. Stevenson, <i>Chair</i>     | T. N. Rezk                                      |
| M. A. Lockwood, <i>Vice Chair</i> | E. A. Whittle                                   |
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| S. Andrews                        | M. Blankinship, <i>Alternate</i>                |
| A. Appleton                       | G. Brouette, <i>Alternate</i>                   |
| G. Claffey                        | Y. Diaz-Castillo, <i>Alternate</i>              |
| N. DeSantis                       | P. D. Edwards, <i>Alternate</i>                 |
| C. Dinic                          | R. Hinkle, <i>Alternate</i>                     |
| G. Gobbi                          | K. M. Hottle, <i>Alternate</i>                  |
| J. Grimm                          | J. Kiefer, <i>Alternate</i>                     |
| J. W. Highlands                   | S. J. Montano, <i>Alternate</i>                 |
| K. A. Kavanagh                    | R. Spuhl, <i>Alternate</i>                      |
| J. C. Krane                       | M. Wilson, <i>Alternate</i>                     |
| B. McGlone                        | S. Yang, <i>Alternate</i>                       |
| I. Olson                          | M. Burke, <i>Contributing Member</i>            |
| E. L. Pleins                      | S. F. Harrison, Jr., <i>Contributing Member</i> |
| L. Ponce                          |                                                 |
| T. E. Quaka                       |                                                 |

**COMMITTEE ON BOILER AND PRESSURE VESSEL CONFORMITY ASSESSMENT (CBPVCA)**

|                                  |                                         |
|----------------------------------|-----------------------------------------|
| L. E. McDonald, <i>Chair</i>     | P. Williams                             |
| E. Whittle, <i>Vice Chair</i>    | T. P. Beirne, <i>Alternate</i>          |
| G. Moino, <i>Staff Secretary</i> | N. Caputo, <i>Alternate</i>             |
| P. Chavdarov                     | J. M. Downs, <i>Alternate</i>           |
| J. P. Chicoine                   | Y.-S. Kim, <i>Alternate</i>             |
| A. Donaldson                     | B. L. Krasiun, <i>Alternate</i>         |
| T. E. Hansen                     | K. Roewe, <i>Alternate</i>              |
| W. Hibdon                        | B. C. Turczynski, <i>Alternate</i>      |
| M. Prefumo                       | R. Underwood, <i>Alternate</i>          |
| R. Rockwood                      | J. Yu, <i>Alternate</i>                 |
| G. Scribner                      | D. Cheetham, <i>Contributing Member</i> |
| D. E. Tuttle                     | A. J. Spencer, <i>Honorary Member</i>   |
| R. V. Wielgoszinski              |                                         |

# CORRESPONDENCE WITH THE COMMITTEE

## General

ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Section of the ASME Boiler and Pressure Vessel Code (BPVC) should be sent to the staff secretary noted on the Section's committee web page, accessible at <https://go.asme.org/CSCcommittees>.

NOTE: See ASME BPVC Section II, Part D for guidelines on requesting approval of new materials. See Section II, Part C for guidelines on requesting approval of new welding and brazing materials ("consumables").

## Revisions and Errata

The committee processes revisions to this Code on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Code. Approved revisions will be published in the next edition of the Code.

In addition, the committee may post errata and Special Notices at <http://go.asme.org/BPVCerrata>. Errata and Special Notices become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata and Special Notices.

This Code is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

## Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Code

(4) to permit use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Code.

(c) The committee will consider proposed cases concerning the following topics only:

(1) equipment to be marked with the ASME Single Certification Mark, or

(2) equipment to be constructed as a repair/replacement activity under the requirements of Section XI

(d) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Code Section and the paragraph, figure, or table number to which the proposed case applies

(4) the editions of the Code to which the proposed case applies

(e) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Cases that have been approved will appear in the next edition or supplement of the Code Cases books, "Boilers and Pressure Vessels" or "Nuclear Components." Each Code Cases book is updated with seven Supplements. Supplements will be sent or made available automatically to the purchasers of the Code Cases books until the next edition of the Code. Annulments of Code Cases become effective six months after the first announcement of the annulment in a Code Case Supplement or Edition of the appropriate Code Case book. The status of any case is available at <http://go.asme.org/BPVCCDatabase>. An index of the complete list of Boiler and Pressure Vessel Code Cases and Nuclear Code Cases is available at <http://go.asme.org/BPVCC>.



## Interpretations

(a) Interpretations clarify existing Code requirements and are written as a question and reply. Interpretations do not introduce new requirements. If a revision to resolve conflicting or incorrect wording is required to support the interpretation, the committee will issue an intent interpretation in parallel with a revision to the Code.

(b) Upon request, the committee will render an interpretation of any requirement of the Code. An interpretation can be rendered only in response to a request submitted through the online Inquiry Submittal Form at <http://go.asme.org/InterpretationRequest>. Upon submitting the form, the inquirer will receive an automatic email confirming receipt.

(c) ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Code requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers may track the status of their requests at <http://go.asme.org/Interpretations>.

(d) ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME committee or subcommittee. ASME does not “approve,” “certify,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

(e) Interpretations are published in the ASME Interpretations Database at <http://go.asme.org/Interpretations> as they are issued.

## Committee Meetings

The ASME BPVC committees regularly hold meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the applicable committee. Information on future committee meetings can be found at <http://go.asme.org/BCW>.

## SUMMARY OF CHANGES

Changes listed below are identified on the pages by a margin note, **(25)**, placed next to the affected area.

| <i>Page</i> | <i>Location</i>                                                  | <i>Change</i>                                                                  |
|-------------|------------------------------------------------------------------|--------------------------------------------------------------------------------|
| xiii        | List of Sections                                                 | Title of Section XI, Division 1 revised                                        |
| xiv         | Foreword                                                         | Third, fourth, seventh, tenth, and eleventh paragraphs editorially revised     |
| xvii        | Personnel                                                        | Updated                                                                        |
| 1           | Statement of Policy on Information Provided in the Stress Tables | Last paragraph added                                                           |
| 8–11        | Table 1A                                                         | (1) Lines 9 and 15 revised<br>(2) Line 14 deleted                              |
| 12–15       | Table 1A                                                         | Lines 24–27 and 30–33 revised                                                  |
| 16–19       | Table 1A                                                         | (1) Lines 11, 27, and 30 revised<br>(2) Line 33 deleted                        |
| 20–23       | Table 1A                                                         | Lines 19 and 22 revised                                                        |
| 24–27       | Table 1A                                                         | (1) Lines 7 and 31 revised<br>(2) Line 15 deleted<br>(3) Lines 32 and 38 added |
| 32–35       | Table 1A                                                         | Lines 10, 14, and 19 revised                                                   |
| 36–39       | Table 1A                                                         | Lines 7, 14, 32, and 44 revised                                                |
| 40–43       | Table 1A                                                         | Lines 1, 17, and 37 revised                                                    |
| 44–47       | Table 1A                                                         | Line 13 revised                                                                |
| 52–55       | Table 1A                                                         | Lines 10, 15, 24, 27, 30, 36, 37, 39, 40, 42, and 43 revised                   |
| 56–59       | Table 1A                                                         | Lines 5, 6, and 22–25 deleted                                                  |
| 60–63       | Table 1A                                                         | Line 34 revised                                                                |
| 64–67       | Table 1A                                                         | Lines 11, 13, 28, and 30 added                                                 |
| 72–75       | Table 1A                                                         | Lines 3–45 added                                                               |
| 76–79       | Table 1A                                                         | (1) Lines 1, 3–22, and 31–45 added<br>(2) Line 27 revised                      |
| 80–83       | Table 1A                                                         | Lines 1–44 added                                                               |
| 88–91       | Table 1A                                                         | Lines 15, 16, 19, 20, 22, 23, 26, 27, 33, 40, and 41 revised                   |
| 92–95       | Table 1A                                                         | Lines 1, 2, 4, 5, 7, 8, 36, 37, 40, 41, 43, and 44 revised                     |
| 96–99       | Table 1A                                                         | Lines 1 and 2 revised                                                          |
| 100–103     | Table 1A                                                         | Lines 25 and 26 revised                                                        |
| 104–107     | Table 1A                                                         | Lines 4, 9, 10, 13, 14, 17, 18, 21, 22 and 26–29 revised                       |
| 108–111     | Table 1A                                                         | Lines 31, 32, 36, 37, 39, and 40 revised                                       |

| <i>Page</i> | <i>Location</i>   | <i>Change</i>                                                                                                     |
|-------------|-------------------|-------------------------------------------------------------------------------------------------------------------|
| 112–115     | Table 1A          | Lines 12, 13, 19–24, 27, 28, 31–34, 39, 40, and 43–45 revised                                                     |
| 116–119     | Table 1A          | Lines 1, 2, 4, 7, 9–14, 17–28, 42, and 43 revised                                                                 |
| 120–123     | Table 1A          | Lines 19, 20, 36, 37, 42, and 45 revised                                                                          |
| 124–127     | Table 1A          | Lines 1–5, 19, 20, 25–27, 31–34, 36–42, and 45 revised                                                            |
| 128–131     | Table 1A          | Lines 1, 6–9, 11, 17, and 18 revised                                                                              |
| 148–151     | Table 1A          | Lines 20, 21, 31, 32, 38, and 39 revised                                                                          |
| 152–155     | Table 1A          | Lines 37, 39, 40, and 44 revised                                                                                  |
| 156–159     | Table 1A          | Lines 33 and 34 revised                                                                                           |
| 160–163     | Table 1A          | Lines 21, 22, 40, and 41 revised                                                                                  |
| 172, 173    | Notes to Table 1A | General Note (a) revised and Notes H3 and H4 deleted                                                              |
| 196–199     | Table 1B          | Lines 36–42 revised                                                                                               |
| 200–203     | Table 1B          | Lines 5–25 revised                                                                                                |
| 204–207     | Table 1B          | (1) Lines 2, 3, and 28 added<br>(2) Lines 8–18, 23, 36, and 37 revised                                            |
| 208–211     | Table 1B          | (1) Lines 3, 6, 7, 23, 24, 29, 30, 35, and 36 added<br>(2) Lines 4, 16–22, 25, 28, 31, 34, 37, 42, and 43 revised |
| 212–215     | Table 1B          | Lines 1, 2, 5–23, and 28–31 revised                                                                               |
| 228–231     | Table 1B          | Lines 16–21 and 31 revised                                                                                        |
| 252–255     | Table 1B          | Lines 21 and 27 revised                                                                                           |
| 312–314     | Table 2A          | Lines 26 and 27 revised                                                                                           |
| 316–318     | Table 2A          | (1) Line 22 revised<br>(2) Lines 23 and 25 added                                                                  |
| 324–326     | Table 2A          | Lines 29 and 30 revised                                                                                           |
| 328–330     | Table 2A          | Line 40 revised                                                                                                   |
| 336–338     | Table 2A          | Lines 35 and 36 revised                                                                                           |
| 340–342     | Table 2A          | Line 32 deleted                                                                                                   |
| 344–346     | Table 2A          | Lines 13, 15, 26, and 28 added                                                                                    |
| 348–350     | Table 2A          | Lines 28–38 added                                                                                                 |
| 399, 400    | Notes to Table 2A | (1) General Note (a) and Note E4 revised<br>(2) Notes G22, G23, and W8 added                                      |
| 406–408     | Table 2B          | (1) Lines 11–14 added<br>(2) Lines 22–25, 27–29, 31–41, 43, and 44 revised                                        |
| 410–412     | Table 2B          | Lines 26, 36, and 37 revised                                                                                      |
| 430–433     | Table 3           | (1) Line 4 deleted<br>(2) Lines 5 and 29 revised                                                                  |
| 438–441     | Table 3           | Lines 16 and 17 added                                                                                             |
| 446–449     | Table 3           | Lines 11–14, 16–18, 35, 40, 44, and 45 revised                                                                    |
| 450–453     | Table 3           | Lines 1–4 revised                                                                                                 |

| <i>Page</i> | <i>Location</i>   | <i>Change</i>                                                                                |
|-------------|-------------------|----------------------------------------------------------------------------------------------|
| 460–462     | Table 4           | Line 8 revised                                                                               |
| 472–475     | Table 5A          | Lines 38 and 39 revised                                                                      |
| 476–479     | Table 5A          | (1) Line 21 revised<br>(2) Lines 22 and 24 added                                             |
| 484–487     | Table 5A          | Lines 5 and 6 revised                                                                        |
| 488–491     | Table 5A          | Line 5 revised                                                                               |
| 492–495     | Table 5A          | Lines 22, 23, and 30–32 revised                                                              |
| 496–499     | Table 5A          | (1) Line 10 deleted<br>(2) Lines 35, 37, and 45 added                                        |
| 500–503     | Table 5A          | Lines 2 and 39–45 added                                                                      |
| 504–507     | Table 5A          | Lines 1–4 added                                                                              |
| 520–523     | Table 5A          | Lines 33–38 revised                                                                          |
| 532         | Notes to Table 5A | General Note (a) revised and Notes G17 through G19 added                                     |
| 538–541     | Table 5B          | (1) Lines 17–20 added<br>(2) Lines 34–39 and 42 revised                                      |
| 560, 561    | Table 6A          | Line 32 added                                                                                |
| 562, 563    | Table 6A          | (1) Lines 20 and 32–35 revised<br>(2) Line 22 added<br>(3) Line 25 deleted                   |
| 564, 565    | Table 6A          | (1) Line 13 revised<br>(2) Line 29 deleted                                                   |
| 566, 567    | Table 6A          | Lines 1–5 and 10 added                                                                       |
| 570, 571    | Table 6B          | (1) Lines 5, 17, and 18 added<br>(2) Lines 25–45 revised                                     |
| 572, 573    | Table 6B          | Lines 1–24, 28–30, 33, 36, 39, and 44 revised                                                |
| 574, 575    | Table 6B          | Lines 1 and 25–28 revised                                                                    |
| 586, 587    | Table 6D          | Lines 21–40 added                                                                            |
| 588, 589    | Table 6D          | Lines 1–5 added                                                                              |
| 592–595     | Table U           | (1) Lines 1–5, 8, 14, 22, 28, 35, and 39 added<br>(2) Line 20 deleted                        |
| 600–603     | Table U           | (1) Line 16 deleted<br>(2) Line 43 added                                                     |
| 604–607     | Table U           | Line 37 deleted                                                                              |
| 608–611     | Table U           | (1) Line 7 added<br>(2) Lines 9 and 14 revised                                               |
| 612–615     | Table U           | (1) Lines 2, 7, 13, 15–17, 22, and 28–37 added<br>(2) Line 18 deleted<br>(3) Line 19 revised |
| 616–619     | Table U           | Lines 12 and 13 added                                                                        |
| 620–623     | Table U           | (1) Lines 18–30 and 35 added<br>(2) Line 36 revised                                          |

| <i>Page</i> | <i>Location</i> | <i>Change</i>                                                                |
|-------------|-----------------|------------------------------------------------------------------------------|
| 624–627     | Table U         | Line 1 added                                                                 |
| 632–635     | Table U         | Line 19 revised                                                              |
| 640–643     | Table U         | Lines 44 and 45 revised                                                      |
| 644–647     | Table U         | Lines 1–12 and 30–44 revised                                                 |
| 648–651     | Table U         | (1) Lines 4 and 6 added<br>(2) Lines 9, 20, and 21 deleted                   |
| 652–655     | Table U         | Lines 31, 32, and 39 added                                                   |
| 656–659     | Table U         | Lines 2, 3, 18, 20, 34, and 36 added                                         |
| 660–663     | Table U         | Lines 12–15, 17, 19, 21, 22, and 43–45 added                                 |
| 664–667     | Table U         | Lines 1–12, 17–23, and 29–45 added                                           |
| 668–671     | Table U         | Lines 1 and 2 added                                                          |
| 676–679     | Table U         | Line 31 added                                                                |
| 688–691     | Table U         | Lines 16 and 17 added                                                        |
| 740–743     | Table U         | Line 36 revised                                                              |
| 744–747     | Table U         | Lines 11–16 and 24–41 revised                                                |
| 748–751     | Table U         | (1) Lines 21–26 and 43 revised<br>(2) Line 36 added                          |
| 752–755     | Table U         | Lines 14–18, 23, 24, 29, 30, 35, 36, 39, 41, and 43 revised                  |
| 756–759     | Table U         | Lines 7, 10, 11, 22, 23, 25, and 27–29 revised                               |
| 776–779     | Table U         | Line 45 revised                                                              |
| 780–783     | Table U         | Line 6 revised                                                               |
| 788–791     | Table U         | Lines 24–34 added                                                            |
| 792–795     | Table U         | Lines 16–21 added                                                            |
| 808–811     | Table U         | Lines 17 and 25 added                                                        |
| 814–818     | Table Y-1       | (1) Lines 3, 9, 17, 23, 30, and 34 added<br>(2) Line 15 deleted              |
| 826–830     | Table Y-1       | Line 25 deleted                                                              |
| 832–836     | Table Y-1       | (1) Line 12 added<br>(2) Lines 14 and 18 revised                             |
| 838–842     | Table Y-1       | (1) Line 16 deleted<br>(2) Lines 31, 34, and 40 added<br>(3) Line 33 revised |
| 844–848     | Table Y-1       | Lines 30, 35, 41, and 43–45 added                                            |
| 850–854     | Table Y-1       | (1) Line 1 deleted<br>(2) Line 2 revised<br>(3) Lines 5, 44, and 45 added    |
| 862–866     | Table Y-1       | (1) Lines 11 and 24 added<br>(2) Lines 41 and 43 revised                     |
| 874–878     | Table Y-1       | Line 25 revised                                                              |

| <i>Page</i> | <i>Location</i>    | <i>Change</i>                                                                                                 |
|-------------|--------------------|---------------------------------------------------------------------------------------------------------------|
| 892–896     | Table Y-1          | Lines 7–20 and 38–45 revised                                                                                  |
| 898–902     | Table Y-1          | (1) Lines 1–7 revised<br>(2) Lines 12 and 14 added<br>(3) Lines 17, 28, and 29 deleted                        |
| 910–914     | Table Y-1          | Lines 10, 11, 26, 28, 42, and 44 added                                                                        |
| 916–920     | Table Y-1          | Lines 21–24 added                                                                                             |
| 922–926     | Table Y-1          | Lines 7–21, 26–32, and 38–45 added                                                                            |
| 928–932     | Table Y-1          | Lines 1–11 added                                                                                              |
| 940–944     | Table Y-1          | Line 41 added                                                                                                 |
| 958–962     | Table Y-1          | Lines 30 and 31 added                                                                                         |
| 1042–1046   | Table Y-1          | Lines 29–34 and 42–45 revised                                                                                 |
| 1048–1052   | Table Y-1          | Lines 1–14 and 35–39 revised                                                                                  |
| 1054–1058   | Table Y-1          | (1) Line 4 added<br>(2) Lines 11, 27–31, 36, 37, 42, and 43 revised                                           |
| 1060–1064   | Table Y-1          | (1) Lines 4, 6, 9, 11, 12, 14–17, 29, 30, 43, and 44 revised<br>(2) Line 32 deleted                           |
| 1066–1070   | Table Y-1          | Lines 1 and 3–5 revised                                                                                       |
| 1096–1100   | Table Y-1          | Lines 26 and 32 revised                                                                                       |
| 1114–1118   | Table Y-1          | Lines 9–19 added                                                                                              |
| 1120–1124   | Table Y-1          | Lines 1–6 added                                                                                               |
| 1144–1148   | Table Y-1          | Lines 13 and 21 added                                                                                         |
| 1149        | Notes to Table Y-1 | General Note (a) revised                                                                                      |
| 1152        | Table TE-1         | Note (1) revised                                                                                              |
| 1159        | Table TE-4         | N06617 added                                                                                                  |
| 1170        | Table TCD          | N06617 added and Note (5) revised                                                                             |
| 1184        | Table TM-1         | Note (2) revised                                                                                              |
| 1188        | Table TM-3         | Modulus of elasticity of C62300 for 300°F corrected by errata                                                 |
| 1189        | Table TM-4         | Modulus of elasticity for 1,600°F, 1,700°F, and 1,800°F added for N06617                                      |
| 1280        | Table HA-2         | Revised                                                                                                       |
| 1334        | 5-100              | Second and last paragraphs revised                                                                            |
| 1336        | 5-300              | Revised                                                                                                       |
| 1336        | 5-400              | First paragraph revised                                                                                       |
| 1337        | 5-700              | First paragraph revised                                                                                       |
| 1337        | 5-900              | Revised                                                                                                       |
| 1340        | 5-1500             | (1) First paragraph and subparas. (b) and (b)(2)(-a) through (b)(2)(-e) revised<br>(2) Subparagraph (c) added |



## CROSS-REFERENCING IN THE ASME BPVC

Paragraphs within the ASME BPVC may include subparagraph breakdowns, i.e., nested lists. The following is a guide to the designation and cross-referencing of subparagraph breakdowns:

*(a) Hierarchy of Subparagraph Breakdowns*

- (1) First-level breakdowns are designated as (a), (b), (c), etc.
- (2) Second-level breakdowns are designated as (1), (2), (3), etc.
- (3) Third-level breakdowns are designated as (-a), (-b), (-c), etc.
- (4) Fourth-level breakdowns are designated as (-1), (-2), (-3), etc.
- (5) Fifth-level breakdowns are designated as (+a), (+b), (+c), etc.
- (6) Sixth-level breakdowns are designated as (+1), (+2), etc.

*(b) Cross-References to Subparagraph Breakdowns.* Cross-references within an alphanumerically designated paragraph (e.g., PG-1, UIG-56.1, NCD-3223) do not include the alphanumeric designator of that paragraph. The cross-references to subparagraph breakdowns follow the hierarchy of the designators under which the breakdown appears.

The following examples show the format:

- (1) If X.1(c)(1)(-a) is referenced in X.1(c)(1), it will be referenced as (-a).
- (2) If X.1(c)(1)(-a) is referenced in X.1(c)(2), it will be referenced as (1)(-a).
- (3) If X.1(c)(1)(-a) is referenced in X.1(e)(1), it will be referenced as (c)(1)(-a).
- (4) If X.1(c)(1)(-a) is referenced in X.2(c)(2), it will be referenced as X.1(c)(1)(-a).

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# SUBPART 1

## STRESS TABLES

### STATEMENT OF POLICY ON INFORMATION PROVIDED IN THE STRESS TABLES (25)

The purpose of this Statement of Policy is to clarify which information in the stress tables is mandatory and which is not. The information and restrictions provided in the Notes found throughout the various stress tables provided in Section II, Part D, [Subpart 1](#), are mandatory. It is vital to recognize that lines of information in Tables 1A, 1B, 2A, 2B, 3, 4, 5A, 5B, 6A, 6B, 6C, and 6D frequently have essential information referenced in the Notes column. These Notes are organized as follows:

- (a) EXX: defining onset of values based on successful experience in service
- (b) GXX: general requirements
- (c) HXX: heat treatment requirements
- (d) SXX: size requirements
- (e) TXX: defining onset of time-dependent behavior
- (f) WXX: welding requirements

The specifications and grades or types, coupled with the assigned Notes for each line, provide the complete description of material in the context of the allowable stresses or design stress intensities. Additional requirements for particular types of construction must also be obtained from the rules governing the construction.

In Tables 1A, 2A, 5A, 6A, 6C, and 6D, the information in the Nominal Composition column is nonmandatory and is for information only. However, these nominal compositions are the primary sorting used in these six tables. See the Guideline on Locating Materials in Stress Tables, and in Tables of Mechanical and Physical Properties. The information in the Alloy Designation/UNS Number column is nonmandatory for specifications for which a grade or type is provided. This is primarily true for the non-stainless steel alloys in these tables. For specifications for which no type or grade is listed, the UNS number is mandatory. Particularly for the stainless steels, for which no type or grade is listed, the UNS number is the grade.

The only difference between Tables 1A, 2A, 5A, 6A, 6C, and 6D and Tables 1B, 2B, 5B, and 6B, with regard to the mandatory/nonmandatory nature of the information, is

that in Tables 1B, 2B, 5B, and 6B, the UNS number information is used as the basis of the sorting scheme for materials and is almost always mandatory.

Where provided, the information in the columns for Product Form, Specification Number, Type/Grade, Class/Condition/Temper, and External Pressure Chart Number is mandatory. The information in the P-Number and Group Number columns is also mandatory; however, the primary source for this information is Table QW/QB-422 in Section IX. When there is a conflict between the P-number and Group number information in these stress tables and that in Section IX, the numbers in Section IX shall govern.

The information in the Minimum Tensile Strength, Minimum Yield Strength, and Size/Thickness dimension columns is also mandatory; however, the primary source for this information is the material specifications in Section II, Parts A and B. These values are a primary basis for establishing the allowable stresses and design stress intensities. When there is a conflict between the tensile and yield strength values in the stress tables and those in the material specifications in Section II, Parts A and B, the minimum tensile and yield strength values in Parts A and B shall govern. For dual-unit specifications and for product forms for which separate U.S. Customary and Metric specifications are provided, for the Size/Thickness dimensions for size breaks at which the Minimum Specified Yield or Tensile Strengths, or both, decrease with increasing size or thickness, the values in the material specifications in Parts A and B shall govern. When there is a conflict between the maximum size or thickness values in the stress tables and those in the material specifications, the values in the stress tables shall govern.

The information in the Applicability and Maximum Temperature Limits columns is mandatory. Where a material is permitted for use in more than one Construction Code, and in the SI units version of these tables, the maximum use temperature limit in these columns is critical. The temperature to which allowable stress or design stress intensity values are listed is not necessarily the

temperature to which use is permitted by a particular Construction Code. Different Construction Codes often have different use temperature limits for the same material and condition. Further, values may be listed in the stress tables at temperatures above the maximum use temperature limit. These stress values are provided to permit interpolation to be used to determine the allowable stress or design stress intensity at temperatures between the next lowest temperature for which stress values are listed and the maximum-use temperature limit listed in these columns.

The stress tables contain External Pressure Chart assignments. The assignments shown in the stress tables are mandatory. The titles shown for the individual charts are for information only and do not establish whether the chart is suitable for any material. The highest temperature shown on the chart represents the maximum temperature that an assigned material can be used for compression or external pressure loading, unless the allowable stress tables' Notes, the chart, or construction code rules say otherwise.

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# GUIDELINE ON LOCATING MATERIALS IN STRESS TABLES, AND IN TABLES OF MECHANICAL AND PHYSICAL PROPERTIES

## 1 INTRODUCTION

The goal of this Guideline is to assist the users of Section II, Part D in locating materials in stress tables (Tables 1A, 1B, 2A, 2B, 3, 4, 5A, 5B, 6A, 6B, 6C, and 6D), tables of mechanical properties (Tables U and Y-1), and tables of physical properties (Tables TE-1 through TE-5, TCD, TM-1 through TM-5, and PRD). This Guideline defines the logic used to place materials within these tables.

## 2 STRESS TABLES

Stress tables are all found within Section II, Part D, Subpart 1. Tables 1A, 1B, 3, 5A, 5B, 6A, 6B, 6C, and 6D cover allowable stresses, while Tables 2A, 2B, and 4 cover design stress intensities. The governing allowable stresses for those materials are provided in ASME BPVC, Section IV. Although Subpart 1 also covers ultimate tensile strength and yield strength, the organization of those mechanical property tables will be discussed separately in para. 3. A table-by-table listing of the materials-organization logic used to place materials within the designated tables follows.

### 2.1 TABLE 1A

Table 1A provides allowable stresses for ferrous<sup>1</sup> materials used in Section I; Section III, Division 1, Classes 2 and 3; Section VIII, Division 1; and Section XII construction. Within Table 1A, the first step in ordering materials is to use their nominal compositions. These nominal compositions are nothing more than accepted compositional fingerprints or widely recognized designators for each alloy or alloy class. These nominal compositions are arranged in Table 1A as follows:

- (a) carbon steels
- (b) carbon steels with small additions of Cb, Ti, and V (microalloyed steels)
- (c) C- $\frac{1}{2}$ Mo steels
- (d) chromium steels, including ferritic stainless steels, by increasing Cr content [ $\frac{1}{2}$ Cr,  $\frac{3}{4}$ Cr, 1Cr,  $1\frac{1}{4}$ Cr,  $2\frac{1}{4}$ Cr, 3Cr, 5Cr, 9Cr, 11Cr, 12Cr, 13Cr, 15Cr, 17Cr (including 17Cr-4Ni-4Cu and 17Cr-4Ni-6Mn), 18Cr, 26Cr, 27Cr, and 29Cr]
- (e) manganese steels (Mn- $\frac{1}{4}$ Mo, Mn- $\frac{1}{2}$ Mo, Mn- $\frac{1}{2}$ Ni, and Mn-V)
- (f) silicon steel ( $1\frac{1}{2}$ Si- $\frac{1}{2}$ Mo)
- (g) nickel steels ( $\frac{1}{2}$ Ni,  $\frac{3}{4}$ Ni, 1Ni,  $1\frac{1}{4}$ Ni, 2Ni,  $2\frac{1}{2}$ Ni,  $2\frac{3}{4}$ Ni, 3Ni,  $3\frac{1}{2}$ Ni, 4Ni, 5Ni, 8Ni, and 9Ni)

(h) other high nickel steels [25Ni-15Cr-2Ti (Grade 660) and 29Ni-20Cr-3Cu-2Mo (CN7M)]

(i) high alloy steels, including the duplex stainless steels, in order of increasing chromium content [beginning with 14Cr-16Ni-6Si-Cu-Mo, then 16Cr-9Mn-2Ni-N, then 16Cr-12Ni-2Mo (316L), etc.], then by increasing nickel content within a given chromium or other alloy content [18Cr-8Ni, 18Cr-8Ni-N, 18Cr-8Ni-4Si-N, 18Cr-10Ni-Cb (first S34700, then S34709, S34800, and S34809), 18Cr-10Ni-Ti, 18Cr-11Ni, etc., ending with 29Cr-6.5Ni-2Mo-N]

Unfortunately, most specifications for materials do not give nominal compositions — and without that information, one may not know the nominal composition for a particular material in Table 1A. If the specification number and alloy grade or type designation are known, then one can go to Section IX, Table QW/QB-422 and find the corresponding nominal composition.

Now, for a given nominal composition, Table 1A is arranged by increasing strength — first tensile strength and then yield strength. For a given nominal composition, tensile strength, and yield strength, stress listings are provided in order of increasing specification number. Sometimes, for a given nominal composition, tensile strength, yield strength, and specification number/grade or type, there may be more than one line of stresses. At this point, the Notes referenced on the second page of each page set within Table 1A will define why there are two or more lines of stresses and when each applies.

### 2.2 TABLE 1B

Table 1B provides allowable stresses for nonferrous materials used in Section I; Section III, Division 1, Classes 2 and 3; Section VIII, Division 1; and Section XII construction. Aluminum alloys (UNS AXXXXX materials) are the first materials covered in Table 1B, followed by copper alloys (UNS CXXXXX), nickel alloys (UNS NXXXXX), and the reactive and refractory metals and alloys (UNS RXXXXX). Within this latter category there are the following:

- (a) chromium alloys (R2XXXX)
- (b) cobalt alloys (R3XXXX)
- (c) titanium alloys (R5XXXX)
- (d) zirconium alloys (R6XXXX)

Within each of these material class groupings, stress lines are first organized by increasing UNS (Unified Numbering System) number. The nonferrous specifications now show these numbers in association with grade designations. Then, for a given UNS number, stress lines are

next ordered by strength — first tensile strength and then yield strength. Finally, for a given UNS number, tensile strength, and yield strength, stress lines are ordered by increasing specification number. Again, some materials may have two or more stress lines even if their UNS number, tensile strength, yield strength, and specification number are the same. The Notes provide direction for the applicability of each line.

For those material specifications that may not show UNS numbers associated with alloy grades, one again can refer to Section IX, Table QW/QB-422 for that information.

For Table 1B, nominal compositions are shown only for the NXXXXX and RXXXXX materials, but they have no influence on the location of alloys in the table. In this Table, the nominal compositions are simply for information.

### 2.3 TABLE 2A

Table 2A provides design stress intensities for ferrous materials for Section III, Division 1, Classes 1, MC, and CS; Section III, Division 3; and Section III, Division 5 construction; and allowable stresses for ferrous materials for Section VIII, Division 2, Class 1 construction. This Table is organized in the same manner as Table 1A. Refer back to para. 2.1 for that description.

### 2.4 TABLE 2B

Table 2B provides design stress intensities for nonferrous materials for Section III, Division 1, Classes 1, MC, and CS; Section III, Division 3; and Section III, Division 5 construction; and allowable stresses for nonferrous materials for Section VIII, Division 2, Class 1 construction. Table 2B materials are ordered in the same manner as in Table 1B. Refer back to para. 2.2 for that description.

### 2.5 TABLE 3

Table 3 provides allowable stresses for bolting materials for use in Section III, Division 1, Classes 2 and 3; Section VIII, Division 1; Section VIII, Division 2 (using Section VIII, Division 2, Part 4.16); and Section XII construction. The table first covers ferrous materials and then nonferrous materials. For the ferrous materials, the ordering logic parallels that used in Tables 1A and 2A — first by nominal composition, then by increasing ultimate tensile strength, then by increasing yield strength, and finally by increasing specification number. Again, refer back to para. 2.1 for a discussion on nominal composition.

Nonferrous materials are presented using the same logic as in Tables 1B and 2B; see para. 2.2 for that discussion.

### 2.6 TABLE 4

Table 4 provides design stress intensities for bolting materials used in Section III, Division 1, Classes 1 and MC; Section III, Division 3; and Section III, Division 5;

and allowable stresses for bolting materials used in Section VIII, Division 2 (using Section VIII, Division 2, Part 5 and Annex 5.F).

Table 4 is organized in the same manner as Table 3 — first covering ferrous materials and then nonferrous materials — except that Table 4 covers far fewer materials. For the ordering logic, again refer to paras. 2.1 and 2.2 for ferrous and nonferrous materials, respectively.

### 2.7 TABLE 5A

Table 5A provides allowable stresses for ferrous materials for Section VIII, Division 2, Class 2 construction. This Table is organized in the same manner as Table 1A. Refer back to para. 2.1 for that description.

### 2.8 TABLE 5B

Table 5B provides allowable stresses for nonferrous materials for Section VIII, Division 2, Class 2 construction. This Table is organized in the same manner as Table 1B. Refer back to para. 2.2 for that description.

### 2.9 TABLE 6A

Table 6A provides allowable stresses for ferrous materials for Section IV construction. This Table is organized in the same manner as Table 1A. Refer back to para. 2.1 for that description.

### 2.10 TABLE 6B

Table 6B provides allowable stresses for nonferrous materials for Section IV construction. This Table is organized in the same manner as Table 1B. Refer back to para. 2.2 for that description.

### 2.11 TABLE 6C

Table 6C provides allowable stresses for Section IV construction of lined water heaters. This Table is organized in the same manner as Table 1A. Refer back to para. 2.1 for that description.

### 2.12 TABLE 6D

Table 6D provides allowable stresses for Section IV construction of unlined water heaters. This Table is organized in the same manner as Table 1A. Refer back to para. 2.1 for that description.

## 3 MECHANICAL PROPERTY TABLES

Ultimate tensile strength values and yield strength values are to be used in design calculations according to the rules of the Construction Codes. However, they are not to be construed as minimum strength values at temperature. This is explained in the General Notes to these tables. Paragraphs 3.1 through 3.3 provide a table-by-table listing of the materials-organization logic.



Tensile (Table U) and yield (Table Y-1) strengths at elevated temperatures are based on trend curves determined by statistical curve fitting of submitted mechanical property data. Wrought materials and cast materials are considered different materials. A material has only one trend curve for tensile strengths and one trend curve for yield strengths. Each curve is anchored to the minimum value at room temperature in its set of units. See Nonmandatory Appendix D for more information.

### 3.1 TABLE U

Table U provides tensile strength values for ferrous and nonferrous materials, in that order. The ordering logic for ferrous materials is the same as used in Table 1A, except yield strength level is not shown. Using the logic described in para. 2.1, stress lines are organized by nominal composition, then by increasing tensile strength level, and then by increasing specification number.

Nonferrous materials coverage begins following the last of the high alloy steels (25Cr-22Ni-2Mo-N). Coverage of nonferrous alloys begins with the UNS AXXXXX alloys, followed by NXXXXX and RXXXXX alloys. The ordering of materials within these three groups has been previously described in para. 2.2.

### 3.3 TABLE Y-1

Table Y-1 provides yield strength values for ferrous and nonferrous materials, in that order. Again, the ordering of yield strength lines parallels the logic described for ferrous and nonferrous materials in paras. 2.1 and 2.2, respectively. Unlike Table U, for ferrous materials, the tensile strength level does enter into the ordering process, again following nominal composition designation. Table Y-1's nonferrous materials listings begin with the aluminum-base alloys (UNS AXXXXX). These are followed by the copper materials (CXXXXX), nickel-base materials (NXXXXX), and the reactive and refractory metals and alloys (RXXXXX).

## 4 PHYSICAL PROPERTY TABLES

Since physical properties (thermal conductivity, thermal diffusivity, thermal expansion, and density), Young's modulus, and Poisson's ratio values can be shown for numerous materials with a single set of property values, most of the tables found in Section II, Part D, Subpart 2 are based on nominal composition. Paragraphs 4.1 through 4.4 describe how these tables are organized.

### 4.1 TABLE TE

Table TE covers thermal expansion behavior, presented in terms of A (instantaneous coefficient of thermal expansion), B (mean coefficient of thermal expansion), and C (linear thermal expansion). This Table is split into five parts as follows:

(a) Table TE-1 covers numerous individual ferrous materials and ferrous material groupings. Notes at the end of Table TE-1 list the nominal compositions covered by the designated groupings. Again, knowledge of the nominal composition for a given material is essential, and it was noted previously that these can be extracted from Section IX, Table QW/QB-422, given the specification number and grade or type designation.

(b) Table TE-2 covers aluminum alloys. One set of A/B/C values covers all of the aluminum-base materials listed in General Note (a) of Table TE-2.

(c) Table TE-3 covers copper alloys, currently in five general groupings: C1XXXX alloys, bronze alloys, brass alloys, 70Cu-30Ni, and 90Cu-10Ni. According to an article in ASM International's "Advanced Materials & Processes" (December 1999), the general terms of bronze and brass cover the following alloys:

(1) wrought copper-base alloys

(-a) C20500-C28580 — brasses (Cu-Zn)

(-b) C31200-C38590 — leaded brasses (Cu-Zn-Pb)

(-c) C40400-C49080 — tin brasses (Cu-Zn-Sn-Pb)

(-d) C60600-C64400 — aluminum bronzes (Cu-Al-Ni-Fe-Si-Sn)

(-e) C64700-C66100 — silicon bronzes (Cu-Si-Sn)

(2) cast copper-base alloys

(-a) C83300-C85800 — red and leaded red brasses (Cu-Zn-Sn-Pb)

(-b) C86100-C86800 — manganese bronzes and leaded manganese bronzes (Cu-Zn-Mn-Fe-Pb)

(-c) C90200-C94500 — tin bronzes and leaded tin bronzes (Cu-Sn-Zn-Pb)

(-d) C95300-C95810 — aluminum bronzes (Cu-Al-Fe-Ni)

This guidance should help define which group of A/B/C values of thermal expansion to select for a given brass or bronze.

(d) Table TE-4 provides thermal expansion values for nickel alloys and refractory alloys. The thermal expansion value sets for the nickel alloys are arranged by increasing UNS NXXXXX numbers.

(e) Table TE-5 provides thermal expansion values for two groupings of titanium-base alloys. One group covers only Grade 9; the other group covers the other alloys. In this Table, there is no reference to the UNS number, just to the grade number.

### 4.2 TABLE TCD

Table TCD provides both thermal conductivity (TC) and thermal diffusivity (TD) values for numerous ferrous and nonferrous materials and material groupings. The table begins with ferrous materials, split into groups of carbon and low alloy steels, followed by groups of high chromium steels and groups of high alloy steels. For each

of these groups, there is a listing of nominal composition designations found at the end of the table, defining the extent of coverage.

The next series of materials are the nickel-base alloys, covered by TC/TD listings for nickel alloys (arranged by increasing UNS number) and refractory alloys. Then there are TC/TD listings for individual titanium and aluminum alloys (arranged by increasing UNS number). [Table TCD](#) does not currently provide values for copper or zirconium alloys.

#### 4.3 TABLE TM

Table TM provides moduli of elasticity for five categories of materials, as follows:

(a) [Table TM-1](#) covers ferrous materials in nine general categories and with additional lines for specific materials. Groups A through G are subdivided by nominal composition; see the Notes at the end of [Table TM-1](#).

(b) [Table TM-2](#) covers aluminum alloys, listed by UNS number designation.

(c) [Table TM-3](#) covers copper alloys, listed by UNS number designation.

(d) [Table TM-4](#) covers nickel alloys, listed by UNS number designation.

(e) [Table TM-5](#) covers titanium alloys, listed by increasing grade numbers, and zirconium-base alloys, listed by increasing UNS number (or grade) designation.

#### 4.4 TABLE PRD

[Table PRD](#) provides Poisson's ratio and density for ferrous and nonferrous materials.

### 5 REFERENCES

The official reference for UNS numbers is *Metals & Alloys in the Unified Numbering System*, ASTM DS-56. This document is periodically updated as various material specifications are revised, added, or deleted by their sponsoring organizations. Only UNS numbers published in this reference appear in Section II, Part A and Part B specifications, and in the various Section II, Part D stress tables, mechanical property tables, and physical property tables.

Nominal compositions are defined by various groups within the ASME Code committee structure and there are no published guidelines describing how these designations are developed. These designations have the greatest relevance in the arrangement of ferrous materials and, as indicated previously, the simplest way to obtain these designations is to look in Section IX of the ASME Boiler and Pressure Vessel Code and use Table QW/QB-422, which is arranged by increasing specification number. These start with the "SA" specification numbers, followed by the "SB" numbers.

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**Table 1A**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.                  |
|----------|---------------------|--------------|---------------|------------|-----------------------|--------------------------|--------------------------------------|
| 1        | Carbon steel        | Sheet        | SA-1008       | CS-A       | ...                   | ...                      | ...                                  |
| 2        | Carbon steel        | Sheet        | SA-1008       | CS-B       | ...                   | ...                      | ...                                  |
| 3        | Carbon steel        | Bar          | SA-675        | 45         | ...                   | ...                      | ...                                  |
| 4        | Carbon steel        | Wld. pipe    | SA-134        | A283A      | ...                   | ...                      | ...                                  |
| 5        | Carbon steel        | Plate        | SA-285        | A          | K01700                | ...                      | ...                                  |
| 6        | Carbon steel        | Wld. pipe    | SA-672        | A45        | K01700                | ...                      | ...                                  |
| 7        | Carbon steel        | Sheet        | SA-414        | A          | K01501                | ...                      | ...                                  |
| 8        | Carbon steel        | Wld. tube    | SA-178        | A          | K01200                | ...                      | ...                                  |
| (25) 9   | Carbon steel        | Wld. tube    | SA-178        | A          | K01200                | ...                      | ...                                  |
| 10       | Carbon steel        | Smls. tube   | SA-179        | ...        | K01200                | ...                      | ...                                  |
| 11       | Carbon steel        | Smls. tube   | SA-192        | ...        | K01201                | ...                      | ...                                  |
| 12       | Carbon steel        | Wld. tube    | SA-214        | ...        | K01807                | ...                      | ...                                  |
| 13       | Carbon steel        | Smls. tube   | SA-556        | A2         | K01807                | ...                      | ...                                  |
| (25) 14  | ...                 | ...          | ...           | ...        | ...                   | ...                      | ...                                  |
| (25) 15  | Carbon steel        | Wld. pipe    | SA-53         | E/A        | K02504                | ...                      | ...                                  |
| 16       | Carbon steel        | Wld. pipe    | SA-53         | E/A        | K02504                | ...                      | ...                                  |
| 17       | Carbon steel        | Wld. pipe    | SA-53         | E/A        | K02504                | ...                      | ...                                  |
| 18       | Carbon steel        | Wld. pipe    | SA-53         | F/A        | ...                   | ...                      | ...                                  |
| 19       | Carbon steel        | Smls. pipe   | SA-53         | S/A        | K02504                | ...                      | ...                                  |
| 20       | Carbon steel        | Smls. pipe   | SA-53         | S/A        | K02504                | ...                      | ...                                  |
| 21       | Carbon steel        | Smls. pipe   | SA-106        | A          | K02501                | ...                      | ...                                  |
| 22       | Carbon steel        | Wld. pipe    | SA-135        | A          | ...                   | ...                      | ...                                  |
| 23       | Carbon steel        | Forged pipe  | SA-369        | FPA        | K02501                | ...                      | ...                                  |
| 24       | Carbon steel        | Wld. pipe    | SA-587        | ...        | K11500                | ...                      | ...                                  |
| 25       | Carbon steel        | Wld. pipe    | SA-587        | ...        | K11500                | ...                      | ...                                  |
| 26       | Carbon steel        | Bar          | SA-675        | 50         | ...                   | ...                      | ...                                  |
| 27       | Carbon steel        | Bar          | SA-675        | 50         | ...                   | ...                      | ...                                  |
| 28       | Carbon steel        | Wld. pipe    | SA-134        | A283B      | ...                   | ...                      | ...                                  |
| 29       | Carbon steel        | Plate        | SA-285        | B          | K02200                | ...                      | ...                                  |
| 30       | Carbon steel        | Plate        | SA-285        | B          | K02200                | ...                      | ...                                  |
| 31       | Carbon steel        | Wld. pipe    | SA-672        | A50        | K02200                | ...                      | ...                                  |
| 32       | Carbon steel        | Sheet        | SA-414        | B          | K02201                | ...                      | ...                                  |
| 33       | Carbon steel        | Plate        | SA/EN 10028-3 | P275NH     | ...                   | ...                      | $6 < t \leq 10$                      |
| 34       | Carbon steel        | Plate        | SA/EN 10028-2 | P235GH     | ...                   | ...                      | $\leq 2\frac{1}{4}$                  |
| 35       | Carbon steel        | Smls. tube   | SA/EN 10216-2 | P235GH     | ...                   | ...                      | $1\frac{5}{8} < t \leq 2\frac{1}{2}$ |
| 36       | Carbon steel        | Plate        | SA/EN 10028-3 | P275NH     | ...                   | ...                      | $4 < t \leq 6$                       |
| 37       | Carbon steel        | Smls. tube   | SA/EN 10216-2 | P235GH     | ...                   | ...                      | $\frac{5}{8} < t \leq 1\frac{5}{8}$  |
| 38       | Carbon steel        | Smls. tube   | SA/EN 10216-2 | P235GH     | ...                   | ...                      | $t \leq \frac{5}{8}$                 |
| 39       | Carbon steel        | Sheet, strip | SA-1011       | 36         | SS                    | Type 1                   | $t \leq 0.23$                        |
| 40       | Carbon steel        | Plate        | SA/EN 10028-3 | P275NH     | ...                   | ...                      | $2\frac{1}{4} < t \leq 4$            |
| 41       | Carbon steel        | Sheet, strip | SA-1011       | 40         | SS                    | ...                      | $t \leq 0.23$                        |
| 42       | Carbon steel        | Sheet, strip | SA-1011       | 45         | HSLAS                 | 2                        | ...                                  |
| 43       | Carbon steel        | Bar          | SA-675        | 55         | ...                   | ...                      | ...                                  |
| 44       | Carbon steel        | Bar          | SA-675        | 55         | ...                   | ...                      | ...                                  |
| 45       | Carbon steel        | Wld. pipe    | SA-134        | A283C      | K02401                | ...                      | ...                                  |

**Table 1A**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |                  |        |     |                             |                       |  |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|------------------|--------|-----|-----------------------------|-----------------------|--|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |                  |        |     | External Pressure Chart No. | Notes                 |  |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |                  |        |     |                             |                       |  |
|                                    |       |           |                            |                          | (SPT = Supports Only) |                  |        |     |                             |                       |  |
|                                    |       |           |                            |                          | I                     | III              | VIII-1 | XII |                             |                       |  |
| 1                                  | 1     | 1         | 40                         | 20                       | NP                    | NP               | 650    | NP  | CS-6                        | ...                   |  |
| 2                                  | 1     | 1         | 40                         | 20                       | NP                    | NP               | 650    | NP  | CS-6                        | ...                   |  |
| 3                                  | 1     | 1         | 45                         | 22.5                     | NP                    | 650 (Cl. 3 only) | 900    | 650 | CS-6                        | G10, G22, T10         |  |
| 4                                  | 1     | 1         | 45                         | 24                       | NP                    | 300 (Cl. 3 only) | NP     | NP  | CS-1                        | W12                   |  |
| 5                                  | 1     | 1         | 45                         | 24                       | 900                   | 700              | 900    | 650 | CS-1                        | G10, T2               |  |
| 6                                  | 1     | 1         | 45                         | 24                       | NP                    | 700              | NP     | NP  | CS-1                        | S6, W10, W12          |  |
| 7                                  | 1     | 1         | 45                         | 25                       | NP                    | NP               | 900    | 650 | CS-1                        | G10, T2               |  |
| 8                                  | 1     | 1         | 47                         | 26                       | 1000                  | NP               | NP     | NP  | CS-1                        | G4, G10, S1, T2, W13  |  |
| 9                                  | 1     | 1         | 47                         | 26                       | 1000                  | NP               | 1000   | 650 | CS-1                        | G10, G24, S1, T2, W6  |  |
| 10                                 | 1     | 1         | 47                         | 26                       | NP                    | NP               | 900    | 650 | CS-1                        | G10, T2               |  |
| 11                                 | 1     | 1         | 47                         | 26                       | 1000                  | NP               | 1000   | 650 | CS-1                        | G10, S1, T2           |  |
| 12                                 | 1     | 1         | 47                         | 26                       | NP                    | NP               | 1000   | 650 | CS-1                        | G24, T2, W6           |  |
| 13                                 | 1     | 1         | 47                         | 26                       | NP                    | NP               | 1000   | 650 | CS-1                        | G10, T2               |  |
| 14                                 | ...   | ...       | ...                        | ...                      | ...                   | ...              | ...    | ... | ...                         | ...                   |  |
| 15                                 | 1     | 1         | 48                         | 30                       | 900                   | NP               | NP     | NP  | CS-2                        | G10, S1, T2           |  |
| 16                                 | 1     | 1         | 48                         | 30                       | 900                   | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G10, S1, T2, W12, W13 |  |
| 17                                 | 1     | 1         | 48                         | 30                       | NP                    | NP               | 900    | 650 | CS-2                        | G24, T2, W6           |  |
| 18                                 | 1     | 1         | 48                         | 30                       | 750                   | NP               | NP     | NP  | CS-2                        | G2, G10, S10, T2, W15 |  |
| 19                                 | 1     | 1         | 48                         | 30                       | 900                   | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G10, S1, T2           |  |
| 20                                 | 1     | 1         | 48                         | 30                       | NP                    | 700 (SPT)        | 900    | 650 | CS-2                        | G10, T2               |  |
| 21                                 | 1     | 1         | 48                         | 30                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G10, S1, T1           |  |
| 22                                 | 1     | 1         | 48                         | 30                       | NP                    | NP               | 900    | 650 | CS-2                        | G24, T2, W6           |  |
| 23                                 | 1     | 1         | 48                         | 30                       | 1000                  | NP               | NP     | NP  | CS-2                        | G10, S1, T1           |  |
| 24                                 | 1     | 1         | 48                         | 30                       | NP                    | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | ...                   |  |
| 25                                 | 1     | 1         | 48                         | 30                       | NP                    | NP               | 850    | 650 | CS-2                        | G24, T2, W6           |  |
| 26                                 | 1     | 1         | 50                         | 25                       | NP                    | 650 (Cl. 3 only) | NP     | NP  | CS-1                        | ...                   |  |
| 27                                 | 1     | 1         | 50                         | 25                       | 850                   | 700 (SPT)        | 900    | 650 | CS-1                        | G10, G15, G22, S1, T2 |  |
| 28                                 | 1     | 1         | 50                         | 27                       | NP                    | 300 (Cl. 3 only) | NP     | NP  | CS-1                        | W12                   |  |
| 29                                 | 1     | 1         | 50                         | 27                       | 900                   | NP               | NP     | NP  | CS-1                        | G10, S1, T1           |  |
| 30                                 | 1     | 1         | 50                         | 27                       | NP                    | 700              | 900    | 650 | CS-1                        | G10, T1               |  |
| 31                                 | 1     | 1         | 50                         | 27                       | NP                    | 700              | NP     | NP  | CS-1                        | S6, T1, W10, W12      |  |
| 32                                 | 1     | 1         | 50                         | 30                       | NP                    | NP               | 900    | 650 | CS-2                        | G10, T1               |  |
| 33                                 | 1     | 1         | 51                         | 31                       | NP                    | NP               | 400    | NP  | CS-2                        | G10                   |  |
| 34                                 | 1     | 1         | 52                         | 31                       | NP                    | NP               | 700    | NP  | CS-2                        | T11                   |  |
| 35                                 | 1     | 1         | 52                         | 31                       | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T2, W14      |  |
| 36                                 | 1     | 1         | 52                         | 32.5                     | NP                    | NP               | 400    | NP  | CS-2                        | G10                   |  |
| 37                                 | 1     | 1         | 52                         | 32.5                     | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T2, W14      |  |
| 38                                 | 1     | 1         | 52                         | 34                       | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T2, W14      |  |
| 39                                 | ...   | ...       | 53                         | 36                       | NP                    | NP               | 600    | 600 | CS-2                        | ...                   |  |
| 40                                 | 1     | 1         | 53.5                       | 34                       | NP                    | NP               | 400    | NP  | CS-2                        | G10                   |  |
| 41                                 | ...   | ...       | 55                         | 40                       | NP                    | NP               | 600    | 600 | CS-2                        | ...                   |  |
| 42                                 | ...   | ...       | 55                         | 45                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                   |  |
| 43                                 | 1     | 1         | 55                         | 27.5                     | 850                   | 700 (SPT)        | 900    | 650 | CS-1                        | G10, G15, G22, S1, T2 |  |
| 44                                 | 1     | 1         | 55                         | 27.5                     | NP                    | 650 (Cl. 3 only) | NP     | NP  | CS-1                        | ...                   |  |
| 45                                 | 1     | 1         | 55                         | 30                       | NP                    | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | W12                   |  |

**Table 1A**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 11.4                                                                                                     | 11.4 | 11.4 | ...  | 11.4 | 11.4 | 10.9 | 10.2 | 9.99 | ...  | ...  | ...  | ... | ... |
| 2        | 11.4                                                                                                     | 11.4 | 11.4 | ...  | 11.4 | 11.4 | 10.9 | 10.2 | 9.9  | ...  | ...  | ...  | ... | ... |
| 3        | 12.9                                                                                                     | 12.9 | 12.9 | ...  | 12.9 | 12.8 | 12.2 | 11.5 | 11.1 | 10.7 | 10.4 | 9.2  | 7.9 | 5.9 |
| 4        | 12.9                                                                                                     | ...  | 12.9 | ...  | 12.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 5        | 12.9                                                                                                     | 12.9 | 12.9 | ...  | 12.9 | 12.9 | 12.9 | 12.3 | 11.9 | 11.5 | 10.7 | 9.2  | 7.9 | 5.9 |
| 6        | 12.9                                                                                                     | ...  | 12.9 | ...  | 12.9 | 12.9 | 12.9 | 12.3 | 11.9 | 11.5 | ...  | ...  | ... | ... |
| 7        | 12.9                                                                                                     | 12.9 | 12.9 | ...  | 12.9 | 12.9 | 12.9 | 12.8 | 12.4 | 11.9 | 10.7 | 9.2  | 7.9 | 5.9 |
| 8        | 13.4                                                                                                     | ...  | 13.4 | ...  | 13.4 | 13.4 | 13.4 | 13.3 | 12.8 | 12.4 | 10.7 | 9.2  | 7.9 | 5.9 |
| 9        | 11.4                                                                                                     | 11.4 | 11.4 | ...  | 11.4 | 11.4 | 11.4 | 11.3 | 10.9 | 10.5 | 9.1  | 7.8  | 6.7 | 5.0 |
| 10       | 13.4                                                                                                     | 13.4 | 13.4 | ...  | 13.4 | 13.4 | 13.4 | 13.3 | 12.8 | 12.4 | 10.7 | 9.2  | 7.9 | 5.9 |
| 11       | 13.4                                                                                                     | 13.4 | 13.4 | ...  | 13.4 | 13.4 | 13.4 | 13.3 | 12.8 | 12.4 | 10.7 | 9.2  | 7.9 | 5.9 |
| 12       | 11.4                                                                                                     | 11.4 | 11.4 | ...  | 11.4 | 11.4 | 11.4 | 11.3 | 10.9 | 10.5 | 9.1  | 7.8  | 6.7 | 5.0 |
| 13       | 13.4                                                                                                     | 13.4 | 13.4 | ...  | 13.4 | 13.4 | 13.4 | 13.3 | 12.8 | 12.4 | 10.7 | 9.2  | 7.9 | 5.9 |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 15       | 11.7                                                                                                     | ...  | 11.7 | ...  | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 10.6 | 9.1  | 7.7  | 6.1 | 4.3 |
| 16       | 13.7                                                                                                     | ...  | 13.7 | ...  | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 12.5 | 10.7 | 9.0  | 7.1 | 5.0 |
| 17       | 11.7                                                                                                     | 11.7 | 11.7 | ...  | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 10.6 | 9.1  | 7.9  | 6.7 | 5.5 |
| 18       | 8.2                                                                                                      | ...  | 8.2  | ...  | 8.2  | 8.2  | 8.2  | 8.2  | 8.2  | 7.5  | 6.4  | ...  | ... | ... |
| 19       | 13.7                                                                                                     | ...  | 13.7 | ...  | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 12.5 | 10.7 | 9.0  | 7.1 | 5.0 |
| 20       | 13.7                                                                                                     | 13.7 | 13.7 | ...  | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 12.5 | 10.7 | 9.3  | 7.9 | 6.5 |
| 21       | 13.7                                                                                                     | 13.7 | 13.7 | ...  | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 12.5 | 10.7 | 9.3  | 7.9 | 6.5 |
| 22       | 11.7                                                                                                     | 11.7 | 11.7 | ...  | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 10.6 | 9.1  | 7.9  | 6.7 | 5.5 |
| 23       | 13.7                                                                                                     | ...  | 13.7 | ...  | 13.7 | 13.7 | 13.7 | 13.7 | 13.7 | 12.5 | 10.7 | 9.0  | 7.1 | 5.0 |
| 24       | 13.7                                                                                                     | ...  | 13.7 | ...  | 13.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 25       | 11.7                                                                                                     | 11.7 | 11.7 | ...  | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 10.6 | 9.1  | 7.9  | 6.7 | ... |
| 26       | 14.3                                                                                                     | ...  | 14.3 | ...  | 14.3 | 14.2 | 13.6 | 12.8 | 12.4 | ...  | ...  | ...  | ... | ... |
| 27       | 14.3                                                                                                     | 14.3 | 14.3 | ...  | 14.3 | 14.2 | 13.6 | 12.8 | 12.4 | 11.9 | 10.7 | 9.3  | 7.9 | 6.5 |
| 28       | 14.3                                                                                                     | ...  | 14.3 | ...  | 14.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 29       | 14.3                                                                                                     | ...  | 14.3 | ...  | 14.3 | 14.3 | 14.3 | 13.8 | 13.3 | 12.5 | 11.0 | 9.4  | 7.3 | 5.0 |
| 30       | 14.3                                                                                                     | 14.3 | 14.3 | ...  | 14.3 | 14.3 | 14.3 | 13.8 | 13.3 | 12.5 | 11.2 | 9.6  | 8.1 | 5.9 |
| 31       | 14.3                                                                                                     | ...  | 14.3 | ...  | 14.3 | 14.3 | 14.3 | 13.8 | 13.3 | 12.5 | ...  | ...  | ... | ... |
| 32       | 14.3                                                                                                     | 14.3 | 14.3 | ...  | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 12.5 | 11.2 | 9.6  | 8.1 | 5.9 |
| 33       | 14.5                                                                                                     | 14.5 | 14.5 | ...  | 14.5 | 14.5 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 34       | 14.9                                                                                                     | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 14.6 | 12.5 | ...  | ... | ... |
| 35       | 14.9                                                                                                     | ...  | 14.9 | ...  | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 13.0 | 10.8 | 8.7 | 5.9 |
| 36       | 14.9                                                                                                     | 14.9 | 14.9 | ...  | 14.9 | 14.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 37       | 14.9                                                                                                     | ...  | 14.9 | ...  | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 13.0 | 10.8 | 8.7 | 5.9 |
| 38       | 14.9                                                                                                     | ...  | 14.9 | ...  | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 14.9 | 13.0 | 10.8 | 8.7 | 5.9 |
| 39       | 15.1                                                                                                     | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | ...  | ...  | ...  | ...  | ... | ... |
| 40       | 15.3                                                                                                     | 15.3 | 15.3 | ...  | 15.3 | 15.3 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 41       | 15.7                                                                                                     | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | ...  | ...  | ...  | ...  | ... | ... |
| 42       | 15.7                                                                                                     | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | ...  | ...  | ...  | ...  | ... | ... |
| 43       | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 14.9 | 14.1 | 13.6 | 13.1 | 12.7 | 10.8 | 8.7 | 5.9 |
| 44       | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 14.9 | 14.1 | 13.6 | ...  | ...  | ...  | ... | ... |
| 45       | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |



**Table 1A**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 3.4                                                                                                      | 2.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 3.4                                                                                                      | 2.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 4.5                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 3.0                                                                                                      | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form       | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.                    |
|----------|---------------------|--------------------|---------------|------------|-----------------------|--------------------------|----------------------------------------|
| 1        | Carbon steel        | Plate              | SA-283        | C          | K02401                | ...                      | ...                                    |
| 2        | Carbon steel        | Plate              | SA-285        | C          | K02801                | ...                      | ...                                    |
| 3        | Carbon steel        | Smls. & wld. pipe  | SA-333        | 1          | K03008                | ...                      | ...                                    |
| 4        | Carbon steel        | Smls. & wld. tube  | SA-334        | 1          | K03008                | ...                      | ...                                    |
| 5        | Carbon steel        | Wld. tube          | SA-334        | 1          | K03008                | ...                      | ...                                    |
| 6        | Carbon steel        | Plate              | SA-516        | 55         | K01800                | ...                      | ...                                    |
| 7        | Carbon steel        | Smls. pipe         | SA-524        | II         | K02104                | ...                      | ...                                    |
| 8        | Carbon steel        | Wld. pipe          | SA-671        | CA55       | K02801                | ...                      | ...                                    |
| 9        | Carbon steel        | Wld. pipe          | SA-671        | CE55       | K02202                | ...                      | ...                                    |
| 10       | Carbon steel        | Wld. pipe          | SA-672        | A55        | K02801                | ...                      | ...                                    |
| 11       | Carbon steel        | Wld. pipe          | SA-672        | B55        | K02001                | ...                      | ...                                    |
| 12       | Carbon steel        | Wld. pipe          | SA-672        | C55        | K01800                | ...                      | ...                                    |
| 13       | Carbon steel        | Wld. pipe          | SA-672        | E55        | K02202                | ...                      | ...                                    |
| 14       | Carbon steel        | Sheet              | SA-414        | C          | K02503                | ...                      | ...                                    |
| 15       | Carbon steel        | Plate              | SA/EN 10028-3 | P275NH     | ...                   | ...                      | $\leq 2\frac{1}{4}$                    |
| 16       | Carbon steel        | Bar                | SA-36         | ...        | K02600                | ...                      | ...                                    |
| 17       | Carbon steel        | Plate, sheet       | SA-36         | ...        | K02600                | ...                      | ...                                    |
| 18       | Carbon steel        | Plate, sheet       | SA-662        | A          | K01701                | ...                      | ...                                    |
| 19       | Carbon steel        | Sheet, strip       | SA-1011       | 36         | SS                    | Type 2                   | $t \leq 0.23$                          |
| 20       | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250A      | ...                   | ...                      | $t > 1\frac{1}{2}$                     |
| 21       | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250BR     | ...                   | ...                      | $t > 1\frac{1}{2}$                     |
| 22       | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250 B0    | ...                   | ...                      | $t > 1\frac{1}{2}$                     |
| 23       | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250C      | ...                   | ...                      | $t > 1\frac{1}{2}$                     |
| (25) 24  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250A      | ...                   | ...                      | $\frac{3}{4} \leq t \leq 1\frac{1}{2}$ |
| (25) 25  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250BR     | ...                   | ...                      | $\frac{3}{4} \leq t \leq 1\frac{1}{2}$ |
| (25) 26  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250 B0    | ...                   | ...                      | $\frac{3}{4} \leq t \leq 1\frac{1}{2}$ |
| (25) 27  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250C      | ...                   | ...                      | $\frac{3}{4} \leq t \leq 1\frac{1}{2}$ |
| 28       | Carbon steel        | Plate              | SA/EN 10028-2 | P265GH     | ...                   | ...                      | $\leq 2\frac{1}{4}$                    |
| 29       | Carbon steel        | Smls. tube         | SA/EN 10216-2 | P265GH     | ...                   | ...                      | $1\frac{5}{8} < t \leq 2\frac{1}{2}$   |
| (25) 30  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250A      | ...                   | ...                      | $t < \frac{3}{4}$                      |
| (25) 31  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250BR     | ...                   | ...                      | $t < \frac{3}{4}$                      |
| (25) 32  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250 B0    | ...                   | ...                      | $t < \frac{3}{4}$                      |
| (25) 33  | Carbon steel        | Plate, bar, shapes | SA/IS 2062    | E250C      | ...                   | ...                      | $t < \frac{3}{4}$                      |
| 34       | Carbon steel        | Smls. tube         | SA/EN 10216-2 | P265GH     | ...                   | ...                      | $\frac{5}{8} < t \leq 1\frac{5}{8}$    |
| 35       | Carbon steel        | Smls. tube         | SA/EN 10216-2 | P265GH     | ...                   | ...                      | $t \leq \frac{5}{8}$                   |
| 36       | Carbon steel        | Forgings           | SA-181        | ...        | K03502                | 60                       | ...                                    |
| 37       | Carbon steel        | Castings           | SA-216        | WCA        | J02502                | ...                      | ...                                    |
| 38       | Carbon steel        | Forgings           | SA-266        | 1          | K03506                | ...                      | ...                                    |
| 39       | Carbon steel        | Forgings           | SA-350        | LF1        | K03009                | 1                        | ...                                    |
| 40       | Carbon steel        | Castings           | SA-352        | LCA        | J02504                | ...                      | ...                                    |
| 41       | Carbon steel        | Cast pipe          | SA-660        | WCA        | J02504                | ...                      | ...                                    |
| 42       | Carbon steel        | Bar                | SA-675        | 60         | ...                   | ...                      | ...                                    |
| 43       | Carbon steel        | Bar                | SA-675        | 60         | ...                   | ...                      | ...                                    |
| 44       | Carbon steel        | Forgings           | SA-765        | I          | K03046                | ...                      | ...                                    |
| 45       | Carbon steel        | Plate              | SA-515        | 60         | K02401                | ...                      | ...                                    |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |                  |        |     |                             |                      |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|------------------|--------|-----|-----------------------------|----------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |                  |        |     | External Pressure Chart No. | Notes                |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     |                             |                      |
|                                    |       |           |                            |                          | I                                             | III              | VIII-1 | XII |                             |                      |
| 1                                  | 1     | 1         | 55                         | 30                       | NP                                            | 300 (Cl. 3 only) | 650    | 650 | CS-2                        | ...                  |
| 2                                  | 1     | 1         | 55                         | 30                       | 900                                           | 700              | 900    | 650 | CS-2                        | G10, S1, T2          |
| 3                                  | 1     | 1         | 55                         | 30                       | NP                                            | 700              | 650    | 650 | CS-2                        | W12, W14             |
| 4                                  | 1     | 1         | 55                         | 30                       | NP                                            | 700              | 650    | 650 | CS-2                        | W12, W14             |
| 5                                  | 1     | 1         | 55                         | 30                       | NP                                            | NP               | 650    | 650 | CS-2                        | G24, W6              |
| 6                                  | 1     | 1         | 55                         | 30                       | 850                                           | 700              | 1000   | 650 | CS-2                        | G10, S1, T2          |
| 7                                  | 1     | 1         | 55                         | 30                       | NP                                            | NP               | 1000   | 650 | CS-2                        | G10, T2              |
| 8                                  | 1     | 1         | 55                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |
| 9                                  | 1     | 1         | 55                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |
| 10                                 | 1     | 1         | 55                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |
| 11                                 | 1     | 1         | 55                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |
| 12                                 | 1     | 1         | 55                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |
| 13                                 | 1     | 1         | 55                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |
| 14                                 | 1     | 1         | 55                         | 33                       | NP                                            | 700              | 900    | 650 | CS-2                        | G10, T1              |
| 15                                 | 1     | 1         | 56.5                       | ...                      | NP                                            | NP               | 400    | 400 | CS-2                        | G10, G18             |
| 16                                 | 1     | 1         | 58                         | 36                       | 650                                           | 650 (SPT)        | 900    | 650 | CS-2                        | G10, G15, T1         |
| 17                                 | 1     | 1         | 58                         | 36                       | NP                                            | 700              | 650    | 650 | CS-2                        | G9, G10, T1          |
| 18                                 | 1     | 1         | 58                         | 40                       | NP                                            | NP               | 700    | 650 | CS-2                        | T1                   |
| 19                                 | ...   | ...       | 58                         | 36                       | NP                                            | NP               | 600    | 600 | CS-2                        | ...                  |
| 20                                 | 1     | 1         | 59.5                       | 33.4                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 21                                 | 1     | 1         | 59.5                       | 33.4                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 22                                 | 1     | 1         | 59.5                       | 36.3                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 23                                 | 1     | 1         | 59.5                       | 33.4                     | NP                                            | NP               | 650    | NP  | CS-2                        | ...                  |
| 24                                 | 1     | 1         | 59.5                       | 34.8                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 25                                 | 1     | 1         | 59.5                       | 34.8                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 26                                 | 1     | 1         | 59.5                       | 34.8                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 27                                 | 1     | 1         | 59.5                       | 34.8                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 28                                 | 1     | 1         | 59.5                       | 35.5                     | NP                                            | NP               | 700    | NP  | CS-2                        | T1                   |
| 29                                 | 1     | 1         | 59.5                       | 35.5                     | 1000                                          | NP               | 1000   | NP  | CS-2                        | G10, S1, T2          |
| 30                                 | 1     | 1         | 59.5                       | 36.3                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 31                                 | 1     | 1         | 59.5                       | 36.3                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 32                                 | 1     | 1         | 59.5                       | 33.4                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 33                                 | 1     | 1         | 59.5                       | 36.3                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...                  |
| 34                                 | 1     | 1         | 59.5                       | 37                       | 1000                                          | NP               | 1000   | NP  | CS-2                        | G10, S1, T2          |
| 35                                 | 1     | 1         | 59.5                       | 38.5                     | 1000                                          | NP               | 1000   | NP  | CS-2                        | G10, S1, T2          |
| 36                                 | 1     | 1         | 60                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G10, S1, T2          |
| 37                                 | 1     | 1         | 60                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G1, G10, G17, S1, T2 |
| 38                                 | 1     | 1         | 60                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G10, S1, T2          |
| 39                                 | 1     | 1         | 60                         | 30                       | NP                                            | 700              | 1000   | 650 | CS-2                        | G10, T2              |
| 40                                 | 1     | 1         | 60                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | G17                  |
| 41                                 | 1     | 1         | 60                         | 30                       | 1000                                          | 700              | NP     | NP  | CS-2                        | G1, G10, G17, S1, T2 |
| 42                                 | 1     | 1         | 60                         | 30                       | 850                                           | 700 (SPT)        | NP     | NP  | CS-2                        | G10, G15, S1, T2     |
| 43                                 | 1     | 1         | 60                         | 30                       | NP                                            | 650 (Cl. 3 only) | 900    | 650 | CS-2                        | G10, G22, T2         |
| 44                                 | 1     | 1         | 60                         | 30                       | NP                                            | NP               | 1000   | 650 | CS-2                        | G10, T2              |
| 45                                 | 1     | 1         | 60                         | 32                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G10, S1, T2          |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | ...  | ...  | ...  | ... | ... |
| 2        | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 3        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 4        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 5        | 13.4                                                                                                     | 13.4 | 13.4 | ...  | 13.4 | 13.4 | 13.4 | 13.0 | 12.6 | ...  | ...  | ...  | ... | ... |
| 6        | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 7        | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 8        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 9        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 10       | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 11       | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 12       | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 13       | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 14       | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 15       | 16.2                                                                                                     | 16.2 | 16.2 | ...  | 16.2 | 16.2 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 16       | 16.6                                                                                                     | 16.6 | 16.6 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 17       | 16.6                                                                                                     | ...  | 16.6 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 15.6 | ...  | ...  | ... | ... |
| 18       | 16.6                                                                                                     | 16.6 | 16.6 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 15.6 | ...  | ...  | ... | ... |
| 19       | 16.6                                                                                                     | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | ...  | ...  | ...  | ...  | ... | ... |
| 20       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 16.5 | ...  | ...  | ...  | ... | ... |
| 21       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 16.5 | ...  | ...  | ...  | ... | ... |
| 22       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 23       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 16.5 | ...  | ...  | ...  | ... | ... |
| 24       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 25       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 26       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 27       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 28       | 17.0                                                                                                     | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 15.6 | ...  | ...  | ... | ... |
| 29       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 13.0 | 10.8 | 8.7 | 5.9 |
| 30       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 31       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 32       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 16.5 | ...  | ...  | ...  | ... | ... |
| 33       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | ...  | ...  | ...  | ... | ... |
| 34       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 13.0 | 10.8 | 8.7 | 5.9 |
| 35       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 13.0 | 10.8 | 8.7 | 5.9 |
| 36       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 37       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 38       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 39       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 40       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | ...  | ...  | ... | ... |
| 41       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 42       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | ... |
| 43       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 44       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 16.3 | 15.3 | 14.8 | 14.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 45       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | 13.0 | 10.8 | 8.7 | 5.9 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 34       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.     | Type/Grade | Alloy Desig./UNS No. | Class/Condition/Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|---------------|------------|----------------------|------------------------|---------------------|
| 1        | Carbon steel        | Plate                 | SA-516        | 60         | K02100               | ...                    | ...                 |
| 2        | Carbon steel        | Wld. pipe             | SA-671        | CB60       | K02401               | ...                    | ...                 |
| 3        | Carbon steel        | Wld. pipe             | SA-671        | CC60       | K02100               | ...                    | ...                 |
| 4        | Carbon steel        | Wld. pipe             | SA-671        | CE60       | K02402               | ...                    | ...                 |
| 5        | Carbon steel        | Wld. pipe             | SA-672        | B60        | K02401               | ...                    | ...                 |
| 6        | Carbon steel        | Wld. pipe             | SA-672        | C60        | K02100               | ...                    | ...                 |
| 7        | Carbon steel        | Wld. pipe             | SA-672        | E60        | K02402               | ...                    | ...                 |
| 8        | Carbon steel        | Wld. pipe             | SA-134        | A283D      | K02702               | ...                    | ...                 |
| 9        | Carbon steel        | Plate                 | SA-283        | D          | K02702               | ...                    | ...                 |
| 10       | Carbon steel        | Wld. pipe             | SA-53         | E/B        | K03005               | ...                    | ...                 |
| (25) 11  | Carbon steel        | Wld. pipe             | SA-53         | E/B        | K03005               | ...                    | ...                 |
| 12       | Carbon steel        | Smls. pipe            | SA-53         | S/B        | K03005               | ...                    | ...                 |
| 13       | Carbon steel        | Smls. pipe            | SA-53         | S/B        | K03005               | ...                    | ...                 |
| 14       | Carbon steel        | Smls. pipe            | SA-106        | B          | K03006               | ...                    | ...                 |
| 15       | Carbon steel        | Wld. pipe             | SA-135        | B          | ...                  | ...                    | ...                 |
| 16       | Carbon steel        | Smls. & wld. fittings | SA-234        | WPB        | K03006               | ...                    | ...                 |
| 17       | Carbon steel        | Smls. & wld. pipe     | SA-333        | 6          | K03006               | ...                    | ...                 |
| 18       | Carbon steel        | Wld. pipe             | SA-333        | 6          | K03006               | ...                    | ...                 |
| 19       | Carbon steel        | Smls. & wld. tube     | SA-334        | 6          | K03006               | ...                    | ...                 |
| 20       | Carbon steel        | Wld. tube             | SA-334        | 6          | K03006               | ...                    | ...                 |
| 21       | Carbon steel        | Forged pipe           | SA-369        | FPB        | K03006               | ...                    | ...                 |
| 22       | Carbon steel        | Forgings              | SA-372        | A          | K03002               | ...                    | ...                 |
| 23       | Carbon steel        | Sheet                 | SA-414        | D          | K02505               | ...                    | ...                 |
| 24       | Carbon steel        | Smls. & wld. fittings | SA-420        | WPL6       | ...                  | ...                    | ...                 |
| 25       | Carbon steel        | Smls. pipe            | SA-524        | I          | K02104               | ...                    | ...                 |
| 26       | Carbon steel        | Bar                   | SA-696        | B          | K03200               | ...                    | ...                 |
| (25) 27  | Carbon steel        | Forgings              | SA-727        | ...        | K02506               | ...                    | ...                 |
| 28       | Carbon steel        | Wld. tube             | SA-178        | C          | K03503               | ...                    | ...                 |
| 29       | Carbon steel        | Wld. tube             | SA-178        | C          | K03503               | ...                    | ...                 |
| (25) 30  | Carbon steel        | Wld. tube             | SA-178        | C          | K03503               | ...                    | ...                 |
| 31       | Carbon steel        | Smls. tube            | SA-210        | A-1        | K02707               | ...                    | ...                 |
| 32       | Carbon steel        | Smls. tube            | SA-556        | B2         | K02707               | ...                    | ...                 |
| (25) 33  | ...                 | ...                   | ...           | ...        | ...                  | ...                    | ...                 |
| 34       | Carbon steel        | Plate, bar            | SA/CSA-G40.21 | 38W        | ...                  | ...                    | ...                 |
| 35       | Carbon steel        | Plate, sheet, bar     | SA-572        | 42         | ...                  | ...                    | $t \leq 6$          |
| 36       | Carbon steel        | Sheet, strip          | SA-1011       | 45         | HSLAS                | 1                      | ...                 |
| 37       | Carbon steel        | Sheet, strip          | SA-1011       | 45         | SS                   | ...                    | $t \leq 0.23$       |
| 38       | Carbon steel        | Sheet, strip          | SA-1011       | 50         | HSLAS                | 2                      | ...                 |
| 39       | Carbon steel        | Plate                 | SA/AS 1548    | PT430N     | ...                  | Normalized             | $\leq 6$            |
| 40       | Carbon steel        | Plate                 | SA/AS 1548    | PT430NR    | ...                  | Norm. rld.             | $\leq 6$            |
| 41       | Carbon steel        | Plate                 | SA/EN 10028-2 | P295GH     | ...                  | ...                    | $6 < t \leq 10$     |
| 42       | Carbon steel        | Plate                 | SA/EN 10028-2 | P295GH     | ...                  | ...                    | $4 < t \leq 6$      |
| 43       | Carbon steel        | Bar                   | SA-675        | 65         | ...                  | ...                    | ...                 |
| 44       | Carbon steel        | Castings              | SA-352        | LCB        | J03003               | ...                    | ...                 |
| 45       | Carbon steel        | Plate                 | SA-515        | 65         | K02800               | ...                    | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |                  |        |     |                             |                        |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|------------------|--------|-----|-----------------------------|------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |                  |        |     | External Pressure Chart No. | Notes                  |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     |                             |                        |
|                                    |       |           |                            |                          | I                                             | III              | VIII-1 | XII |                             |                        |
| 1                                  | 1     | 1         | 60                         | 32                       | 850                                           | 700              | 1000   | 650 | CS-2                        | G10, S1, T2            |
| 2                                  | 1     | 1         | 60                         | 32                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12           |
| 3                                  | 1     | 1         | 60                         | 32                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12           |
| 4                                  | 1     | 1         | 60                         | 32                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12           |
| 5                                  | 1     | 1         | 60                         | 32                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12           |
| 6                                  | 1     | 1         | 60                         | 32                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12           |
| 7                                  | 1     | 1         | 60                         | 32                       | NP                                            | 700              | NP     | NP  | CS-2                        | S6, W10, W12           |
| 8                                  | 1     | 1         | 60                         | 33                       | NP                                            | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | W12                    |
| 9                                  | 1     | 1         | 60                         | 33                       | NP                                            | 300 (Cl. 3 only) | 650    | 650 | CS-2                        | ...                    |
| 10                                 | 1     | 1         | 60                         | 35                       | 900                                           | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G10, S1, T1, W12, W13  |
| 11                                 | 1     | 1         | 60                         | 35                       | 900                                           | NP               | 900    | 650 | CS-2                        | G10, G24, S1, T1, W6   |
| 12                                 | 1     | 1         | 60                         | 35                       | 900                                           | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G10, S1, T1            |
| 13                                 | 1     | 1         | 60                         | 35                       | NP                                            | 700 (SPT)        | 900    | 650 | CS-2                        | G10, T1                |
| 14                                 | 1     | 1         | 60                         | 35                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G10, S1, T1            |
| 15                                 | 1     | 1         | 60                         | 35                       | NP                                            | NP               | 900    | 650 | CS-2                        | G24, T1, W6            |
| 16                                 | 1     | 1         | 60                         | 35                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G10, S1, T1            |
| 17                                 | 1     | 1         | 60                         | 35                       | 700                                           | 700              | 1000   | 650 | CS-2                        | G10, T1, W12, W13, W14 |
| 18                                 | 1     | 1         | 60                         | 35                       | 700                                           | NP               | NP     | NP  | CS-2                        | T1                     |
| 19                                 | 1     | 1         | 60                         | 35                       | NP                                            | 700              | 650    | 650 | CS-2                        | T1, W12, W14           |
| 20                                 | 1     | 1         | 60                         | 35                       | NP                                            | NP               | 650    | 650 | CS-2                        | G24, W6                |
| 21                                 | 1     | 1         | 60                         | 35                       | 1000                                          | NP               | NP     | NP  | CS-2                        | G10, S1, T1            |
| 22                                 | 1     | 1         | 60                         | 35                       | NP                                            | NP               | 650    | 650 | CS-2                        | ...                    |
| 23                                 | 1     | 1         | 60                         | 35                       | NP                                            | NP               | 900    | 650 | CS-2                        | G10, T1                |
| 24                                 | 1     | 1         | 60                         | 35                       | NP                                            | 700              | 850    | 650 | CS-2                        | G10, T1, W14           |
| 25                                 | 1     | 1         | 60                         | 35                       | NP                                            | NP               | 1000   | 650 | CS-2                        | G10, T1                |
| 26                                 | 1     | 1         | 60                         | 35                       | NP                                            | 700              | NP     | NP  | CS-2                        | T1                     |
| 27                                 | 1     | 1         | 60                         | 36                       | NP                                            | 700              | 1000   | 650 | CS-2                        | G10, T1                |
| 28                                 | 1     | 1         | 60                         | 37                       | 1000                                          | NP               | NP     | NP  | CS-2                        | G4, G10, S1, T2        |
| 29                                 | 1     | 1         | 60                         | 37                       | 1000                                          | 700              | NP     | NP  | CS-2                        | G10, S1, T1, W13       |
| 30                                 | 1     | 1         | 60                         | 37                       | 1000                                          | NP               | 1000   | 650 | CS-2                        | G10, G24, S1, T2, W6   |
| 31                                 | 1     | 1         | 60                         | 37                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G10, S1, T1            |
| 32                                 | 1     | 1         | 60                         | 37                       | NP                                            | NP               | 1000   | 650 | CS-2                        | G10, T1                |
| 33                                 | ...   | ...       | ...                        | ...                      | ...                                           | ...              | ...    | ... | ...                         | ...                    |
| 34                                 | 1     | 1         | 60                         | 38                       | NP                                            | NP               | 650    | 650 | CS-2                        | ...                    |
| 35                                 | ...   | ...       | 60                         | 42                       | NP                                            | NP               | 600    | 600 | CS-3                        | ...                    |
| 36                                 | ...   | ...       | 60                         | 45                       | NP                                            | NP               | 600    | 600 | CS-3                        | ...                    |
| 37                                 | ...   | ...       | 60                         | 45                       | NP                                            | NP               | 600    | 600 | CS-3                        | ...                    |
| 38                                 | ...   | ...       | 60                         | 50                       | NP                                            | NP               | 600    | 600 | CS-3                        | ...                    |
| 39                                 | 1     | 1         | 62.5                       | ...                      | 1000                                          | NP               | 1000   | NP  | CS-2                        | G10, G18, S1, T1       |
| 40                                 | 1     | 1         | 62.5                       | ...                      | 1000                                          | NP               | 1000   | NP  | CS-2                        | G10, G18, S1, T1       |
| 41                                 | 1     | 1         | 62.5                       | 32                       | 850                                           | NP               | 1000   | NP  | CS-2                        | G10, S1, T2            |
| 42                                 | 1     | 1         | 64                         | 34                       | 850                                           | NP               | 1000   | NP  | CS-2                        | G10, S1, T2            |
| 43                                 | 1     | 1         | 65                         | 32.5                     | 850                                           | 650 (Cl. 3 only) | 1000   | 650 | CS-2                        | G10, G15, G22, S1, T2  |
| 44                                 | 1     | 1         | 65                         | 35                       | NP                                            | 700              | 650    | 650 | CS-2                        | G1, G17                |
| 45                                 | 1     | 1         | 65                         | 35                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G10, S1, T2            |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | 13.0 | 10.8 | 8.7 | 5.9 |
| 2        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | ...  | ...  | ... | ... |
| 3        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | ...  | ...  | ... | ... |
| 4        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | ...  | ...  | ... | ... |
| 5        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | ...  | ...  | ... | ... |
| 6        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | ...  | ...  | ... | ... |
| 7        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.4 | 15.8 | 15.3 | ...  | ...  | ... | ... |
| 8        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 9        | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.9 | 16.3 | ...  | ...  | ...  | ... | ... |
| 10       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 11       | 14.6                                                                                                     | 14.6 | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | 13.3 | 11.1 | 9.2  | 7.4 | 5.0 |
| 12       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 13       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 14       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 15       | 14.6                                                                                                     | 14.6 | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | 13.3 | 11.1 | 9.2  | 7.4 | 5.0 |
| 16       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 17       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 18       | 14.6                                                                                                     | 14.6 | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | 13.3 | ...  | ...  | ... | ... |
| 19       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | ...  | ...  | ... | ... |
| 20       | 14.6                                                                                                     | 14.6 | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | ...  | ...  | ...  | ... | ... |
| 21       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 22       | 17.1                                                                                                     | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ... | ... |
| 23       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 24       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | ... |
| 25       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 26       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | ...  | ...  | ... | ... |
| 27       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 28       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.0 |
| 29       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 30       | 14.6                                                                                                     | ...  | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | 13.3 | 11.1 | 9.2  | 7.4 | 5.0 |
| 31       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 32       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 15.6 | 13.0 | 10.8 | 8.7 | 5.9 |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 34       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ... | ... |
| 35       | 17.1                                                                                                     | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  | ... | ... |
| 36       | 17.1                                                                                                     | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  | ... | ... |
| 37       | 17.1                                                                                                     | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  | ... | ... |
| 38       | 17.1                                                                                                     | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  | ... | ... |
| 39       | 17.9                                                                                                     | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 16.9 | 13.9 | 11.4 | 8.7 | 5.9 |
| 40       | 17.9                                                                                                     | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 16.9 | 13.9 | 11.4 | 8.7 | 5.9 |
| 41       | 17.9                                                                                                     | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.4 | 16.4 | 15.8 | 15.3 | 13.9 | 11.4 | 8.7 | 5.9 |
| 42       | 18.3                                                                                                     | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 17.4 | 16.8 | 16.2 | 13.9 | 11.4 | 8.7 | 5.9 |
| 43       | 18.6                                                                                                     | 18.6 | 18.6 | 18.6 | 18.6 | 18.5 | 17.7 | 16.6 | 16.1 | 15.5 | 13.9 | 11.4 | 8.7 | 5.0 |
| 44       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.9 | 17.3 | 16.7 | ...  | ...  | ... | ... |
| 45       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.9 | 17.3 | 16.7 | 13.9 | 11.4 | 8.7 | 5.9 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 3.4                                                                                                      | 2.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 3.4                                                                                                      | 2.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form      | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.         |
|----------|---------------------|-------------------|---------------|------------|-----------------------|--------------------------|-----------------------------|
| 1        | Carbon steel        | Plate             | SA-516        | 65         | K02403                | ...                      | ...                         |
| 2        | Carbon steel        | Wld. pipe         | SA-671        | CB65       | K02800                | ...                      | ...                         |
| 3        | Carbon steel        | Wld. pipe         | SA-671        | CC65       | K02403                | ...                      | ...                         |
| 4        | Carbon steel        | Wld. pipe         | SA-672        | B65        | K02800                | ...                      | ...                         |
| 5        | Carbon steel        | Wld. pipe         | SA-672        | C65        | K02403                | ...                      | ...                         |
| 6        | Carbon steel        | Sheet             | SA-414        | E          | K02704                | ...                      | ...                         |
| 7        | Carbon steel        | Plate             | SA-662        | B          | K02203                | ...                      | ...                         |
| 8        | Carbon steel        | Plate             | SA-537        | ...        | K12437                | 1                        | $2\frac{1}{2} < t \leq 4$   |
| 9        | Carbon steel        | Wld. pipe         | SA-691        | CMSH-70    | K12437                | ...                      | $2\frac{1}{2} < t \leq 4$   |
| 10       | Carbon steel        | Plate, sheet, bar | SA-572        | 50         | ...                   | ...                      | $t \leq 4$                  |
| 11       | Carbon steel        | Round bar         | SA-572        | 50         | ...                   | ...                      | $t \leq 11$                 |
| 12       | Carbon steel        | Sheet, strip      | SA-1011       | 50         | SS                    | ...                      | $t \leq 0.23$               |
| 13       | Carbon steel        | Sheet, strip      | SA-1011       | 50         | HSLAS                 | 1                        | ...                         |
| 14       | Carbon steel        | Sheet, strip      | SA-1011       | 55         | HSLAS                 | 2                        | ...                         |
| 15       | Carbon steel        | Plate, bar        | SA/CSA-G40.21 | 44W        | ...                   | ...                      | $t \leq 8$                  |
| 16       | Carbon steel        | Plate, bar        | SA/CSA-G40.21 | 50W        | ...                   | ...                      | $t \leq 6$                  |
| 17       | Carbon steel        | Plate             | SA/AS 1548    | PT460N     | ...                   | Normalized               | $\leq 6$                    |
| 18       | Carbon steel        | Plate             | SA/AS 1548    | PT460NR    | ...                   | Norm. rld.               | $\leq 6$                    |
| (25) 19  | Carbon steel        | Forgings          | SA/EN 10222-2 | P280GH     | ...                   | N, NT, or QT             | $1.4 < t \leq 6.3$          |
| 20       | Carbon steel        | Plate             | SA/EN 10028-2 | P295GH     | ...                   | ...                      | $2\frac{1}{4} < t \leq 4$   |
| 21       | Carbon steel        | Plate             | SA/EN 10028-2 | P295GH     | ...                   | ...                      | $\leq 2\frac{1}{4}$         |
| (25) 22  | Carbon steel        | Forgings          | SA/EN 10222-2 | P280GH     | ...                   | N, NT, or QT             | $t \leq 1.4$                |
| 23       | Carbon steel        | Plate             | SA/GB 713     | Q345R      | ...                   | ...                      | $6 < t \leq 10$             |
| 24       | Carbon steel        | Plate             | SA/EN 10028-2 | P355GH     | ...                   | ...                      | $6 < t \leq 10$             |
| 25       | Carbon steel        | Plate             | SA/GB 713     | Q345R      | ...                   | ...                      | $4 < t \leq 6$              |
| 26       | Carbon steel        | Plate             | SA/EN 10028-2 | P355GH     | ...                   | ...                      | $4 < t \leq 6$              |
| 27       | Carbon steel        | Plate             | SA-455        | ...        | K03300                | ...                      | $0.58 < t \leq \frac{3}{4}$ |
| 28       | Carbon steel        | Bar               | SA-675        | 70         | ...                   | ...                      | ...                         |
| 29       | Carbon steel        | Forgings          | SA-105        | ...        | K03504                | ...                      | ...                         |
| 30       | Carbon steel        | Forgings          | SA-181        | ...        | K03502                | 70                       | ...                         |
| 31       | Carbon steel        | Castings          | SA-216        | WCB        | J03002                | ...                      | ...                         |
| 32       | Carbon steel        | Forgings          | SA-266        | 2          | K03506                | ...                      | ...                         |
| 33       | Carbon steel        | Forgings          | SA-266        | 4          | K03017                | ...                      | ...                         |
| 34       | Carbon steel        | Forgings          | SA-350        | LF2        | K03011                | 1                        | ...                         |
| 35       | Carbon steel        | Forgings          | SA-350        | LF2        | K03011                | 2                        | ...                         |
| 36       | Carbon steel        | Forgings          | SA-508        | 1          | K13502                | ...                      | ...                         |
| 37       | Carbon steel        | Forgings          | SA-508        | 1A         | K13502                | ...                      | ...                         |
| 38       | Carbon steel        | Forgings          | SA-541        | 1          | K03506                | ...                      | ...                         |
| 39       | Carbon steel        | Forgings          | SA-541        | 1A         | K03020                | ...                      | ...                         |
| 40       | Carbon steel        | Cast pipe         | SA-660        | WCB        | J03003                | ...                      | ...                         |
| 41       | Carbon steel        | Forgings          | SA-765        | II         | K03047                | ...                      | ...                         |
| 42       | Carbon steel        | Plate             | SA-515        | 70         | K03101                | ...                      | ...                         |
| 43       | Carbon steel        | Plate             | SA-516        | 70         | K02700                | ...                      | ...                         |
| 44       | Carbon steel        | Wld. pipe         | SA-671        | CB70       | K03101                | ...                      | ...                         |
| 45       | Carbon steel        | Wld. pipe         | SA-671        | CC70       | K02700                | ...                      | ...                         |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |                  |        |     |                             |                       |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|------------------|--------|-----|-----------------------------|-----------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |                  |        |     | External Pressure Chart No. | Notes                 |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |                  |        |     |                             |                       |
|                                    |       |           |                            |                          | (SPT = Supports Only) |                  |        |     |                             |                       |
|                                    |       |           |                            |                          | I                     | III              | VIII-1 | XII |                             |                       |
| 1                                  | 1     | 1         | 65                         | 35                       | 850                   | 700              | 1000   | 650 | CS-2                        | G10, S1, T2           |
| 2                                  | 1     | 1         | 65                         | 35                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12          |
| 3                                  | 1     | 1         | 65                         | 35                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12          |
| 4                                  | 1     | 1         | 65                         | 35                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12          |
| 5                                  | 1     | 1         | 65                         | 35                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12          |
| 6                                  | 1     | 1         | 65                         | 38                       | NP                    | NP               | 900    | 650 | CS-2                        | G10, T1               |
| 7                                  | 1     | 1         | 65                         | 40                       | NP                    | NP               | 700    | 650 | CS-2                        | T1                    |
| 8                                  | 1     | 2         | 65                         | 45                       | NP                    | 700              | 650    | 650 | CS-2                        | T1                    |
| 9                                  | 1     | 2         | 65                         | 45                       | NP                    | 700              | NP     | NP  | CS-2                        | G26, T1, W10, W12     |
| 10                                 | ...   | ...       | 65                         | 50                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                   |
| 11                                 | ...   | ...       | 65                         | 50                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                   |
| 12                                 | ...   | ...       | 65                         | 50                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                   |
| 13                                 | ...   | ...       | 65                         | 50                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                   |
| 14                                 | ...   | ...       | 65                         | 55                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                   |
| 15                                 | 1     | 1         | 65                         | ...                      | 650                   | NP               | 650    | 650 | CS-2                        | G18                   |
| 16                                 | 1     | 1         | 65                         | ...                      | 650                   | NP               | 650    | 650 | CS-2                        | G18                   |
| 17                                 | 1     | 1         | 66.5                       | ...                      | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, G18, S1, T1      |
| 18                                 | 1     | 1         | 66.5                       | ...                      | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, G18, S1, T1      |
| 19                                 | 1     | 1         | 66.5                       | 37                       | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T2           |
| 20                                 | 1     | 1         | 66.5                       | 37.5                     | 850                   | NP               | 1000   | NP  | CS-2                        | G10, S1, T1           |
| 21                                 | 1     | 1         | 66.5                       | ...                      | 850                   | NP               | 1000   | 650 | CS-2                        | G10, G18, S1, T1      |
| 22                                 | 1     | 1         | 66.5                       | 40.5                     | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T2           |
| 23                                 | 1     | 2         | 68                         | 38.5                     | 800                   | NP               | 800    | NP  | CS-2                        | T1                    |
| 24                                 | 1     | 2         | 68                         | 40.5                     | 850                   | NP               | 1000   | NP  | CS-2                        | G10, S1, T1           |
| 25                                 | 1     | 2         | 69.5                       | 41.5                     | 800                   | NP               | 800    | NP  | CS-2                        | T1                    |
| 26                                 | 1     | 2         | 69.5                       | 43                       | 850                   | NP               | 1000   | NP  | CS-2                        | G10, S1, T1           |
| 27                                 | 1     | 2         | 70                         | 35                       | NP                    | 400 (Cl. 3 only) | 650    | 650 | CS-2                        | ...                   |
| 28                                 | 1     | 2         | 70                         | 35                       | 850                   | 650 (Cl. 3 only) | 1000   | 650 | CS-2                        | G10, G15, G22, S1, T2 |
| 29                                 | 1     | 2         | 70                         | 36                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G10, S1, T2           |
| 30                                 | 1     | 2         | 70                         | 36                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G10, S1, T2           |
| 31                                 | 1     | 2         | 70                         | 36                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G1, G10, G17, S1, T2  |
| 32                                 | 1     | 2         | 70                         | 36                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G10, S1, T2           |
| 33                                 | 1     | 2         | 70                         | 36                       | NP                    | NP               | 1000   | 650 | CS-2                        | G10, T2               |
| 34                                 | 1     | 2         | 70                         | 36                       | 850                   | 700              | 1000   | 650 | CS-2                        | G10, T2               |
| 35                                 | 1     | 2         | 70                         | 36                       | 850                   | 700              | 1000   | 650 | CS-2                        | G10, T2               |
| 36                                 | 1     | 2         | 70                         | 36                       | NP                    | 700              | 1000   | 650 | CS-2                        | G10, T2               |
| 37                                 | 1     | 2         | 70                         | 36                       | NP                    | 700              | 1000   | 650 | CS-2                        | G10, T2               |
| 38                                 | 1     | 2         | 70                         | 36                       | NP                    | 700              | 1000   | 650 | CS-2                        | G10, T2               |
| 39                                 | 1     | 2         | 70                         | 36                       | NP                    | 700              | 1000   | 650 | CS-2                        | G10, T2               |
| 40                                 | 1     | 2         | 70                         | 36                       | 1000                  | 700              | NP     | NP  | CS-2                        | G1, G10, G17, S1, T2  |
| 41                                 | 1     | 2         | 70                         | 36                       | NP                    | NP               | 1000   | 650 | CS-2                        | G10, T2               |
| 42                                 | 1     | 2         | 70                         | 38                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G10, S1, T2           |
| 43                                 | 1     | 2         | 70                         | 38                       | 850                   | 700              | 1000   | 650 | CS-2                        | G10, S1, T2           |
| 44                                 | 1     | 2         | 70                         | 38                       | NP                    | 700              | NP     | NP  | CS-2                        | S5, W10, W12          |
| 45                                 | 1     | 2         | 70                         | 38                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12          |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.9 | 17.3 | 16.7 | 13.9 | 11.4 | 8.7 | 5.9 |
| 2        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.9 | 17.3 | 16.7 | ...  | ...  | ... | ... |
| 3        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.9 | 17.3 | 16.7 | ...  | ...  | ... | ... |
| 4        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.9 | 17.3 | 16.7 | ...  | ...  | ... | ... |
| 5        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.9 | 17.3 | 16.7 | ...  | ...  | ... | ... |
| 6        | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 16.9 | 13.9 | 11.4 | 8.7 | 5.9 |
| 7        | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 16.9 | ...  | ...  | ... | ... |
| 8        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 16.9 | ...  | ...  | ... | ... |
| 9        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 16.9 | ...  | ...  | ... | ... |
| 10       | 18.6                                                                                                     | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ... | ... |
| 11       | 18.6                                                                                                     | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ... | ... |
| 12       | 18.6                                                                                                     | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ... | ... |
| 13       | 18.6                                                                                                     | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ... | ... |
| 14       | 18.6                                                                                                     | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ... | ... |
| 15       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ... | ... |
| 16       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ... | ... |
| 17       | 19.0                                                                                                     | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 16.9 | 13.9 | 11.4 | 8.7 | 5.9 |
| 18       | 19.0                                                                                                     | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 16.9 | 13.9 | 11.4 | 8.7 | 5.9 |
| 19       | 19.1                                                                                                     | ...  | 19.1 | ...  | 19.1 | 19.1 | 19.1 | 18.8 | 18.1 | 17.5 | 14.8 | 12.0 | 9.3 | 6.7 |
| 20       | 19.0                                                                                                     | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 18.5 | 16.7 | 13.9 | 11.4 | 8.7 | 5.9 |
| 21       | 19.0                                                                                                     | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 19.0 | 16.7 | 13.9 | 11.4 | 8.7 | 5.9 |
| 22       | 19.1                                                                                                     | ...  | 19.1 | ...  | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 19.1 | 14.8 | 12.0 | 9.3 | 6.7 |
| 23       | 19.5                                                                                                     | ...  | 19.5 | ...  | 19.5 | 19.5 | 19.5 | 19.5 | 19.0 | 18.3 | 14.8 | 12.0 | ... | ... |
| 24       | 19.5                                                                                                     | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 25       | 19.9                                                                                                     | ...  | 19.9 | ...  | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 18.3 | 14.8 | 12.0 | ... | ... |
| 26       | 19.9                                                                                                     | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 27       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 19.9 | 19.0 | 17.9 | 17.3 | ...  | ...  | ...  | ... | ... |
| 28       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 19.9 | 19.0 | 17.9 | 17.3 | 16.7 | 14.8 | 12.0 | 9.3 | 6.7 |
| 29       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 30       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 31       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 32       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 33       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 34       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 35       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 36       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 37       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 38       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 39       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 40       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 41       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 19.6 | 18.4 | 17.8 | 17.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 42       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 19.4 | 18.8 | 18.1 | 14.8 | 12.0 | 9.3 | 6.7 |
| 43       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 19.4 | 18.8 | 18.1 | 14.8 | 12.0 | 9.3 | 6.7 |
| 44       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 19.4 | 18.8 | 18.1 | ...  | ...  | ... | ... |
| 45       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 19.4 | 18.8 | 18.1 | ...  | ...  | ... | ... |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.                   |
|----------|---------------------|-----------------------|---------------|------------|-----------------------|--------------------------|---------------------------------------|
| 1        | Carbon steel        | Wld. pipe             | SA-672        | B70        | K03101                | ...                      | ...                                   |
| 2        | Carbon steel        | Wld. pipe             | SA-672        | C70        | K02700                | ...                      | ...                                   |
| 3        | Carbon steel        | Plate                 | SA/JIS G3118  | SGV480     | ...                   | ...                      | ...                                   |
| 4        | Carbon steel        | Smls. pipe            | SA-106        | C          | K03501                | ...                      | ...                                   |
| 5        | Carbon steel        | Wld. tube             | SA-178        | D          | ...                   | ...                      | ...                                   |
| (25) 6   | Carbon steel        | Wld. tube             | SA-178        | D          | ...                   | ...                      | ...                                   |
| 7        | Carbon steel        | Wld. tube             | SA-178        | D          | ...                   | ...                      | ...                                   |
| 8        | Carbon steel        | Smls. tube            | SA-210        | C          | K03501                | ...                      | ...                                   |
| 9        | Carbon steel        | Castings              | SA-216        | WCC        | J02503                | ...                      | ...                                   |
| 10       | Carbon steel        | Smls. & wld. fittings | SA-234        | WPC        | K03501                | ...                      | ...                                   |
| 11       | Carbon steel        | Castings              | SA-352        | LCC        | J02505                | ...                      | ...                                   |
| 12       | Carbon steel        | Castings              | SA-487        | 16         | ...                   | A                        | ...                                   |
| 13       | Carbon steel        | Plate                 | SA-537        | ...        | K12437                | 3                        | $4 < t \leq 6$                        |
| 14       | Carbon steel        | Smls. tube            | SA-556        | C2         | K03006                | ...                      | ...                                   |
| (25) 15  | ...                 | ...                   | ...           | ...        | ...                   | ...                      | ...                                   |
| 16       | Carbon steel        | Cast pipe             | SA-660        | WCC        | J02505                | ...                      | ...                                   |
| 17       | Carbon steel        | Bar                   | SA-696        | C          | K03200                | ...                      | ...                                   |
| 18       | Carbon steel        | Sheet                 | SA-414        | F          | K03102                | ...                      | ...                                   |
| 19       | Carbon steel        | Plate                 | SA-662        | C          | K02007                | ...                      | ...                                   |
| 20       | Carbon steel        | Plate                 | SA-537        | ...        | K12437                | 2                        | $4 < t \leq 6$                        |
| 21       | Carbon steel        | Plate                 | SA-738        | C          | K02008                | ...                      | $4 < t \leq 6$                        |
| 22       | Carbon steel        | Plate                 | SA-537        | ...        | K12437                | 1                        | $\leq 2\frac{1}{2}$                   |
| 23       | Carbon steel        | Wld. pipe             | SA-671        | CD70       | K12437                | ...                      | $\leq 2\frac{1}{2}$                   |
| 24       | Carbon steel        | Wld. pipe             | SA-672        | D70        | K12437                | ...                      | $\leq 2\frac{1}{2}$                   |
| 25       | Carbon steel        | Wld. pipe             | SA-691        | CMSH-70    | K12437                | ...                      | $\leq 2\frac{1}{2}$                   |
| 26       | Carbon steel        | Plate                 | SA-841        | A          | ...                   | 1                        | $\leq 4$                              |
| 27       | Carbon steel        | Plate, sheet, bar     | SA-572        | 55         | ...                   | ...                      | $t \leq 2$                            |
| 28       | Carbon steel        | Round bar             | SA-572        | 55         | ...                   | ...                      | $t \leq 3\frac{1}{2}$                 |
| 29       | Carbon steel        | Sheet, strip          | SA-1011       | 55         | HSLAS                 | 1                        | ...                                   |
| 30       | Carbon steel        | Sheet, strip          | SA-1011       | 60         | HSLAS                 | 2                        | ...                                   |
| (25) 31  | Carbon steel        | Forgings              | SA/EN 10222-2 | P305GH     | ...                   | N, NT, or QT             | $2.8 < t \leq 6.3$                    |
| (25) 32  | Carbon steel        | Forgings              | SA/EN 10222-2 | P305GH     | ...                   | N, NT, or QT             | $1.4 < t \leq 2.8$                    |
| 33       | Carbon steel        | Plate                 | SA/GB 713     | Q345R      | ...                   | ...                      | $2\frac{1}{4} < t \leq 4$             |
| 34       | Carbon steel        | Plate                 | SA/EN 10028-2 | P355GH     | ...                   | ...                      | $2.5 < t \leq 4$                      |
| 35       | Carbon steel        | Plate                 | SA/GB 713     | Q345R      | ...                   | ...                      | $1.5 < t \leq 2\frac{1}{4}$           |
| 36       | Carbon steel        | Plate                 | SA/GB 713     | Q345R      | ...                   | ...                      | $\frac{5}{8} < t \leq 1.5$            |
| 37       | Carbon steel        | Plate                 | SA-455        | ...        | K03300                | ...                      | $\frac{3}{8} < t \leq 0.58$           |
| (25) 38  | Carbon steel        | Forgings              | SA/EN 10222-2 | P305GH     | ...                   | N, NT, or QT             | $t \leq 1.4$                          |
| 39       | Carbon steel        | Plate                 | SA/GB 713     | Q345R      | ...                   | ...                      | $\frac{1}{8} \leq t \leq \frac{5}{8}$ |
| 40       | Carbon steel        | Plate                 | SA/EN 10028-2 | P355GH     | ...                   | ...                      | $\leq 2.5$                            |
| 41       | Carbon steel        | Forgings              | SA-266        | 3          | K05001                | ...                      | ...                                   |
| 42       | Carbon steel        | Plate                 | SA-455        | ...        | K03300                | ...                      | $\leq \frac{3}{8}$                    |
| 43       | Carbon steel        | Plate                 | SA-299        | A          | K02803                | ...                      | $> 1$                                 |
| 44       | Carbon steel        | Wld. pipe             | SA-671        | CK75       | K02803                | ...                      | $> 1$                                 |
| 45       | Carbon steel        | Wld. pipe             | SA-672        | N75        | K02803                | ...                      | $> 1$                                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |                  |        |     |                             |                      |  |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|------------------|--------|-----|-----------------------------|----------------------|--|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |                  |        |     | External Pressure Chart No. | Notes                |  |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |                  |        |     |                             |                      |  |
|                                    |       |           |                            |                          | (SPT = Supports Only) |                  |        |     |                             |                      |  |
|                                    |       |           |                            |                          | I                     | III              | VIII-1 | XII |                             |                      |  |
| 1                                  | 1     | 2         | 70                         | 38                       | NP                    | 700              | NP     | NP  | CS-2                        | S5, W10, W12         |  |
| 2                                  | 1     | 2         | 70                         | 38                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |  |
| 3                                  | 1     | 2         | 70                         | 38                       | 850                   | NP               | NP     | NP  | CS-2                        | G10, S1, T2          |  |
| 4                                  | 1     | 2         | 70                         | 40                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G10, S1, T1          |  |
| 5                                  | 1     | 2         | 70                         | 40                       | 1000                  | NP               | NP     | NP  | CS-2                        | G10, S1, T1, W13     |  |
| 6                                  | 1     | 2         | 70                         | 40                       | 1000                  | NP               | NP     | NP  | CS-2                        | G4, G10, S1, T4      |  |
| 7                                  | 1     | 2         | 70                         | 40                       | 1000                  | NP               | NP     | NP  | CS-2                        | G10, G24, S1, T2     |  |
| 8                                  | 1     | 2         | 70                         | 40                       | 1000                  | NP               | 1000   | 650 | CS-2                        | G10, S1, T1          |  |
| 9                                  | 1     | 2         | 70                         | 40                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G1, G10, G17, S1, T1 |  |
| 10                                 | 1     | 2         | 70                         | 40                       | 800                   | 700              | 800    | 650 | CS-2                        | G10, T1, W14         |  |
| 11                                 | 1     | 2         | 70                         | 40                       | NP                    | 700              | NP     | NP  | CS-2                        | G17, T1              |  |
| 12                                 | 1     | 2         | 70                         | 40                       | NP                    | 700              | NP     | NP  | CS-2                        | ...                  |  |
| 13                                 | 1     | 3         | 70                         | 40                       | NP                    | NP               | 700    | 650 | CS-2                        | G23, W11             |  |
| 14                                 | 1     | 2         | 70                         | 40                       | NP                    | NP               | 800    | 650 | CS-2                        | G10, T1              |  |
| 15                                 | ...   | ...       | ...                        | ...                      | ...                   | ...              | ...    | ... | ...                         | ...                  |  |
| 16                                 | 1     | 2         | 70                         | 40                       | 1000                  | 700              | NP     | NP  | CS-2                        | G1, G10, G17, S1, T1 |  |
| 17                                 | 1     | 2         | 70                         | 40                       | NP                    | 700              | NP     | NP  | CS-2                        | T1                   |  |
| 18                                 | 1     | 2         | 70                         | 42                       | NP                    | NP               | 900    | 650 | CS-2                        | G10, T1              |  |
| 19                                 | 1     | 2         | 70                         | 43                       | NP                    | NP               | 700    | 650 | CS-3                        | T1                   |  |
| 20                                 | 1     | 3         | 70                         | 46                       | NP                    | 700              | 700    | 650 | CS-3                        | G23, T1, W11         |  |
| 21                                 | 1     | 3         | 70                         | 46                       | NP                    | 650              | 650    | 650 | CS-3                        | G23, W11             |  |
| 22                                 | 1     | 2         | 70                         | 50                       | NP                    | 700              | 650    | 650 | CS-3                        | G23, T1              |  |
| 23                                 | 1     | 2         | 70                         | 50                       | NP                    | 700              | NP     | NP  | CS-3                        | S6, T1, W10, W12     |  |
| 24                                 | 1     | 2         | 70                         | 50                       | NP                    | 700              | NP     | NP  | CS-3                        | S6, T1, W10, W12     |  |
| 25                                 | 1     | 2         | 70                         | 50                       | NP                    | 700              | NP     | NP  | CS-3                        | S6, T1, W10, W12     |  |
| 26                                 | 1     | 2         | 70                         | 50                       | NP                    | NP               | 650    | NP  | CS-3                        | ...                  |  |
| 27                                 | ...   | ...       | 70                         | 55                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                  |  |
| 28                                 | ...   | ...       | 70                         | 55                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                  |  |
| 29                                 | ...   | ...       | 70                         | 55                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                  |  |
| 30                                 | ...   | ...       | 70                         | 60                       | NP                    | NP               | 600    | 600 | CS-3                        | ...                  |  |
| 31                                 | 1     | 2         | 71                         | 40.5                     | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T2          |  |
| 32                                 | 1     | 2         | 74                         | 41.5                     | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T2          |  |
| 33                                 | 1     | 2         | 71                         | 44                       | 800                   | NP               | 800    | NP  | CS-2                        | T1                   |  |
| 34                                 | 1     | 2         | 71                         | 45.5                     | 850                   | NP               | 1000   | NP  | CS-2                        | G10, S1, T1          |  |
| 35                                 | 1     | 2         | 71                         | 45.5                     | 800                   | NP               | 800    | NP  | CS-2                        | T1                   |  |
| 36                                 | 1     | 2         | 72.5                       | 47                       | 800                   | NP               | 800    | NP  | CS-2                        | T1                   |  |
| 37                                 | 1     | 2         | 73                         | 37                       | NP                    | 400 (Cl. 3 only) | 650    | 650 | CS-2                        | ...                  |  |
| 38                                 | 1     | 2         | 74                         | 44                       | 1000                  | NP               | 1000   | NP  | CS-2                        | G10, S1, T1          |  |
| 39                                 | 1     | 2         | 74                         | 50                       | 800                   | NP               | 800    | NP  | CS-2                        | T1                   |  |
| 40                                 | 1     | 2         | 74                         | ...                      | 850                   | NP               | 1000   | NP  | CS-2                        | G10, G18, S1, T1     |  |
| 41                                 | 1     | 2         | 75                         | 37.5                     | 1000                  | 700              | 1000   | NP  | CS-2                        | G10, S1, T2, W11     |  |
| 42                                 | 1     | 2         | 75                         | 38                       | NP                    | 400 (Cl. 3 only) | 650    | 650 | CS-2                        | ...                  |  |
| 43                                 | 1     | 2         | 75                         | 40                       | 1000                  | 700              | 1000   | 650 | CS-2                        | G10, S1, T2          |  |
| 44                                 | 1     | 2         | 75                         | 40                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |  |
| 45                                 | 1     | 2         | 75                         | 40                       | NP                    | 700              | NP     | NP  | CS-2                        | S6, W10, W12         |  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 19.4 | 18.8 | 18.1 | ...  | ...  | ... | ... |
| 2        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 19.4 | 18.8 | 18.1 | ...  | ...  | ... | ... |
| 3        | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 19.4 | 18.8 | 18.1 | 14.8 | 12.0 | 9.3 | ... |
| 4        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 5        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 6        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | 9.3 | 5.7 |
| 7        | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 17.0 | 17.0 | 16.8 | 15.5 | 12.6 | 10.2 | 7.9 | 5.7 |
| 8        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 9        | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 10       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | ... | ... |
| 11       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | ...  | ...  | ... | ... |
| 12       | 20.0                                                                                                     | ...  | 19.9 | ...  | 18.8 | 18.1 | 17.9 | 17.9 | 17.9 | 17.9 | ...  | ...  | ... | ... |
| 13       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 19.7 | 19.5 | 18.9 | 18.0 | 17.6 | 17.2 | ...  | ...  | ... | ... |
| 14       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | ... | ... |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 16       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 17       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.8 | 18.3 | ...  | ...  | ... | ... |
| 18       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 18.3 | 14.8 | 12.0 | 9.3  | 6.7 | ... |
| 19       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 18.3 | ...  | ...  | ...  | ... | ... |
| 20       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.7 | 19.5 | 19.5 | 19.5 | 19.5 | 18.3 | ...  | ...  | ... | ... |
| 21       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.7 | 19.5 | 19.5 | 19.5 | 19.5 | ...  | ...  | ...  | ... | ... |
| 22       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.7 | 19.5 | 19.5 | 19.5 | 19.5 | 18.3 | ...  | ...  | ... | ... |
| 23       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.7 | 19.5 | 19.5 | 19.5 | 19.5 | 18.3 | ...  | ...  | ... | ... |
| 24       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.7 | 19.5 | 19.5 | 19.5 | 19.5 | 18.3 | ...  | ...  | ... | ... |
| 25       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.7 | 19.5 | 19.5 | 19.5 | 19.5 | 18.3 | ...  | ...  | ... | ... |
| 26       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ... | ... |
| 27       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  | ... | ... |
| 28       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  | ... | ... |
| 29       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  | ... | ... |
| 30       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  | ... | ... |
| 31       | 20.3                                                                                                     | ...  | 20.3 | ...  | 20.3 | 20.3 | 20.3 | 20.3 | 19.9 | 19.2 | 14.8 | 12.0 | 9.3 | 6.7 |
| 32       | 21.1                                                                                                     | ...  | 21.1 | ...  | 21.1 | 21.1 | 21.1 | 21.0 | 20.3 | 19.6 | 14.8 | 12.0 | 9.3 | 6.7 |
| 33       | 20.3                                                                                                     | ...  | 20.3 | ...  | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 18.3 | 14.8 | 12.0 | ... | ... |
| 34       | 20.3                                                                                                     | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 35       | 20.3                                                                                                     | ...  | 20.3 | ...  | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 18.3 | 14.8 | 12.0 | ... | ... |
| 36       | 20.7                                                                                                     | ...  | 20.7 | ...  | 20.7 | 20.7 | 20.7 | 20.7 | 20.7 | 18.3 | 14.8 | 12.0 | ... | ... |
| 37       | 20.9                                                                                                     | 20.9 | 20.9 | ...  | 20.9 | 20.9 | 20.1 | 18.9 | 18.3 | ...  | ...  | ...  | ... | ... |
| 38       | 21.1                                                                                                     | ...  | 21.1 | ...  | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 20.0 | 14.8 | 12.0 | 9.3 | 6.7 |
| 39       | 21.1                                                                                                     | ...  | 21.1 | ...  | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 18.3 | 14.8 | 12.0 | ... | ... |
| 40       | 21.1                                                                                                     | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 41       | 21.4                                                                                                     | 21.4 | 21.4 | ...  | 21.4 | 21.4 | 20.4 | 19.2 | 18.5 | 17.9 | 15.7 | 12.6 | 9.3 | 6.7 |
| 42       | 21.4                                                                                                     | 21.4 | 21.4 | ...  | 21.4 | 21.4 | 20.6 | 19.4 | 18.8 | ...  | ...  | ...  | ... | ... |
| 43       | 21.4                                                                                                     | 21.4 | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 20.4 | 19.8 | 19.1 | 15.7 | 12.6 | 9.3 | 6.7 |
| 44       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 20.4 | 19.8 | 19.1 | ...  | ...  | ... | ... |
| 45       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 20.4 | 19.8 | 19.1 | ...  | ...  | ... | ... |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 3.4                                                                                                      | 2.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 3.4                                                                                                      | 2.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form      | Spec. No.  | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.       |
|----------|---------------------|-------------------|------------|------------|-----------------------|--------------------------|---------------------------|
| 1        | Carbon steel        | Wld. pipe         | SA-691     | CMS-75     | K02803                | ...                      | >1                        |
| 2        | Carbon steel        | Plate             | SA-299     | A          | K02803                | ...                      | ≤1                        |
| 3        | Carbon steel        | Wld. pipe         | SA-691     | CMS-75     | K02803                | ...                      | ≤1                        |
| 4        | Carbon steel        | Forgings          | SA-372     | B          | K04001                | ...                      | ...                       |
| 5        | Carbon steel        | Sheet             | SA-414     | G          | K03103                | ...                      | ...                       |
| 6        | Carbon steel        | Plate             | SA-738     | A          | K12447                | ...                      | ...                       |
| 7        | Carbon steel        | Plate             | SA-537     | ...        | K12437                | 3                        | $2\frac{1}{2} < t \leq 4$ |
| 8        | Carbon steel        | Plate             | SA-537     | ...        | K12437                | 2                        | $2\frac{1}{2} < t \leq 4$ |
| 9        | Carbon steel        | Wld. pipe         | SA-691     | CMSH-80    | K12437                | ...                      | $2\frac{1}{2} < t \leq 4$ |
| 10       | Carbon steel        | Plate             | SA-738     | C          | K02008                | ...                      | $2\frac{1}{2} < t \leq 4$ |
| 11       | Carbon steel        | Plate, sheet, bar | SA-572     | 60         | ...                   | ...                      | $t \leq 1\frac{1}{4}$     |
| 12       | Carbon steel        | Round bar         | SA-572     | 60         | ...                   | ...                      | $t \leq 3\frac{1}{2}$     |
| 13       | Carbon steel        | Sheet, strip      | SA-1011    | 60         | HSLAS                 | 1                        | ...                       |
| 14       | Carbon steel        | Plate             | SA-299     | B          | K02803                | ...                      | >1                        |
| 15       | Carbon steel        | Plate             | SA-299     | B          | K02803                | ...                      | ≤1                        |
| 16       | Carbon steel        | Forgings          | SA-765     | IV         | K02009                | ...                      | ...                       |
| 17       | Carbon steel        | Plate             | SA-537     | ...        | K12437                | 3                        | $\leq 2\frac{1}{2}$       |
| 18       | Carbon steel        | Plate             | SA-537     | ...        | K12437                | 2                        | $\leq 2\frac{1}{2}$       |
| 19       | Carbon steel        | Wld. pipe         | SA-671     | CD80       | K12437                | ...                      | $\leq 2\frac{1}{2}$       |
| 20       | Carbon steel        | Wld. pipe         | SA-672     | D80        | K12437                | ...                      | $\leq 2\frac{1}{2}$       |
| 21       | Carbon steel        | Wld. pipe         | SA-691     | CMSH-80    | K12437                | ...                      | $\leq 2\frac{1}{2}$       |
| 22       | Carbon steel        | Plate             | SA-738     | C          | K02008                | ...                      | $\leq 2\frac{1}{2}$       |
| 23       | Carbon steel        | Plate             | SA-841     | B          | ...                   | 2                        | ≤4                        |
| 24       | Carbon steel        | Plate, sheet, bar | SA-572     | 65         | ...                   | ...                      | $t \leq 1\frac{1}{4}$     |
| 25       | Carbon steel        | Plate             | SA-612     | ...        | K02900                | ...                      | $\frac{1}{2} < t \leq 1$  |
| 26       | Carbon steel        | Plate             | SA-612     | ...        | K02900                | ...                      | $\leq \frac{1}{2}$        |
| 27       | Carbon steel        | Plate             | SA-738     | B          | K12007                | ...                      | ...                       |
| 28       | Carbon steel        | Forgings          | SA-372     | C          | K04801                | ...                      | ...                       |
| 29       | Carbon steel        | Plate             | SA-724     | A          | K11831                | ...                      | ...                       |
| 30       | Carbon steel        | Plate             | SA-724     | C          | K12037                | ...                      | ...                       |
| 31       | Carbon steel        | Plate             | SA-724     | B          | K12031                | ...                      | ...                       |
| 32       | C-Mn-Si-Cb          | Plate             | SA-737     | B          | K12001                | ...                      | ...                       |
| 33       | C-Mn-Si-Cb          | Plate             | SA/AS 1548 | PT490N     | ...                   | Normalized               | ≤6                        |
| 34       | C-Mn-Si-Cb          | Plate             | SA/AS 1548 | PT490NR    | ...                   | Norm. rld.               | ≤6                        |
| 35       | C-Mn-Si-Cb          | Plate             | SA/GB 713  | Q370R      | ...                   | Normalized               | $2.5 < t \leq 4$          |
| 36       | C-Mn-Si-Cb          | Plate             | SA/GB 713  | Q370R      | ...                   | Normalized               | $1.5 < t \leq 2.5$        |
| 37       | C-Mn-Si-Cb          | Plate             | SA/GB 713  | Q370R      | ...                   | Normalized               | $0.6 < t \leq 1.5$        |
| 38       | C-Mn-Si-Cb          | Plate             | SA/GB 713  | Q370R      | ...                   | Normalized               | $0.4 \leq t \leq 0.6$     |
| 39       | C-Mn-Si-V           | Plate             | SA-737     | C          | K12202                | ...                      | ...                       |
| 40       | C-Mn-Si-V-Cb        | Plate             | SA-656     | T3         | ...                   | ...                      | ≤2                        |
| 41       | C-Mn-Si-V-Cb        | Plate             | SA-656     | T7         | ...                   | ...                      | ≤2                        |
| 42       | C-Mn-Si-V-Cb        | Plate             | SA-656     | T3         | ...                   | ...                      | $\leq 1\frac{1}{2}$       |
| 43       | C-Mn-Si-V-Cb        | Plate             | SA-656     | T7         | ...                   | ...                      | $\leq 1\frac{1}{2}$       |
| 44       | C-Mn-Si-V-Cb        | Plate             | SA-656     | T3         | ...                   | ...                      | ≤1                        |
| 45       | C-Mn-Si-V-Cb        | Plate             | SA-656     | T7         | ...                   | ...                      | ≤1                        |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |     |        |     |                             |                            |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|----------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes                      |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |                            |
|                                    |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                            |
| 1                                  | 1     | 2         | 75                         | 40                       | NP                                            | 700 | NP     | NP  | CS-2                        | S6, W10, W12               |
| 2                                  | 1     | 2         | 75                         | 42                       | 1000                                          | 700 | 1000   | 650 | CS-2                        | G10, S1, T1                |
| 3                                  | 1     | 2         | 75                         | 42                       | NP                                            | 700 | NP     | NP  | CS-2                        | T1, W10, W12               |
| 4                                  | 1     | 2         | 75                         | 45                       | NP                                            | NP  | 650    | 650 | CS-3                        | W11                        |
| 5                                  | 1     | 2         | 75                         | 45                       | NP                                            | NP  | 900    | 650 | CS-3                        | G10, T1                    |
| 6                                  | 1     | 2         | 75                         | 45                       | NP                                            | NP  | 700    | 650 | CS-2                        | T1                         |
| 7                                  | 1     | 3         | 75                         | 50                       | NP                                            | NP  | 700    | 650 | CS-5                        | G23, T1, W11               |
| 8                                  | 1     | 3         | 75                         | 55                       | NP                                            | 700 | 650    | 650 | CS-5                        | G23, T1, W11               |
| 9                                  | 1     | 3         | 75                         | 55                       | NP                                            | 700 | NP     | NP  | CS-5                        | G26, T1, W10, W12          |
| 10                                 | 1     | 3         | 75                         | 55                       | NP                                            | 650 | 650    | 650 | CS-5                        | G23, W11                   |
| 11                                 | ...   | ...       | 75                         | 60                       | NP                                            | NP  | 600    | 600 | CS-3                        | ...                        |
| 12                                 | ...   | ...       | 75                         | 60                       | NP                                            | NP  | 600    | 600 | CS-3                        | ...                        |
| 13                                 | ...   | ...       | 75                         | 60                       | NP                                            | NP  | 600    | 600 | CS-3                        | ...                        |
| 14                                 | 1     | 3         | 80                         | 45                       | 800                                           | NP  | 1000   | 650 | CS-3                        | G10, S1, T1                |
| 15                                 | 1     | 3         | 80                         | 47                       | 800                                           | NP  | 1000   | 650 | CS-3                        | G10, S1, T1                |
| 16                                 | 1     | 3         | 80                         | 50                       | NP                                            | NP  | 700    | NP  | CS-3                        | ...                        |
| 17                                 | 1     | 3         | 80                         | 55                       | NP                                            | NP  | 700    | 650 | CS-5                        | G23, T1, W11               |
| 18                                 | 1     | 3         | 80                         | 60                       | NP                                            | 700 | 650    | 650 | CS-5                        | G23, S6, T1, W10, W11, W12 |
| 19                                 | 1     | 3         | 80                         | 60                       | NP                                            | 700 | NP     | NP  | CS-5                        | S6, T1, W10, W12           |
| 20                                 | 1     | 3         | 80                         | 60                       | NP                                            | 700 | NP     | NP  | CS-5                        | S6, T1, W10, W12           |
| 21                                 | 1     | 3         | 80                         | 60                       | NP                                            | 700 | NP     | NP  | CS-5                        | S6, T1, W10, W12           |
| 22                                 | 1     | 3         | 80                         | 60                       | NP                                            | 650 | 650    | 650 | CS-5                        | G23, W11                   |
| 23                                 | 1     | 3         | 80                         | 60                       | NP                                            | NP  | 650    | NP  | CS-3                        | ...                        |
| 24                                 | ...   | ...       | 80                         | 65                       | NP                                            | NP  | 600    | 600 | CS-3                        | ...                        |
| 25                                 | 10C   | 1         | 81                         | 50                       | NP                                            | 700 | 650    | 650 | CS-3                        | T1                         |
| 26                                 | 10C   | 1         | 83                         | 50                       | NP                                            | 650 | 650    | 650 | CS-3                        | ...                        |
| 27                                 | 1     | 3         | 85                         | 60                       | NP                                            | 650 | 650    | 650 | CS-5                        | ...                        |
| 28                                 | ...   | ...       | 90                         | 55                       | NP                                            | NP  | 650    | 650 | CS-3                        | W11                        |
| 29                                 | 1     | 4         | 90                         | 70                       | NP                                            | NP  | 700    | 650 | CS-5                        | ...                        |
| 30                                 | 1     | 4         | 90                         | 70                       | NP                                            | NP  | 700    | 650 | CS-5                        | ...                        |
| 31                                 | 1     | 4         | 95                         | 75                       | NP                                            | NP  | 700    | 650 | CS-5                        | ...                        |
| 32                                 | 1     | 2         | 70                         | 50                       | NP                                            | 700 | 700    | 650 | CS-3                        | T1                         |
| 33                                 | 1     | 2         | 71                         | ...                      | 1000                                          | NP  | 1000   | NP  | CS-2                        | G10, G18, S1, T1           |
| 34                                 | 1     | 2         | 71                         | ...                      | 1000                                          | NP  | 1000   | NP  | CS-2                        | G10, G18, S1, T1           |
| 35                                 | 1     | 2         | 74                         | 48                       | 800                                           | NP  | NP     | NP  | CS-3                        | T1                         |
| 36                                 | 1     | 2         | 75.5                       | 49.5                     | 800                                           | NP  | NP     | NP  | CS-3                        | T1                         |
| 37                                 | 1     | 2         | 77                         | 52                       | 800                                           | NP  | NP     | NP  | CS-3                        | T1                         |
| 38                                 | 1     | 2         | 77                         | 53.5                     | 800                                           | NP  | NP     | NP  | CS-3                        | T1                         |
| 39                                 | 1     | 3         | 80                         | 60                       | NP                                            | 700 | 700    | 650 | CS-3                        | ...                        |
| 40                                 | 1     | 1         | 60                         | 50                       | NP                                            | NP  | NP     | 650 | ...                         | ...                        |
| 41                                 | 1     | 1         | 60                         | 50                       | NP                                            | NP  | NP     | 650 | ...                         | ...                        |
| 42                                 | 1     | 2         | 70                         | 60                       | NP                                            | NP  | NP     | 650 | ...                         | ...                        |
| 43                                 | 1     | 2         | 70                         | 60                       | NP                                            | NP  | NP     | 650 | ...                         | ...                        |
| 44                                 | 1     | 3         | 80                         | 70                       | NP                                            | NP  | NP     | 650 | ...                         | ...                        |
| 45                                 | 1     | 3         | 80                         | 70                       | NP                                            | NP  | NP     | 650 | ...                         | ...                        |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 20.4 | 19.8 | 19.1 | ...  | ...  | ... | ... |
| 2        | 21.4                                                                                                     | 21.4 | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 20.8 | 19.6 | 15.7 | 12.6 | 9.3 | 6.7 |
| 3        | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 20.8 | 19.6 | ...  | ...  | ... | ... |
| 4        | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | ...  | ...  | ...  | ... | ... |
| 5        | 21.4                                                                                                     | 21.4 | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 19.6 | 15.7 | 12.6 | 9.3 | 6.7 |
| 6        | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 19.6 | ...  | ...  | ... | ... |
| 7        | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.1 | 20.9 | 20.9 | 20.9 | 20.9 | 18.3 | ...  | ...  | ... | ... |
| 8        | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.1 | 20.9 | 20.9 | 20.9 | 20.9 | 19.6 | ...  | ...  | ... | ... |
| 9        | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.1 | 20.9 | 20.9 | 20.9 | 20.9 | 19.6 | ...  | ...  | ... | ... |
| 10       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.1 | 20.9 | 20.9 | 20.9 | 20.9 | ...  | ...  | ...  | ... | ... |
| 11       | 21.4                                                                                                     | 21.4 | 21.4 | 21.3 | 21.1 | 20.9 | 20.9 | 20.9 | ...  | ...  | ...  | ...  | ... | ... |
| 12       | 21.4                                                                                                     | 21.4 | 21.4 | 21.3 | 21.1 | 20.9 | 20.9 | 20.9 | ...  | ...  | ...  | ...  | ... | ... |
| 13       | 21.4                                                                                                     | 21.4 | 21.4 | 21.3 | 21.1 | 20.9 | 20.9 | 20.9 | ...  | ...  | ...  | ...  | ... | ... |
| 14       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.2 | 19.6 | 15.7 | 12.6 | 9.3 | 6.7 |
| 15       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 19.6 | 15.7 | 12.6 | 9.3 | 6.7 |
| 16       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.6 | 22.6 | 22.6 | 22.5 | 22.2 | ...  | ...  | ... | ... |
| 17       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.3 | 22.3 | 22.3 | 22.3 | 19.6 | ...  | ...  | ... | ... |
| 18       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.3 | 22.3 | 22.3 | 22.3 | 19.6 | ...  | ...  | ... | ... |
| 19       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.3 | 22.3 | 22.3 | 22.3 | 19.6 | ...  | ...  | ... | ... |
| 20       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.3 | 22.3 | 22.3 | 22.3 | 19.6 | ...  | ...  | ... | ... |
| 21       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.3 | 22.3 | 22.3 | 22.3 | 19.6 | ...  | ...  | ... | ... |
| 22       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.3 | 22.3 | 22.3 | 22.3 | ...  | ...  | ...  | ... | ... |
| 23       | 22.9                                                                                                     | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  | ... | ... |
| 24       | 22.9                                                                                                     | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  | ...  | ... | ... |
| 25       | 23.1                                                                                                     | ...  | 23.1 | ...  | 22.8 | 22.6 | 22.6 | 22.5 | 22.0 | 19.6 | ...  | ...  | ... | ... |
| 26       | 23.7                                                                                                     | ...  | 23.7 | ...  | 23.4 | 23.2 | 23.2 | 22.5 | 22.0 | ...  | ...  | ...  | ... | ... |
| 27       | 24.3                                                                                                     | 24.3 | 24.3 | 24.3 | 24.3 | 24.3 | 24.3 | 24.1 | 23.7 | ...  | ...  | ...  | ... | ... |
| 28       | 25.7                                                                                                     | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 24.4 | ...  | ...  | ...  | ... | ... |
| 29       | 25.7                                                                                                     | 25.7 | 25.7 | 25.6 | 25.4 | 25.1 | 25.1 | 25.1 | 24.4 | 21.9 | ...  | ...  | ... | ... |
| 30       | 25.7                                                                                                     | 25.7 | 25.7 | 25.6 | 25.4 | 25.1 | 25.1 | 25.1 | 24.4 | 21.9 | ...  | ...  | ... | ... |
| 31       | 27.1                                                                                                     | 27.1 | 27.1 | 27.0 | 26.8 | 26.5 | 26.5 | 26.5 | 24.4 | 23.1 | ...  | ...  | ... | ... |
| 32       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.6 | ...  | ...  | ... | ... |
| 33       | 20.3                                                                                                     | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 34       | 20.3                                                                                                     | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 20.3 | 18.3 | 14.8 | 12.0 | 9.3 | 6.7 |
| 35       | 21.1                                                                                                     | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 21.1 | 19.6 | 15.7 | 12.6 | ... | ... |
| 36       | 21.5                                                                                                     | ...  | 21.5 | ...  | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 19.6 | 15.7 | 12.6 | ... | ... |
| 37       | 22.0                                                                                                     | ...  | 22.0 | ...  | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 19.6 | 15.7 | 12.6 | ... | ... |
| 38       | 22.0                                                                                                     | ...  | 22.0 | ...  | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 19.6 | 15.7 | 12.6 | ... | ... |
| 39       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 20.0 | ...  | ...  | ... | ... |
| 40       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ... | ... |
| 41       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ... | ... |
| 42       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ... | ... |
| 43       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ... | ... |
| 44       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  | ... | ... |
| 45       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  | ... | ... |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 4.0                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition                   | Product Form          | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.                  |
|----------|---------------------------------------|-----------------------|---------------|------------|-----------------------|--------------------------|--------------------------------------|
| 1        | C-Mn-Si-V-Cb                          | Plate                 | SA-656        | T3         | ...                   | ...                      | $\leq \frac{3}{4}$                   |
| 2        | C-Mn-Si-V-Cb                          | Plate                 | SA-656        | T7         | ...                   | ...                      | $\leq \frac{3}{4}$                   |
| 3        | C-Mn-Ti                               | Plate, sheet          | SA-562        | ...        | K11224                | ...                      | ...                                  |
| 4        | C-Si-Ti                               | Forgings              | SA-836        | ...        | ...                   | 1                        | ...                                  |
| 5        | C-0.3Mo                               | Smls. tube            | SA/EN 10216-2 | 16Mo3      | ...                   | ...                      | $1\frac{5}{8} < t \leq 2\frac{1}{2}$ |
| 6        | C-0.3Mo                               | Smls. tube            | SA/EN 10216-2 | 16Mo3      | ...                   | ...                      | $\frac{5}{8} < t \leq 1\frac{5}{8}$  |
| 7        | C-0.3Mo                               | Smls. tube            | SA/EN 10216-2 | 16Mo3      | ...                   | ...                      | $t \leq \frac{5}{8}$                 |
| 8        | C- $\frac{1}{2}$ Mo                   | Smls. tube            | SA-209        | T1b        | K11422                | ...                      | ...                                  |
| 9        | C- $\frac{1}{2}$ Mo                   | Wld. tube             | SA-250        | T1b        | K11422                | ...                      | ...                                  |
| (25) 10  | C- $\frac{1}{2}$ Mo                   | Wld. tube             | SA-250        | T1b        | K11422                | ...                      | ...                                  |
| 11       | C- $\frac{1}{2}$ Mo                   | Smls. tube            | SA-209        | T1         | K11522                | ...                      | ...                                  |
| 12       | C- $\frac{1}{2}$ Mo                   | Smls. & wld. fittings | SA-234        | WP1        | K12821                | ...                      | ...                                  |
| 13       | C- $\frac{1}{2}$ Mo                   | Wld. tube             | SA-250        | T1         | K11522                | ...                      | ...                                  |
| (25) 14  | C- $\frac{1}{2}$ Mo                   | Wld. tube             | SA-250        | T1         | K11522                | ...                      | ...                                  |
| 15       | C- $\frac{1}{2}$ Mo                   | Smls. pipe            | SA-335        | P1         | K11522                | ...                      | ...                                  |
| 16       | C- $\frac{1}{2}$ Mo                   | Forged pipe           | SA-369        | FP1        | K11522                | ...                      | ...                                  |
| 17       | C- $\frac{1}{2}$ Mo                   | Smls. tube            | SA-209        | T1a        | K12023                | ...                      | ...                                  |
| 18       | C- $\frac{1}{2}$ Mo                   | Wld. tube             | SA-250        | T1a        | K12023                | ...                      | ...                                  |
| (25) 19  | C- $\frac{1}{2}$ Mo                   | Wld. tube             | SA-250        | T1a        | K12023                | ...                      | ...                                  |
| 20       | C- $\frac{1}{2}$ Mo                   | Castings              | SA-217        | WC1        | J12524                | ...                      | ...                                  |
| 21       | C- $\frac{1}{2}$ Mo                   | Castings              | SA-352        | LC1        | J12522                | ...                      | ...                                  |
| 22       | C- $\frac{1}{2}$ Mo                   | Cast pipe             | SA-426        | CP1        | J12521                | ...                      | ...                                  |
| 23       | C- $\frac{1}{2}$ Mo                   | Plate                 | SA-204        | A          | K11820                | ...                      | ...                                  |
| 24       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-672        | L65        | K11820                | ...                      | ...                                  |
| 25       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-691        | CM-65      | K11820                | ...                      | ...                                  |
| 26       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-691        | CM-65      | K11820                | ...                      | ...                                  |
| 27       | C- $\frac{1}{2}$ Mo                   | Forgings              | SA-182        | F1         | K12822                | ...                      | ...                                  |
| 28       | C- $\frac{1}{2}$ Mo                   | Plate                 | SA-204        | B          | K12020                | ...                      | ...                                  |
| 29       | C- $\frac{1}{2}$ Mo                   | Forgings              | SA-336        | F1         | K12520                | ...                      | ...                                  |
| 30       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-672        | L70        | K12020                | ...                      | ...                                  |
| 31       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-691        | CM-70      | K12020                | ...                      | ...                                  |
| 32       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-691        | CM-70      | K12020                | ...                      | ...                                  |
| 33       | C- $\frac{1}{2}$ Mo                   | Plate                 | SA-204        | C          | K12320                | ...                      | ...                                  |
| 34       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-672        | L75        | K12320                | ...                      | ...                                  |
| 35       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-691        | CM-75      | K12320                | ...                      | ...                                  |
| 36       | C- $\frac{1}{2}$ Mo                   | Wld. pipe             | SA-691        | CM-75      | K12320                | ...                      | ...                                  |
| 37       | $\frac{1}{2}$ Cr- $\frac{1}{5}$ Mo    | Forgings              | SA-372        | G          | K13049                | 55                       | ...                                  |
| 38       | $\frac{1}{2}$ Cr- $\frac{1}{5}$ Mo    | Forgings              | SA-372        | H          | K13547                | 55                       | ...                                  |
| 39       | $\frac{1}{2}$ Cr- $\frac{1}{5}$ Mo    | Forgings              | SA-372        | G          | K13049                | 65                       | ...                                  |
| 40       | $\frac{1}{2}$ Cr- $\frac{1}{5}$ Mo    | Forgings              | SA-372        | H          | K13547                | 65                       | ...                                  |
| 41       | $\frac{1}{2}$ Cr- $\frac{1}{5}$ Mo    | Forgings              | SA-372        | G          | K13049                | 70                       | ...                                  |
| 42       | $\frac{1}{2}$ Cr- $\frac{1}{5}$ Mo    | Forgings              | SA-372        | H          | K13547                | 70                       | ...                                  |
| 43       | $\frac{1}{2}$ Cr- $\frac{1}{5}$ Mo-V  | Plate                 | SA-517        | B          | K11630                | ...                      | $\leq 1\frac{1}{4}$                  |
| 44       | $\frac{1}{2}$ Cr- $\frac{1}{4}$ Mo-Si | Plate                 | SA-517        | A          | K11856                | ...                      | $\leq 1\frac{1}{4}$                  |
| 45       | $\frac{1}{2}$ Cr- $\frac{1}{4}$ Mo-Si | Forgings              | SA-592        | A          | K11856                | ...                      | $\leq 2\frac{1}{2}$                  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |                  |        |     |                             |                      |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|------------------|--------|-----|-----------------------------|----------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |                  |        |     | External Pressure Chart No. | Notes                |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     |                             |                      |
|                                    |       |           |                            |                          | I                                             | III              | VIII-1 | XII |                             |                      |
| 1                                  | 1     | 4         | 90                         | 80                       | NP                                            | NP               | NP     | 650 | ...                         | ...                  |
| 2                                  | 1     | 4         | 90                         | 80                       | NP                                            | NP               | NP     | 650 | ...                         | ...                  |
| 3                                  | 1     | 1         | 71                         | 30                       | NP                                            | NP               | 650    | NP  | CS-6                        | G7                   |
| 4                                  | 1     | 1         | 55                         | 25                       | NP                                            | NP               | 650    | 650 | CS-1                        | ...                  |
| 5                                  | 3     | 1         | 65.5                       | 37.5                     | 1000                                          | NP               | 1000   | NP  | CS-2                        | G11, S2, T4          |
| 6                                  | 3     | 1         | 65.5                       | 39                       | 1000                                          | NP               | 1000   | NP  | CS-2                        | G11, S2, T4          |
| 7                                  | 3     | 1         | 65.5                       | 40.5                     | 1000                                          | NP               | 1000   | NP  | CS-2                        | G11, S2, T4          |
| 8                                  | 3     | 1         | 53                         | 28                       | 1000                                          | NP               | 1000   | 650 | CS-1                        | G11, S3, T5          |
| 9                                  | 3     | 1         | 53                         | 28                       | 1000                                          | NP               | NP     | NP  | CS-1                        | G11, S2, T5, W13     |
| 10                                 | 3     | 1         | 53                         | 28                       | 1000                                          | NP               | 1000   | 650 | CS-1                        | G11, G24, S2, T5     |
| 11                                 | 3     | 1         | 55                         | 30                       | 1000                                          | NP               | 1000   | 650 | CS-2                        | G11, S3, T4          |
| 12                                 | 3     | 1         | 55                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, T4, W14         |
| 13                                 | 3     | 1         | 55                         | 30                       | 1000                                          | NP               | NP     | NP  | CS-2                        | G11, S2, T4, W13     |
| 14                                 | 3     | 1         | 55                         | 30                       | 1000                                          | NP               | 1000   | 650 | CS-2                        | G11, G24, S2, T4     |
| 15                                 | 3     | 1         | 55                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, S2, T4          |
| 16                                 | 3     | 1         | 55                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, S2, T4          |
| 17                                 | 3     | 1         | 60                         | 32                       | 1000                                          | NP               | 1000   | 650 | CS-2                        | G11, S3, T4          |
| 18                                 | 3     | 1         | 60                         | 32                       | 1000                                          | NP               | NP     | NP  | CS-2                        | G11, S2, T4, W13     |
| 19                                 | 3     | 1         | 60                         | 32                       | 1000                                          | NP               | 1000   | 650 | CS-2                        | G11, G24, S2, T4     |
| 20                                 | 3     | 1         | 65                         | 35                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G1, G11, G17, S2, T4 |
| 21                                 | 3     | 1         | 65                         | 35                       | NP                                            | 700              | 650    | 650 | CS-2                        | G1, G17              |
| 22                                 | 3     | 1         | 65                         | 35                       | NP                                            | 700              | NP     | NP  | CS-2                        | G17                  |
| 23                                 | 3     | 1         | 65                         | 37                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, S2, T4          |
| 24                                 | 3     | 1         | 65                         | 37                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12        |
| 25                                 | 3     | 1         | 65                         | 37                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12        |
| 26                                 | 3     | 1         | 65                         | 37                       | NP                                            | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G27, W10, W12        |
| 27                                 | 3     | 2         | 70                         | 40                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, S2, T4          |
| 28                                 | 3     | 2         | 70                         | 40                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, S2, T4          |
| 29                                 | 3     | 2         | 70                         | 40                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, S2, T4          |
| 30                                 | 3     | 2         | 70                         | 40                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12        |
| 31                                 | 3     | 2         | 70                         | 40                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12        |
| 32                                 | 3     | 2         | 70                         | 40                       | NP                                            | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G27, W10, W12        |
| 33                                 | 3     | 2         | 75                         | 43                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | G11, S2, T4, W12     |
| 34                                 | 3     | 2         | 75                         | 43                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12        |
| 35                                 | 3     | 2         | 75                         | 43                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12        |
| 36                                 | 3     | 2         | 75                         | 43                       | NP                                            | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G27, W10, W12        |
| 37                                 | ...   | ...       | 85                         | 55                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11                  |
| 38                                 | ...   | ...       | 85                         | 55                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11                  |
| 39                                 | ...   | ...       | 105                        | 65                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11                  |
| 40                                 | ...   | ...       | 105                        | 65                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11                  |
| 41                                 | ...   | ...       | 120                        | 70                       | NP                                            | NP               | 200    | 200 | CS-3                        | W11                  |
| 42                                 | ...   | ...       | 120                        | 70                       | NP                                            | NP               | 200    | 200 | CS-3                        | W11                  |
| 43                                 | 11B   | 4         | 115                        | 100                      | NP                                            | 650 (SPT)        | 650    | 650 | HT-1                        | ...                  |
| 44                                 | 11B   | 1         | 115                        | 100                      | NP                                            | 650 (SPT)        | 650    | 650 | HT-1                        | ...                  |
| 45                                 | 11B   | 1         | 115                        | 100                      | NP                                            | 650 (SPT)        | 650    | 650 | HT-1                        | ...                  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  | ...  |
| 2        | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  | ...  |
| 3        | 12.9                                                                                                     | ...  | 11.5 | ...  | 10.6 | 10.4 | 10.4 | 10.4 | 10.4 | ...  | ...  | ...  | ...  | ...  |
| 4        | 15.7                                                                                                     | ...  | 14.3 | ...  | 13.3 | 13.0 | 13.0 | 12.9 | 12.7 | ...  | ...  | ...  | ...  | ...  |
| 5        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.2 | 13.7 |
| 6        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.2 | 13.7 |
| 7        | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.2 | 13.7 |
| 8        | 15.1                                                                                                     | 15.1 | 15.1 | ...  | 15.1 | 15.1 | 15.1 | 15.1 | 15.0 | 14.7 | 14.3 | 14.0 | 13.5 | 13.0 |
| 9        | 15.1                                                                                                     | ...  | 15.1 | ...  | 15.1 | 15.1 | 15.1 | 15.1 | 15.0 | 14.7 | 14.3 | 14.0 | 13.5 | 13.0 |
| 10       | 12.9                                                                                                     | 12.9 | 12.9 | ...  | 12.9 | 12.9 | 12.9 | 12.9 | 12.7 | 12.5 | 12.2 | 11.9 | 11.5 | 11.1 |
| 11       | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.4 | 14.9 | 14.5 | 13.7 |
| 12       | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.4 | 14.9 | 14.5 | 13.7 |
| 13       | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.4 | 14.9 | 14.5 | 13.7 |
| 14       | 13.4                                                                                                     | 13.4 | 13.4 | ...  | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.4 | 13.1 | 12.7 | 12.3 | 11.6 |
| 15       | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.4 | 14.9 | 14.5 | 13.7 |
| 16       | 15.7                                                                                                     | 15.7 | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.4 | 14.9 | 14.5 | 13.7 |
| 17       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 16.8 | 16.4 | 15.9 | 15.4 | 13.7 |
| 18       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 16.8 | 16.4 | 15.9 | 15.4 | 13.7 |
| 19       | 14.6                                                                                                     | ...  | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | 14.3 | 13.9 | 13.6 | 13.1 | 11.6 |
| 20       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.4 | 17.9 | 17.4 | 16.9 | 13.7 |
| 21       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.4 | ...  | ...  | ...  | ...  |
| 22       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.4 | ...  | ...  | ...  | ...  |
| 23       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.4 | 17.9 | 13.7 |
| 24       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  |
| 25       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  |
| 26       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.9 | 19.3 | 13.7 |
| 28       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.9 | 19.3 | 13.7 |
| 29       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.9 | 19.3 | 13.7 |
| 30       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  |
| 31       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  |
| 32       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 20.7 | 13.7 |
| 34       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | ...  | ...  | ...  | ...  |
| 35       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | ...  | ...  | ...  | ...  |
| 36       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.3 | 24.3 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.3 | 24.3 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 30.0                                                                                                     | ...  | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 30.0                                                                                                     | ...  | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 34.3                                                                                                     | ...  | 34.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 34.3                                                                                                     | ...  | 34.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 32.9                                                                                                     | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.8 | ...  | ...  | ...  | ...  | ...  |
| 44       | 32.9                                                                                                     | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.8 | ...  | ...  | ...  | ...  | ...  |
| 45       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.8 | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 7.0                                                                                                      | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 11       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 7.0                                                                                                      | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 15       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 7.0                                                                                                      | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 20       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition                                             | Product Form          | Spec. No.     | Type/Grade             | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.                  |
|----------|-----------------------------------------------------------------|-----------------------|---------------|------------------------|-----------------------|--------------------------|--------------------------------------|
| 1        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Smls. pipe            | SA-335        | P2                     | K11547                | ...                      | ...                                  |
| 2        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Forged pipe           | SA-369        | FP2                    | K11547                | ...                      | ...                                  |
| 3        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Plate                 | SA-387        | 2                      | K12143                | 1                        | ...                                  |
| 4        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Wld. pipe             | SA-691        | $\frac{1}{2}\text{CR}$ | K12143                | ...                      | ...                                  |
| 5        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Wld. pipe             | SA-691        | $\frac{1}{2}\text{CR}$ | K12143                | ...                      | ...                                  |
| (25) 6   | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Smls. tube            | SA-213        | T2                     | K11547                | ...                      | ...                                  |
| 7        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Wld. tube             | SA-250        | T2                     | K11547                | ...                      | ...                                  |
| 8        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Wld. tube             | SA-250        | T2S1                   | K11547                | ...                      | ...                                  |
| 9        | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Cast pipe             | SA-426        | CP2                    | J11547                | ...                      | ...                                  |
| 10       | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Forgings              | SA-182        | F2                     | K12122                | ...                      | ...                                  |
| 11       | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Plate                 | SA-387        | 2                      | K12143                | 2                        | ...                                  |
| 12       | $\frac{1}{2}\text{Cr}-\frac{1}{2}\text{Mo}$                     | Wld. pipe             | SA-691        | $\frac{1}{2}\text{CR}$ | K12143                | ...                      | ...                                  |
| (25) 13  | $\frac{3}{4}\text{Cr}-\frac{1}{2}\text{Ni}-\text{Cu}$           | Smls. & wld. tube     | SA-423        | 1                      | K11535                | ...                      | ...                                  |
| 14       | $\frac{3}{4}\text{Cr}-\frac{1}{2}\text{Ni}-\text{Cu}$           | Wld. tube             | SA-423        | 1                      | K11535                | ...                      | ...                                  |
| 15       | $\frac{3}{4}\text{Cr}-\frac{3}{4}\text{Ni}-\text{Cu}-\text{Al}$ | Pipe                  | SA-333        | 4                      | K11267                | ...                      | ...                                  |
| 16       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | E                      | K13047                | 55                       | ...                                  |
| 17       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | F                      | G41350                | 55                       | ...                                  |
| 18       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | J                      | K13548                | 55                       | ...                                  |
| 19       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | E                      | K13047                | 65                       | ...                                  |
| 20       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | F                      | G41350                | 65                       | ...                                  |
| 21       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | J                      | K13548                | 65                       | ...                                  |
| 22       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | E                      | K13047                | 70                       | ...                                  |
| 23       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | F                      | G41350                | 70                       | ...                                  |
| 24       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | J                      | K13548                | 70                       | ...                                  |
| 25       | $1\text{Cr}-\frac{1}{5}\text{Mo}$                               | Forgings              | SA-372        | J                      | G41370                | 110                      | ...                                  |
| 26       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Plate                 | SA-387        | 12                     | K11757                | 1                        | ...                                  |
| 27       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Wld. pipe             | SA-691        | 1CR                    | K11757                | ...                      | ...                                  |
| 28       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Cast pipe             | SA-426        | CP12                   | J11562                | ...                      | ...                                  |
| 29       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Forgings              | SA-182        | F12                    | K11562                | 1                        | ...                                  |
| 30       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Smls. tube            | SA-213        | T12                    | K11562                | ...                      | ...                                  |
| (25) 31  | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Smls. & wld. fittings | SA-234        | WP12                   | K12062                | 1                        | ...                                  |
| 32       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Wld. tube             | SA-250        | T12                    | K11562                | ...                      | ...                                  |
| 33       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Wld. tube             | SA-250        | T12S1                  | K11562                | ...                      | ...                                  |
| 34       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Smls. pipe            | SA-335        | P12                    | K11562                | ...                      | ...                                  |
| 35       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Forged pipe           | SA-369        | FP12                   | K11562                | ...                      | ...                                  |
| 36       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Forgings              | SA/EN 10222-2 | 13CrMo4-5              | ...                   | NT or QT                 | $10 < t \leq 20$                     |
| 37       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Plate                 | SA/EN 10028-2 | 13CrMo4-5              | ...                   | ...                      | $6 < t \leq 10$                      |
| 38       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Plate                 | SA/EN 10028-2 | 13CrMo4-5              | ...                   | ...                      | $4 < t \leq 6$                       |
| 39       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Plate                 | SA/GB 713     | 15CrMoR                | ...                   | NT                       | $4 < t \leq 8$                       |
| 40       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Forgings              | SA/EN 10222-2 | 13CrMo4-5              | ...                   | NT or QT                 | $4 < t \leq 10$                      |
| 41       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Plate                 | SA/EN 10028-2 | 13CrMo4-5              | ...                   | ...                      | $2.5 < t \leq 4$                     |
| 42       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Forgings              | SA/EN 10222-2 | 13CrMo4-5              | ...                   | NT or QT                 | $2.8 < t \leq 4$                     |
| (25) 43  | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Smls. tube            | SA/EN 10216-2 | 13CrMo4-5              | ...                   | ...                      | $1\frac{5}{8} < t \leq 2\frac{1}{2}$ |
| 44       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Forgings              | SA/EN 10222-2 | 13CrMo4-5              | ...                   | NT or QT                 | $1.4 < t \leq 2.8$                   |
| 45       | $1\text{Cr}-\frac{1}{2}\text{Mo}$                               | Smls. tube            | SA/EN 10216-2 | 13CrMo4-5              | ...                   | ...                      | $t \leq 1\frac{5}{8}$                |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |                  |        |     |                             |               |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|------------------|--------|-----|-----------------------------|---------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |                  |        |     | External Pressure Chart No. | Notes         |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     |                             |               |
|                                    |       |           |                            |                          | I                                             | III              | VIII-1 | XII |                             |               |
| 1                                  | 3     | 1         | 55                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | T5            |
| 2                                  | 3     | 1         | 55                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | T5            |
| 3                                  | 3     | 1         | 55                         | 33                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | T5            |
| 4                                  | 3     | 1         | 55                         | 33                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12 |
| 5                                  | 3     | 1         | 55                         | 33                       | NP                                            | 300 (Cl. 3 only) | NP     | NP  | CS-2                        | G27, W10, W12 |
| 6                                  | 3     | 1         | 60                         | 30                       | 1000                                          | 700              | 1000   | 650 | CS-2                        | T5            |
| 7                                  | 3     | 1         | 60                         | 30                       | 1000                                          | NP               | NP     | NP  | CS-2                        | G24, T5       |
| 8                                  | 3     | 1         | 60                         | 30                       | 1000                                          | NP               | NP     | NP  | CS-2                        | T5, W13       |
| 9                                  | 3     | 1         | 60                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | G17           |
| 10                                 | 3     | 2         | 70                         | 40                       | 1000                                          | NP               | 1000   | 650 | CS-2                        | T5            |
| 11                                 | 3     | 2         | 70                         | 45                       | NP                                            | 700              | 1000   | 650 | CS-3                        | T5            |
| 12                                 | 3     | 2         | 70                         | 45                       | NP                                            | 700              | NP     | NP  | CS-3                        | G26, W10, W12 |
| 13                                 | 4     | 2         | 60                         | 37                       | 700                                           | NP               | 650    | NP  | CS-2                        | W13, W14      |
| 14                                 | 4     | 2         | 60                         | 37                       | 700                                           | NP               | 650    | NP  | CS-2                        | G24           |
| 15                                 | 4     | 2         | 60                         | 35                       | NP                                            | 700              | 650    | NP  | CS-2                        | ...           |
| 16                                 | ...   | ...       | 85                         | 55                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11           |
| 17                                 | ...   | ...       | 85                         | 55                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11           |
| 18                                 | ...   | ...       | 85                         | 55                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11           |
| 19                                 | ...   | ...       | 105                        | 65                       | NP                                            | NP               | 650    | 650 | CS-2                        | W11           |
| 20                                 | ...   | ...       | 105                        | 65                       | NP                                            | NP               | 600    | 600 | CS-3                        | W11           |
| 21                                 | ...   | ...       | 105                        | 65                       | NP                                            | NP               | 650    | 650 | CS-2                        | W11           |
| 22                                 | ...   | ...       | 120                        | 70                       | NP                                            | NP               | 650    | 650 | CS-5                        | W11           |
| 23                                 | ...   | ...       | 120                        | 70                       | NP                                            | NP               | 650    | 650 | CS-5                        | W11           |
| 24                                 | ...   | ...       | 120                        | 70                       | NP                                            | NP               | 650    | 650 | CS-5                        | W11           |
| 25                                 | ...   | ...       | 135                        | 110                      | NP                                            | NP               | 650    | 650 | HT-1                        | W11           |
| 26                                 | 4     | 1         | 55                         | 33                       | 1200                                          | 700              | 1200   | NP  | CS-2                        | S4, T5        |
| 27                                 | 4     | 1         | 55                         | 33                       | NP                                            | 700              | NP     | NP  | CS-2                        | G26, W10, W12 |
| 28                                 | 4     | 1         | 60                         | 30                       | NP                                            | 700              | NP     | NP  | CS-2                        | G17           |
| 29                                 | 4     | 1         | 60                         | 32                       | 1200                                          | NP               | 1200   | NP  | CS-2                        | T5            |
| 30                                 | 4     | 1         | 60                         | 32                       | 1200                                          | 700              | 1200   | NP  | CS-2                        | S4, T5        |
| 31                                 | 4     | 1         | 60                         | 32                       | 1200                                          | 700              | 1200   | NP  | CS-2                        | S4, T5, W14   |
| 32                                 | 4     | 1         | 60                         | 32                       | 1200                                          | NP               | NP     | NP  | CS-2                        | G24, S4, T5   |
| 33                                 | 4     | 1         | 60                         | 32                       | 1200                                          | NP               | NP     | NP  | CS-2                        | S4, T5, W13   |
| 34                                 | 4     | 1         | 60                         | 32                       | 1200                                          | 700              | 1200   | NP  | CS-2                        | S4, T5        |
| 35                                 | 4     | 1         | 60                         | 32                       | 1200                                          | 700              | 1200   | NP  | CS-2                        | S4, T5        |
| 36                                 | 4     | 1         | 61                         | 35                       | 1200                                          | NP               | 1200   | NP  | CS-2                        | S4, T5        |
| 37                                 | 4     | 1         | 61                         | 35.5                     | 1200                                          | NP               | 1200   | NP  | CS-2                        | S4, T5        |
| 38                                 | 4     | 1         | 62.5                       | 37                       | 1200                                          | NP               | 1200   | NP  | CS-2                        | S4, T5        |
| 39                                 | 4     | 1         | 64                         | 37                       | 1200                                          | NP               | NP     | NP  | CS-2                        | S4, T5        |
| 40                                 | 4     | 1         | 64                         | 38.5                     | 1200                                          | NP               | 1200   | NP  | CS-2                        | S4, T5        |
| 41                                 | 4     | 1         | 64                         | 39                       | 1200                                          | NP               | 1200   | NP  | CS-2                        | S4, T5        |
| 42                                 | 4     | 1         | 64                         | 40                       | 1200                                          | NP               | 1200   | NP  | CS-2                        | S4, T5        |
| 43                                 | 4     | 1         | 64                         | 40.5                     | 1200                                          | NP               | 1200   | NP  | CS-2                        | T5            |
| 44                                 | 4     | 1         | 64                         | 41.5                     | 1200                                          | NP               | 1200   | NP  | CS-2                        | S4, T5        |
| 45                                 | 4     | 1         | 64                         | 42                       | 1200                                          | NP               | 1200   | NP  | CS-2                        | T5            |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.4 | 14.9 | 14.5 | 13.9 |
| 2        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.4 | 14.9 | 14.5 | 13.9 |
| 3        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.3 | 14.3 |
| 4        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | ...  | ...  | ...  | ...  |
| 5        | 15.7                                                                                                     | ...  | 15.7 | ...  | 15.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 16.9 | 16.4 | 16.1 | 15.7 | 15.4 | 14.9 | 14.5 | 13.9 |
| 7        | 14.5                                                                                                     | ...  | 14.5 | ...  | 14.5 | 14.5 | 14.4 | 13.9 | 13.7 | 13.3 | 13.1 | 12.7 | 12.3 | 11.8 |
| 8        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 16.9 | 16.4 | 16.1 | 15.7 | 15.4 | 14.9 | 14.5 | 13.9 |
| 9        | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 16.9 | 16.4 | 16.1 | 15.7 | ...  | ...  | ...  | ...  |
| 10       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.9 | 19.3 | 18.6 |
| 11       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.5 | 18.6 |
| 12       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  |
| 13       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  |
| 14       | 14.6                                                                                                     | ...  | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | ...  | ...  | ...  | ...  |
| 15       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  |
| 16       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.3 | 24.3 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.3 | 24.3 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.3 | 24.3 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 30.0                                                                                                     | ...  | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 29.8 | ...  | ...  | ...  | ...  | ...  |
| 20       | 30.0                                                                                                     | ...  | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 30.0                                                                                                     | ...  | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 29.8 | ...  | ...  | ...  | ...  | ...  |
| 22       | 34.3                                                                                                     | 34.3 | 34.3 | ...  | 34.3 | 34.3 | 34.3 | 34.3 | 34.1 | ...  | ...  | ...  | ...  | ...  |
| 23       | 34.3                                                                                                     | ...  | 34.3 | ...  | 34.3 | 34.3 | 34.3 | 34.3 | 34.1 | ...  | ...  | ...  | ...  | ...  |
| 24       | 34.3                                                                                                     | ...  | 34.3 | ...  | 34.3 | 34.3 | 34.3 | 34.3 | 34.1 | ...  | ...  | ...  | ...  | ...  |
| 25       | 38.5                                                                                                     | ...  | 36.9 | ...  | 36.7 | 36.5 | 36.1 | 35.9 | 34.3 | ...  | ...  | ...  | ...  | ...  |
| 26       | 15.7                                                                                                     | ...  | 15.4 | ...  | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 14.7 |
| 27       | 15.7                                                                                                     | ...  | 15.4 | ...  | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | ...  | ...  | ...  | ...  |
| 28       | 17.1                                                                                                     | ...  | 16.8 | ...  | 16.5 | 16.2 | 15.7 | 15.2 | 15.0 | 14.8 | ...  | ...  | ...  | ...  |
| 29       | 17.1                                                                                                     | 17.1 | 16.8 | ...  | 16.5 | 16.5 | 16.5 | 16.3 | 16.0 | 15.8 | 15.5 | 15.3 | 14.9 | 14.5 |
| 30       | 17.1                                                                                                     | ...  | 16.8 | ...  | 16.5 | 16.5 | 16.5 | 16.3 | 16.0 | 15.8 | 15.5 | 15.3 | 14.9 | 14.5 |
| 31       | 17.1                                                                                                     | ...  | 16.8 | ...  | 16.5 | 16.5 | 16.5 | 16.3 | 16.0 | 15.8 | 15.5 | 15.3 | 14.9 | 14.5 |
| 32       | 14.5                                                                                                     | 14.5 | 14.3 | ...  | 14.0 | 14.0 | 14.0 | 13.8 | 13.6 | 13.4 | 13.2 | 13.0 | 12.7 | 12.3 |
| 33       | 17.1                                                                                                     | 17.1 | 16.8 | ...  | 16.5 | 16.5 | 16.5 | 16.3 | 16.0 | 15.8 | 15.5 | 15.3 | 14.9 | 14.5 |
| 34       | 17.1                                                                                                     | ...  | 16.8 | ...  | 16.5 | 16.5 | 16.5 | 16.3 | 16.0 | 15.8 | 15.5 | 15.3 | 14.9 | 14.5 |
| 35       | 17.1                                                                                                     | ...  | 16.8 | ...  | 16.5 | 16.5 | 16.5 | 16.3 | 16.0 | 15.8 | 15.5 | 15.3 | 14.9 | 14.5 |
| 36       | 17.4                                                                                                     | ...  | 17.2 | ...  | 16.7 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.3 | 15.8 |
| 37       | 17.4                                                                                                     | 17.2 | 17.1 | 16.9 | 16.8 | 16.8 | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 |
| 38       | 17.8                                                                                                     | 17.7 | 17.5 | 17.3 | 17.2 | 17.2 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.0 | 16.7 |
| 39       | 18.2                                                                                                     | ...  | 17.9 | ...  | 17.6 | 17.6 | 17.1 | 16.6 | 16.4 | 16.1 | 15.9 | 15.5 | 15.2 | 14.8 |
| 40       | 18.2                                                                                                     | ...  | 18.0 | ...  | 17.5 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.3 | 16.9 |
| 41       | 18.2                                                                                                     | 18.1 | 17.9 | 17.7 | 17.6 | 17.6 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.4 | 17.1 |
| 42       | 18.2                                                                                                     | ...  | 18.0 | ...  | 17.5 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.3 | 16.9 |
| 43       | 18.2                                                                                                     | ...  | 18.2 | ...  | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 17.7 | 17.0 |
| 44       | 18.2                                                                                                     | ...  | 18.0 | ...  | 17.5 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.3 | 16.9 |
| 45       | 18.2                                                                                                     | ...  | 18.2 | ...  | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 18.2 | 17.7 | 17.0 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 7.8                                                                                                      | 5.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 9.6                                                                                                      | 6.1  | 3.8  | 2.4  | 1.5  | 0.94 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition                      | Product Form          | Spec. No.     | Type/Grade        | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.        |
|----------|------------------------------------------|-----------------------|---------------|-------------------|-----------------------|--------------------------|----------------------------|
| (25)     | 1 1Cr- $\frac{1}{2}$ Mo                  | Forgings              | SA/EN 10222-2 | 13CrMo4-5         | ...                   | NT or QT                 | $t \leq 1.4$               |
|          | 2 1Cr- $\frac{1}{2}$ Mo                  | Plate                 | SA-387        | 12                | K11757                | 2                        | ...                        |
|          | 3 1Cr- $\frac{1}{2}$ Mo                  | Wld. pipe             | SA-691        | 1CR               | K11757                | ...                      | ...                        |
|          | 4 1Cr- $\frac{1}{2}$ Mo                  | Plate                 | SA/GB 713     | 15CrMoR           | ...                   | NT                       | $2.5 < t \leq 4$           |
|          | 5 1Cr- $\frac{1}{2}$ Mo                  | Plate                 | SA/EN 10028-2 | 13CrMo4-5         | ...                   | ...                      | $\frac{5}{8} < t \leq 2.5$ |
|          | 6 1Cr- $\frac{1}{2}$ Mo                  | Plate                 | SA/GB 713     | 15CrMoR           | ...                   | NT                       | $0.25 \leq t \leq 2.5$     |
|          | 7 1Cr- $\frac{1}{2}$ Mo                  | Plate                 | SA/EN 10028-2 | 13CrMo4-5         | ...                   | ...                      | $t \leq \frac{5}{8}$       |
|          | 8 1Cr- $\frac{1}{2}$ Mo                  | Forgings              | SA-182        | F12               | K11564                | 2                        | ...                        |
|          | 9 1Cr- $\frac{1}{2}$ Mo                  | Forgings              | SA-336        | F12               | K11564                | ...                      | ...                        |
|          | 10 1Cr-V                                 | Smls. tube            | SA-213        | T17               | K12047                | ...                      | ...                        |
|          | 11 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo    | Castings              | SA-217        | WC6               | J12072                | ...                      | ...                        |
|          | 12 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo    | Cast pipe             | SA-426        | CP11              | J12072                | ...                      | ...                        |
|          | 13 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo    | Bar                   | SA-739        | B11               | K11797                | ...                      | ...                        |
|          | 14 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Forgings              | SA-182        | F11               | K11597                | 1                        | ...                        |
|          | 15 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Smls. tube            | SA-213        | T11               | K11597                | ...                      | ...                        |
| (25)     | 16 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Smls. & wld. fittings | SA-234        | WP11              | ...                   | 1                        | ...                        |
|          | 17 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Wld. tube             | SA-250        | T11               | K11597                | ...                      | ...                        |
|          | 18 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Wld. tube             | SA-250        | T11S1             | K11597                | ...                      | ...                        |
|          | 19 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Smls. pipe            | SA-335        | P11               | K11597                | ...                      | ...                        |
|          | 20 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Forgings              | SA-336        | F11               | K11597                | 1                        | ...                        |
|          | 21 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Forged pipe           | SA-369        | FP11              | K11597                | ...                      | ...                        |
|          | 22 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Plate                 | SA-387        | 11                | K11789                | 1                        | ...                        |
|          | 23 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Wld. pipe             | SA-691        | $\frac{1}{4}$ CR  | K11789                | ...                      | ...                        |
|          | 24 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Wld. pipe             | SA-691        | $\frac{1}{4}$ CR  | K11789                | ...                      | ...                        |
|          | 25 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Forgings              | SA-182        | F11               | K11572                | 2                        | ...                        |
|          | 26 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Forgings              | SA-336        | F11               | K11572                | 2                        | ...                        |
|          | 27 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Forgings              | SA-336        | F11               | K11572                | 3                        | ...                        |
|          | 28 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Plate                 | SA-387        | 11                | K11789                | 2                        | ...                        |
|          | 29 $\frac{1}{4}$ Cr- $\frac{1}{2}$ Mo-Si | Wld. pipe             | SA-691        | $\frac{1}{4}$ CR  | K11789                | ...                      | ...                        |
|          | 30 $\frac{3}{4}$ Cr- $\frac{1}{2}$ Mo-Cu | Forgings              | SA-592        | E                 | K11695                | ...                      | $2\frac{1}{2} < t \leq 4$  |
| (25)     | 31 $\frac{3}{4}$ Cr- $\frac{1}{2}$ Mo-Cu | Forgings              | SA-592        | E                 | K11695                | ...                      | $\leq 2\frac{1}{2}$        |
|          | 32 $\frac{3}{4}$ Cr- $\frac{1}{2}$ Mo-Ti | Plate                 | SA-517        | E                 | K21604                | ...                      | $2\frac{1}{2} < t \leq 6$  |
|          | 33 $\frac{3}{4}$ Cr- $\frac{1}{2}$ Mo-Ti | Plate                 | SA-517        | E                 | K21604                | ...                      | $\leq 2\frac{1}{2}$        |
|          | 34 $2\frac{1}{4}$ Cr-1Mo                 | Forgings              | SA-182        | F22               | K21590                | 1                        | ...                        |
|          | 35 $2\frac{1}{4}$ Cr-1Mo                 | Smls. tube            | SA-213        | T22               | K21590                | ...                      | ...                        |
|          | 36 $2\frac{1}{4}$ Cr-1Mo                 | Smls. & wld. fittings | SA-234        | WP22              | K21590                | 1                        | ...                        |
|          | 37 $2\frac{1}{4}$ Cr-1Mo                 | Wld. tube             | SA-250        | T22               | K21590                | ...                      | ...                        |
|          | 38 $2\frac{1}{4}$ Cr-1Mo                 | Wld. tube             | SA-250        | T22S1             | K21590                | ...                      | ...                        |
|          | 39 $2\frac{1}{4}$ Cr-1Mo                 | Smls. pipe            | SA-335        | P22               | K21590                | ...                      | ...                        |
|          | 40 $2\frac{1}{4}$ Cr-1Mo                 | Forgings              | SA-336        | F22               | K21590                | 1                        | ...                        |
|          | 41 $2\frac{1}{4}$ Cr-1Mo                 | Forged pipe           | SA-369        | FP22              | K21590                | ...                      | ...                        |
|          | 42 $2\frac{1}{4}$ Cr-1Mo                 | Plate                 | SA-387        | 22                | K21590                | 1                        | ...                        |
|          | 43 $2\frac{1}{4}$ Cr-1Mo                 | Wld. pipe             | SA-691        | $2\frac{1}{4}$ CR | K21590                | ...                      | ...                        |
|          | 44 $2\frac{1}{4}$ Cr-1Mo                 | Plate                 | SA/EN 10028-2 | 10CrMo9-10        | ...                   | ...                      | $6 < t \leq 10$            |
|          | 45 $2\frac{1}{4}$ Cr-1Mo                 | Forgings              | SA/EN 10222-2 | 11CrMo9-10        | ...                   | NT or QT                 | $8 < t \leq 20$            |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |                    |        |     |                             |                     |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|--------------------|--------|-----|-----------------------------|---------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |                    |        |     | External Pressure Chart No. | Notes               |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |                    |        |     |                             |                     |
|                                    |       |           |                            |                          | I                                             | III                | VIII-1 | XII |                             |                     |
| 1                                  | 4     | 1         | 64                         | 43                       | 1200                                          | NP                 | 1200   | NP  | CS-2                        | S4, T5              |
| 2                                  | 4     | 1         | 65                         | 40                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T5              |
| 3                                  | 4     | 1         | 65                         | 40                       | NP                                            | 700                | NP     | NP  | CS-2                        | G26, W10, W12       |
| 4                                  | 4     | 1         | 65.5                       | 40                       | 1200                                          | NP                 | NP     | NP  | CS-2                        | S4, T5              |
| 5                                  | 4     | 1         | 65.5                       | 42                       | 1200                                          | NP                 | 1200   | NP  | CS-2                        | S4, T5              |
| 6                                  | 4     | 1         | 65.5                       | 43                       | 1200                                          | NP                 | NP     | NP  | CS-2                        | S4, T5              |
| 7                                  | 4     | 1         | 65.5                       | 43.5                     | 1200                                          | NP                 | 1200   | NP  | CS-2                        | S4, T5              |
| 8                                  | 4     | 1         | 70                         | 40                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4              |
| 9                                  | 4     | 1         | 70                         | 40                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4              |
| 10                                 | 10B   | 1         | 60                         | 30                       | NP                                            | NP                 | 650    | 650 | CS-2                        | ...                 |
| 11                                 | 4     | 1         | 70                         | 40                       | 1100                                          | 700                | 1100   | NP  | CS-2                        | G1, G17, T4         |
| 12                                 | 4     | 1         | 70                         | 40                       | NP                                            | 700                | NP     | NP  | CS-2                        | G17                 |
| 13                                 | 4     | 1         | 70                         | 45                       | NP                                            | 700                | 1200   | NP  | CS-3                        | T4                  |
| 14                                 | 4     | 1         | 60                         | 30                       | 1200                                          | NP                 | 1200   | NP  | CS-2                        | S4, T5              |
| 15                                 | 4     | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T5              |
| 16                                 | 4     | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T5, W14         |
| 17                                 | 4     | 1         | 60                         | 30                       | 1200                                          | NP                 | NP     | NP  | CS-2                        | G24, S4, T5         |
| 18                                 | 4     | 1         | 60                         | 30                       | 1200                                          | NP                 | NP     | NP  | CS-2                        | S4, T5, W13         |
| 19                                 | 4     | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T5              |
| 20                                 | 4     | 1         | 60                         | 30                       | 1200                                          | NP                 | NP     | NP  | CS-2                        | S4, T5              |
| 21                                 | 4     | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T5              |
| 22                                 | 4     | 1         | 60                         | 35                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4              |
| 23                                 | 4     | 1         | 60                         | 35                       | NP                                            | 300 (Cl. 3 only)   | NP     | NP  | CS-2                        | G27, W10, W12       |
| 24                                 | 4     | 1         | 60                         | 35                       | NP                                            | 700                | NP     | NP  | CS-2                        | G26, W10, W12       |
| 25                                 | 4     | 1         | 70                         | 40                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4              |
| 26                                 | 4     | 1         | 70                         | 40                       | 1200                                          | NP                 | 1200   | NP  | CS-2                        | S4, T4              |
| 27                                 | 4     | 1         | 75                         | 45                       | NP                                            | NP                 | 1200   | NP  | CS-3                        | T3                  |
| 28                                 | 4     | 1         | 75                         | 45                       | 1200                                          | 700                | 1200   | NP  | CS-3                        | S4, T3              |
| 29                                 | 4     | 1         | 75                         | 45                       | NP                                            | 700                | NP     | NP  | CS-3                        | G26, W10, W12       |
| 30                                 | 11B   | 2         | 105                        | 90                       | NP                                            | 650 (SPT)          | 650    | 650 | CS-5                        | S7                  |
| 31                                 | 11B   | 2         | 115                        | 100                      | NP                                            | NP                 | 650    | 650 | HT-1                        | ...                 |
| 32                                 | 11B   | 2         | 105                        | 90                       | NP                                            | 700 (Cl. MC & SPT) | 650    | 650 | CS-5                        | ...                 |
| 33                                 | 11B   | 2         | 115                        | 100                      | NP                                            | 700 (Cl. MC & SPT) | 650    | 650 | HT-1                        | ...                 |
| 34                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4, W7, W9      |
| 35                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4, W7, W9      |
| 36                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4, W7, W9, W14 |
| 37                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | NP                 | NP     | NP  | CS-2                        | G24, S4, T4, W9     |
| 38                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | NP                 | NP     | NP  | CS-2                        | S4, T4, W9, W13     |
| 39                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4, W7, W9      |
| 40                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4, W7, W9      |
| 41                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4, W7, W9      |
| 42                                 | 5A    | 1         | 60                         | 30                       | 1200                                          | 700                | 1200   | NP  | CS-2                        | S4, T4, W7, W9      |
| 43                                 | 5A    | 1         | 60                         | 30                       | NP                                            | 700                | NP     | NP  | CS-2                        | G26, W10, W12       |
| 44                                 | 5A    | 1         | 65.5                       | 36.5                     | 1100                                          | NP                 | 1100   | NP  | CS-3                        | S4, T4, W7, W9      |
| 45                                 | 5A    | 1         | 65.5                       | 38.5                     | 1200                                          | NP                 | 1200   | NP  | CS-3                        | S4, T5, W7, W9      |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 18.2                                                                                                     | ...  | 18.0 | ...  | 17.5 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.3 | 16.9 |
| 2        | 18.6                                                                                                     | 18.6 | 18.2 | ...  | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.4 |
| 3        | 18.6                                                                                                     | ...  | 18.2 | ...  | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | ...  | ...  | ...  | ...  |
| 4        | 18.6                                                                                                     | ...  | 18.3 | ...  | 18.0 | 18.0 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.7 | 17.1 |
| 5        | 18.6                                                                                                     | 18.5 | 18.3 | 18.1 | 18.0 | 18.0 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.8 | 17.5 |
| 6        | 18.6                                                                                                     | ...  | 18.3 | ...  | 18.0 | 18.0 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.7 | 17.1 |
| 7        | 18.6                                                                                                     | 18.5 | 18.3 | 18.1 | 18.0 | 18.0 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.9 | 17.8 | 17.5 |
| 8        | 20.0                                                                                                     | ...  | 19.6 | ...  | 19.2 | 19.2 | 19.2 | 19.2 | 19.2 | 19.2 | 19.2 | 19.1 | 18.6 | 18.0 |
| 9        | 20.0                                                                                                     | 20.0 | 19.6 | ...  | 19.2 | 19.2 | 19.2 | 19.2 | 19.2 | 19.2 | 19.2 | 19.1 | 18.6 | 18.0 |
| 10       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | ...  | ...  | ...  | ...  | ...  |
| 11       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.7 | 19.2 | 18.7 | 13.7 |
| 12       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  |
| 13       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.4 | 13.7 |
| 14       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | 15.1 | 14.8 | 14.4 | 14.0 | 13.6 |
| 15       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | 15.1 | 14.8 | 14.4 | 14.0 | 13.6 |
| 16       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | 15.1 | 14.8 | 14.4 | 14.0 | 13.6 |
| 17       | 14.5                                                                                                     | ...  | 14.5 | ...  | 14.5 | 14.3 | 13.8 | 13.3 | 13.1 | 12.8 | 12.6 | 12.2 | 11.9 | 11.6 |
| 18       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | 15.1 | 14.8 | 14.4 | 14.0 | 13.6 |
| 19       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | 15.1 | 14.8 | 14.4 | 14.0 | 13.6 |
| 20       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | 15.1 | 14.8 | 14.4 | 14.0 | 13.6 |
| 21       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 16.8 | 16.2 | 15.7 | 15.4 | 15.1 | 14.8 | 14.4 | 14.0 | 13.6 |
| 22       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 16.8 | 16.4 | 13.7 |
| 23       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  |
| 25       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.7 | 19.2 | 18.7 | 13.7 |
| 26       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.7 | 19.2 | 18.7 | 13.7 |
| 27       | 21.4                                                                                                     | 21.4 | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 20.2 | 13.7 |
| 28       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 20.2 | 13.7 |
| 29       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | ...  | ...  | ...  | ...  |
| 30       | 30.0                                                                                                     | ...  | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  | ...  |
| 31       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | ...  | ...  | ...  | ...  | ...  |
| 32       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 29.9 | ...  | ...  | ...  | ...  |
| 33       | 32.9                                                                                                     | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.7 | ...  | ...  | ...  | ...  |
| 34       | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 35       | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 36       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 37       | 14.5                                                                                                     | ...  | 14.5 | ...  | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 11.6 |
| 38       | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 39       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 40       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 41       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 42       | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 13.6 |
| 43       | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | ...  | ...  | ...  | ...  |
| 44       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.2 | 18.0 | 17.9 | 17.7 | 17.6 | 17.4 | 17.2 | 16.8 | 16.3 | 15.8 |
| 45       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.3 | 18.0 | 17.9 | 17.8 | 17.7 | 17.5 | 17.3 | 16.9 | 16.3 | 15.7 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 11.3                                                                                                     | 7.2  | 4.5  | 2.8  | 1.8  | 1.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 7.9                                                                                                      | 5.4  | 3.6  | 2.4  | 1.6  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 9.3                                                                                                      | 6.3  | 4.2  | 2.8  | 1.9  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 9.2                                                                                                      | 6.8  | 4.8  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 10.8                                                                                                     | 8.0  | 5.7  | 3.8  | 2.4  | 1.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition            | Product Form          | Spec. No.     | Type/Grade         | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.                   |
|----------|--------------------------------|-----------------------|---------------|--------------------|-----------------------|--------------------------|---------------------------------------|
| 1        | 2 $\frac{1}{4}$ Cr-1Mo         | Plate                 | SA/EN 10028-2 | 10CrMo9-10         | ...                   | ...                      | 4 < t ≤ 6                             |
| 2        | 2 $\frac{1}{4}$ Cr-1Mo         | Plate                 | SA/EN 10028-2 | 10CrMo9-10         | ...                   | ...                      | 2.5 < t ≤ 4                           |
| 3        | 2 $\frac{1}{4}$ Cr-1Mo         | Smls. tube            | SA/EN 10216-2 | 10CrMo9-10         | ...                   | ...                      | 1 $\frac{5}{8}$ < t ≤ 2 $\frac{1}{2}$ |
| 4        | 2 $\frac{1}{4}$ Cr-1Mo         | Smls. tube            | SA/EN 10216-2 | 10CrMo9-10         | ...                   | ...                      | t ≤ 1 $\frac{5}{8}$                   |
| 5        | 2 $\frac{1}{4}$ Cr-1Mo         | Plate                 | SA/EN 10028-2 | 10CrMo9-10         | ...                   | ...                      | t ≤ 2.5                               |
| 6        | 2 $\frac{1}{4}$ Cr-1Mo         | Castings              | SA-217        | WC9                | J21890                | ...                      | ...                                   |
| 7        | 2 $\frac{1}{4}$ Cr-1Mo         | Cast pipe             | SA-426        | CP22               | J21890                | ...                      | ...                                   |
| 8        | 2 $\frac{1}{4}$ Cr-1Mo         | Forgings              | SA-182        | F22                | K21590                | 3                        | ...                                   |
| 9        | 2 $\frac{1}{4}$ Cr-1Mo         | Forgings              | SA-336        | F22                | K21590                | 3                        | ...                                   |
| 10       | 2 $\frac{1}{4}$ Cr-1Mo         | Plate                 | SA-387        | 22                 | K21590                | 2                        | ...                                   |
| 11       | 2 $\frac{1}{4}$ Cr-1Mo         | Wld. pipe             | SA-691        | 2 $\frac{1}{4}$ CR | K21590                | ...                      | ...                                   |
| 12       | 2 $\frac{1}{4}$ Cr-1Mo         | Bar                   | SA-739        | B22                | K21390                | ...                      | ...                                   |
| (25) 13  | 2 $\frac{1}{4}$ Cr-1Mo         | Forgings              | SA/EN 10222-2 | 11CrMo9-10         | ...                   | NT or QT                 | t ≤ 8                                 |
| 14       | 2 $\frac{1}{4}$ Cr-1Mo         | Castings              | SA-487        | 8                  | J22091                | A                        | ...                                   |
| 15       | 2 $\frac{1}{4}$ Cr-1Mo         | Forgings              | SA-508        | 22                 | K21590                | 3                        | ...                                   |
| 16       | 2 $\frac{1}{4}$ Cr-1Mo         | Forgings              | SA-541        | 22                 | K21390                | 3                        | ...                                   |
| 17       | 2 $\frac{1}{4}$ Cr-1Mo         | Plate                 | SA-542        | B                  | K21590                | 4                        | ...                                   |
| 18       | 2 $\frac{1}{4}$ Cr-1Mo-V       | Forgings              | SA-182        | F22V               | K31835                | ...                      | ...                                   |
| 19       | 2 $\frac{1}{4}$ Cr-1Mo-V       | Forgings              | SA-336        | F22V               | K31835                | ...                      | ...                                   |
| 20       | 2 $\frac{1}{4}$ Cr-1Mo-V       | Forgings              | SA-541        | 22V                | K31835                | ...                      | ...                                   |
| 21       | 2 $\frac{1}{4}$ Cr-1Mo-V       | Plate                 | SA-542        | D                  | K31835                | 4a                       | ...                                   |
| 22       | 2 $\frac{1}{4}$ Cr-1Mo-V       | Plate                 | SA-832        | 22V                | K31835                | ...                      | ...                                   |
| 23       | 3Cr-1Mo                        | Smls. tube            | SA-213        | T21                | K31545                | ...                      | ...                                   |
| 24       | 3Cr-1Mo                        | Smls. pipe            | SA-335        | P21                | K31545                | ...                      | ...                                   |
| 25       | 3Cr-1Mo                        | Forgings              | SA-336        | F21                | K31545                | 1                        | ...                                   |
| 26       | 3Cr-1Mo                        | Forged pipe           | SA-369        | FP21               | K31545                | ...                      | ...                                   |
| 27       | 3Cr-1Mo                        | Plate                 | SA-387        | 21                 | K31545                | 1                        | ...                                   |
| 28       | 3Cr-1Mo                        | Cast pipe             | SA-426        | CP21               | J31545                | ...                      | ...                                   |
| 29       | 3Cr-1Mo                        | Forgings              | SA-182        | F21                | K31545                | ...                      | ...                                   |
| 30       | 3Cr-1Mo                        | Forgings              | SA-336        | F21                | K31545                | 3                        | ...                                   |
| 31       | 3Cr-1Mo                        | Plate                 | SA-387        | 21                 | K31545                | 2                        | ...                                   |
| 32       | 3Cr-1Mo- $\frac{1}{4}$ V-Ti-B  | Forgings              | SA-182        | F3V                | K31830                | ...                      | ...                                   |
| 33       | 3Cr-1Mo- $\frac{1}{4}$ V-Ti-B  | Forgings              | SA-336        | F3V                | K31830                | ...                      | ...                                   |
| 34       | 3Cr-1Mo- $\frac{1}{4}$ V-Ti-B  | Forgings              | SA-508        | 3V                 | K31830                | ...                      | ...                                   |
| 35       | 3Cr-1Mo- $\frac{1}{4}$ V-Ti-B  | Forgings              | SA-541        | 3V                 | K31830                | ...                      | ...                                   |
| 36       | 3Cr-1Mo- $\frac{1}{4}$ V-Ti-B  | Plate                 | SA-542        | C                  | K31830                | 4a                       | ...                                   |
| 37       | 3Cr-1Mo- $\frac{1}{4}$ V-Ti-B  | Plate                 | SA-832        | 21V                | K31830                | ...                      | ...                                   |
| 38       | 3Cr-1Mo- $\frac{1}{4}$ V-Cb-Ca | Forgings              | SA-182        | F3VCb              | ...                   | ...                      | ...                                   |
| 39       | 3Cr-1Mo- $\frac{1}{4}$ V-Cb-Ca | Forgings              | SA-336        | F3VCb              | ...                   | ...                      | ...                                   |
| 40       | 3Cr-1Mo- $\frac{1}{4}$ V-Cb-Ca | Forgings              | SA-508        | 3VCb               | ...                   | ...                      | ...                                   |
| 41       | 3Cr-1Mo- $\frac{1}{4}$ V-Cb-Ca | Forgings              | SA-541        | 3VCb               | ...                   | ...                      | ...                                   |
| 42       | 3Cr-1Mo- $\frac{1}{4}$ V-Cb-Ca | Plate                 | SA-542        | E                  | ...                   | 4a                       | ...                                   |
| 43       | 3Cr-1Mo- $\frac{1}{4}$ V-Cb-Ca | Plate                 | SA-832        | 23V                | ...                   | ...                      | ...                                   |
| 44       | 5Cr- $\frac{1}{2}$ Mo          | Smls. tube            | SA-213        | T5                 | K41545                | ...                      | ...                                   |
| 45       | 5Cr- $\frac{1}{2}$ Mo          | Smls. & wld. fittings | SA-234        | WP5                | K41545                | ...                      | ...                                   |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                         |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|-------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                   |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                         |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                         |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                         |
| 1                                  | 5A    | 1         | 66.5                       | 37.5                     | 1100                  | NP  | 1100   | NP  | CS-3                        | S4, T4, W7, W9          |
| 2                                  | 5A    | 1         | 68                         | 40.5                     | 1100                  | NP  | 1100   | NP  | CS-3                        | S4, T4, W7, W9          |
| 3                                  | 5A    | 1         | 69.5                       | 39                       | 1200                  | NP  | 1200   | NP  | CS-2                        | T4, W7, W9              |
| 4                                  | 5A    | 1         | 69.5                       | 40.5                     | 1200                  | NP  | 1200   | NP  | CS-2                        | T4, W7, W9              |
| 5                                  | 5A    | 1         | 69.5                       | ...                      | 1100                  | NP  | 1100   | NP  | CS-3                        | G18, S4, T4, W7, W9     |
| 6                                  | 5A    | 1         | 70                         | 40                       | 1200                  | 700 | 1200   | NP  | CS-2                        | G1, G17, S4, T4, W7, W9 |
| 7                                  | 5A    | 1         | 70                         | 40                       | NP                    | 700 | NP     | NP  | CS-2                        | G17                     |
| 8                                  | 5A    | 1         | 75                         | 45                       | 1200                  | 700 | 1200   | NP  | CS-3                        | S4, T4, W7, W9          |
| 9                                  | 5A    | 1         | 75                         | 45                       | 1200                  | 700 | 1200   | NP  | CS-3                        | S4, T4, W7, W9          |
| 10                                 | 5A    | 1         | 75                         | 45                       | 1200                  | 700 | 1200   | NP  | CS-3                        | S4, T4, W7, W9          |
| 11                                 | 5A    | 1         | 75                         | 45                       | NP                    | 700 | NP     | NP  | CS-3                        | G26, W10, W12           |
| 12                                 | 5A    | 1         | 75                         | 45                       | NP                    | 700 | 1200   | NP  | CS-3                        | T4, W7                  |
| 13                                 | 5A    | 1         | 75.5                       | 45                       | 1200                  | NP  | 1200   | NP  | CS-3                        | S4, T4, W7, W9          |
| 14                                 | 5C    | 1         | 85                         | 55                       | NP                    | NP  | 1000   | NP  | CS-3                        | G1, T4, W7              |
| 15                                 | 5C    | 1         | 85                         | 55                       | NP                    | NP  | 850    | NP  | CS-2                        | ...                     |
| 16                                 | 5C    | 1         | 85                         | 55                       | NP                    | NP  | 850    | NP  | CS-2                        | ...                     |
| 17                                 | 5C    | 1         | 85                         | 55                       | NP                    | NP  | 850    | NP  | CS-2                        | ...                     |
| 18                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-2                        | ...                     |
| 19                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-2                        | ...                     |
| 20                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-2                        | ...                     |
| 21                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-2                        | ...                     |
| 22                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-2                        | ...                     |
| 23                                 | 5A    | 1         | 60                         | 30                       | 1200                  | 700 | 1200   | NP  | CS-2                        | S4, T3                  |
| 24                                 | 5A    | 1         | 60                         | 30                       | 1200                  | 700 | 1200   | NP  | CS-2                        | S4, T3                  |
| 25                                 | 5A    | 1         | 60                         | 30                       | 1200                  | 700 | 1200   | NP  | CS-2                        | S4, T3                  |
| 26                                 | 5A    | 1         | 60                         | 30                       | 1200                  | 700 | 1200   | NP  | CS-2                        | S4, T3                  |
| 27                                 | 5A    | 1         | 60                         | 30                       | 1200                  | 700 | 1200   | NP  | CS-2                        | S4, T3                  |
| 28                                 | 5A    | 1         | 60                         | 30                       | NP                    | 700 | NP     | NP  | CS-2                        | G17                     |
| 29                                 | 5A    | 1         | 75                         | 45                       | 1200                  | 700 | 1200   | NP  | CS-3                        | S4, T3                  |
| 30                                 | 5A    | 1         | 75                         | 45                       | 1200                  | 700 | 1200   | NP  | CS-3                        | S4, T3                  |
| 31                                 | 5A    | 1         | 75                         | 45                       | 1200                  | 700 | 1200   | NP  | CS-3                        | S4, T3                  |
| 32                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 33                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 34                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 35                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 36                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 37                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 38                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 39                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 40                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 41                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 42                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 43                                 | 5C    | 1         | 85                         | 60                       | NP                    | NP  | 900    | NP  | CS-3                        | ...                     |
| 44                                 | 5B    | 1         | 60                         | 30                       | 1200                  | 700 | 1200   | NP  | CS-2                        | T4                      |
| 45                                 | 5B    | 1         | 60                         | 30                       | 1200                  | 700 | 1200   | NP  | CS-2                        | T4, W14                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 19.1                                                                                                     | ...  | 19.1 | ... | 18.6 | 18.4 | 18.3 | 18.1 | 18.0 | 17.8 | 17.5 | 17.2 | 16.7 | 15.8 |
| 2        | 19.5                                                                                                     | ...  | 19.5 | ... | 19.0 | 18.8 | 18.7 | 18.5 | 18.4 | 18.2 | 17.9 | 17.5 | 17.0 | 15.8 |
| 3        | 19.9                                                                                                     | ...  | 19.9 | ... | 19.4 | 19.2 | 19.1 | 18.9 | 18.8 | 18.6 | 18.3 | 17.9 | 17.4 | 15.8 |
| 4        | 19.9                                                                                                     | ...  | 19.9 | ... | 19.4 | 19.2 | 19.1 | 18.9 | 18.8 | 18.6 | 18.3 | 17.9 | 17.4 | 15.8 |
| 5        | 19.9                                                                                                     | ...  | 19.9 | ... | 19.4 | 19.2 | 19.1 | 18.9 | 18.8 | 18.6 | 18.3 | 17.9 | 17.4 | 15.8 |
| 6        | 20.0                                                                                                     | ...  | 20.0 | ... | 19.7 | 19.4 | 19.3 | 19.2 | 19.1 | 18.8 | 18.5 | 17.9 | 17.2 | 15.8 |
| 7        | 20.0                                                                                                     | ...  | 20.0 | ... | 19.7 | 19.4 | 19.3 | 19.2 | 19.1 | 18.8 | ...  | ...  | ...  | ...  |
| 8        | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | 19.7 | 19.3 | 18.7 | 15.8 |
| 9        | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | 19.7 | 19.3 | 18.7 | 15.8 |
| 10       | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | 19.7 | 19.3 | 18.7 | 15.8 |
| 11       | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | ...  | ...  | ...  | ...  |
| 12       | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | 19.7 | 19.3 | 18.7 | 15.8 |
| 13       | 21.5                                                                                                     | ...  | 21.5 | ... | 21.1 | 20.8 | 20.7 | 20.6 | 20.5 | 20.3 | 19.9 | 19.5 | 18.9 | 15.8 |
| 14       | 24.3                                                                                                     | 24.3 | 24.3 | ... | 23.7 | 23.5 | 23.5 | 23.3 | 23.2 | 22.9 | 22.4 | 21.7 | 20.8 | 15.8 |
| 15       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 23.8 | 23.3 | 23.1 | 22.9 | 22.6 | 21.9 | 20.4 | ...  |
| 16       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 23.8 | 23.3 | 23.1 | 22.9 | 22.6 | 21.9 | 20.4 | ...  |
| 17       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 23.8 | 23.3 | 23.1 | 22.9 | 22.6 | 21.9 | 20.4 | ...  |
| 18       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 24.3 | 23.7 | 23.2 | 22.8 | 22.2 | 21.6 | 21.0 | 20.3 |
| 19       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 24.3 | 23.7 | 23.2 | 22.8 | 22.2 | 21.6 | 21.0 | 20.3 |
| 20       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 24.3 | 23.7 | 23.2 | 22.8 | 22.2 | 21.6 | 21.0 | 20.3 |
| 21       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 24.3 | 23.7 | 23.2 | 22.8 | 22.2 | 21.6 | 21.0 | 20.3 |
| 22       | 24.3                                                                                                     | ...  | 24.3 | ... | 24.3 | 24.3 | 24.3 | 23.7 | 23.2 | 22.8 | 22.2 | 21.6 | 21.0 | 20.3 |
| 23       | 17.1                                                                                                     | ...  | 17.1 | ... | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.0 | 12.0 |
| 24       | 17.1                                                                                                     | 17.1 | 17.1 | ... | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.0 | 12.0 |
| 25       | 17.1                                                                                                     | 17.1 | 17.1 | ... | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.0 | 12.0 |
| 26       | 17.1                                                                                                     | ...  | 17.1 | ... | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.0 | 12.0 |
| 27       | 17.1                                                                                                     | ...  | 17.1 | ... | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.0 | 12.0 |
| 28       | 17.1                                                                                                     | ...  | 17.1 | ... | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | ...  | ...  | ...  | ...  |
| 29       | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | 19.7 | 19.3 | 18.1 | 13.1 |
| 30       | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | 19.7 | 19.3 | 18.1 | 13.1 |
| 31       | 21.4                                                                                                     | ...  | 21.4 | ... | 20.9 | 20.6 | 20.5 | 20.4 | 20.2 | 20.0 | 19.7 | 19.3 | 18.1 | 13.1 |
| 32       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 33       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 34       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 35       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 36       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 37       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 38       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 39       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 40       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 41       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 42       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 43       | 24.3                                                                                                     | ...  | 24.3 | ... | 23.3 | 22.6 | 22.2 | 21.8 | 21.6 | 21.4 | 21.1 | 20.8 | 20.4 | 20.0 |
| 44       | 17.1                                                                                                     | ...  | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 45       | 17.1                                                                                                     | ...  | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 11.4                                                                                                     | 7.8  | 5.1  | 3.2  | 2.0  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 11.4                                                                                                     | 7.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 9.0                                                                                                      | 7.0  | 5.5  | 4.0  | 2.7  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 9.0                                                                                                      | 7.0  | 5.5  | 4.0  | 2.7  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 9.0                                                                                                      | 7.0  | 5.5  | 4.0  | 2.7  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 9.0                                                                                                      | 7.0  | 5.5  | 4.0  | 2.7  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 9.0                                                                                                      | 7.0  | 5.5  | 4.0  | 2.7  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 9.5                                                                                                      | 6.8  | 4.9  | 3.2  | 2.4  | 1.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 9.5                                                                                                      | 6.8  | 4.9  | 3.2  | 2.4  | 1.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 9.5                                                                                                      | 6.8  | 4.9  | 3.2  | 2.4  | 1.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

(25)

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition      | Product Form | Spec. No. | Type/Grade  | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|--------------------------|--------------|-----------|-------------|-----------------------|--------------------------|---------------------|
| 1        | 5Cr- $\frac{1}{2}$ Mo    | Smls. pipe   | SA-335    | P5          | K41545                | ...                      | ...                 |
| 2        | 5Cr- $\frac{1}{2}$ Mo    | Forged pipe  | SA-369    | FP5         | K41545                | ...                      | ...                 |
| 3        | 5Cr- $\frac{1}{2}$ Mo    | Plate        | SA-387    | 5           | K41545                | 1                        | ...                 |
| 4        | 5Cr- $\frac{1}{2}$ Mo    | Wld. pipe    | SA-691    | 5CR         | K41545                | ...                      | ...                 |
| 5        | 5Cr- $\frac{1}{2}$ Mo    | Forgings     | SA-336    | F5          | K41545                | ...                      | ...                 |
| 6        | 5Cr- $\frac{1}{2}$ Mo    | Forgings     | SA-182    | F5          | K41545                | ...                      | ...                 |
| 7        | 5Cr- $\frac{1}{2}$ Mo    | Plate        | SA-387    | 5           | K41545                | 2                        | ...                 |
| 8        | 5Cr- $\frac{1}{2}$ Mo    | Forgings     | SA-336    | F5A         | K42544                | ...                      | ...                 |
| 9        | 5Cr- $\frac{1}{2}$ Mo    | Castings     | SA-217    | C5          | J42045                | ...                      | ...                 |
| 10       | 5Cr- $\frac{1}{2}$ Mo    | Cast pipe    | SA-426    | CP5         | J42045                | ...                      | ...                 |
| 11       | 5Cr- $\frac{1}{2}$ Mo    | Forgings     | SA-182    | F5a         | K42544                | ...                      | ...                 |
| 12       | 5Cr- $\frac{1}{2}$ Mo-Si | Smls. tube   | SA-213    | T5b         | K51545                | ...                      | ...                 |
| 13       | 5Cr- $\frac{1}{2}$ Mo-Si | Smls. pipe   | SA-335    | P5b         | K51545                | ...                      | ...                 |
| 14       | 5Cr- $\frac{1}{2}$ Mo-Ti | Smls. tube   | SA-213    | T5c         | K41245                | ...                      | ...                 |
| 15       | 5Cr- $\frac{1}{2}$ Mo-Ti | Smls. pipe   | SA-335    | P5c         | K41245                | ...                      | ...                 |
| 16       | 9Cr-1Mo                  | Smls. tube   | SA-213    | T9          | K90941                | ...                      | ...                 |
| 17       | 9Cr-1Mo                  | Fittings     | SA-234    | WP9         | K90941                | ...                      | ...                 |
| 18       | 9Cr-1Mo                  | Smls. pipe   | SA-335    | P9          | K90941                | ...                      | ...                 |
| 19       | 9Cr-1Mo                  | Forged pipe  | SA-369    | FP9         | K90941                | ...                      | ...                 |
| 20       | 9Cr-1Mo                  | Forgings     | SA-182    | F9          | K90941                | ...                      | ...                 |
| 21       | 9Cr-1Mo                  | Forgings     | SA-336    | F9          | K90941                | ...                      | ...                 |
| 22       | 9Cr-1Mo                  | Castings     | SA-217    | C12         | J82090                | ...                      | ...                 |
| 23       | 9Cr-1Mo                  | Cast pipe    | SA-426    | CP9         | J82090                | ...                      | ...                 |
| 24       | 9Cr-1Mo-V                | Smls. tube   | SA-213    | T91 Type 1  | K90901                | ...                      | ...                 |
| 25       | 9Cr-1Mo-V                | Fittings     | SA-234    | WP91 Type 1 | K90901                | ...                      | ...                 |
| 26       | 9Cr-1Mo-V                | Smls. pipe   | SA-335    | P91 Type 1  | K90901                | ...                      | $t \leq 3$          |
| 27       | 9Cr-1Mo-V                | Smls. pipe   | SA-335    | P91 Type 1  | K90901                | ...                      | $t > 3$             |
| 28       | 9Cr-1Mo-V                | Forged pipe  | SA-369    | FP91 Type 1 | K90901                | ...                      | ...                 |
| 29       | 9Cr-1Mo-V                | Plate        | SA-387    | 91 Type 1   | K90901                | 2                        | $t \leq 3$          |
| 30       | 9Cr-1Mo-V                | Plate        | SA-387    | 91 Type 1   | K90901                | 2                        | $t > 3$             |
| 31       | 9Cr-1Mo-V                | Forgings     | SA-182    | F91 Type 1  | K90901                | ...                      | $t \leq 3$          |
| 32       | 9Cr-1Mo-V                | Forgings     | SA-182    | F91 Type 1  | K90901                | ...                      | $t > 3$             |
| 33       | 9Cr-1Mo-V                | Forgings     | SA-336    | F91 Type 1  | K90901                | ...                      | ...                 |
| 34       | 9Cr-1Mo-V                | Smls. tube   | SA-213    | T91 Type 2  | K90901                | ...                      | ...                 |
| 35       | 9Cr-1Mo-V                | Fittings     | SA-234    | WP91 Type 2 | K90901                | ...                      | ...                 |
| 36       | 9Cr-1Mo-V                | Smls. pipe   | SA-335    | P91 Type 2  | K90901                | ...                      | ...                 |
| 37       | 9Cr-1Mo-V                | Forged pipe  | SA-369    | FP91 Type 2 | K90901                | ...                      | ...                 |
| 38       | 9Cr-1Mo-V                | Plate        | SA-387    | 91 Type 2   | K90901                | 2                        | ...                 |
| 39       | 9Cr-1Mo-V                | Forgings     | SA-182    | F91 Type 2  | K90901                | ...                      | ...                 |
| 40       | 9Cr-1Mo-V                | Forgings     | SA-336    | F91 Type 2  | K90901                | ...                      | ...                 |
| 41       | 11Cr-Ti                  | Plate        | SA-240    | ...         | S40910                | ...                      | ...                 |
| 42       | 11Cr-Ti                  | Plate        | SA-240    | ...         | S40920                | ...                      | ...                 |
| 43       | 11Cr-Ti                  | Plate        | SA-240    | ...         | S40930                | ...                      | ...                 |
| 44       | 11Cr-Ti                  | Wld. tube    | SA-268    | TP409       | S40900                | ...                      | ...                 |
| 45       | 11Cr-Ti                  | Smls. tube   | SA-268    | TP409       | S40900                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |           |        |     |                             |               |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----------|--------|-----|-----------------------------|---------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |           |        |     | External Pressure Chart No. | Notes         |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |           |        |     |                             |               |
|                                    |       |           |                            |                          | I                                             | III       | VIII-1 | XII |                             |               |
| 1                                  | 5B    | 1         | 60                         | 30                       | 1200                                          | 700       | 1200   | NP  | CS-2                        | T4            |
| 2                                  | 5B    | 1         | 60                         | 30                       | 1200                                          | 700       | 1200   | NP  | CS-2                        | T4            |
| 3                                  | 5B    | 1         | 60                         | 30                       | 1200                                          | 700       | 1200   | NP  | CS-2                        | T4            |
| 4                                  | 5B    | 1         | 60                         | 30                       | NP                                            | 700       | NP     | NP  | CS-2                        | G26, W10, W12 |
| 5                                  | 5B    | 1         | 60                         | 36                       | 1200                                          | NP        | 1200   | NP  | CS-2                        | T4            |
| 6                                  | 5B    | 1         | 70                         | 40                       | 1200                                          | 700       | 1200   | NP  | CS-2                        | T3            |
| 7                                  | 5B    | 1         | 75                         | 45                       | NP                                            | 700       | 1200   | NP  | CS-3                        | T3            |
| 8                                  | 5B    | 1         | 80                         | 50                       | 1200                                          | NP        | 1200   | NP  | CS-3                        | T3            |
| 9                                  | 5B    | 1         | 90                         | 60                       | 1200                                          | 700       | 1200   | NP  | CS-3                        | G1, G17, T3   |
| 10                                 | 5B    | 1         | 90                         | 60                       | NP                                            | 700       | NP     | NP  | CS-3                        | G17           |
| 11                                 | 5B    | 1         | 90                         | 65                       | 1200                                          | NP        | 1200   | NP  | CS-5                        | T3            |
| 12                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | NP        | 1200   | NP  | CS-2                        | T4            |
| 13                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | NP        | 1200   | NP  | CS-2                        | T4            |
| 14                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | NP        | 1200   | NP  | CS-2                        | T4            |
| 15                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | NP        | 1200   | NP  | CS-2                        | T4            |
| 16                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | 700       | 1200   | NP  | CS-2                        | T5            |
| 17                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | NP        | 1200   | NP  | CS-2                        | T5            |
| 18                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | 700       | 1200   | NP  | CS-2                        | T5            |
| 19                                 | 5B    | 1         | 60                         | 30                       | 1200                                          | 700       | 1200   | NP  | CS-2                        | T5            |
| 20                                 | 5B    | 1         | 85                         | 55                       | 1200                                          | NP        | 1200   | NP  | CS-3                        | T4            |
| 21                                 | 5B    | 1         | 85                         | 55                       | NP                                            | NP        | 1200   | NP  | CS-3                        | T4            |
| 22                                 | 5B    | 1         | 90                         | 60                       | 1200                                          | 700 (SPT) | 1200   | NP  | CS-3                        | G1, T4        |
| 23                                 | 5B    | 1         | 90                         | 60                       | NP                                            | 700       | NP     | NP  | CS-3                        | G17           |
| 24                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | 700       | 1200   | NP  | CS-3                        | T6            |
| 25                                 | 15E   | 1         | 90                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T6            |
| 26                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | 700       | 1200   | NP  | CS-3                        | T6            |
| 27                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | NP        | 1200   | NP  | CS-3                        | T6            |
| 28                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T6            |
| 29                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | 700       | 1200   | NP  | CS-3                        | T6            |
| 30                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | NP        | 1200   | NP  | CS-3                        | T6            |
| 31                                 | 15E   | 1         | 90                         | 60                       | 1200                                          | 700       | 1200   | NP  | CS-3                        | T6            |
| 32                                 | 15E   | 1         | 90                         | 60                       | 1200                                          | NP        | 1200   | NP  | CS-3                        | T6            |
| 33                                 | 15E   | 1         | 90                         | 60                       | 1200                                          | NP        | 1200   | NP  | CS-3                        | T6            |
| 34                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T7            |
| 35                                 | 15E   | 1         | 90                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T6            |
| 36                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T7            |
| 37                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T7            |
| 38                                 | 15E   | 1         | 85                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T7            |
| 39                                 | 15E   | 1         | 90                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T6            |
| 40                                 | 15E   | 1         | 90                         | 60                       | 1200                                          | NP        | NP     | NP  | CS-3                        | T6            |
| 41                                 | 7     | 1         | 55                         | 25                       | NP                                            | NP        | 800    | NP  | CS-1                        | ...           |
| 42                                 | 7     | 1         | 55                         | 25                       | NP                                            | NP        | 800    | NP  | CS-1                        | ...           |
| 43                                 | 7     | 1         | 55                         | 25                       | NP                                            | NP        | 800    | NP  | CS-1                        | ...           |
| 44                                 | 7     | 1         | 55                         | 25                       | NP                                            | NP        | 800    | 650 | CS-1                        | G24           |
| 45                                 | 7     | 1         | 55                         | 25                       | NP                                            | NP        | 800    | 650 | CS-1                        | ...           |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 2        | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 3        | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 4        | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | ...  | ...  | ...  | ...  |
| 5        | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 6        | 20.0                                                                                                     | ... | 20.0 | ... | 19.4 | 19.2 | 19.2 | 18.9 | 18.6 | 18.2 | 17.6 | 17.0 | 14.3 | 10.9 |
| 7        | 21.4                                                                                                     | ... | 21.4 | ... | 20.8 | 20.6 | 20.5 | 20.2 | 19.9 | 19.5 | 18.9 | 18.2 | 14.3 | 10.9 |
| 8        | 22.9                                                                                                     | ... | 22.8 | ... | 22.1 | 22.0 | 21.9 | 21.6 | 21.3 | 20.8 | 20.2 | 19.1 | 14.3 | 10.9 |
| 9        | 25.7                                                                                                     | ... | 25.7 | ... | 24.9 | 24.7 | 24.6 | 24.3 | 23.9 | 23.4 | 22.7 | 19.1 | 14.3 | 10.9 |
| 10       | 25.7                                                                                                     | ... | 25.7 | ... | 24.9 | 24.7 | 24.6 | 24.3 | 23.9 | 23.4 | ...  | ...  | ...  | ...  |
| 11       | 25.7                                                                                                     | ... | 25.7 | ... | 24.9 | 24.7 | 24.6 | 24.3 | 23.9 | 23.4 | 22.7 | 19.1 | 14.3 | 10.9 |
| 12       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 13       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 14       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 15       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 10.9 |
| 16       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 13.0 |
| 17       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 13.0 |
| 18       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 13.0 |
| 19       | 17.1                                                                                                     | ... | 17.1 | ... | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.6 | 15.1 | 14.5 | 13.8 | 13.0 |
| 20       | 24.3                                                                                                     | ... | 24.2 | ... | 23.5 | 23.4 | 23.3 | 22.9 | 22.6 | 22.1 | 21.4 | 20.6 | 19.6 | 16.4 |
| 21       | 24.3                                                                                                     | ... | 24.2 | ... | 23.5 | 23.4 | 23.3 | 22.9 | 22.6 | 22.1 | 21.4 | 20.6 | 19.6 | 16.4 |
| 22       | 25.7                                                                                                     | ... | 25.7 | ... | 24.9 | 24.7 | 24.6 | 24.3 | 23.9 | 23.4 | 22.7 | 21.8 | 20.8 | 16.4 |
| 23       | 25.7                                                                                                     | ... | 25.7 | ... | 24.9 | 24.7 | 24.6 | 24.3 | 23.9 | 23.4 | ...  | ...  | ...  | ...  |
| 24       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 25       | 25.7                                                                                                     | ... | 25.7 | ... | 25.7 | 25.6 | 25.5 | 25.1 | 24.7 | 24.2 | 23.5 | 22.6 | 21.5 | 20.2 |
| 26       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 27       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 28       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 29       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 30       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 31       | 25.7                                                                                                     | ... | 25.7 | ... | 25.7 | 25.6 | 25.5 | 25.1 | 24.7 | 24.2 | 23.5 | 22.6 | 21.5 | 20.2 |
| 32       | 25.7                                                                                                     | ... | 25.7 | ... | 25.7 | 25.6 | 25.5 | 25.1 | 24.7 | 24.2 | 23.5 | 22.6 | 21.5 | 20.2 |
| 33       | 25.7                                                                                                     | ... | 25.7 | ... | 25.7 | 25.6 | 25.5 | 25.1 | 24.7 | 24.2 | 23.5 | 22.6 | 21.5 | 20.2 |
| 34       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 35       | 25.7                                                                                                     | ... | 25.7 | ... | 25.7 | 25.6 | 25.5 | 25.1 | 24.7 | 24.2 | 23.5 | 22.6 | 21.5 | 20.2 |
| 36       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 37       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 38       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | 24.2 | 24.1 | 23.7 | 23.4 | 22.9 | 22.2 | 21.3 | 20.3 | 19.1 |
| 39       | 25.7                                                                                                     | ... | 25.7 | ... | 25.7 | 25.6 | 25.5 | 25.1 | 24.7 | 24.2 | 23.5 | 22.6 | 21.5 | 20.2 |
| 40       | 25.7                                                                                                     | ... | 25.7 | ... | 25.7 | 25.6 | 25.5 | 25.1 | 24.7 | 24.2 | 23.5 | 22.6 | 21.5 | 20.2 |
| 41       | 15.7                                                                                                     | ... | 14.5 | ... | 13.1 | 12.1 | 11.6 | 11.3 | 11.3 | 11.3 | 11.2 | 11.1 | ...  | ...  |
| 42       | 15.7                                                                                                     | ... | 14.5 | ... | 13.1 | 12.1 | 11.6 | 11.3 | 11.3 | 11.3 | 11.2 | 11.1 | ...  | ...  |
| 43       | 15.7                                                                                                     | ... | 14.5 | ... | 13.1 | 12.1 | 11.6 | 11.3 | 11.3 | 11.3 | 11.2 | 11.1 | ...  | ...  |
| 44       | 13.4                                                                                                     | ... | 12.3 | ... | 11.1 | 10.3 | 9.9  | 9.6  | 9.6  | 9.6  | 9.5  | 9.4  | ...  | ...  |
| 45       | 15.7                                                                                                     | ... | 14.5 | ... | 13.1 | 12.1 | 11.6 | 11.3 | 11.3 | 11.3 | 11.2 | 11.1 | ...  | ...  |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 8.0                                                                                                      | 5.8  | 4.2  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 10.6                                                                                                     | 7.4  | 5.0  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 10.6                                                                                                     | 7.4  | 5.0  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 10.6                                                                                                     | 7.4  | 5.0  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 10.6                                                                                                     | 7.4  | 5.0  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 11.0                                                                                                     | 7.4  | 5.0  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 11.0                                                                                                     | 7.4  | 5.0  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 11.0                                                                                                     | 7.4  | 5.0  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 17.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 18.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 17.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 17.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 17.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 17.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 17.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 18.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 18.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 18.8                                                                                                     | 16.1 | 12.2 | 8.7  | 5.7  | 3.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 17.8                                                                                                     | 16.3 | 12.6 | 9.1  | 6.1  | 3.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 18.8                                                                                                     | 16.7 | 12.6 | 9.1  | 6.1  | 3.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 17.8                                                                                                     | 16.3 | 12.6 | 9.1  | 6.1  | 3.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 17.8                                                                                                     | 16.3 | 12.6 | 9.1  | 6.1  | 3.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 17.8                                                                                                     | 16.3 | 12.6 | 9.1  | 6.1  | 3.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 18.8                                                                                                     | 16.7 | 12.6 | 9.1  | 6.1  | 3.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 18.8                                                                                                     | 16.7 | 12.6 | 9.1  | 6.1  | 3.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form      | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.  |
|----------|---------------------|-------------------|---------------|------------|-----------------------|--------------------------|----------------------|
| 1        | 12Cr                | Plate             | SA-1010       | 40         | S41003                | ...                      | $t \leq \frac{3}{4}$ |
| 2        | 12Cr                | Bar               | SA-479        | 403        | S40300                | A                        | ...                  |
| 3        | 12Cr                | Bar               | SA-479        | 403        | S40300                | 1                        | ...                  |
| 4        | 12Cr                | Plate             | SA-1010       | 50         | S41003                | ...                      | $t \leq \frac{3}{4}$ |
| 5        | 12Cr-Al             | Plate             | SA-240        | 405        | S40500                | ...                      | ...                  |
| 6        | 12Cr-Al             | Plate             | SA-240        | 405        | S40500                | ...                      | ...                  |
| 7        | 12Cr-Al             | Bar               | SA-479        | 405        | S40500                | ...                      | ...                  |
| 8        | 12Cr-Al             | Bar               | SA/JIS G4303  | SUS405     | ...                   | ...                      | ...                  |
| 9        | 12Cr-Al             | Smls. & wld. tube | SA-268        | TP405      | S40500                | ...                      | ...                  |
| (25) 10  | 12Cr-Al             | Wld. tube         | SA-268        | TP405      | S40500                | ...                      | ...                  |
| 11       | 12Cr-Ti             | Wld. tube         | SA-268        | ...        | S40800                | ...                      | ...                  |
| 12       | 12Cr-Ti             | Smls. tube        | SA-268        | ...        | S40800                | ...                      | ...                  |
| 13       | 13Cr                | Plate             | SA-240        | 410S       | S41008                | ...                      | ...                  |
| 14       | 13Cr                | Smls. & wld. tube | SA-268        | TP410      | S41000                | ...                      | ...                  |
| (25) 15  | 13Cr                | Wld. tube         | SA-268        | TP410      | S41000                | ...                      | ...                  |
| 16       | 13Cr                | Plate             | SA-240        | 410        | S41000                | ...                      | ...                  |
| 17       | 13Cr                | Forgings          | SA-182        | F6a        | S41000                | 1                        | ...                  |
| 18       | 13Cr                | Bar               | SA-479        | 410        | S41000                | ...                      | ...                  |
| 19       | 13Cr                | Bar               | SA-479        | 410        | S41000                | A                        | ...                  |
| 20       | 13Cr                | Bar               | SA-479        | 410        | S41000                | 1                        | ...                  |
| 21       | 13Cr                | Forgings          | SA-182        | F6a        | S41000                | 2                        | ...                  |
| 22       | 13Cr                | Castings          | SA-217        | CA15       | J91150                | ...                      | ...                  |
| 23       | 13Cr                | Cast pipe         | SA-426        | CPCA15     | J91150                | ...                      | ...                  |
| (25) 24  | 13Cr                | Bar               | SA/EN 10088-3 | X12Cr13    | ...                   | QT650                    | $t \leq 6.25$        |
| 25       | 13Cr-4Ni            | Castings          | SA-487        | CA6NM      | J91540                | A                        | ...                  |
| 26       | 13Cr-4Ni            | Forgings          | SA-182        | F6NM       | S41500                | ...                      | ...                  |
| (25) 27  | 15Cr                | Wld. tube         | SA-268        | TP429      | S42900                | ...                      | ...                  |
| 28       | 15Cr                | Smls. & wld. tube | SA-268        | TP429      | S42900                | ...                      | ...                  |
| 29       | 15Cr                | Plate             | SA-240        | 429        | S42900                | ...                      | ...                  |
| (25) 30  | 17Cr                | Wld. tube         | SA-268        | TP430      | S43000                | ...                      | ...                  |
| 31       | 17Cr                | Smls. & wld. tube | SA-268        | TP430      | S43000                | ...                      | ...                  |
| 32       | 17Cr                | Plate             | SA-240        | 430        | S43000                | ...                      | ...                  |
| 33       | 17Cr                | Bar               | SA-479        | 430        | S43000                | ...                      | ...                  |
| 34       | 17Cr-4Ni-3Cu        | Castings          | SA-747        | CB7Cu-1    | J92180                | ...                      | ...                  |
| 35       | 17Cr-4Ni-4Cu        | Bar               | SA-564        | 630        | S17400                | H1150                    | ...                  |
| (25) 36  | 17Cr-4Ni-4Cu        | Plate             | SA-693        | 630        | S17400                | H1150                    | ...                  |
| (25) 37  | 17Cr-4Ni-4Cu        | Forgings          | SA-705        | 630        | S17400                | H1150                    | ...                  |
| 38       | 17Cr-4Ni-4Cu        | Bar               | SA-564        | 630        | S17400                | H1100                    | ...                  |
| (25) 39  | 17Cr-4Ni-4Cu        | Plate             | SA-693        | 630        | S17400                | H1100                    | ...                  |
| (25) 40  | 17Cr-4Ni-4Cu        | Forgings          | SA-705        | 630        | S17400                | H1100                    | ...                  |
| 41       | 17Cr-4Ni-4Cu        | Bar               | SA-564        | 630        | S17400                | H1075                    | ...                  |
| (25) 42  | 17Cr-4Ni-4Cu        | Plate             | SA-693        | 630        | S17400                | H1075                    | ...                  |
| (25) 43  | 17Cr-4Ni-4Cu        | Forgings          | SA-705        | 630        | S17400                | H1075                    | ...                  |
| 44       | 18Cr-2Mo            | Plate             | SA-240        | ...        | S44400                | ...                      | ...                  |
| 45       | 18Cr-2Mo            | Wld. tube         | SA-268        | ...        | S44400                | ...                      | ...                  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |           |        |     |                             |                        |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----------|--------|-----|-----------------------------|------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |           |        |     | External Pressure Chart No. | Notes                  |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |           |        |     |                             |                        |
|                                    |       |           |                            |                          | (SPT = Supports Only) |           |        |     |                             |                        |
|                                    |       |           |                            |                          | I                     | III       | VIII-1 | XII |                             |                        |
| 1                                  | 7     | 1         | 66                         | 40                       | NP                    | NP        | 600    | 600 | CS-2                        | ...                    |
| 2                                  | 6     | 1         | 70                         | 40                       | NP                    | 700       | NP     | NP  | ...                         | ...                    |
| 3                                  | 6     | 1         | 70                         | 40                       | NP                    | 700       | NP     | NP  | ...                         | ...                    |
| 4                                  | 7     | 1         | 70                         | 50                       | NP                    | NP        | 600    | 600 | CS-3                        | ...                    |
| 5                                  | 7     | 1         | 60                         | 25                       | 700                   | NP        | 1000   | 650 | CS-1                        | G19, T5                |
| 6                                  | 7     | 1         | 60                         | 25                       | NP                    | 700       | NP     | NP  | CS-1                        | G19                    |
| 7                                  | 7     | 1         | 60                         | 25                       | NP                    | 700       | 1000   | 650 | CS-1                        | G19, T5                |
| 8                                  | 7     | 1         | 60                         | 25                       | NP                    | 700       | 1000   | NP  | CS-1                        | G19, T5                |
| 9                                  | 7     | 1         | 60                         | 30                       | 700                   | NP        | 1000   | 650 | CS-2                        | G19, T5, W13, W14      |
| 10                                 | 7     | 1         | 60                         | 30                       | 700                   | NP        | 1000   | 650 | CS-2                        | G19, G24, T5           |
| 11                                 | 7     | 1         | 55                         | 30                       | NP                    | NP        | 800    | 650 | CS-2                        | G19, W14               |
| 12                                 | 7     | 1         | 55                         | 30                       | NP                    | NP        | 800    | 650 | CS-2                        | G19                    |
| 13                                 | 7     | 1         | 60                         | 30                       | NP                    | 700       | 1200   | 650 | CS-2                        | T4                     |
| 14                                 | 6     | 1         | 60                         | 30                       | 700                   | NP        | 1200   | 650 | CS-2                        | T4, W13, W14           |
| 15                                 | 6     | 1         | 60                         | 30                       | 700                   | NP        | 1200   | 650 | CS-2                        | G24, T4                |
| 16                                 | 6     | 1         | 65                         | 30                       | NP                    | NP        | 1200   | 650 | CS-2                        | T4                     |
| 17                                 | 6     | 1         | 70                         | 40                       | NP                    | 700       | 1000   | 650 | CS-2                        | T4                     |
| 18                                 | 6     | 1         | 70                         | 40                       | NP                    | NP        | 1000   | 650 | CS-2                        | G22, T4                |
| 19                                 | 6     | 1         | 70                         | 40                       | NP                    | 700       | NP     | NP  | CS-2                        | ...                    |
| 20                                 | 6     | 1         | 70                         | 40                       | 700                   | 700       | NP     | NP  | CS-2                        | ...                    |
| 21                                 | 6     | 3         | 85                         | 55                       | NP                    | 700       | 1200   | 650 | CS-3                        | T3                     |
| 22                                 | 6     | 3         | 90                         | 65                       | NP                    | 700       | 1200   | 650 | CS-5                        | G1, G17, T3            |
| 23                                 | 6     | 3         | 90                         | 65                       | NP                    | 700       | NP     | NP  | CS-5                        | G17                    |
| 24                                 | ...   | ...       | 94.5                       | 65.5                     | NP                    | 700 (SPT) | NP     | NP  | ...                         | W1                     |
| 25                                 | 6     | 4         | 110                        | 80                       | NP                    | 700       | 800    | 650 | CS-5                        | G1, G17                |
| 26                                 | 6     | 4         | 115                        | 90                       | NP                    | 700       | NP     | NP  | CS-3                        | G17                    |
| 27                                 | 6     | 2         | 60                         | 35                       | 700                   | NP        | 700    | 650 | CS-2                        | G19, G24, W14          |
| 28                                 | 6     | 2         | 60                         | 35                       | 700                   | NP        | 1200   | 650 | CS-2                        | G19, T4, W13, W14      |
| 29                                 | 6     | 2         | 65                         | 30                       | NP                    | NP        | 1200   | 650 | CS-2                        | G19, T4                |
| 30                                 | 7     | 2         | 60                         | 35                       | 700                   | NP        | 1200   | 650 | CS-2                        | G19, G24, T4           |
| 31                                 | 7     | 2         | 60                         | 35                       | 700                   | 700       | 1200   | 650 | CS-2                        | G19, T4, W12, W13, W14 |
| 32                                 | 7     | 2         | 65                         | 30                       | NP                    | NP        | 1200   | 650 | CS-2                        | G19, T4                |
| 33                                 | 7     | 2         | 70                         | 40                       | 700                   | 700       | 1000   | 650 | CS-2                        | G19, G22, T4           |
| 34                                 | ...   | ...       | 150                        | 140                      | NP                    | NP        | 200    | NP  | HT-1                        | G1, G28, W1            |
| 35                                 | ...   | ...       | 135                        | 105                      | NP                    | 650       | 650    | NP  | HT-1                        | G8, G19, W1            |
| 36                                 | ...   | ...       | 135                        | 105                      | NP                    | 650       | 650    | NP  | HT-1                        | G19, W2                |
| 37                                 | ...   | ...       | 135                        | 105                      | NP                    | 650       | 650    | NP  | HT-1                        | G19, W2                |
| 38                                 | ...   | ...       | 140                        | 115                      | NP                    | 650       | 650    | NP  | HT-1                        | G8, G19, W1            |
| 39                                 | ...   | ...       | 140                        | 115                      | NP                    | 650       | 650    | NP  | HT-1                        | G19, W2                |
| 40                                 | ...   | ...       | 140                        | 115                      | NP                    | 650       | 650    | NP  | HT-1                        | G19, W2                |
| 41                                 | ...   | ...       | 145                        | 125                      | NP                    | 650       | NP     | NP  | HT-1                        | G19, W1                |
| 42                                 | ...   | ...       | 145                        | 125                      | NP                    | 650       | 650    | NP  | HT-1                        | G19, W2                |
| 43                                 | ...   | ...       | 145                        | 125                      | NP                    | 650       | 650    | NP  | HT-1                        | G19, W2                |
| 44                                 | 7     | 2         | 60                         | 40                       | NP                    | NP        | 650    | 650 | CS-2                        | G19                    |
| 45                                 | 7     | 2         | 60                         | 40                       | NP                    | NP        | 650    | 650 | CS-2                        | G19, G24               |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 18.9                                                                                                     | ... | 18.9 | ...  | 18.9 | 18.4 | 17.7 | 17.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 20.0                                                                                                     | ... | 20.0 | ...  | 19.6 | 19.3 | 19.0 | 18.5 | 18.1 | 17.7 | ...  | ...  | ...  | ...  |
| 3        | 20.0                                                                                                     | ... | 20.0 | ...  | 19.6 | 19.3 | 19.0 | 18.5 | 18.1 | 17.7 | ...  | ...  | ...  | ...  |
| 4        | 20.0                                                                                                     | ... | 20.0 | ...  | 20.0 | 19.5 | 18.8 | 18.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 16.7                                                                                                     | ... | 15.3 | ...  | 14.8 | 14.5 | 14.3 | 14.0 | 13.8 | 13.5 | 13.1 | 12.6 | 12.0 | 11.3 |
| 6        | 16.7                                                                                                     | ... | 15.3 | ...  | 14.8 | 14.5 | 14.3 | 14.0 | 13.8 | 13.5 | ...  | ...  | ...  | ...  |
| 7        | 16.7                                                                                                     | ... | 15.3 | ...  | 14.8 | 14.5 | 14.3 | 14.0 | 13.8 | 13.5 | 13.1 | 12.6 | 12.0 | 11.3 |
| 8        | 16.7                                                                                                     | ... | 15.3 | ...  | 14.8 | 14.5 | 14.3 | 14.0 | 13.8 | 13.5 | 13.1 | 12.6 | 12.0 | 11.3 |
| 9        | 17.1                                                                                                     | ... | 17.1 | ...  | 16.8 | 16.5 | 16.3 | 15.9 | 15.6 | 15.2 | 14.7 | 14.1 | 13.4 | 12.6 |
| 10       | 14.6                                                                                                     | ... | 14.6 | ...  | 14.3 | 14.0 | 13.8 | 13.5 | 13.2 | 12.9 | 12.5 | 12.0 | 11.4 | 10.7 |
| 11       | 13.4                                                                                                     | ... | 13.4 | ...  | 13.1 | 12.9 | 12.7 | 12.4 | 12.1 | 11.8 | 11.4 | 11.0 | ...  | ...  |
| 12       | 15.7                                                                                                     | ... | 15.7 | ...  | 15.4 | 15.1 | 14.9 | 14.5 | 14.3 | 13.9 | 13.5 | 12.9 | ...  | ...  |
| 13       | 17.1                                                                                                     | ... | 17.1 | ...  | 16.8 | 16.5 | 16.3 | 15.9 | 15.6 | 15.2 | 14.7 | 14.1 | 13.4 | 12.3 |
| 14       | 17.1                                                                                                     | ... | 17.1 | ...  | 16.8 | 16.5 | 16.3 | 15.9 | 15.6 | 15.2 | 14.7 | 14.1 | 13.4 | 12.3 |
| 15       | 14.6                                                                                                     | ... | 14.6 | ...  | 14.3 | 14.0 | 13.8 | 13.5 | 13.2 | 12.9 | 12.5 | 12.0 | 11.4 | 10.5 |
| 16       | 18.6                                                                                                     | ... | 18.4 | ...  | 17.8 | 17.4 | 17.2 | 16.8 | 16.6 | 16.2 | 15.7 | 15.1 | 14.4 | 12.3 |
| 17       | 20.0                                                                                                     | ... | 20.0 | ...  | 19.6 | 19.3 | 19.0 | 18.5 | 18.1 | 17.7 | 17.1 | 16.4 | 15.6 | 12.3 |
| 18       | 20.0                                                                                                     | ... | 20.0 | ...  | 19.6 | 19.3 | 19.0 | 18.5 | 18.1 | 17.7 | 17.1 | 16.4 | 15.6 | 12.3 |
| 19       | 20.0                                                                                                     | ... | 20.0 | ...  | 19.6 | 19.3 | 19.0 | 18.5 | 18.1 | 17.7 | ...  | ...  | ...  | ...  |
| 20       | 20.0                                                                                                     | ... | 20.0 | ...  | 19.6 | 19.3 | 19.0 | 18.5 | 18.1 | 17.7 | ...  | ...  | ...  | ...  |
| 21       | 24.3                                                                                                     | ... | 24.3 | ...  | 23.8 | 23.4 | 23.0 | 22.5 | 22.0 | 21.5 | 20.8 | 19.9 | 17.2 | 12.3 |
| 22       | 25.7                                                                                                     | ... | 25.7 | ...  | 25.2 | 24.8 | 24.4 | 23.8 | 23.3 | 22.7 | 22.0 | 21.1 | 15.9 | 11.0 |
| 23       | 25.7                                                                                                     | ... | 25.7 | ...  | 25.2 | 24.8 | 24.4 | 23.8 | 23.3 | 22.7 | ...  | ...  | ...  | ...  |
| 24       | 26.9                                                                                                     | ... | 26.9 | ...  | 26.4 | 25.9 | 25.5 | 24.9 | 24.5 | 23.8 | ...  | ...  | ...  | ...  |
| 25       | 31.4                                                                                                     | ... | 31.4 | 31.3 | 30.8 | 30.1 | 29.4 | 28.8 | 28.4 | 27.9 | 27.4 | 26.7 | ...  | ...  |
| 26       | 32.9                                                                                                     | ... | 32.9 | ...  | 32.9 | 32.5 | 31.3 | 30.0 | 29.4 | 28.7 | ...  | ...  | ...  | ...  |
| 27       | 14.6                                                                                                     | ... | 14.6 | ...  | 14.3 | 14.0 | 13.8 | 13.5 | 13.2 | 12.9 | ...  | ...  | ...  | ...  |
| 28       | 17.1                                                                                                     | ... | 17.1 | ...  | 16.8 | 16.5 | 16.3 | 15.9 | 15.6 | 15.2 | 14.7 | 14.1 | 13.4 | 12.0 |
| 29       | 18.6                                                                                                     | ... | 18.4 | ...  | 17.8 | 17.4 | 17.2 | 16.8 | 16.6 | 16.2 | 15.7 | 15.1 | 14.4 | 12.0 |
| 30       | 14.6                                                                                                     | ... | 14.6 | ...  | 14.3 | 14.0 | 13.8 | 13.5 | 13.2 | 12.9 | 12.5 | 12.0 | 11.4 | 10.2 |
| 31       | 17.1                                                                                                     | ... | 17.1 | ...  | 16.8 | 16.5 | 16.3 | 15.9 | 15.6 | 15.2 | 14.7 | 14.1 | 13.4 | 12.0 |
| 32       | 18.6                                                                                                     | ... | 18.4 | ...  | 17.8 | 17.4 | 17.2 | 16.8 | 16.6 | 16.2 | 15.7 | 15.1 | 14.4 | 12.0 |
| 33       | 20.0                                                                                                     | ... | 20.0 | ...  | 19.6 | 19.3 | 19.0 | 18.5 | 18.1 | 17.7 | 17.1 | 16.4 | 15.6 | 12.0 |
| 34       | 32.0                                                                                                     | ... | 32.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 38.6                                                                                                     | ... | 38.6 | ...  | 38.6 | 37.5 | 36.8 | 36.2 | 35.9 | ...  | ...  | ...  | ...  | ...  |
| 36       | 38.6                                                                                                     | ... | 38.6 | ...  | 38.6 | 37.5 | 36.8 | 36.2 | 35.9 | ...  | ...  | ...  | ...  | ...  |
| 37       | 38.6                                                                                                     | ... | 38.6 | ...  | 38.6 | 37.5 | 36.8 | 36.2 | 35.9 | ...  | ...  | ...  | ...  | ...  |
| 38       | 40.0                                                                                                     | ... | 40.0 | ...  | 40.0 | 38.9 | 38.1 | 37.5 | 37.2 | ...  | ...  | ...  | ...  | ...  |
| 39       | 40.0                                                                                                     | ... | 40.0 | ...  | 40.0 | 38.9 | 38.1 | 37.5 | 37.2 | ...  | ...  | ...  | ...  | ...  |
| 40       | 40.0                                                                                                     | ... | 40.0 | ...  | 40.0 | 38.9 | 38.1 | 37.5 | 37.2 | ...  | ...  | ...  | ...  | ...  |
| 41       | 41.4                                                                                                     | ... | 41.4 | ...  | 41.4 | 40.3 | 39.5 | 38.9 | 38.5 | ...  | ...  | ...  | ...  | ...  |
| 42       | 41.4                                                                                                     | ... | 41.4 | ...  | 41.4 | 40.3 | 39.5 | 38.9 | 38.5 | ...  | ...  | ...  | ...  | ...  |
| 43       | 41.4                                                                                                     | ... | 41.4 | ...  | 41.4 | 40.3 | 39.5 | 38.9 | 38.5 | ...  | ...  | ...  | ...  | ...  |
| 44       | 17.1                                                                                                     | ... | 17.1 | ...  | 16.6 | 16.2 | 15.9 | 15.4 | 15.1 | ...  | ...  | ...  | ...  | ...  |
| 45       | 14.6                                                                                                     | ... | 14.6 | ...  | 14.1 | 13.8 | 13.5 | 13.1 | 12.8 | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 8.4                                                                                                      | 4.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 8.4                                                                                                      | 4.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 8.4                                                                                                      | 4.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 8.4                                                                                                      | 4.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 7.1                                                                                                      | 3.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 8.8                                                                                                      | 6.4  | 4.4  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 8.8                                                                                                      | 6.4  | 4.4  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 7.5                                                                                                      | 5.4  | 3.7  | 2.5  | 1.5  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 16       | 8.8                                                                                                      | 6.4  | 4.4  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 8.8                                                                                                      | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 8.8                                                                                                      | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 8.8                                                                                                      | 6.4  | 4.4  | 2.9  | 1.8  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 7.6                                                                                                      | 5.0  | 3.3  | 2.2  | 1.5  | 1.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 28       | 9.2                                                                                                      | 6.5  | 4.5  | 3.2  | 2.4  | 1.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 9.2                                                                                                      | 6.5  | 4.5  | 3.2  | 2.4  | 1.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 7.8                                                                                                      | 5.5  | 3.8  | 2.7  | 2.0  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | 9.2                                                                                                      | 6.5  | 4.5  | 3.2  | 2.4  | 1.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 9.2                                                                                                      | 6.5  | 4.5  | 3.2  | 2.4  | 1.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 9.2                                                                                                      | 6.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition    | Product Form | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|------------------------|--------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 18Cr-2Mo               | Smls. tube   | SA-268    | ...        | S44400                | ...                      | ...                 |
| 2        | 18Cr-Ti                | Plate        | SA-240    | ...        | S43932                | ...                      | ...                 |
| 3        | 18Cr-Ti                | Wld. tube    | SA-268    | TP439      | S43035                | ...                      | ...                 |
| 4        | 18Cr-Ti                | Smls. tube   | SA-268    | TP439      | S43035                | ...                      | ...                 |
| (25) 5   | ...                    | ...          | ...       | ...        | ...                   | ...                      | ...                 |
| (25) 6   | ...                    | ...          | ...       | ...        | ...                   | ...                      | ...                 |
| 7        | 18Cr-Ti                | Wld. tube    | SA-803    | TP439      | S43035                | ...                      | ...                 |
| 8        | 18Cr-Ti                | Smls. tube   | SA-268    | TP430 Ti   | S43036                | ...                      | ...                 |
| 9        | 18Cr-Ti                | Wld. tube    | SA-268    | TP430 Ti   | S43036                | ...                      | ...                 |
| 10       | 18Cr-Ti                | Bar          | SA-479    | 439        | S43035                | ...                      | ...                 |
| 11       | 26Cr-3Ni-3Mo           | Plate        | SA-240    | 26-3-3     | S44660                | ...                      | $\leq \frac{2}{10}$ |
| 12       | 26Cr-3Ni-3Mo           | Smls. tube   | SA-268    | 26-3-3     | S44660                | ...                      | $\leq \frac{2}{10}$ |
| 13       | 26Cr-3Ni-3Mo           | Wld. tube    | SA-268    | 26-3-3     | S44660                | ...                      | $\leq \frac{2}{10}$ |
| 14       | 26Cr-3Ni-3Mo           | Wld. tube    | SA-268    | 26-3-3     | S44660                | ...                      | $\leq \frac{2}{10}$ |
| 15       | 26Cr-3Ni-3Mo           | Wld. tube    | SA-803    | 26-3-3     | S44660                | ...                      | $\leq \frac{2}{10}$ |
| 16       | 27Cr                   | Smls. tube   | SA-268    | TP446-1    | S44600                | ...                      | ...                 |
| 17       | 27Cr-1Mo               | Forgings     | SA-182    | FXM-27Cb   | S44627                | ...                      | ...                 |
| 18       | 27Cr-1Mo               | Plate        | SA-240    | XM-27      | S44627                | ...                      | ...                 |
| 19       | 27Cr-1Mo               | Wld. tube    | SA-268    | TPXM-27    | S44627                | ...                      | ...                 |
| 20       | 27Cr-1Mo               | Smls. tube   | SA-268    | TPXM-27    | S44627                | ...                      | ...                 |
| 21       | 27Cr-1Mo               | Bar          | SA-479    | XM-27      | S44627                | ...                      | ...                 |
| (25) 22  | ...                    | ...          | ...       | ...        | ...                   | ...                      | ...                 |
| (25) 23  | ...                    | ...          | ...       | ...        | ...                   | ...                      | ...                 |
| (25) 24  | ...                    | ...          | ...       | ...        | ...                   | ...                      | ...                 |
| (25) 25  | ...                    | ...          | ...       | ...        | ...                   | ...                      | ...                 |
| 26       | 27Cr-1Mo-Ti            | Plate        | SA-240    | XM-33      | S44626                | ...                      | ...                 |
| 27       | 27Cr-1Mo-Ti            | Smls. tube   | SA-268    | TPXM-33    | S44626                | ...                      | ...                 |
| 28       | 27Cr-1Mo-Ti            | Wld. tube    | SA-268    | TPXM-33    | S44626                | ...                      | ...                 |
| 29       | 29Cr-4Mo               | Bar          | SA-479    | ...        | S44700                | ...                      | ...                 |
| 30       | 29Cr-4Mo               | Plate        | SA-240    | ...        | S44700                | ...                      | ...                 |
| 31       | 29Cr-4Mo               | Smls. tube   | SA-268    | 29-4       | S44700                | ...                      | ...                 |
| 32       | 29Cr-4Mo               | Wld. tube    | SA-268    | 29-4       | S44700                | ...                      | ...                 |
| 33       | 29Cr-4Mo-2Ni           | Bar          | SA-479    | ...        | S44800                | ...                      | ...                 |
| 34       | 29Cr-4Mo-2Ni           | Plate        | SA-240    | ...        | S44800                | ...                      | ...                 |
| 35       | 29Cr-4Mo-2Ni           | Smls. tube   | SA-268    | 29-4-2     | S44800                | ...                      | ...                 |
| 36       | 29Cr-4Mo-2Ni           | Wld. tube    | SA-268    | 29-4-2     | S44800                | ...                      | ...                 |
| 37       | 29Cr-4Mo-Ti            | Smls. tube   | SA-268    | ...        | S44735                | ...                      | ...                 |
| 38       | 29Cr-4Mo-Ti            | Wld. tube    | SA-268    | ...        | S44735                | ...                      | ...                 |
| 39       | Mn- $\frac{1}{4}$ Mo   | Forgings     | SA-372    | D          | K14508                | ...                      | ...                 |
| 40       | Mn- $\frac{1}{4}$ Mo-V | Castings     | SA-487    | 2          | J13005                | A                        | ...                 |
| 41       | Mn- $\frac{1}{4}$ Mo-V | Castings     | SA-487    | 2          | J13005                | B                        | ...                 |
| 42       | Mn- $\frac{1}{2}$ Mo   | Plate        | SA-302    | A          | K12021                | ...                      | ...                 |
| 43       | Mn- $\frac{1}{2}$ Mo   | Wld. pipe    | SA-672    | H75        | K12021                | ...                      | ...                 |
| 44       | Mn- $\frac{1}{2}$ Mo   | Plate        | SA-302    | B          | K12022                | ...                      | ...                 |
| 45       | Mn- $\frac{1}{2}$ Mo   | Plate        | SA-533    | A          | K12521                | 1                        | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |           |        |     |                             |              |  |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----------|--------|-----|-----------------------------|--------------|--|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |           |        |     | External Pressure Chart No. | Notes        |  |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |           |        |     |                             |              |  |
|                                    |       |           |                            |                          | (SPT = Supports Only) |           |        |     |                             |              |  |
|                                    |       |           |                            |                          | I                     | III       | VIII-1 | XII |                             |              |  |
| 1                                  | 7     | 2         | 60                         | 40                       | NP                    | NP        | 650    | 650 | CS-2                        | G19          |  |
| 2                                  | 7     | 2         | 60                         | 30                       | NP                    | NP        | 600    | 600 | CS-2                        | G19          |  |
| 3                                  | 7     | 2         | 60                         | 30                       | 800                   | NP        | 800    | 650 | CS-2                        | G19, G24     |  |
| 4                                  | 7     | 2         | 60                         | 30                       | 800                   | NP        | 800    | 650 | CS-2                        | G19          |  |
| 5                                  | ...   | ...       | ...                        | ...                      | ...                   | ...       | ...    | ... | ...                         | ...          |  |
| 6                                  | ...   | ...       | ...                        | ...                      | ...                   | ...       | ...    | ... | ...                         | ...          |  |
| 7                                  | 7     | 2         | 60                         | 30                       | NP                    | NP        | 600    | 600 | CS-2                        | G19, G24     |  |
| 8                                  | 7     | 2         | 60                         | 35                       | NP                    | NP        | 800    | NP  | CS-2                        | G19          |  |
| 9                                  | 7     | 2         | 60                         | 35                       | NP                    | NP        | 800    | NP  | CS-2                        | G19, G24     |  |
| 10                                 | 7     | 2         | 70                         | 40                       | NP                    | NP        | 1000   | 650 | CS-2                        | G19, G22, T4 |  |
| 11                                 | 10K   | 1         | 85                         | 65                       | NP                    | NP        | 700    | 650 | HA-5                        | G19          |  |
| 12                                 | 10K   | 1         | 85                         | 65                       | NP                    | 700       | 700    | 650 | HA-5                        | G19, H5      |  |
| 13                                 | 10K   | 1         | 85                         | 65                       | NP                    | 700       | NP     | NP  | HA-5                        | G19, H5, W12 |  |
| 14                                 | 10K   | 1         | 85                         | 65                       | NP                    | NP        | 700    | 650 | HA-5                        | G19, G24     |  |
| 15                                 | 10K   | 1         | 85                         | 65                       | NP                    | NP        | 600    | 600 | HA-5                        | G19, G24     |  |
| 16                                 | 10I   | 1         | 70                         | 40                       | 700                   | NP        | 650    | 650 | CS-2                        | G19          |  |
| 17                                 | 10I   | 1         | 60                         | 35                       | NP                    | NP        | 650    | 650 | HA-2                        | G19          |  |
| 18                                 | 10I   | 1         | 65                         | 40                       | NP                    | 650       | 650    | 650 | HA-2                        | G19          |  |
| 19                                 | 10I   | 1         | 65                         | 40                       | NP                    | NP        | 650    | 650 | HA-2                        | G19, G24     |  |
| 20                                 | 10I   | 1         | 65                         | 40                       | NP                    | 650       | 650    | 650 | HA-2                        | G19          |  |
| 21                                 | 10I   | 1         | 65                         | 40                       | NP                    | 700       | 650    | 650 | HA-2                        | G19, G22     |  |
| 22                                 | ...   | ...       | ...                        | ...                      | ...                   | ...       | ...    | ... | ...                         | ...          |  |
| 23                                 | ...   | ...       | ...                        | ...                      | ...                   | ...       | ...    | ... | ...                         | ...          |  |
| 24                                 | ...   | ...       | ...                        | ...                      | ...                   | ...       | ...    | ... | ...                         | ...          |  |
| 25                                 | ...   | ...       | ...                        | ...                      | ...                   | ...       | ...    | ... | ...                         | ...          |  |
| 26                                 | 10I   | 1         | 68                         | 45                       | NP                    | NP        | 650    | 650 | HA-6                        | G19          |  |
| 27                                 | 10I   | 1         | 68                         | 45                       | NP                    | NP        | 650    | 650 | HA-6                        | G19          |  |
| 28                                 | 10I   | 1         | 68                         | 45                       | NP                    | NP        | 650    | 650 | HA-6                        | G19, G24     |  |
| 29                                 | 10J   | 1         | 70                         | 55                       | NP                    | NP        | 600    | 600 | HA-6                        | G19, G22     |  |
| 30                                 | 10J   | 1         | 80                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19          |  |
| 31                                 | 10J   | 1         | 80                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19          |  |
| 32                                 | 10J   | 1         | 80                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19, G24     |  |
| 33                                 | 10K   | 1         | 70                         | 55                       | NP                    | NP        | 600    | 600 | HA-6                        | G19, G22     |  |
| 34                                 | 10K   | 1         | 80                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19          |  |
| 35                                 | 10K   | 1         | 80                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19          |  |
| 36                                 | 10K   | 1         | 80                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19, G24     |  |
| 37                                 | 10J   | 1         | 75                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19          |  |
| 38                                 | 10J   | 1         | 75                         | 60                       | NP                    | NP        | 600    | 600 | HA-6                        | G19, G24     |  |
| 39                                 | ...   | ...       | 105                        | 65                       | NP                    | 650       | 650    | 650 | CS-5                        | G25, W2, W11 |  |
| 40                                 | 3     | 3         | 85                         | 53                       | NP                    | 700 (SPT) | 650    | 650 | CS-3                        | G1           |  |
| 41                                 | 3     | 3         | 90                         | 65                       | NP                    | NP        | 650    | 650 | CS-5                        | G1           |  |
| 42                                 | 3     | 2         | 75                         | 45                       | 1000                  | 700       | 1000   | 650 | CS-3                        | G11, S2, T3  |  |
| 43                                 | 3     | 2         | 75                         | 45                       | NP                    | 700       | NP     | NP  | CS-3                        | S6, W10, W12 |  |
| 44                                 | 3     | 3         | 80                         | 50                       | 1000                  | 700       | 1000   | 650 | CS-3                        | G11, S2, T3  |  |
| 45                                 | 3     | 3         | 80                         | 50                       | NP                    | 700       | 1000   | NP  | CS-5                        | G23, T4      |  |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.2 | 15.9 | 15.4 | 15.1 | ...  | ...  | ...  | ...  | ...  |
| 2        | 17.1                                                                                                     | ...  | 17.1 | ...  | 15.7 | 14.6 | 13.9 | 13.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 14.6                                                                                                     | ...  | 14.6 | ...  | 13.3 | 12.4 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 | 11.2 | ...  | ...  |
| 4        | 17.1                                                                                                     | ...  | 17.1 | ...  | 15.7 | 14.6 | 13.9 | 13.6 | 13.6 | 13.5 | 13.4 | 13.2 | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 14.6                                                                                                     | ...  | 14.6 | ...  | 13.3 | 12.4 | 11.8 | 11.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.1 | 15.8 | 15.4 | 15.1 | 14.8 | 14.5 | 14.0 | ...  | ...  |
| 9        | 14.6                                                                                                     | ...  | 14.6 | ...  | 14.1 | 13.7 | 13.4 | 13.1 | 12.9 | 12.6 | 12.3 | 11.9 | ...  | ...  |
| 10       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.3 | 18.8 | 18.4 | 17.9 | 17.7 | 17.3 | 16.9 | 16.4 | 15.8 | 12.2 |
| 11       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.2 | 23.9 | 23.8 | 23.6 | 23.5 | 23.4 | ...  | ...  | ...  | ...  |
| 12       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.2 | 23.9 | 23.8 | 23.6 | 23.5 | 23.4 | ...  | ...  | ...  | ...  |
| 13       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.2 | 23.9 | 23.8 | 23.6 | 23.5 | 23.4 | ...  | ...  | ...  | ...  |
| 14       | 20.6                                                                                                     | ...  | 20.6 | ...  | 20.6 | 20.3 | 20.2 | 20.1 | 20.0 | 19.9 | ...  | ...  | ...  | ...  |
| 15       | 20.6                                                                                                     | ...  | 20.6 | ...  | 20.6 | 20.3 | 20.2 | 20.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.3 | 18.8 | 18.4 | 17.9 | 17.7 | 17.3 | ...  | ...  | ...  | ...  |
| 17       | 17.1                                                                                                     | ...  | 17.1 | ...  | 16.6 | 16.1 | 16.1 | 16.1 | 16.1 | ...  | ...  | ...  | ...  | ...  |
| 18       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.3 | 18.1 | 18.1 | 18.1 | 18.1 | ...  | ...  | ...  | ...  | ...  |
| 19       | 15.8                                                                                                     | ...  | 15.8 | ...  | 15.5 | 15.4 | 15.4 | 15.4 | 15.4 | ...  | ...  | ...  | ...  | ...  |
| 20       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.3 | 18.1 | 18.1 | 18.1 | 18.1 | ...  | ...  | ...  | ...  | ...  |
| 21       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.3 | 18.1 | 18.1 | 18.1 | 18.1 | 18.1 | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 19.4                                                                                                     | ...  | 19.4 | ...  | 19.3 | 19.0 | 18.8 | 18.4 | 18.1 | ...  | ...  | ...  | ...  | ...  |
| 27       | 19.4                                                                                                     | ...  | 19.4 | ...  | 19.3 | 19.0 | 18.8 | 18.4 | 18.1 | ...  | ...  | ...  | ...  | ...  |
| 28       | 16.5                                                                                                     | ...  | 16.5 | ...  | 16.4 | 16.2 | 16.0 | 15.7 | 15.4 | ...  | ...  | ...  | ...  | ...  |
| 29       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.3 | 19.2 | 19.2 | 19.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 22.9                                                                                                     | ...  | 22.8 | ...  | 22.1 | 21.9 | 21.9 | 21.9 | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 22.9                                                                                                     | ...  | 22.8 | ...  | 22.1 | 21.9 | 21.9 | 21.9 | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 19.4                                                                                                     | ...  | 19.4 | ...  | 18.8 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 20.0                                                                                                     | ...  | 19.6 | ...  | 19.3 | 19.2 | 18.9 | 18.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 22.9                                                                                                     | ...  | 22.4 | ...  | 22.1 | 21.9 | 21.6 | 21.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 22.9                                                                                                     | ...  | 22.4 | ...  | 22.1 | 21.9 | 21.6 | 21.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 19.4                                                                                                     | ...  | 19.1 | ...  | 18.8 | 18.6 | 18.4 | 18.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 21.4                                                                                                     | ...  | 21.0 | ...  | 20.7 | 20.5 | 20.3 | 20.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 18.2                                                                                                     | ...  | 17.9 | ...  | 17.6 | 17.5 | 17.2 | 17.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  | ...  |
| 40       | 24.3                                                                                                     | ...  | 24.3 | ...  | 24.3 | 24.2 | 24.2 | 24.2 | 24.1 | 24.1 | ...  | ...  | ...  | ...  |
| 41       | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.6 | 25.6 | 25.6 | 25.6 | ...  | ...  | ...  | ...  | ...  |
| 42       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 20.0 | 13.7 |
| 43       | 21.4                                                                                                     | ...  | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | 21.4 | ...  | ...  | ...  | ...  |
| 44       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 20.0 | 13.7 |
| 45       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.1 | 13.3 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 9.2                                                                                                      | 6.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 10.0                                                                                                     | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition                                    | Product Form      | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.       |
|----------|--------------------------------------------------------|-------------------|-----------|------------|-----------------------|--------------------------|---------------------------|
| 1        | Mn- $\frac{1}{2}$ Mo                                   | Plate             | SA-533    | A          | K12521                | 2                        | ...                       |
| 2        | Mn- $\frac{1}{2}$ Mo                                   | Plate             | SA-533    | A          | K12521                | 3                        | ...                       |
| 3        | Mn- $\frac{1}{2}$ Mo- $\frac{1}{4}$ Ni                 | Plate             | SA-533    | D          | K12529                | 1                        | ...                       |
| 4        | Mn- $\frac{1}{2}$ Mo- $\frac{1}{4}$ Ni                 | Plate             | SA-533    | D          | K12529                | 2                        | ...                       |
| 5        | Mn- $\frac{1}{2}$ Mo- $\frac{1}{4}$ Ni                 | Plate             | SA-533    | D          | K12529                | 3                        | ...                       |
| 6        | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Plate             | SA-302    | C          | K12039                | ...                      | ...                       |
| 7        | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Plate             | SA-533    | B          | K12539                | 1                        | ...                       |
| 8        | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Wld. pipe         | SA-672    | H80        | K12039                | ...                      | ...                       |
| 9        | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Wld. pipe         | SA-672    | J80        | K12539                | ...                      | ...                       |
| 10       | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Plate             | SA-533    | B          | K12539                | 2                        | ...                       |
| 11       | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Wld. pipe         | SA-672    | J90        | K12539                | ...                      | ...                       |
| 12       | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Plate             | SA-533    | B          | K12539                | 3                        | ...                       |
| 13       | Mn- $\frac{1}{2}$ Mo- $\frac{1}{2}$ Ni                 | Wld. pipe         | SA-672    | J100       | K12539                | ...                      | ...                       |
| 14       | Mn- $\frac{1}{2}$ Mo- $\frac{3}{4}$ Ni                 | Plate             | SA-302    | D          | K12054                | ...                      | ...                       |
| 15       | Mn- $\frac{1}{2}$ Mo- $\frac{3}{4}$ Ni                 | Plate             | SA-533    | C          | K12554                | 1                        | ...                       |
| 16       | Mn- $\frac{1}{2}$ Mo- $\frac{3}{4}$ Ni                 | Plate             | SA-533    | E          | K12554                | 1                        | ...                       |
| 17       | Mn- $\frac{1}{2}$ Mo- $\frac{3}{4}$ Ni                 | Plate             | SA-533    | C          | K12554                | 2                        | ...                       |
| 18       | Mn- $\frac{1}{2}$ Mo- $\frac{3}{4}$ Ni                 | Plate             | SA-533    | E          | K12554                | 2                        | ...                       |
| 19       | Mn- $\frac{1}{2}$ Mo- $\frac{3}{4}$ Ni                 | Plate             | SA-533    | C          | K12554                | 3                        | ...                       |
| 20       | Mn- $\frac{1}{2}$ Ni-V                                 | Plate             | SA-225    | C          | K12524                | ...                      | ...                       |
| 21       | Mn-V                                                   | Castings          | SA-487    | 1          | J13002                | A                        | ...                       |
| 22       | Mn-V                                                   | Castings          | SA-487    | 1          | J13002                | A                        | ...                       |
| 23       | Mn-V                                                   | Castings          | SA-487    | 1          | J13002                | B                        | ...                       |
| 24       | $1\frac{1}{2}$ Si- $\frac{1}{2}$ Mo                    | Smls. pipe        | SA-335    | P15        | K11578                | ...                      | ...                       |
| 25       | $\frac{1}{2}$ Ni- $\frac{1}{2}$ Cr- $\frac{1}{4}$ Mo-V | Castings          | SA-487    | 4          | J13047                | A                        | ...                       |
| 26       | $\frac{1}{2}$ Ni- $\frac{1}{2}$ Cr- $\frac{1}{4}$ Mo-V | Castings          | SA-487    | 4          | J13047                | B                        | ...                       |
| 27       | $\frac{1}{2}$ Ni- $\frac{1}{2}$ Cr- $\frac{1}{4}$ Mo-V | Castings          | SA-487    | 4          | J13047                | E                        | ...                       |
| 28       | $\frac{1}{2}$ Ni- $\frac{1}{2}$ Mo-V                   | Forgings          | SA-541    | 3          | K12045                | 1                        | ...                       |
| 29       | $\frac{1}{2}$ Ni- $\frac{1}{2}$ Mo-V                   | Forgings          | SA-541    | 3          | K12045                | 2                        | ...                       |
| 30       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo-V | Forgings          | SA-592    | F          | K11576                | ...                      | $2\frac{1}{2} < t \leq 4$ |
| 31       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo-V | Plate             | SA-517    | F          | K11576                | ...                      | $\leq 2\frac{1}{2}$       |
| 32       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo-V | Forgings          | SA-592    | F          | K11576                | ...                      | $\leq 2\frac{1}{2}$       |
| 33       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Cu-Mo                  | Smls. & wld. tube | SA-423    | 2          | K11540                | ...                      | ...                       |
| 34       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Cu-Mo                  | Wld. tube         | SA-423    | 2          | K11540                | ...                      | ...                       |
| 35       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Mo- $\frac{1}{3}$ Cr-V | Forgings          | SA-508    | 2          | K12766                | 1                        | ...                       |
| 36       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Mo- $\frac{1}{3}$ Cr-V | Forgings          | SA-541    | 2          | K12765                | 1                        | ...                       |
| 37       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Mo- $\frac{1}{3}$ Cr-V | Forgings          | SA-508    | 2          | K12766                | 2                        | ...                       |
| 38       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Mo- $\frac{1}{3}$ Cr-V | Forgings          | SA-541    | 2          | K12765                | 2                        | ...                       |
| 39       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Mo-Cr-V                | Forgings          | SA-508    | 3          | K12042                | 1                        | ...                       |
| 40       | $\frac{3}{4}$ Ni- $\frac{1}{2}$ Mo-Cr-V                | Forgings          | SA-508    | 3          | K12042                | 2                        | ...                       |
| 41       | $\frac{3}{4}$ Ni-1Mo- $\frac{3}{4}$ Cr                 | Castings          | SA-217    | WC5        | J22000                | ...                      | ...                       |
| 42       | $\frac{1}{2}$ Ni- $\frac{1}{2}$ Cr- $\frac{1}{2}$ Mo   | Castings          | SA-217    | WC4        | J12082                | ...                      | ...                       |
| 43       | $1\frac{1}{4}$ Ni-1Cr- $\frac{1}{2}$ Mo                | Plate             | SA-517    | P          | K21650                | ...                      | $2\frac{1}{2} < t \leq 4$ |
| 44       | $1\frac{1}{4}$ Ni-1Cr- $\frac{1}{2}$ Mo                | Plate             | SA-517    | P          | K21650                | ...                      | $\leq 2\frac{1}{2}$       |
| 45       | $1\frac{1}{2}$ Ni                                      | Forgings          | SA-350    | LF5        | K13050                | 1                        | ...                       |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |           |        |     |                             |               |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----------|--------|-----|-----------------------------|---------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |           |        |     | External Pressure Chart No. | Notes         |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |           |        |     |                             |               |
|                                    |       |           |                            |                          | I                                             | III       | VIII-1 | XII |                             |               |
| 1                                  | 3     | 3         | 90                         | 70                       | NP                                            | 700       | 800    | NP  | CS-5                        | ...           |
| 2                                  | 11A   | 4         | 100                        | 83                       | NP                                            | 700       | NP     | NP  | CS-5                        | ...           |
| 3                                  | 3     | 3         | 80                         | 50                       | NP                                            | 700       | NP     | NP  | CS-5                        | ...           |
| 4                                  | 3     | 3         | 90                         | 70                       | NP                                            | 700       | 800    | NP  | CS-5                        | ...           |
| 5                                  | 11A   | 4         | 100                        | 83                       | NP                                            | 700       | 750    | 650 | CS-5                        | ...           |
| 6                                  | 3     | 3         | 80                         | 50                       | 1000                                          | 700       | 1000   | 650 | CS-3                        | G11, S2, T3   |
| 7                                  | 3     | 3         | 80                         | 50                       | NP                                            | 700       | 800    | NP  | CS-5                        | G23           |
| 8                                  | 3     | 3         | 80                         | 50                       | NP                                            | 700       | NP     | NP  | CS-3                        | G26, W10, W12 |
| 9                                  | 3     | 3         | 80                         | 50                       | NP                                            | 700       | NP     | NP  | CS-5                        | G26, W10, W12 |
| 10                                 | 3     | 3         | 90                         | 70                       | NP                                            | 700       | 800    | NP  | CS-5                        | ...           |
| 11                                 | 3     | 3         | 90                         | 70                       | NP                                            | 700       | NP     | NP  | CS-5                        | G26, W10, W12 |
| 12                                 | 11A   | 4         | 100                        | 83                       | NP                                            | 700       | 750    | 650 | CS-5                        | ...           |
| 13                                 | 11A   | 4         | 100                        | 83                       | NP                                            | 700       | NP     | NP  | CS-5                        | G26, W10, W12 |
| 14                                 | 3     | 3         | 80                         | 50                       | 1000                                          | 700       | 1000   | 650 | CS-3                        | G11, S2, T3   |
| 15                                 | 3     | 3         | 80                         | 50                       | NP                                            | 700       | 800    | NP  | CS-5                        | G23           |
| 16                                 | 3     | 3         | 80                         | 50                       | NP                                            | NP        | 800    | NP  | CS-5                        | G23           |
| 17                                 | 3     | 3         | 90                         | 70                       | NP                                            | 700       | 800    | NP  | CS-5                        | ...           |
| 18                                 | 3     | 3         | 90                         | 70                       | NP                                            | NP        | 800    | NP  | CS-5                        | ...           |
| 19                                 | 11A   | 4         | 100                        | 83                       | NP                                            | 700       | NP     | NP  | CS-5                        | ...           |
| 20                                 | 10A   | 1         | 105                        | 70                       | NP                                            | NP        | 700    | 650 | CS-5                        | ...           |
| 21                                 | 10A   | 1         | 85                         | 55                       | NP                                            | 700 (SPT) | NP     | NP  | CS-3                        | ...           |
| 22                                 | 10A   | 1         | 85                         | 55                       | NP                                            | NP        | 650    | 650 | CS-3                        | G1            |
| 23                                 | 10A   | 1         | 90                         | 65                       | NP                                            | NP        | 650    | 650 | CS-5                        | G1            |
| 24                                 | 3     | 1         | 60                         | 30                       | NP                                            | NP        | 1000   | 650 | CS-2                        | T3            |
| 25                                 | 3     | 3         | 90                         | 60                       | NP                                            | 650       | 650    | 650 | CS-3                        | G1            |
| 26                                 | 11A   | 3         | 105                        | 85                       | NP                                            | NP        | 700    | 650 | CS-5                        | G1            |
| 27                                 | 11A   | 3         | 115                        | 95                       | NP                                            | NP        | 700    | 650 | CS-5                        | G1            |
| 28                                 | 3     | 3         | 80                         | 50                       | NP                                            | 700       | 800    | 650 | CS-5                        | G23           |
| 29                                 | 3     | 3         | 90                         | 65                       | NP                                            | 700       | 700    | NP  | CS-5                        | ...           |
| 30                                 | 11B   | 3         | 105                        | 90                       | NP                                            | 650 (SPT) | 650    | 650 | CS-5                        | S7            |
| 31                                 | 11B   | 3         | 115                        | 100                      | NP                                            | 650 (SPT) | 650    | 650 | HT-1                        | ...           |
| 32                                 | 11B   | 3         | 115                        | 100                      | NP                                            | NP        | 650    | 650 | HT-1                        | ...           |
| 33                                 | 4     | 2         | 60                         | 37                       | 650                                           | NP        | 650    | NP  | CS-2                        | W13, W14      |
| 34                                 | 4     | 2         | 60                         | 37                       | 650                                           | NP        | 650    | NP  | CS-2                        | G24           |
| 35                                 | 3     | 3         | 80                         | 50                       | NP                                            | 700       | 800    | 650 | CS-5                        | G23           |
| 36                                 | 3     | 3         | 80                         | 50                       | NP                                            | 700       | 800    | 650 | CS-5                        | G23           |
| 37                                 | 3     | 3         | 90                         | 65                       | NP                                            | 700       | 700    | NP  | CS-5                        | ...           |
| 38                                 | 3     | 3         | 90                         | 65                       | NP                                            | 700       | 700    | NP  | CS-5                        | ...           |
| 39                                 | 3     | 3         | 80                         | 50                       | NP                                            | 700       | 800    | 650 | CS-5                        | G23           |
| 40                                 | 3     | 3         | 90                         | 65                       | NP                                            | 700       | 700    | NP  | CS-5                        | ...           |
| 41                                 | 4     | 1         | 70                         | 40                       | 1100                                          | 700       | 1100   | NP  | CS-2                        | G1, G17, T4   |
| 42                                 | 4     | 1         | 70                         | 40                       | 1000                                          | 700       | 1000   | NP  | CS-2                        | G1, G17, T4   |
| 43                                 | 11B   | 8         | 105                        | 90                       | NP                                            | 700 (SPT) | 650    | 650 | CS-5                        | ...           |
| 44                                 | 11B   | 8         | 115                        | 100                      | NP                                            | 650 (SPT) | 650    | 650 | HT-1                        | ...           |
| 45                                 | 9A    | 1         | 60                         | 30                       | NP                                            | NP        | 500    | 500 | CS-2                        | ...           |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  |
| 2        | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | ...  | ...  | ...  | ...  |
| 3        | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  | ...  |
| 4        | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  |
| 5        | 28.6                                                                                                     | ...  | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | ...  | ...  | ...  |
| 6        | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 20.0 | 13.7 |
| 7        | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  |
| 8        | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  | ...  |
| 9        | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  | ...  |
| 10       | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  |
| 11       | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  |
| 12       | 28.6                                                                                                     | ...  | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | ...  | ...  | ...  |
| 13       | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | ...  | ...  | ...  | ...  |
| 14       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 20.0 | 13.7 |
| 15       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  |
| 16       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  |
| 17       | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  |
| 18       | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  |
| 19       | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | 28.6 | ...  | ...  | ...  | ...  |
| 20       | 30.0                                                                                                     | 30.0 | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  |
| 21       | 24.3                                                                                                     | ...  | 23.0 | ...  | 22.4 | 22.4 | 22.4 | 21.9 | 21.5 | 20.9 | ...  | ...  | ...  | ...  |
| 22       | 24.3                                                                                                     | ...  | 23.1 | ...  | 22.5 | 22.5 | 22.5 | 21.9 | 21.5 | ...  | ...  | ...  | ...  | ...  |
| 23       | 25.7                                                                                                     | ...  | 24.6 | ...  | 24.2 | 24.1 | 24.1 | 23.9 | 23.4 | ...  | ...  | ...  | ...  | ...  |
| 24       | 17.1                                                                                                     | 17.1 | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 16.8 | 16.6 | 16.3 | 15.9 | 15.4 | 13.8 | 12.5 |
| 25       | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  | ...  |
| 26       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  |
| 27       | 32.9                                                                                                     | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | ...  | ...  | ...  | ...  |
| 28       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  |
| 29       | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  |
| 30       | 30.0                                                                                                     | ...  | 30.0 | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | ...  | ...  | ...  | ...  | ...  |
| 31       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.8 | ...  | ...  | ...  | ...  | ...  |
| 32       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.8 | ...  | ...  | ...  | ...  | ...  |
| 33       | 17.1                                                                                                     | ...  | 17.1 | ...  | 17.1 | 17.1 | 17.1 | 17.1 | 17.1 | ...  | ...  | ...  | ...  | ...  |
| 34       | 14.6                                                                                                     | ...  | 14.6 | ...  | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | ...  | ...  | ...  | ...  | ...  |
| 35       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  |
| 36       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  |
| 37       | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  |
| 38       | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  |
| 39       | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  |
| 40       | 25.7                                                                                                     | ...  | 25.7 | ...  | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | 25.7 | ...  | ...  | ...  | ...  |
| 41       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.3 | 16.3 |
| 42       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.3 | 15.0 |
| 43       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 29.4 | ...  | ...  | ...  | ...  |
| 44       | 32.9                                                                                                     | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 | 32.8 | ...  | ...  | ...  | ...  | ...  |
| 45       | 17.1                                                                                                     | ...  | 16.5 | ...  | 15.7 | 15.3 | 15.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 8.2                                                                                                      | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 10.0                                                                                                     | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 11.0                                                                                                     | 6.9  | 4.6  | 2.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 9.2                                                                                                      | 5.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

(25)

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 1½Ni                | Forgings              | SA-350    | LF5        | K13050                | 2                        | ...                 |
| 2        | 1¾Ni-¾Cr-Mo         | Forgings              | SA-372    | L          | K24055                | ...                      | ...                 |
| 3        | 2Ni-1Cu             | Forgings              | SA-182    | FR         | K22035                | ...                      | ...                 |
| 4        | 2Ni-1Cu             | Fittings              | SA-234    | WPR        | K22035                | ...                      | ...                 |
| 5        | 2Ni-1Cu             | Pipe                  | SA-333    | 9          | K22035                | ...                      | ...                 |
| 6        | 2Ni-1Cu             | Smls. pipe            | SA-333    | 9          | K22035                | ...                      | ...                 |
| 7        | 2Ni-1Cu             | Wld. pipe             | SA-333    | 9          | K22035                | ...                      | ...                 |
| 8        | 2Ni-1Cu             | Tube                  | SA-334    | 9          | K22035                | ...                      | ...                 |
| 9        | 2Ni-1Cu             | Forgings              | SA-350    | LF9        | K22036                | ...                      | ...                 |
| 10       | 2Ni-1Cu             | Smls. & wld. fittings | SA-420    | WPL9       | K22035                | ...                      | ...                 |
| (25) 11  | 2Ni-1½Cr-¼Mo-V      | Forgings              | SA-372    | N          | K23550                | 100                      | ...                 |
| 12       | 2Ni-1½Cr-¼Mo-V      | Forgings              | SA-723    | 1          | K23550                | 1                        | ...                 |
| (25) 13  | 2Ni-1½Cr-¼Mo-V      | Forgings              | SA-372    | N          | K23550                | 120                      | ...                 |
| 14       | 2Ni-1½Cr-¼Mo-V      | Forgings              | SA-723    | 1          | K23550                | 2                        | ...                 |
| 15       | 2Ni-1½Cr-¼Mo-V      | Forgings              | SA-723    | 1          | K23550                | 3                        | ...                 |
| 16       | 2Ni-1½Cr-¼Mo-V      | Forgings              | SA-723    | 1          | K23550                | 4                        | ...                 |
| 17       | 2Ni-1½Cr-¼Mo-V      | Forgings              | SA-723    | 1          | K23550                | 5                        | ...                 |
| 18       | 2½Ni                | Pipe                  | SA-333    | 7          | K21903                | ...                      | ...                 |
| 19       | 2½Ni                | Wld. pipe             | SA-333    | 7          | K21903                | ...                      | ...                 |
| 20       | 2½Ni                | Tube                  | SA-334    | 7          | K21903                | ...                      | ...                 |
| 21       | 2½Ni                | Wld. tube             | SA-334    | 7          | K21903                | ...                      | ...                 |
| 22       | 2½Ni                | Plate                 | SA-203    | A          | K21703                | ...                      | ...                 |
| 23       | 2½Ni                | Plate                 | SA-203    | B          | K22103                | ...                      | ...                 |
| 24       | 2½Ni                | Castings              | SA-352    | LC2        | J22500                | ...                      | ...                 |
| 25       | 2¾Ni-1½Cr-½Mo       | Plate                 | SA-543    | C          | ...                   | 3                        | ...                 |
| 26       | 2¾Ni-1½Cr-½Mo       | Plate                 | SA-543    | C          | ...                   | 1                        | ...                 |
| 27       | 2¾Ni-1½Cr-½Mo       | Plate                 | SA-543    | C          | ...                   | 2                        | ...                 |
| (25) 28  | 2¾Ni-1½Cr-½Mo-V     | Forgings              | SA-372    | P          | K34035                | 100                      | ...                 |
| 29       | 2¾Ni-1½Cr-½Mo-V     | Forgings              | SA-723    | 2          | K34035                | 1                        | ...                 |
| (25) 30  | 2¾Ni-1½Cr-½Mo-V     | Forgings              | SA-372    | P          | K34035                | 120                      | ...                 |
| 31       | 2¾Ni-1½Cr-½Mo-V     | Forgings              | SA-723    | 2          | K34035                | 2                        | ...                 |
| 32       | 2¾Ni-1½Cr-½Mo-V     | Forgings              | SA-723    | 2          | K34035                | 3                        | ...                 |
| 33       | 2¾Ni-1½Cr-½Mo-V     | Forgings              | SA-723    | 2          | K34035                | 4                        | ...                 |
| 34       | 2¾Ni-1½Cr-½Mo-V     | Forgings              | SA-723    | 2          | K34035                | 5                        | ...                 |
| 35       | 3Ni-1¾Cr-½Mo        | Plate                 | SA-543    | B          | K42339                | 3                        | ...                 |
| 36       | 3Ni-1¾Cr-½Mo        | Forgings              | SA-372    | M          | K42365                | 85                       | ...                 |
| 37       | 3Ni-1¾Cr-½Mo        | Plate                 | SA-543    | B          | K42339                | 1                        | ...                 |
| 38       | 3Ni-1¾Cr-½Mo        | Plate                 | SA-543    | B          | K42339                | 2                        | ...                 |
| 39       | 3Ni-1¾Cr-½Mo        | Forgings              | SA-372    | M          | K42365                | 100                      | ...                 |
| 40       | 3½Ni                | Pipe                  | SA-333    | 3          | K31918                | ...                      | ...                 |
| 41       | 3½Ni                | Wld. pipe             | SA-333    | 3          | K31918                | ...                      | ...                 |
| 42       | 3½Ni                | Tube                  | SA-334    | 3          | K31918                | ...                      | ...                 |
| 43       | 3½Ni                | Wld. tube             | SA-334    | 3          | K31918                | ...                      | ...                 |
| 44       | 3½Ni                | Fittings              | SA-420    | WPL3       | ...                   | ...                      | ...                 |
| 45       | 3½Ni                | Plate                 | SA-203    | D          | K31718                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |           |        |     |                             |       |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----------|--------|-----|-----------------------------|-------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |           |        |     | External Pressure Chart No. | Notes |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |           |        |     |                             |       |
|                                    |       |           |                            |                          | I                                             | III       | VIII-1 | XII |                             |       |
| 1                                  | 9A    | 1         | 70                         | 37.5                     | NP                                            | NP        | 500    | 500 | CS-2                        | ...   |
| 2                                  | ...   | ...       | 155                        | 135                      | NP                                            | NP        | 650    | 650 | ...                         | W11   |
| 3                                  | 9A    | 1         | 63                         | 46                       | NP                                            | NP        | 100    | 100 | CS-3                        | ...   |
| 4                                  | 9A    | 1         | 63                         | 46                       | NP                                            | NP        | 100    | NP  | CS-3                        | ...   |
| 5                                  | 9A    | 1         | 63                         | 46                       | NP                                            | NP        | 100    | 100 | CS-3                        | ...   |
| 6                                  | 9A    | 1         | 63                         | 46                       | NP                                            | 100       | NP     | NP  | CS-3                        | ...   |
| 7                                  | 9A    | 1         | 63                         | 46                       | NP                                            | NP        | 100    | 100 | CS-3                        | G24   |
| 8                                  | 9A    | 1         | 63                         | 46                       | NP                                            | NP        | 100    | 100 | CS-3                        | ...   |
| 9                                  | 9A    | 1         | 63                         | 46                       | NP                                            | NP        | 100    | 100 | CS-3                        | ...   |
| 10                                 | 9A    | 1         | 63                         | 46                       | NP                                            | 100       | 100    | 100 | CS-3                        | W14   |
| 11                                 | ...   | ...       | 115                        | 100                      | NP                                            | NP        | 650    | NP  | HT-1                        | W1    |
| 12                                 | ...   | ...       | 115                        | 100                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 13                                 | ...   | ...       | 135                        | 120                      | NP                                            | NP        | 650    | NP  | HT-1                        | W1    |
| 14                                 | ...   | ...       | 135                        | 120                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 15                                 | ...   | ...       | 155                        | 140                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 16                                 | ...   | ...       | 175                        | 160                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 17                                 | ...   | ...       | 190                        | 180                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 18                                 | 9A    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | ...   |
| 19                                 | 9A    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | G24   |
| 20                                 | 9A    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | ...   |
| 21                                 | 9A    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | G24   |
| 22                                 | 9A    | 1         | 65                         | 37                       | NP                                            | 700       | 1000   | 650 | CS-2                        | T2    |
| 23                                 | 9A    | 1         | 70                         | 40                       | NP                                            | 650       | 1000   | 650 | CS-2                        | T2    |
| 24                                 | 9A    | 1         | 70                         | 40                       | NP                                            | 100       | 650    | 650 | CS-2                        | G1    |
| 25                                 | 3     | 3         | 90                         | 70                       | NP                                            | NP        | 650    | NP  | CS-5                        | ...   |
| 26                                 | 11A   | 5         | 105                        | 85                       | NP                                            | NP        | 650    | NP  | CS-5                        | ...   |
| 27                                 | 11B   | 10        | 115                        | 100                      | NP                                            | NP        | 650    | NP  | HT-1                        | ...   |
| 28                                 | ...   | ...       | 115                        | 100                      | NP                                            | NP        | 650    | NP  | HT-1                        | W1    |
| 29                                 | ...   | ...       | 115                        | 100                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 30                                 | ...   | ...       | 135                        | 120                      | NP                                            | NP        | 650    | NP  | HT-1                        | W1    |
| 31                                 | ...   | ...       | 135                        | 120                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 32                                 | ...   | ...       | 155                        | 140                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 33                                 | ...   | ...       | 175                        | 160                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 34                                 | ...   | ...       | 190                        | 180                      | NP                                            | 700 (SPT) | NP     | NP  | HT-1                        | W1    |
| 35                                 | 3     | 3         | 90                         | 70                       | NP                                            | NP        | 650    | NP  | CS-5                        | ...   |
| 36                                 | ...   | ...       | 105                        | 85                       | NP                                            | NP        | 650    | 650 | ...                         | W11   |
| 37                                 | 11A   | 5         | 105                        | 85                       | NP                                            | NP        | 650    | NP  | CS-5                        | ...   |
| 38                                 | 11B   | 10        | 115                        | 100                      | NP                                            | NP        | 650    | NP  | HT-1                        | ...   |
| 39                                 | ...   | ...       | 120                        | 100                      | NP                                            | NP        | 650    | 650 | ...                         | W11   |
| 40                                 | 9B    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | ...   |
| 41                                 | 9B    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | G24   |
| 42                                 | 9B    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | ...   |
| 43                                 | 9B    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | G24   |
| 44                                 | 9B    | 1         | 65                         | 35                       | NP                                            | NP        | 650    | 650 | CS-2                        | ...   |
| 45                                 | 9B    | 1         | 65                         | 37                       | NP                                            | 700       | 1000   | 650 | CS-2                        | T2    |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 20.0                                                                                                     | ...  | 19.2 | ...  | 18.3 | 17.8 | 17.8 | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 2        | 44.3                                                                                                     | ...  | 44.3 | ...  | 44.3 | 44.3 | 44.3 | 44.1 | 42.9 | ...  | ...  | ...  | ... | ... |
| 3        | 18.1                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 4        | 18.1                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 5        | 18.1                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 6        | 17.9                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 7        | 15.3                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 8        | 18.1                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 9        | 18.1                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 10       | 18.1                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 11       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.4 | ...  | ...  | ...  | ... | ... |
| 12       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.4 | 31.6 | ...  | ...  | ... | ... |
| 13       | 38.6                                                                                                     | ...  | 38.6 | ...  | 38.6 | 38.6 | 38.6 | 38.6 | 38.0 | ...  | ...  | ...  | ... | ... |
| 14       | 38.6                                                                                                     | ...  | 38.6 | ...  | 38.6 | 38.6 | 38.6 | 38.6 | 38.0 | 37.1 | ...  | ...  | ... | ... |
| 15       | 44.3                                                                                                     | ...  | 44.3 | ...  | 44.3 | 44.3 | 44.3 | 44.3 | 43.6 | 42.6 | ...  | ...  | ... | ... |
| 16       | 50.0                                                                                                     | ...  | 50.0 | ...  | 50.0 | 50.0 | 50.0 | 50.0 | 49.2 | 48.0 | ...  | ...  | ... | ... |
| 17       | 54.3                                                                                                     | ...  | 54.3 | ...  | 54.3 | 54.3 | 54.3 | 54.3 | 53.5 | 52.2 | ...  | ...  | ... | ... |
| 18       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.5 | 16.7 | ...  | ...  | ...  | ... | ... |
| 19       | 15.8                                                                                                     | ...  | 15.8 | ...  | 15.8 | 15.8 | 15.8 | 14.9 | 14.2 | ...  | ...  | ...  | ... | ... |
| 20       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.5 | 16.7 | ...  | ...  | ...  | ... | ... |
| 21       | 15.8                                                                                                     | 15.8 | 15.8 | ...  | 15.8 | 15.8 | 15.8 | 14.9 | 14.2 | ...  | ...  | ...  | ... | ... |
| 22       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.5 | 17.6 | 16.6 | 13.9 | 11.4 | 9.0 | 6.5 |
| 23       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.0 | 18.0 | 14.8 | 12.0 | 9.3 | 6.5 |
| 24       | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.0 | ...  | ...  | ...  | ... | ... |
| 25       | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.5 | 25.3 | 25.0 | 24.6 | ...  | ...  | ...  | ... | ... |
| 26       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 29.7 | 29.5 | 29.1 | 28.7 | ...  | ...  | ...  | ... | ... |
| 27       | 32.9                                                                                                     | ...  | 32.9 | 32.9 | 32.9 | 32.5 | 32.3 | 31.9 | 31.5 | ...  | ...  | ...  | ... | ... |
| 28       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.4 | ...  | ...  | ...  | ... | ... |
| 29       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.4 | 31.6 | ...  | ...  | ... | ... |
| 30       | 38.6                                                                                                     | ...  | 38.6 | ...  | 38.6 | 38.6 | 38.6 | 38.6 | 38.0 | ...  | ...  | ...  | ... | ... |
| 31       | 38.6                                                                                                     | ...  | 38.6 | ...  | 38.6 | 38.6 | 38.6 | 38.6 | 38.0 | 37.1 | ...  | ...  | ... | ... |
| 32       | 44.3                                                                                                     | ...  | 44.3 | ...  | 44.3 | 44.3 | 44.3 | 44.3 | 43.6 | 42.6 | ...  | ...  | ... | ... |
| 33       | 50.0                                                                                                     | ...  | 50.0 | ...  | 50.0 | 50.0 | 50.0 | 50.0 | 49.2 | 48.0 | ...  | ...  | ... | ... |
| 34       | 54.3                                                                                                     | ...  | 54.3 | ...  | 54.3 | 54.3 | 54.3 | 54.3 | 53.5 | 52.2 | ...  | ...  | ... | ... |
| 35       | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.5 | 25.3 | 25.0 | 24.6 | ...  | ...  | ...  | ... | ... |
| 36       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 29.7 | 29.5 | 29.1 | 28.7 | ...  | ...  | ...  | ... | ... |
| 37       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 29.7 | 29.5 | 29.1 | 28.7 | ...  | ...  | ...  | ... | ... |
| 38       | 32.9                                                                                                     | ...  | 32.9 | 32.9 | 32.9 | 32.5 | 32.3 | 31.9 | 31.5 | ...  | ...  | ...  | ... | ... |
| 39       | 34.3                                                                                                     | ...  | 34.3 | 34.3 | 34.3 | 33.9 | 33.7 | 33.3 | 32.9 | ...  | ...  | ...  | ... | ... |
| 40       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.5 | 16.7 | ...  | ...  | ...  | ... | ... |
| 41       | 15.8                                                                                                     | ...  | 15.8 | ...  | 15.8 | 15.8 | 15.8 | 14.9 | 14.2 | ...  | ...  | ...  | ... | ... |
| 42       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.5 | 16.7 | ...  | ...  | ...  | ... | ... |
| 43       | 15.8                                                                                                     | 15.8 | 15.8 | ...  | 15.8 | 15.8 | 15.8 | 14.9 | 14.2 | ...  | ...  | ...  | ... | ... |
| 44       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 17.5 | 16.7 | ...  | ...  | ...  | ... | ... |
| 45       | 18.6                                                                                                     | 18.6 | 18.6 | ...  | 18.6 | 18.6 | 18.6 | 18.5 | 17.6 | 16.6 | 13.9 | 11.4 | 9.0 | 6.5 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 4.5                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 4.5                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 4.5                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|---------------|------------|-----------------------|--------------------------|---------------------|
| 1        | 3½Ni                | Forgings              | SA-350        | LF3        | K32025                | 1                        | ...                 |
| 2        | 3½Ni                | Forgings              | SA-350        | LF3        | K32025                | 2                        | ...                 |
| 3        | 3½Ni                | Forgings              | SA-765        | III        | K32026                | ...                      | ...                 |
| 4        | 3½Ni                | Plate                 | SA-203        | E          | K32018                | ...                      | ...                 |
| 5        | 3½Ni                | Plate                 | SA-203        | E          | K32018                | ...                      | ...                 |
| 6        | 3½Ni                | Castings              | SA-352        | LC3        | J31550                | ...                      | ...                 |
| 7        | 3½Ni                | Plate                 | SA-203        | F          | ...                   | ...                      | >2                  |
| 8        | 3½Ni                | Plate                 | SA-203        | F          | ...                   | ...                      | ≤2                  |
| 9        | 3½Ni-1¾Cr-½Mo-V     | Forgings              | SA-508        | 4N         | K22375                | 3                        | ...                 |
| 10       | 3½Ni-1¾Cr-½Mo-V     | Forgings              | SA-508        | 4N         | K22375                | 1                        | ...                 |
| 11       | 3½Ni-1¾Cr-½Mo-V     | Forgings              | SA-508        | 4N         | K22375                | 2                        | ...                 |
| 12       | 4Ni-1½Cr-½Mo-V      | Forgings              | SA-723        | 3          | K44045                | 1                        | ...                 |
| 13       | 4Ni-1½Cr-½Mo-V      | Forgings              | SA-723        | 3          | K44045                | 2                        | ...                 |
| 14       | 4Ni-1½Cr-½Mo-V      | Forgings              | SA-723        | 3          | K44045                | 3                        | ...                 |
| 15       | 4Ni-1½Cr-½Mo-V      | Forgings              | SA-723        | 3          | K44045                | 4                        | ...                 |
| 16       | 4Ni-1½Cr-½Mo-V      | Forgings              | SA-723        | 3          | K44045                | 5                        | ...                 |
| 17       | 5Ni-¼Mo             | Plate                 | SA-645        | A          | K41583                | ...                      | ...                 |
| 18       | 7Ni                 | Plate                 | SA-553        | III        | K61365                | ...                      | ≤2                  |
| 19       | 7Ni                 | Plate                 | SA-553        | III        | K61365                | ...                      | ≤2                  |
| 20       | 8Ni                 | Forgings              | SA-522        | II         | K71340                | ...                      | ...                 |
| 21       | 8Ni                 | Plate                 | SA-553        | II         | K71340                | ...                      | ...                 |
| 22       | 8Ni                 | Plate                 | SA-553        | II         | K71340                | ...                      | ...                 |
| 23       | 9Ni                 | Plate                 | SA/EN 10028-4 | X8Ni9      | ...                   | NNT640                   | ≤2                  |
| 24       | 9Ni                 | Plate                 | SA/EN 10028-4 | X8Ni9      | ...                   | QT640                    | ≤2                  |
| 25       | 9Ni                 | Plate                 | SA/EN 10028-4 | X7Ni9      | ...                   | QT                       | ≤2                  |
| 26       | 9Ni                 | Plate                 | SA/EN 10028-4 | X7Ni9      | ...                   | QT                       | ≤2                  |
| 27       | 9Ni                 | Plate                 | SA/EN 10028-4 | X8Ni9      | ...                   | QT680                    | ≤2                  |
| 28       | 9Ni                 | Plate                 | SA/EN 10028-4 | X8Ni9      | ...                   | QT680                    | ≤2                  |
| 29       | 9Ni                 | Smls. & wld. pipe     | SA-333        | 8          | K81340                | ...                      | ...                 |
| 30       | 9Ni                 | Smls. & wld. pipe     | SA-333        | 8          | K81340                | ...                      | ...                 |
| 31       | 9Ni                 | Smls. pipe            | SA-333        | 8          | K81340                | ...                      | ...                 |
| 32       | 9Ni                 | Smls. pipe            | SA-333        | 8          | K81340                | ...                      | ...                 |
| 33       | 9Ni                 | Wld. pipe             | SA-333        | 8          | K81340                | ...                      | ...                 |
| 34       | 9Ni                 | Wld. tube             | SA-334        | 8          | K81340                | ...                      | ...                 |
| 35       | 9Ni                 | Smls. & wld. tube     | SA-334        | 8          | K81340                | ...                      | ...                 |
| 36       | 9Ni                 | Smls. tube            | SA-334        | 8          | K81340                | ...                      | ...                 |
| 37       | 9Ni                 | Smls. tube            | SA-334        | 8          | K81340                | ...                      | ...                 |
| 38       | 9Ni                 | Wld. tube             | SA-334        | 8          | K81340                | ...                      | ...                 |
| 39       | 9Ni                 | Plate                 | SA-353        | ...        | K81340                | ...                      | ...                 |
| 40       | 9Ni                 | Plate                 | SA-353        | ...        | K81340                | ...                      | ...                 |
| 41       | 9Ni                 | Plate                 | SA-353        | ...        | K81340                | ...                      | ...                 |
| 42       | 9Ni                 | Smls. & wld. fittings | SA-420        | WPL8       | K81340                | ...                      | ...                 |
| 43       | 9Ni                 | Smls. & wld. fittings | SA-420        | WPL8       | K81340                | ...                      | ...                 |
| 44       | 9Ni                 | Forgings              | SA-522        | I          | K81340                | ...                      | ...                 |
| 45       | 9Ni                 | Forgings              | SA-522        | I          | K81340                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits     |                  |        |     | External Pressure Chart No. | Notes        |
|----------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|------------------|--------|-----|-----------------------------|--------------|
|          |       |           |                            |                          | Limits                                        |                  |        |     |                             |              |
|          |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     |                             |              |
|          |       |           |                            |                          | I                                             | III              | VIII-1 | XII |                             |              |
| 1        | 9B    | 1         | 70                         | 37.5                     | NP                                            | 650              | 650    | 650 | CS-2                        | ...          |
| 2        | 9B    | 1         | 70                         | 37.5                     | NP                                            | 650              | 650    | 650 | CS-2                        | ...          |
| 3        | 9B    | 1         | 70                         | 37.5                     | NP                                            | NP               | 650    | 650 | CS-2                        | ...          |
| 4        | 9B    | 1         | 70                         | 40                       | NP                                            | 300 (SPT)        | NP     | NP  | CS-2                        | ...          |
| 5        | 9B    | 1         | 70                         | 40                       | NP                                            | 650              | 1000   | 650 | CS-2                        | T2           |
| 6        | 9B    | 1         | 70                         | 40                       | NP                                            | 100              | 650    | 650 | CS-2                        | G1           |
| 7        | 9B    | 1         | 75                         | 50                       | NP                                            | NP               | 650    | 650 | CS-3                        | ...          |
| 8        | 9B    | 1         | 80                         | 55                       | NP                                            | NP               | 650    | 650 | CS-3                        | ...          |
| 9        | 3     | 3         | 90                         | 70                       | NP                                            | NP               | 650    | 650 | CS-5                        | ...          |
| 10       | 11A   | 5         | 105                        | 85                       | NP                                            | 600 (SPT)        | 650    | NP  | CS-5                        | ...          |
| 11       | 11B   | 10        | 115                        | 100                      | NP                                            | NP               | 650    | NP  | HT-1                        | ...          |
| 12       | ...   | ...       | 115                        | 100                      | NP                                            | 700 (SPT)        | NP     | NP  | HT-1                        | W1           |
| 13       | ...   | ...       | 135                        | 120                      | NP                                            | 700 (SPT)        | NP     | NP  | HT-1                        | W1           |
| 14       | ...   | ...       | 155                        | 140                      | NP                                            | 700 (SPT)        | NP     | NP  | HT-1                        | W1           |
| 15       | ...   | ...       | 175                        | 160                      | NP                                            | 700 (SPT)        | NP     | NP  | HT-1                        | W1           |
| 16       | ...   | ...       | 190                        | 180                      | NP                                            | 700 (SPT)        | NP     | NP  | HT-1                        | W1           |
| 17       | 11A   | 2         | 95                         | 65                       | NP                                            | NP               | 250    | 250 | CS-3                        | ...          |
| 18       | 11A   | 1         | 100                        | 85                       | NP                                            | NP               | 150    | NP  | CS-3                        | G20, W4      |
| 19       | 11A   | 1         | 100                        | 85                       | NP                                            | NP               | 150    | NP  | CS-3                        | G20, W5      |
| 20       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | NP     | NP  | CS-3                        | G20, W5      |
| 21       | 11A   | 1         | 100                        | 85                       | NP                                            | 200 (Cl. 3 only) | 250    | 250 | CS-3                        | G20, W5      |
| 22       | 11A   | 1         | 100                        | 85                       | NP                                            | 200 (Cl. 3 only) | 250    | 250 | CS-3                        | G20, W4      |
| 23       | 11A   | 1         | 93                         | 69.5                     | NP                                            | NP               | 250    | 250 | CS-3                        | G20          |
| 24       | 11A   | 1         | 93                         | 69.5                     | NP                                            | NP               | 250    | 250 | CS-3                        | G20          |
| 25       | 11A   | 1         | 98.5                       | 83.5                     | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W4      |
| 26       | 11A   | 1         | 98.5                       | 83.5                     | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W5      |
| 27       | 11A   | 1         | 98.5                       | 83.5                     | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W4      |
| 28       | 11A   | 1         | 98.5                       | 83.5                     | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W5      |
| 29       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | NP     | NP  | CS-3                        | G20, W12     |
| 30       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | NP     | NP  | CS-3                        | G20, W5, W12 |
| 31       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W4      |
| 32       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W5      |
| 33       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, G24, W3 |
| 34       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | NP     | NP  | CS-3                        | G20, W12     |
| 35       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | NP     | NP  | CS-3                        | G20, W5, W12 |
| 36       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W4      |
| 37       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W5      |
| 38       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, G24, W3 |
| 39       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | 250    | 250 | CS-3                        | G20, W4      |
| 40       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W5      |
| 41       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | NP     | NP  | CS-3                        | G20, W5      |
| 42       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W4      |
| 43       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, W3      |
| 44       | 11A   | 1         | 100                        | 75                       | NP                                            | 200 (Cl. 3 only) | 250    | 250 | CS-3                        | G20, S8, W4  |
| 45       | 11A   | 1         | 100                        | 75                       | NP                                            | NP               | 250    | 250 | CS-3                        | G20, S8, W5  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 18.8 | 17.9 | ...  | ...  | ...  | ... | ... |
| 2        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 18.8 | 17.9 | ...  | ...  | ...  | ... | ... |
| 3        | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 18.8 | 17.9 | ...  | ...  | ...  | ... | ... |
| 4        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 5        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.0 | 18.0 | 14.8 | 12.0 | 9.3 | 6.5 |
| 6        | 20.0                                                                                                     | 20.0 | 20.0 | ...  | 20.0 | 20.0 | 20.0 | 20.0 | 19.0 | ...  | ...  | ...  | ... | ... |
| 7        | 21.4                                                                                                     | 21.4 | 21.4 | ...  | 21.4 | 21.4 | 21.4 | 21.4 | 20.5 | ...  | ...  | ...  | ... | ... |
| 8        | 22.9                                                                                                     | 22.9 | 22.9 | ...  | 22.9 | 22.9 | 22.9 | 22.9 | 20.5 | ...  | ...  | ...  | ... | ... |
| 9        | 25.7                                                                                                     | ...  | 25.7 | 25.7 | 25.7 | 25.5 | 25.3 | 25.0 | 24.6 | ...  | ...  | ...  | ... | ... |
| 10       | 30.0                                                                                                     | ...  | 30.0 | 30.0 | 30.0 | 29.7 | 29.5 | 29.1 | 28.7 | ...  | ...  | ...  | ... | ... |
| 11       | 32.9                                                                                                     | ...  | 32.9 | 32.9 | 32.9 | 32.5 | 32.3 | 31.9 | 31.5 | ...  | ...  | ...  | ... | ... |
| 12       | 32.9                                                                                                     | ...  | 32.9 | ...  | 32.9 | 32.9 | 32.9 | 32.9 | 32.4 | 31.6 | ...  | ...  | ... | ... |
| 13       | 38.6                                                                                                     | ...  | 38.6 | ...  | 38.6 | 38.6 | 38.6 | 38.6 | 38.0 | 37.1 | ...  | ...  | ... | ... |
| 14       | 44.3                                                                                                     | ...  | 44.3 | ...  | 44.3 | 44.3 | 44.3 | 44.3 | 43.6 | 42.6 | ...  | ...  | ... | ... |
| 15       | 50.0                                                                                                     | ...  | 50.0 | ...  | 50.0 | 50.0 | 50.0 | 50.0 | 49.2 | 48.0 | ...  | ...  | ... | ... |
| 16       | 54.3                                                                                                     | ...  | 54.3 | ...  | 54.3 | 54.3 | 54.3 | 54.3 | 53.5 | 52.2 | ...  | ...  | ... | ... |
| 17       | 27.1                                                                                                     | ...  | 27.1 | 26.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 18       | 28.6                                                                                                     | 28.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 19       | 27.1                                                                                                     | 27.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 20       | 27.1                                                                                                     | 27.1 | 25.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 21       | 27.1                                                                                                     | 27.1 | 25.4 | 24.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 22       | 28.6                                                                                                     | 28.6 | 26.7 | 25.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 23       | 26.5                                                                                                     | 26.5 | 26.5 | 26.5 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 24       | 26.5                                                                                                     | 26.5 | 26.5 | 26.5 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 25       | 28.2                                                                                                     | 28.2 | 28.2 | 28.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 26       | 27.1                                                                                                     | 27.1 | 27.1 | 27.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 27       | 28.2                                                                                                     | 28.2 | 28.2 | 28.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 28       | 27.1                                                                                                     | 27.1 | 27.1 | 27.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 29       | 28.6                                                                                                     | 28.6 | 26.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 30       | 27.1                                                                                                     | 27.1 | 25.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 31       | 28.6                                                                                                     | 28.6 | 26.7 | 25.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 32       | 27.1                                                                                                     | 27.1 | 25.4 | 24.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 33       | 24.3                                                                                                     | 24.3 | 22.7 | 22.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 34       | 28.6                                                                                                     | 28.6 | 26.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 35       | 27.1                                                                                                     | 27.1 | 25.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 36       | 28.6                                                                                                     | 28.6 | 26.7 | 25.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 37       | 27.1                                                                                                     | 27.1 | 25.4 | 24.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 38       | 24.3                                                                                                     | 24.3 | 22.7 | 22.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 39       | 28.6                                                                                                     | 28.6 | 26.7 | 25.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 40       | 27.1                                                                                                     | 27.1 | 25.4 | 24.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 41       | 27.1                                                                                                     | 27.1 | 25.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 42       | 28.6                                                                                                     | 28.6 | 26.7 | 25.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 43       | 27.1                                                                                                     | 27.1 | 25.4 | 24.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 44       | 28.6                                                                                                     | 28.6 | 26.7 | 25.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 45       | 27.1                                                                                                     | 27.1 | 25.4 | 24.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 4.5                                                                                                      | 2.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition  | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|----------------------|-----------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 9Ni                  | Plate                 | SA-553    | I          | K81340                | ...                      | ...                 |
| 2        | 9Ni                  | Plate                 | SA-553    | I          | K81340                | ...                      | ...                 |
| (25) 3   | 46Fe-24Ni-21Cr-6Mo-N | Smls. & wld. fittings | SA-403    | ...        | N08367                | ...                      | ...                 |
| (25) 4   | 46Fe-24Ni-21Cr-6Mo-N | Forgings              | SA-182    | F62        | N08367                | ...                      | ...                 |
| (25) 5   | 46Fe-24Ni-21Cr-6Mo-N | Forgings              | SA-182    | F62        | N08367                | ...                      | ...                 |
| (25) 6   | 46Fe-24Ni-21Cr-6Mo-N | Forgings              | SA-965    | F62        | N08367                | ...                      | ...                 |
| (25) 7   | 46Fe-24Ni-21Cr-6Mo-N | Forgings              | SA-965    | F62        | N08367                | ...                      | ...                 |
| (25) 8   | 46Fe-24Ni-21Cr-6Mo-N | Wld. pipe             | SA-312    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 9   | 46Fe-24Ni-21Cr-6Mo-N | Wld. pipe             | SA-312    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 10  | 46Fe-24Ni-21Cr-6Mo-N | Smls. pipe            | SA-312    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 11  | 46Fe-24Ni-21Cr-6Mo-N | Smls. pipe            | SA-312    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 12  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-688    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 13  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-688    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 14  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-249    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 15  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-249    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 16  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-688    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 17  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-688    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 18  | 46Fe-24Ni-21Cr-6Mo-N | Plate                 | SA-240    | ...        | N08367                | ...                      | $\geq^{3/16}$       |
| (25) 19  | 46Fe-24Ni-21Cr-6Mo-N | Plate                 | SA-240    | ...        | N08367                | ...                      | $\geq^{3/16}$       |
| (25) 20  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-213    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 21  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-213    | ...        | N08367                | ...                      | $>^{3/16}$          |
| (25) 22  | 46Fe-24Ni-21Cr-6Mo-N | Bar                   | SA-276    | ...        | N08367                | ...                      | ...                 |
| (25) 23  | 46Fe-24Ni-21Cr-6Mo-N | Bar                   | SA-276    | ...        | N08367                | ...                      | ...                 |
| (25) 24  | 46Fe-24Ni-21Cr-6Mo-N | Bar                   | SA-479    | ...        | N08367                | ...                      | ...                 |
| (25) 25  | 46Fe-24Ni-21Cr-6Mo-N | Bar                   | SA-479    | ...        | N08367                | ...                      | ...                 |
| (25) 26  | 46Fe-24Ni-21Cr-6Mo-N | Wld. pipe             | SA-312    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 27  | 46Fe-24Ni-21Cr-6Mo-N | Wld. pipe             | SA-312    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 28  | 46Fe-24Ni-21Cr-6Mo-N | Smls. pipe            | SA-312    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 29  | 46Fe-24Ni-21Cr-6Mo-N | Smls. pipe            | SA-312    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 30  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-688    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 31  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-688    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 32  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-249    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 33  | 46Fe-24Ni-21Cr-6Mo-N | Wld. tube             | SA-249    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 34  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-688    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 35  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-688    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 36  | 46Fe-24Ni-21Cr-6Mo-N | Sheet, strip          | SA-240    | ...        | N08367                | ...                      | $<^{3/16}$          |
| (25) 37  | 46Fe-24Ni-21Cr-6Mo-N | Sheet, strip          | SA-240    | ...        | N08367                | ...                      | $<^{3/16}$          |
| (25) 38  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-213    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 39  | 46Fe-24Ni-21Cr-6Mo-N | Smls. tube            | SA-213    | ...        | N08367                | ...                      | $\leq^{3/16}$       |
| (25) 40  | 25Ni-47Fe-21Cr-5Mo   | Forgings              | SA-182    | F700       | N08700                | ...                      | ...                 |
| (25) 41  | 25Ni-47Fe-21Cr-5Mo   | Plate, sheet, strip   | SA-240    | ...        | N08700                | ...                      | ...                 |
| (25) 42  | 25Ni-47Fe-21Cr-5Mo   | Bar                   | SA-276    | ...        | N08700                | ...                      | ...                 |
| (25) 43  | 25Ni-47Fe-21Cr-5Mo   | Wld. pipe             | SA-358    | ...        | N08700                | ...                      | ...                 |
| (25) 44  | 25Ni-47Fe-21Cr-5Mo   | Fittings              | SA-403    | 700        | N08700                | ...                      | ...                 |
| (25) 45  | 25Ni-47Fe-21Cr-5Mo   | Bar                   | SA-479    | ...        | N08700                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |                  |        |     |                             |              |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|------------------|--------|-----|-----------------------------|--------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |                  |        |     | External Pressure Chart No. | Notes        |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     |                             |              |
|                                    |       |           |                            |                          | I                                             | III              | VIII-1 | XII |                             |              |
| 1                                  | 11A   | 1         | 100                        | 85                       | NP                                            | 200 (Cl. 3 only) | 250    | 250 | CS-3                        | G20, W4      |
| 2                                  | 11A   | 1         | 100                        | 85                       | NP                                            | 200 (Cl. 3 only) | 250    | 250 | CS-3                        | G20, W5      |
| 3                                  | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | NP  | NFN-12                      | G5, W12, W14 |
| 4                                  | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 5                                  | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 6                                  | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 7                                  | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 8                                  | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G24          |
| 9                                  | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5, G24      |
| 10                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 11                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 12                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G24          |
| 13                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5, G24      |
| 14                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G24          |
| 15                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5, G24      |
| 16                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 17                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 18                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 19                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 20                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 21                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 22                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 23                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 24                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 25                                 | 45    | ...       | 95                         | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 26                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G24          |
| 27                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5, G24      |
| 28                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 29                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 30                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G24          |
| 31                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5, G24      |
| 32                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G24          |
| 33                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5, G24      |
| 34                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 35                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 36                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 37                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 38                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | ...          |
| 39                                 | 45    | ...       | 100                        | 45                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5           |
| 40                                 | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 650    | 650 | NFN-8                       | ...          |
| 41                                 | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 650    | 650 | NFN-8                       | ...          |
| 42                                 | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 650    | 650 | NFN-8                       | ...          |
| 43                                 | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 650    | 650 | NFN-8                       | W14          |
| 44                                 | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 650    | 650 | NFN-8                       | W14          |
| 45                                 | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 650    | 650 | NFN-8                       | ...          |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 28.6                                                                                                     | 28.6 | 26.7 | 25.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 2        | 27.1                                                                                                     | 27.1 | 25.4 | 24.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 3        | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 4        | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 5        | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 6        | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 7        | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 8        | 23.1                                                                                                     | ...  | 22.2 | ...  | 20.2 | 18.7 | 17.4 | 16.5 | 16.1 | 15.8 | 15.5 | 15.3 | ... | ... |
| 9        | 23.1                                                                                                     | ...  | 23.1 | ...  | 21.8 | 20.9 | 20.2 | 19.8 | 19.6 | 19.5 | 19.4 | 19.2 | ... | ... |
| 10       | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 11       | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 12       | 23.1                                                                                                     | ...  | 22.2 | ...  | 20.2 | 18.7 | 17.4 | 16.5 | 16.1 | 15.8 | 15.5 | 15.3 | ... | ... |
| 13       | 23.1                                                                                                     | ...  | 23.1 | ...  | 21.8 | 20.9 | 20.2 | 19.8 | 19.6 | 19.5 | 19.4 | 19.2 | ... | ... |
| 14       | 23.1                                                                                                     | ...  | 22.2 | ...  | 20.2 | 18.7 | 17.4 | 16.5 | 16.1 | 15.8 | 15.5 | 15.3 | ... | ... |
| 15       | 23.1                                                                                                     | ...  | 23.1 | ...  | 21.8 | 20.9 | 20.2 | 19.8 | 19.6 | 19.5 | 19.4 | 19.2 | ... | ... |
| 16       | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 17       | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 18       | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 19       | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 20       | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 21       | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 22       | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 23       | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 24       | 27.1                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 25       | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.7 | 24.6 | 23.8 | 23.3 | 23.1 | 22.9 | 22.8 | 22.6 | ... | ... |
| 26       | 24.3                                                                                                     | ...  | 22.2 | ...  | 20.2 | 18.7 | 17.4 | 16.5 | 16.1 | 15.8 | 15.5 | 15.3 | ... | ... |
| 27       | 24.3                                                                                                     | ...  | 24.3 | ...  | 23.0 | 22.0 | 21.3 | 20.8 | 20.7 | 20.5 | 20.4 | 20.2 | ... | ... |
| 28       | 28.6                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 29       | 28.6                                                                                                     | ...  | 28.6 | ...  | 27.0 | 25.8 | 25.0 | 24.5 | 24.3 | 24.1 | 24.0 | 23.8 | ... | ... |
| 30       | 24.3                                                                                                     | ...  | 22.2 | ...  | 20.2 | 18.7 | 17.4 | 16.5 | 16.1 | 15.8 | 15.5 | 15.3 | ... | ... |
| 31       | 24.3                                                                                                     | ...  | 24.3 | ...  | 23.0 | 22.0 | 21.3 | 20.8 | 20.7 | 20.5 | 20.4 | 20.2 | ... | ... |
| 32       | 24.3                                                                                                     | ...  | 22.2 | ...  | 20.2 | 18.7 | 17.4 | 16.5 | 16.1 | 15.8 | 15.5 | 15.3 | ... | ... |
| 33       | 24.3                                                                                                     | ...  | 24.3 | ...  | 23.0 | 22.0 | 21.3 | 20.8 | 20.7 | 20.5 | 20.4 | 20.2 | ... | ... |
| 34       | 28.6                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 35       | 28.6                                                                                                     | ...  | 28.6 | ...  | 27.0 | 25.8 | 25.0 | 24.5 | 24.3 | 24.1 | 24.0 | 23.8 | ... | ... |
| 36       | 28.6                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 37       | 28.6                                                                                                     | ...  | 28.6 | ...  | 27.0 | 25.8 | 25.0 | 24.5 | 24.3 | 24.1 | 24.0 | 23.8 | ... | ... |
| 38       | 28.6                                                                                                     | ...  | 26.2 | ...  | 23.8 | 21.9 | 20.5 | 19.4 | 19.0 | 18.6 | 18.3 | 18.0 | ... | ... |
| 39       | 28.6                                                                                                     | ...  | 28.6 | ...  | 27.0 | 25.8 | 25.0 | 24.5 | 24.3 | 24.1 | 24.0 | 23.8 | ... | ... |
| 40       | 22.9                                                                                                     | ...  | 21.0 | ...  | 19.0 | 17.7 | 17.1 | 16.5 | 15.8 | ...  | ...  | ...  | ... | ... |
| 41       | 22.9                                                                                                     | ...  | 21.0 | ...  | 19.0 | 17.7 | 17.1 | 16.5 | 15.8 | ...  | ...  | ...  | ... | ... |
| 42       | 22.9                                                                                                     | ...  | 21.0 | ...  | 19.0 | 17.7 | 17.1 | 16.5 | 15.8 | ...  | ...  | ...  | ... | ... |
| 43       | 22.9                                                                                                     | ...  | 21.0 | ...  | 19.0 | 17.7 | 17.1 | 16.5 | 15.8 | ...  | ...  | ...  | ... | ... |
| 44       | 22.9                                                                                                     | ...  | 21.0 | ...  | 19.0 | 17.7 | 17.1 | 16.5 | 15.8 | ...  | ...  | ...  | ... | ... |
| 45       | 22.9                                                                                                     | ...  | 21.0 | ...  | 19.0 | 17.7 | 17.1 | 16.5 | 15.8 | ...  | ...  | ...  | ... | ... |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition   | Product Form        | Spec. No. | Type/Grade    | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|-----------------------|---------------------|-----------|---------------|-----------------------|--------------------------|---------------------|
| (25) 1   | 25Ni-47Fe-21Cr-5Mo    | Forgings            | SA-965    | F700          | N08700                | ...                      | ...                 |
| 2        | 25Ni-15Cr-2Ti         | Forgings, bar       | SA-638    | 660           | S66286                | ...                      | ...                 |
| (25) 3   | 25Ni-20Cr-6Mo-Cu-N    | Plate, sheet, strip | SA-240    | ...           | N08925                | ...                      | ...                 |
| (25) 4   | 25Ni-20Cr-6Mo-Cu-N    | Plate, sheet, strip | SA-240    | ...           | N08925                | ...                      | ...                 |
| (25) 5   | 25Ni-20Cr-6Mo-Cu-N    | Bar                 | SA-276    | ...           | N08925                | ...                      | ...                 |
| (25) 6   | 25Ni-20Cr-6Mo-Cu-N    | Bar                 | SA-276    | ...           | N08925                | ...                      | ...                 |
| (25) 7   | 25Ni-20Cr-6Mo-Cu-N    | Bar                 | SA-479    | ...           | N08925                | ...                      | ...                 |
| (25) 8   | 25Ni-20Cr-6Mo-Cu-N    | Bar                 | SA-479    | ...           | N08925                | ...                      | ...                 |
| (25) 9   | 25Ni-20Cr-6Mo-Cu-N    | Wld. pipe           | SA-312    | ...           | N08925                | ...                      | ...                 |
| (25) 10  | 25Ni-20Cr-6Mo-Cu-N    | Wld. pipe           | SA-312    | ...           | N08925                | ...                      | ...                 |
| (25) 11  | 25Ni-20Cr-6Mo-Cu-N    | Smls. pipe          | SA-312    | ...           | N08925                | ...                      | ...                 |
| (25) 12  | 25Ni-20Cr-6Mo-Cu-N    | Smls. pipe          | SA-312    | ...           | N08925                | ...                      | ...                 |
| (25) 13  | 25Ni-20Cr-6Mo-Cu-N    | Smls. tube          | SA-213    | ...           | N08925                | ...                      | ...                 |
| (25) 14  | 25Ni-20Cr-6Mo-Cu-N    | Smls. tube          | SA-213    | ...           | N08925                | ...                      | ...                 |
| (25) 15  | 44Fe-25Ni-21Cr-Mo     | Forgings            | SA-182    | F904L         | N08904                | ...                      | ...                 |
| (25) 16  | 44Fe-25Ni-21Cr-Mo     | Smls. tube          | SA-213    | ...           | N08904                | ...                      | ...                 |
| (25) 17  | 44Fe-25Ni-21Cr-Mo     | Plate, sheet, strip | SA-240    | 904L          | N08904                | ...                      | ...                 |
| (25) 18  | 44Fe-25Ni-21Cr-Mo     | Wld. tube           | SA-249    | ...           | N08904                | ...                      | ...                 |
| (25) 19  | 44Fe-25Ni-21Cr-Mo     | Smls. pipe          | SA-312    | ...           | N08904                | ...                      | ...                 |
| (25) 20  | 44Fe-25Ni-21Cr-Mo     | Wld. pipe           | SA-312    | ...           | N08904                | ...                      | ...                 |
| (25) 21  | 44Fe-25Ni-21Cr-Mo     | Fittings            | SA-403    | WP904L/CR904L | N08904                | ...                      | ...                 |
| (25) 22  | 44Fe-25Ni-21Cr-Mo     | Bar                 | SA-479    | 904L          | N08904                | ...                      | ...                 |
| 23       | 27Ni-22Cr-7Mo-Mn-Cu-N | Smls. tube          | SA-213    | ...           | S31277                | ...                      | ...                 |
| 24       | 27Ni-22Cr-7Mo-Mn-Cu-N | Smls. tube          | SA-213    | ...           | S31277                | ...                      | ...                 |
| 25       | 27Ni-22Cr-7Mo-Mn-Cu-N | Plate               | SA-240    | ...           | S31277                | ...                      | ...                 |
| 26       | 27Ni-22Cr-7Mo-Mn-Cu-N | Plate               | SA-240    | ...           | S31277                | ...                      | ...                 |
| (25) 27  | 27Ni-22Cr-7Mo-Mn-Cu-N | Wld. tube           | SA-249    | ...           | S31277                | ...                      | ...                 |
| 28       | 27Ni-22Cr-7Mo-Mn-Cu-N | Wld. tube           | SA-249    | ...           | S31277                | ...                      | ...                 |
| 29       | 29Ni-20Cr-3Cu-2Mo     | Castings            | SA-351    | CN7M          | J95150                | ...                      | ...                 |
| 30       | 29Ni-20Cr-3Cu-2Mo     | Castings            | SA-351    | CN7M          | J95150                | ...                      | ...                 |
| (25) 31  | 35Ni-35Fe-20Cr-Cb     | Forgings            | SA-182    | F20           | N08020                | ...                      | ...                 |
| (25) 32  | 35Ni-35Fe-20Cr-Cb     | Forgings            | SA-182    | F20           | N08020                | ...                      | ...                 |
| (25) 33  | 35Ni-35Fe-20Cr-Cb     | Forgings            | SA-965    | F20           | N08020                | ...                      | ...                 |
| (25) 34  | 35Ni-35Fe-20Cr-Cb     | Forgings            | SA-965    | F20           | N08020                | ...                      | ...                 |
| (25) 35  | 35Ni-35Fe-20Cr-Cb     | Plate               | SA-240    | ...           | N08020                | ...                      | ...                 |
| (25) 36  | 35Ni-35Fe-20Cr-Cb     | Plate               | SA-240    | ...           | N08020                | ...                      | ...                 |
| (25) 37  | 35Ni-35Fe-20Cr-Cb     | Bar                 | SA-276    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 38  | 35Ni-35Fe-20Cr-Cb     | Bar                 | SA-276    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 39  | 35Ni-35Fe-20Cr-Cb     | Bar                 | SA-479    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 40  | 35Ni-35Fe-20Cr-Cb     | Bar                 | SA-479    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 41  | 35Ni-35Fe-20Cr-Cb     | Smls. pipe          | SA-312    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 42  | 35Ni-35Fe-20Cr-Cb     | Smls. pipe          | SA-312    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 43  | 35Ni-35Fe-20Cr-Cb     | Wld. pipe           | SA-312    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 44  | 35Ni-35Fe-20Cr-Cb     | Wld. pipe           | SA-312    | Alloy 20      | N08020                | ...                      | ...                 |
| (25) 45  | 35Ni-35Fe-20Cr-Cb     | Wld. pipe           | SA-312    | Alloy 20      | N08020                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                                               |                  |        |     |                             |         |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|------------------|--------|-----|-----------------------------|---------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | (NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes   |
|                                           |       |           |                            |                          | I                                             | III              | VIII-1 | XII |                             |         |
| 1                                         | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 650    | 650 | NFN-8                       | ...     |
| 2                                         | ...   | ...       | 130                        | 85                       | NP                                            | 700              | 700    | NP  | HA-5                        | W1      |
| 3                                         | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 4                                         | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5      |
| 5                                         | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 6                                         | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5      |
| 7                                         | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 8                                         | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5      |
| 9                                         | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G24     |
| 10                                        | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5, G24 |
| 11                                        | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 12                                        | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5      |
| 13                                        | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 14                                        | 45    | ...       | 87                         | 43                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5      |
| 15                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | W14     |
| 16                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | ...     |
| 17                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | ...     |
| 18                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | G24     |
| 19                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | ...     |
| 20                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | G24     |
| 21                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | W14     |
| 22                                        | 45    | ...       | 71                         | 31                       | NP                                            | 700              | 700    | 650 | NFN-9                       | ...     |
| 23                                        | 45    | ...       | 112                        | 52                       | NP                                            | NP               | 800    | NP  | NFN-26                      | G5      |
| 24                                        | 45    | ...       | 112                        | 52                       | NP                                            | NP               | 800    | NP  | NFN-26                      | ...     |
| 25                                        | 45    | ...       | 112                        | 52                       | NP                                            | NP               | 800    | NP  | NFN-26                      | G5      |
| 26                                        | 45    | ...       | 112                        | 52                       | NP                                            | NP               | 800    | NP  | NFN-26                      | ...     |
| 27                                        | 45    | ...       | 112                        | 52                       | NP                                            | NP               | 800    | NP  | NFN-26                      | G5, G24 |
| 28                                        | 45    | ...       | 112                        | 52                       | NP                                            | NP               | 800    | NP  | NFN-26                      | ...     |
| 29                                        | 45    | ...       | 62                         | 25                       | 600                                           | 600 (Cl. 3 only) | 600    | NP  | NFN-9                       | G1, G5  |
| 30                                        | 45    | ...       | 62                         | 25                       | 600                                           | NP               | 600    | NP  | NFN-9                       | G1      |
| 31                                        | 45    | ...       | 80                         | 35                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5      |
| 32                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 33                                        | 45    | ...       | 80                         | 35                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5      |
| 34                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 35                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 36                                        | 45    | ...       | 80                         | 35                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5      |
| 37                                        | 45    | ...       | 80                         | 35                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5      |
| 38                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 39                                        | 45    | ...       | 80                         | 35                       | NP                                            | 800              | 800    | 650 | NFN-12                      | G5      |
| 40                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 41                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | ...     |
| 42                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5      |
| 43                                        | 45    | ...       | 80                         | 35                       | NP                                            | 800              | NP     | NP  | NFN-12                      | G5, W12 |
| 44                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G24     |
| 45                                        | 45    | ...       | 80                         | 35                       | NP                                            | NP               | 800    | 650 | NFN-12                      | G5, G24 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 22.9                                                                                                     | ...  | 21.0 | ...  | 19.0 | 17.7 | 17.1 | 16.5 | 15.8 | ...  | ...  | ...  | ... | ... |
| 2        | 37.1                                                                                                     | ...  | 37.1 | ...  | 37.1 | 37.1 | 36.5 | 35.8 | 35.4 | 35.0 | ...  | ...  | ... | ... |
| 3        | 24.9                                                                                                     | ...  | 23.2 | ...  | 21.3 | 19.8 | 18.3 | 17.3 | 17.0 | 16.9 | 16.9 | 16.9 | ... | ... |
| 4        | 24.9                                                                                                     | ...  | 24.9 | ...  | 23.9 | 23.0 | 22.1 | 21.4 | 21.1 | 20.8 | 20.4 | 20.1 | ... | ... |
| 5        | 24.9                                                                                                     | ...  | 23.2 | ...  | 21.3 | 19.8 | 18.3 | 17.3 | 17.0 | 16.9 | 16.9 | 16.9 | ... | ... |
| 6        | 24.9                                                                                                     | ...  | 24.9 | ...  | 23.9 | 23.0 | 22.1 | 21.4 | 21.1 | 20.8 | 20.4 | 20.1 | ... | ... |
| 7        | 24.9                                                                                                     | ...  | 23.2 | ...  | 21.3 | 19.8 | 18.3 | 17.3 | 17.0 | 16.9 | 16.9 | 16.9 | ... | ... |
| 8        | 24.9                                                                                                     | ...  | 24.9 | ...  | 23.9 | 23.0 | 22.1 | 21.4 | 21.1 | 20.8 | 20.4 | 20.1 | ... | ... |
| 9        | 21.1                                                                                                     | ...  | 19.7 | ...  | 18.1 | 16.8 | 15.6 | 14.7 | 14.4 | 14.4 | 14.4 | 14.4 | ... | ... |
| 10       | 21.1                                                                                                     | ...  | 21.1 | ...  | 20.4 | 19.5 | 18.8 | 18.2 | 17.9 | 17.7 | 17.4 | 17.0 | ... | ... |
| 11       | 24.9                                                                                                     | ...  | 23.2 | ...  | 21.3 | 19.8 | 18.3 | 17.3 | 17.0 | 16.9 | 16.9 | 16.9 | ... | ... |
| 12       | 24.9                                                                                                     | ...  | 24.9 | ...  | 23.9 | 23.0 | 22.1 | 21.4 | 21.1 | 20.8 | 20.4 | 20.1 | ... | ... |
| 13       | 24.9                                                                                                     | ...  | 23.2 | ...  | 21.3 | 19.8 | 18.3 | 17.3 | 17.0 | 16.9 | 16.9 | 16.9 | ... | ... |
| 14       | 24.9                                                                                                     | ...  | 24.9 | ...  | 23.9 | 23.0 | 22.1 | 21.4 | 21.1 | 20.8 | 20.4 | 20.1 | ... | ... |
| 15       | 20.3                                                                                                     | ...  | 16.7 | ...  | 15.1 | 13.8 | 12.7 | 11.9 | 11.6 | 11.4 | ...  | ...  | ... | ... |
| 16       | 20.3                                                                                                     | ...  | 16.7 | ...  | 15.1 | 13.8 | 12.7 | 11.9 | 11.6 | 11.4 | ...  | ...  | ... | ... |
| 17       | 20.3                                                                                                     | ...  | 16.7 | ...  | 15.1 | 13.8 | 12.7 | 11.9 | 11.6 | 11.4 | ...  | ...  | ... | ... |
| 18       | 17.2                                                                                                     | ...  | 14.2 | ...  | 12.9 | 11.8 | 10.8 | 10.1 | 9.9  | 9.7  | ...  | ...  | ... | ... |
| 19       | 20.3                                                                                                     | ...  | 16.7 | ...  | 15.1 | 13.8 | 12.7 | 11.9 | 11.6 | 11.4 | ...  | ...  | ... | ... |
| 20       | 17.2                                                                                                     | ...  | 14.2 | ...  | 12.9 | 11.8 | 10.8 | 10.1 | 9.9  | 9.7  | ...  | ...  | ... | ... |
| 21       | 20.3                                                                                                     | ...  | 16.7 | ...  | 15.1 | 13.8 | 12.7 | 11.9 | 11.6 | 11.4 | ...  | ...  | ... | ... |
| 22       | 20.3                                                                                                     | ...  | 16.7 | ...  | 15.1 | 13.8 | 12.7 | 11.9 | 11.6 | 11.4 | ...  | ...  | ... | ... |
| 23       | 32.0                                                                                                     | 32.0 | 32.0 | 31.5 | 30.7 | 29.4 | 28.4 | 27.5 | 27.1 | 26.8 | 26.5 | 26.3 | ... | ... |
| 24       | 32.0                                                                                                     | 32.0 | 32.0 | 30.4 | 28.8 | 26.5 | 25.5 | 25.4 | 25.4 | 25.3 | 25.1 | 24.9 | ... | ... |
| 25       | 32.0                                                                                                     | 32.0 | 32.0 | 31.5 | 30.7 | 29.4 | 28.4 | 27.5 | 27.1 | 26.8 | 26.5 | 26.3 | ... | ... |
| 26       | 32.0                                                                                                     | 32.0 | 32.0 | 30.4 | 28.8 | 26.5 | 25.5 | 25.4 | 25.4 | 25.3 | 25.1 | 24.9 | ... | ... |
| 27       | 27.2                                                                                                     | 27.2 | 27.2 | 26.8 | 26.1 | 24.9 | 24.1 | 23.4 | 23.1 | 22.7 | 22.5 | 22.3 | ... | ... |
| 28       | 27.2                                                                                                     | 27.2 | 27.2 | 25.8 | 24.5 | 22.5 | 21.7 | 21.6 | 21.6 | 21.5 | 21.3 | 21.2 | ... | ... |
| 29       | 16.7                                                                                                     | ...  | 16.0 | ...  | 13.6 | 12.8 | 12.1 | 11.6 | ...  | ...  | ...  | ...  | ... | ... |
| 30       | 16.7                                                                                                     | ...  | 14.4 | ...  | 12.9 | 11.8 | 10.8 | 10.0 | ...  | ...  | ...  | ...  | ... | ... |
| 31       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |
| 32       | 22.9                                                                                                     | ...  | 20.6 | ...  | 19.7 | 18.9 | 18.2 | 17.7 | 17.5 | 17.4 | 17.2 | 16.8 | ... | ... |
| 33       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |
| 34       | 22.9                                                                                                     | ...  | 20.6 | ...  | 19.7 | 18.9 | 18.2 | 17.7 | 17.5 | 17.4 | 17.2 | 16.8 | ... | ... |
| 35       | 22.9                                                                                                     | ...  | 20.6 | ...  | 19.7 | 18.9 | 18.2 | 17.7 | 17.5 | 17.4 | 17.2 | 16.8 | ... | ... |
| 36       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |
| 37       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |
| 38       | 22.9                                                                                                     | ...  | 20.6 | ...  | 19.7 | 18.9 | 18.2 | 17.7 | 17.5 | 17.4 | 17.2 | 16.8 | ... | ... |
| 39       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |
| 40       | 22.9                                                                                                     | ...  | 20.6 | ...  | 19.7 | 18.9 | 18.2 | 17.7 | 17.5 | 17.4 | 17.2 | 16.8 | ... | ... |
| 41       | 22.9                                                                                                     | ...  | 20.6 | ...  | 19.7 | 18.9 | 18.2 | 17.7 | 17.5 | 17.4 | 17.2 | 16.8 | ... | ... |
| 42       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |
| 43       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |
| 44       | 19.4                                                                                                     | ...  | 17.5 | ...  | 16.7 | 16.1 | 15.5 | 15.0 | 14.9 | 14.8 | 14.6 | 14.3 | ... | ... |
| 45       | 22.9                                                                                                     | ...  | 22.9 | ...  | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ... | ... |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| (25) 1   | 35Ni-35Fe-20Cr-Cb   | Smls. tube            | SA-213    | Alloy 20   | N08020                | ...                      | ...                 |
| (25) 2   | 35Ni-35Fe-20Cr-Cb   | Smls. tube            | SA-213    | Alloy 20   | N08020                | ...                      | ...                 |
| (25) 3   | 35Ni-35Fe-20Cr-Cb   | Wld. tube             | SA-249    | Alloy 20   | N08020                | ...                      | ...                 |
| (25) 4   | 35Ni-35Fe-20Cr-Cb   | Wld. tube             | SA-249    | Alloy 20   | N08020                | ...                      | ...                 |
| (25) 5   | 35Ni-35Fe-20Cr-Cb   | Wld. tube             | SA-249    | Alloy 20   | N08020                | ...                      | ...                 |
| (25) 6   | 35Ni-35Fe-20Cr-Cb   | Smls. & wld. fittings | SA-403    | ...        | N08020                | ...                      | ...                 |
| (25) 7   | 42Fe-33Ni-21Cr      | Forgings              | SA-182    | FNIC10     | N08810                | ...                      | ...                 |
| (25) 8   | 42Fe-33Ni-21Cr      | Forgings              | SA-182    | FNIC10     | N08810                | ...                      | ...                 |
| (25) 9   | 42Fe-33Ni-21Cr      | Smls. tube            | SA-213    | 800H       | N08810                | ...                      | ...                 |
| (25) 10  | 42Fe-33Ni-21Cr      | Smls. tube            | SA-213    | 800H       | N08810                | ...                      | ...                 |
| (25) 11  | 42Fe-33Ni-21Cr      | Plate                 | SA-240    | 800H       | N08810                | ...                      | ...                 |
| (25) 12  | 42Fe-33Ni-21Cr      | Plate                 | SA-240    | 800H       | N08810                | ...                      | ...                 |
| (25) 13  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-249    | 800H       | N08810                | ...                      | ...                 |
| (25) 14  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-249    | 800H       | N08810                | ...                      | ...                 |
| (25) 15  | 42Fe-33Ni-21Cr      | Bar                   | SA-276    | 800H       | N08810                | ...                      | ...                 |
| (25) 16  | 42Fe-33Ni-21Cr      | Bar                   | SA-276    | 800H       | N08810                | ...                      | ...                 |
| (25) 17  | 42Fe-33Ni-21Cr      | Smls. & wld. pipe     | SA-312    | 800H       | N08810                | ...                      | ...                 |
| (25) 18  | 42Fe-33Ni-21Cr      | Smls. & wld. pipe     | SA-312    | 800H       | N08810                | ...                      | ...                 |
| (25) 19  | 42Fe-33Ni-21Cr      | Wld. pipe             | SA-358    | 800H       | N08810                | ...                      | ...                 |
| (25) 20  | 42Fe-33Ni-21Cr      | Wld. pipe             | SA-358    | 800H       | N08810                | ...                      | ...                 |
| (25) 21  | 42Fe-33Ni-21Cr      | Bar                   | SA-479    | 800H       | N08810                | ...                      | ...                 |
| (25) 22  | 42Fe-33Ni-21Cr      | Bar                   | SA-479    | 800H       | N08810                | ...                      | ...                 |
| (25) 23  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-688    | 800H       | N08810                | ...                      | ...                 |
| (25) 24  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-688    | 800H       | N08810                | ...                      | ...                 |
| (25) 25  | 42Fe-33Ni-21Cr      | Forgings              | SA-965    | FNIC10     | N08810                | ...                      | ...                 |
| (25) 26  | 42Fe-33Ni-21Cr      | Forgings              | SA-965    | FNIC10     | N08810                | ...                      | ...                 |
| (25) 27  | 42Fe-33Ni-21Cr      | Forgings              | SA-182    | FNIC11     | N08811                | ...                      | ...                 |
| (25) 28  | 42Fe-33Ni-21Cr      | Forgings              | SA-182    | FNIC11     | N08811                | ...                      | ...                 |
| (25) 29  | 42Fe-33Ni-21Cr      | Smls. tube            | SA-213    | ...        | N08811                | ...                      | ...                 |
| (25) 30  | 42Fe-33Ni-21Cr      | Smls. tube            | SA-213    | ...        | N08811                | ...                      | ...                 |
| (25) 31  | 42Fe-33Ni-21Cr      | Plate                 | SA-240    | ...        | N08811                | ...                      | ...                 |
| (25) 32  | 42Fe-33Ni-21Cr      | Plate                 | SA-240    | ...        | N08811                | ...                      | ...                 |
| (25) 33  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-249    | ...        | N08811                | ...                      | ...                 |
| (25) 34  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-249    | ...        | N08811                | ...                      | ...                 |
| (25) 35  | 42Fe-33Ni-21Cr      | Bar                   | SA-276    | ...        | N08811                | ...                      | ...                 |
| (25) 36  | 42Fe-33Ni-21Cr      | Bar                   | SA-276    | ...        | N08811                | ...                      | ...                 |
| (25) 37  | 42Fe-33Ni-21Cr      | Smls. pipe            | SA-312    | ...        | N08811                | ...                      | ...                 |
| (25) 38  | 42Fe-33Ni-21Cr      | Smls. pipe            | SA-312    | ...        | N08811                | ...                      | ...                 |
| (25) 39  | 42Fe-33Ni-21Cr      | Bar                   | SA-479    | ...        | N08811                | ...                      | ...                 |
| (25) 40  | 42Fe-33Ni-21Cr      | Bar                   | SA-479    | ...        | N08811                | ...                      | ...                 |
| (25) 41  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-688    | ...        | N08811                | ...                      | ...                 |
| (25) 42  | 42Fe-33Ni-21Cr      | Wld. tube             | SA-688    | ...        | N08811                | ...                      | ...                 |
| (25) 43  | 42Fe-33Ni-21Cr      | Forgings              | SA-965    | FNIC11     | N08811                | ...                      | ...                 |
| (25) 44  | 42Fe-33Ni-21Cr      | Forgings              | SA-965    | FNIC11     | N08811                | ...                      | ...                 |
| (25) 45  | 14Cr-16Ni-6Si-Cu-Mo | Smls. tube            | SA-213    | ...        | S38815                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                     |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|---------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes               |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                     |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                     |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                     |
| 1                                  | 45    | ...       | 80                         | 35                       | NP                    | NP  | 800    | 650 | NFN-12                      | ...                 |
| 2                                  | 45    | ...       | 80                         | 35                       | NP                    | NP  | 800    | 650 | NFN-12                      | G5                  |
| 3                                  | 45    | ...       | 80                         | 35                       | NP                    | 800 | NP     | NP  | NFN-12                      | G5, W12             |
| 4                                  | 45    | ...       | 80                         | 35                       | NP                    | NP  | 800    | 650 | NFN-12                      | G24                 |
| 5                                  | 45    | ...       | 80                         | 35                       | NP                    | NP  | 800    | 650 | NFN-12                      | G5, G24             |
| 6                                  | 45    | ...       | 85                         | 40                       | NP                    | 800 | 800    | 650 | NFN-12                      | G5, W12, W14        |
| 7                                  | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T9              |
| 8                                  | 45    | ...       | 65                         | 25                       | 1500                  | 800 | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 9                                  | 45    | ...       | 65                         | 25                       | NP                    | NP  | 1650   | NP  | NFN-9                       | G6, T9              |
| 10                                 | 45    | ...       | 65                         | 25                       | NP                    | 800 | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 11                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T9              |
| 12                                 | 45    | ...       | 65                         | 25                       | 1500                  | 800 | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 13                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, G24, T9         |
| 14                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, G24, T8     |
| 15                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T9              |
| 16                                 | 45    | ...       | 65                         | 25                       | 1500                  | 800 | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 17                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T9, W5, W12     |
| 18                                 | 45    | ...       | 65                         | 25                       | 1500                  | 800 | 1650   | NP  | NFN-9                       | G5, G6, T8, W5, W12 |
| 19                                 | 45    | ...       | 65                         | 25                       | NP                    | NP  | 1650   | NP  | NFN-9                       | G6, G24, T9         |
| 20                                 | 45    | ...       | 65                         | 25                       | NP                    | NP  | 1650   | NP  | NFN-9                       | G5, G6, G24, T8     |
| 21                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T9              |
| 22                                 | 45    | ...       | 65                         | 25                       | 1500                  | 800 | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 23                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, G24, T9         |
| 24                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, G24, T8     |
| 25                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T9              |
| 26                                 | 45    | ...       | 65                         | 25                       | 1500                  | 800 | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 27                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T12             |
| 28                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 29                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T12             |
| 30                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 31                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T12             |
| 32                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 33                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, G24, T12        |
| 34                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, G24, T9     |
| 35                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T12             |
| 36                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 37                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T12             |
| 38                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 39                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T12             |
| 40                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 41                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, G24, T12        |
| 42                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, G24, T9     |
| 43                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G6, T12             |
| 44                                 | 45    | ...       | 65                         | 25                       | 1500                  | NP  | 1650   | NP  | NFN-9                       | G5, G6, T8          |
| 45                                 | 8     | 1         | 78                         | 37                       | NP                    | NP  | 800    | NP  | HA-2                        | G5                  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 22.9                                                                                                     | ... | 20.6 | ... | 19.7 | 18.9 | 18.2 | 17.7 | 17.5 | 17.4 | 17.2 | 16.8 | ...  | ...  |
| 2        | 22.9                                                                                                     | ... | 22.9 | ... | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ...  | ...  |
| 3        | 22.9                                                                                                     | ... | 22.9 | ... | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ...  | ...  |
| 4        | 19.4                                                                                                     | ... | 17.5 | ... | 16.7 | 16.1 | 15.5 | 15.0 | 14.9 | 14.8 | 14.6 | 14.3 | ...  | ...  |
| 5        | 19.4                                                                                                     | ... | 19.4 | ... | 19.2 | 18.8 | 18.8 | 18.8 | 18.7 | 18.6 | 18.5 | 18.5 | ...  | ...  |
| 6        | 22.9                                                                                                     | ... | 22.9 | ... | 22.6 | 22.2 | 22.1 | 22.1 | 22.0 | 21.9 | 21.8 | 21.8 | ...  | ...  |
| 7        | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 8        | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 9        | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 10       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 11       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 12       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 13       | 14.2                                                                                                     | ... | 13.1 | ... | 12.3 | 11.6 | 10.9 | 10.4 | 10.1 | 9.9  | 9.7  | 9.5  | 9.3  | 9.1  |
| 14       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 14.2 | 14.2 | 14.0 | 13.7 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 |
| 15       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 16       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 17       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 18       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 19       | 14.2                                                                                                     | ... | 13.1 | ... | 12.3 | 11.6 | 10.9 | 10.4 | 10.1 | 9.9  | 9.7  | 9.5  | 9.3  | 9.1  |
| 20       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 14.2 | 14.2 | 14.0 | 13.7 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 |
| 21       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 22       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 23       | 14.2                                                                                                     | ... | 13.1 | ... | 12.3 | 11.6 | 10.9 | 10.4 | 10.1 | 9.9  | 9.7  | 9.5  | 9.3  | 9.1  |
| 24       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 14.2 | 14.2 | 14.0 | 13.7 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 |
| 25       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 26       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 27       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 28       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 29       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 30       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 31       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 32       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 33       | 14.2                                                                                                     | ... | 13.1 | ... | 12.3 | 11.6 | 10.9 | 10.4 | 10.1 | 9.9  | 9.7  | 9.5  | 9.3  | 9.1  |
| 34       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 14.2 | 14.2 | 14.0 | 13.7 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 |
| 35       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 36       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 37       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 38       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 39       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 40       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 41       | 14.2                                                                                                     | ... | 13.1 | ... | 12.3 | 11.6 | 10.9 | 10.4 | 10.1 | 9.9  | 9.7  | 9.5  | 9.3  | 9.1  |
| 42       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 14.2 | 14.2 | 14.0 | 13.7 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 |
| 43       | 16.7                                                                                                     | ... | 15.4 | ... | 14.4 | 13.6 | 12.9 | 12.2 | 11.9 | 11.6 | 11.4 | 11.1 | 10.9 | 10.7 |
| 44       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.5 | 16.1 | 15.7 | 15.3 | 15.0 | 14.7 | 14.5 |
| 45       | 22.3                                                                                                     | ... | 22.3 | ... | 22.2 | 21.5 | 21.0 | 20.7 | 20.6 | 20.6 | 20.6 | 20.5 | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |           |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650      |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...       |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...       |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...       |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...       |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...       |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...       |
| 7        | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 8        | 14.2                                                                                                     | 14.0 | 13.8 | 11.6 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 9        | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 10       | 14.2                                                                                                     | 14.0 | 13.8 | 11.6 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 11       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 12       | 14.2                                                                                                     | 14.0 | 13.8 | 11.6 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 13       | 9.0                                                                                                      | 8.8  | 8.7  | 8.5  | 7.9  | 6.3  | 5.0  | 4.0  | 3.2  | 2.6  | 2.0  | 1.6  | 1.2  | 0.94 | 0.73 (25) |
| 14       | 12.1                                                                                                     | 11.9 | 11.7 | 9.9  | 7.9  | 6.3  | 5.0  | 4.0  | 3.2  | 2.6  | 2.0  | 1.6  | 1.2  | 0.94 | 0.73 (25) |
| 15       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 16       | 14.2                                                                                                     | 14.0 | 13.8 | 11.6 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 17       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 18       | 14.2                                                                                                     | 14.0 | 13.8 | 11.6 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 19       | 9.0                                                                                                      | 8.8  | 8.7  | 8.5  | 7.9  | 6.3  | 5.0  | 4.0  | 3.2  | 2.6  | 2.0  | 1.6  | 1.2  | 0.94 | 0.73 (25) |
| 20       | 12.1                                                                                                     | 11.9 | 11.7 | 9.9  | 7.9  | 6.3  | 5.0  | 4.0  | 3.2  | 2.6  | 2.0  | 1.6  | 1.2  | 0.94 | 0.73 (25) |
| 21       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 22       | 14.2                                                                                                     | 14.0 | 13.8 | 11.6 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 23       | 9.0                                                                                                      | 8.8  | 8.7  | 8.5  | 7.9  | 6.3  | 5.0  | 4.0  | 3.2  | 2.6  | 2.0  | 1.6  | 1.2  | 0.94 | 0.73 (25) |
| 24       | 12.1                                                                                                     | 11.9 | 11.7 | 9.9  | 7.9  | 6.3  | 5.0  | 4.0  | 3.2  | 2.6  | 2.0  | 1.6  | 1.2  | 0.94 | 0.73 (25) |
| 25       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 26       | 14.2                                                                                                     | 14.0 | 13.8 | 11.6 | 9.3  | 7.4  | 5.9  | 4.7  | 3.8  | 3.0  | 2.4  | 1.9  | 1.4  | 1.1  | 0.86 (25) |
| 27       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.8  | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 28       | 14.2                                                                                                     | 14.0 | 13.8 | 12.9 | 10.4 | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 29       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.8  | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 30       | 14.2                                                                                                     | 14.0 | 13.8 | 12.9 | 10.4 | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 31       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.8  | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 32       | 14.2                                                                                                     | 14.0 | 13.8 | 12.9 | 10.4 | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 33       | 9.0                                                                                                      | 8.8  | 8.7  | 8.5  | 8.3  | 7.1  | 5.7  | 4.6  | 3.7  | 2.9  | 2.3  | 1.9  | 1.3  | 1.0  | 0.77 (25) |
| 34       | 12.1                                                                                                     | 11.9 | 11.7 | 11.5 | 8.8  | 7.1  | 5.7  | 4.6  | 3.7  | 2.9  | 2.3  | 1.9  | 1.3  | 1.0  | 0.77 (25) |
| 35       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.8  | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 36       | 14.2                                                                                                     | 14.0 | 13.8 | 12.9 | 10.4 | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 37       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.8  | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 38       | 14.2                                                                                                     | 14.0 | 13.8 | 12.9 | 10.4 | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 39       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.8  | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 40       | 14.2                                                                                                     | 14.0 | 13.8 | 12.9 | 10.4 | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 41       | 9.0                                                                                                      | 8.8  | 8.7  | 8.5  | 8.3  | 7.1  | 5.7  | 4.6  | 3.7  | 2.9  | 2.3  | 1.9  | 1.3  | 1.0  | 0.77 (25) |
| 42       | 12.1                                                                                                     | 11.9 | 11.7 | 11.5 | 8.8  | 7.1  | 5.7  | 4.6  | 3.7  | 2.9  | 2.3  | 1.9  | 1.3  | 1.0  | 0.77 (25) |
| 43       | 10.5                                                                                                     | 10.4 | 10.2 | 10.0 | 9.8  | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 44       | 14.2                                                                                                     | 14.0 | 13.8 | 12.9 | 10.4 | 8.3  | 6.7  | 5.4  | 4.3  | 3.4  | 2.7  | 2.2  | 1.6  | 1.2  | 0.91 (25) |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...       |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.    | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|--------------|------------|-----------------------|--------------------------|---------------------|
| 1        | 14Cr-16Ni-6Si-Cu-Mo | Smls. tube            | SA-213       | ...        | S38815                | ...                      | ...                 |
| 2        | 14Cr-16Ni-6Si-Cu-Mo | Plate                 | SA-240       | ...        | S38815                | ...                      | ...                 |
| 3        | 14Cr-16Ni-6Si-Cu-Mo | Plate                 | SA-240       | ...        | S38815                | ...                      | ...                 |
| 4        | 14Cr-16Ni-6Si-Cu-Mo | Wld. tube             | SA-249       | ...        | S38815                | ...                      | ...                 |
| 5        | 14Cr-16Ni-6Si-Cu-Mo | Wld. tube             | SA-249       | ...        | S38815                | ...                      | ...                 |
| 6        | 14Cr-16Ni-6Si-Cu-Mo | Wld. pipe             | SA-312       | ...        | S38815                | ...                      | ...                 |
| 7        | 14Cr-16Ni-6Si-Cu-Mo | Wld. pipe             | SA-312       | ...        | S38815                | ...                      | ...                 |
| 8        | 14Cr-16Ni-6Si-Cu-Mo | Smls. & wld. fittings | SA-403       | ...        | S38815                | ...                      | ...                 |
| 9        | 14Cr-16Ni-6Si-Cu-Mo | Smls. & wld. fittings | SA-403       | ...        | S38815                | ...                      | ...                 |
| 10       | 14Cr-16Ni-6Si-Cu-Mo | Bar                   | SA-479       | ...        | S38815                | ...                      | ...                 |
| 11       | 14Cr-16Ni-6Si-Cu-Mo | Bar                   | SA-479       | ...        | S38815                | ...                      | ...                 |
| 12       | 16Cr-4Ni-6Mn        | Plate                 | SA-240       | 201LN      | S20153                | ...                      | ...                 |
| 13       | 16Cr-4Ni-6Mn        | Plate                 | SA-240       | 201LN      | S20153                | ...                      | ...                 |
| 14       | 16Cr-9Mn-2Ni-N      | Plate                 | SA-240       | 204        | S20400                | ...                      | ...                 |
| 15       | 16Cr-9Mn-2Ni-N      | Plate                 | SA-240       | 204        | S20400                | ...                      | ...                 |
| 16       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316L      | S31603                | ...                      | >5                  |
| 17       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316L      | S31603                | ...                      | >5                  |
| 18       | 16Cr-12Ni-2Mo       | Forgings              | SA-965       | F316L      | S31603                | ...                      | ...                 |
| 19       | 16Cr-12Ni-2Mo       | Forgings              | SA-965       | F316L      | S31603                | ...                      | ...                 |
| 20       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316L      | S31603                | ...                      | ≤5                  |
| 21       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316L      | S31603                | ...                      | ≤5                  |
| 22       | 16Cr-12Ni-2Mo       | Smls. tube            | SA-213       | TP316L     | S31603                | ...                      | ...                 |
| 23       | 16Cr-12Ni-2Mo       | Smls. tube            | SA-213       | TP316L     | S31603                | ...                      | ...                 |
| 24       | 16Cr-12Ni-2Mo       | Plate                 | SA-240       | 316L       | S31603                | ...                      | ...                 |
| 25       | 16Cr-12Ni-2Mo       | Plate                 | SA-240       | 316L       | S31603                | ...                      | ...                 |
| 26       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316L     | S31603                | ...                      | ...                 |
| 27       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316L     | S31603                | ...                      | ...                 |
| 28       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316L     | S31603                | ...                      | ...                 |
| 29       | 16Cr-12Ni-2Mo       | Smls. & wld. pipe     | SA-312       | TP316L     | S31603                | ...                      | ...                 |
| 30       | 16Cr-12Ni-2Mo       | Smls. pipe            | SA-312       | TP316L     | S31603                | ...                      | ...                 |
| 31       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-312       | TP316L     | S31603                | ...                      | ...                 |
| 32       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-312       | TP316L     | S31603                | ...                      | ...                 |
| 33       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-358       | 316L       | S31603                | 1                        | ...                 |
| 34       | 16Cr-12Ni-2Mo       | Smls. & wld. fittings | SA-403       | 316L       | S31603                | ...                      | ...                 |
| 35       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-409       | TP316L     | S31603                | ...                      | ...                 |
| 36       | 16Cr-12Ni-2Mo       | Bar                   | SA-479       | 316L       | S31603                | ...                      | ...                 |
| 37       | 16Cr-12Ni-2Mo       | Bar                   | SA-479       | 316L       | S31603                | ...                      | ...                 |
| 38       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-688       | TP316L     | S31603                | ...                      | ...                 |
| 39       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-688       | TP316L     | S31603                | ...                      | ...                 |
| 40       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-688       | TP316L     | S31603                | ...                      | ...                 |
| 41       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-813       | TP316L     | S31603                | ...                      | ...                 |
| 42       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-814       | TP316L     | S31603                | ...                      | ...                 |
| 43       | 16Cr-12Ni-2Mo       | Bar                   | SA/JIS G4303 | SUS316L    | ...                   | ...                      | ...                 |
| 44       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316       | S31600                | ...                      | >5                  |
| 45       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316       | S31600                | ...                      | >5                  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |     |        |     |                             |                        |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes                  |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |                        |
|                                    |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                        |
| 1                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | ...                    |
| 2                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | G5                     |
| 3                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | ...                    |
| 4                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | G5                     |
| 5                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | ...                    |
| 6                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | G5                     |
| 7                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | ...                    |
| 8                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | G5, W14                |
| 9                                  | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | W14                    |
| 10                                 | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | G5                     |
| 11                                 | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 800    | NP  | HA-2                        | ...                    |
| 12                                 | 8     | 3         | 95                         | 45                       | NP                                            | NP  | 800    | 650 | HA-6                        | G5                     |
| 13                                 | 8     | 3         | 95                         | 45                       | NP                                            | NP  | 800    | 650 | HA-6                        | ...                    |
| 14                                 | 8     | 3         | 95                         | 48                       | NP                                            | NP  | 900    | 650 | HA-6                        | G5                     |
| 15                                 | 8     | 3         | 95                         | 48                       | NP                                            | NP  | 900    | 650 | HA-6                        | ...                    |
| 16                                 | 8     | 1         | 65                         | 25                       | 850                                           | 800 | 1200   | 650 | HA-4                        | G5, T12                |
| 17                                 | 8     | 1         | 65                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, T12               |
| 18                                 | 8     | 1         | 65                         | 25                       | 850                                           | 800 | 1200   | 650 | HA-4                        | G5, T12                |
| 19                                 | 8     | 1         | 65                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, T12               |
| 20                                 | 8     | 1         | 70                         | 25                       | 850                                           | 800 | 1200   | 650 | HA-4                        | G5, T12                |
| 21                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, T12               |
| 22                                 | 8     | 1         | 70                         | 25                       | 850                                           | 800 | 1200   | NP  | HA-4                        | G5, T12                |
| 23                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | NP  | HA-4                        | G21, T12               |
| 24                                 | 8     | 1         | 70                         | 25                       | 850                                           | 800 | 1200   | 650 | HA-4                        | G5, T12                |
| 25                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, T12               |
| 26                                 | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-4                        | G5, W12                |
| 27                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G5, G21, G24, T12      |
| 28                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, G24, T12          |
| 29                                 | 8     | 1         | 70                         | 25                       | 850                                           | 800 | 1200   | 650 | HA-4                        | G5, G21, T12, W12, W14 |
| 30                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, T12               |
| 31                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G5, G21, G24, T12      |
| 32                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, G24, T12          |
| 33                                 | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-4                        | G5                     |
| 34                                 | 8     | 1         | 70                         | 25                       | NP                                            | 800 | 1200   | 650 | HA-4                        | G5, T12, W12, W14      |
| 35                                 | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-4                        | G5                     |
| 36                                 | 8     | 1         | 70                         | 25                       | 850                                           | 800 | 1200   | 650 | HA-4                        | G5, G21, G22, T12      |
| 37                                 | 8     | 1         | 70                         | 25                       | 850                                           | NP  | 1200   | 650 | HA-4                        | G21, G22, T12          |
| 38                                 | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-4                        | G5, W12                |
| 39                                 | 8     | 1         | 70                         | 25                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5, G24                |
| 40                                 | 8     | 1         | 70                         | 25                       | NP                                            | NP  | 850    | 650 | HA-4                        | G24                    |
| 41                                 | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-4                        | G5, W12                |
| 42                                 | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-4                        | G5, W12                |
| 43                                 | 8     | 1         | 70                         | 25                       | 850                                           | 800 | 850    | NP  | HA-4                        | G5, G21, G22           |
| 44                                 | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T8            |
| 45                                 | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T9                |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 22.3                                                                                                     | ... | 20.8 | ... | 18.5 | 17.1 | 16.3 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | ...  | ...  |
| 2        | 22.3                                                                                                     | ... | 22.3 | ... | 22.2 | 21.5 | 21.0 | 20.7 | 20.6 | 20.6 | 20.6 | 20.5 | ...  | ...  |
| 3        | 22.3                                                                                                     | ... | 20.8 | ... | 18.5 | 17.1 | 16.3 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | ...  | ...  |
| 4        | 18.9                                                                                                     | ... | 18.9 | ... | 18.9 | 18.3 | 17.8 | 17.6 | 17.5 | 17.5 | 17.5 | 17.5 | ...  | ...  |
| 5        | 18.9                                                                                                     | ... | 17.7 | ... | 15.7 | 14.5 | 13.8 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | ...  | ...  |
| 6        | 18.9                                                                                                     | ... | 18.9 | ... | 18.9 | 18.3 | 17.8 | 17.6 | 17.5 | 17.5 | 17.5 | 17.5 | ...  | ...  |
| 7        | 18.9                                                                                                     | ... | 17.7 | ... | 15.7 | 14.5 | 13.8 | 13.6 | 13.6 | 13.6 | 13.6 | 13.6 | ...  | ...  |
| 8        | 22.3                                                                                                     | ... | 22.3 | ... | 22.2 | 21.5 | 21.0 | 20.7 | 20.6 | 20.6 | 20.6 | 20.5 | ...  | ...  |
| 9        | 22.3                                                                                                     | ... | 20.8 | ... | 18.5 | 17.1 | 16.3 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | ...  | ...  |
| 10       | 22.3                                                                                                     | ... | 22.3 | ... | 22.2 | 21.5 | 21.0 | 20.7 | 20.6 | 20.6 | 20.6 | 20.5 | ...  | ...  |
| 11       | 22.3                                                                                                     | ... | 20.8 | ... | 18.5 | 17.1 | 16.3 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | ...  | ...  |
| 12       | 27.1                                                                                                     | ... | 23.7 | ... | 21.2 | 20.1 | 20.0 | 19.6 | 19.6 | 19.4 | 19.2 | 18.8 | ...  | ...  |
| 13       | 27.1                                                                                                     | ... | 23.7 | ... | 21.2 | 20.1 | 19.7 | 19.2 | 18.6 | 18.0 | 17.4 | 16.7 | ...  | ...  |
| 14       | 27.1                                                                                                     | ... | 23.6 | ... | 20.6 | 18.9 | 18.1 | 17.9 | 17.9 | 17.9 | 17.8 | 17.7 | 17.4 | 16.9 |
| 15       | 27.1                                                                                                     | ... | 23.6 | ... | 20.3 | 17.9 | 16.5 | 15.8 | 15.6 | 15.5 | 15.3 | 15.1 | 14.8 | 14.3 |
| 16       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 17       | 16.7                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 18       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 19       | 16.7                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 20       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 21       | 16.7                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 22       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 23       | 16.7                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 24       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 25       | 16.7                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 26       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  | ...  |
| 27       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 13.4 | 12.5 | 11.9 | 11.7 | 11.4 | 11.2 | 11.0 | 10.8 | 10.5 |
| 28       | 14.2                                                                                                     | ... | 12.1 | ... | 10.8 | 9.9  | 9.3  | 8.8  | 8.7  | 8.5  | 8.3  | 8.1  | 8.0  | 7.8  |
| 29       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 30       | 16.7                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 31       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 13.4 | 12.5 | 11.9 | 11.7 | 11.4 | 11.2 | 11.0 | 10.8 | 10.5 |
| 32       | 14.2                                                                                                     | ... | 12.1 | ... | 10.8 | 9.9  | 9.3  | 8.8  | 8.7  | 8.5  | 8.3  | 8.1  | 8.0  | 7.8  |
| 33       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  | ...  |
| 34       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 35       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  | ...  |
| 36       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | 12.4 |
| 37       | 16.7                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 38       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  | ...  |
| 39       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 13.4 | 12.5 | 11.9 | 11.7 | 11.4 | 11.2 | 11.0 | 10.8 | ...  |
| 40       | 14.2                                                                                                     | ... | 12.1 | ... | 10.8 | 9.9  | 9.3  | 8.8  | 8.7  | 8.5  | 8.3  | 8.1  | 8.0  | ...  |
| 41       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  | ...  |
| 42       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  | ...  |
| 43       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | ...  |
| 44       | 20.0                                                                                                     | ... | 20.0 | ... | 19.4 | 19.2 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 45       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 9.0                                                                                                      | 8.8  | 8.6  | 8.4  | 8.3  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 9.0                                                                                                      | 8.8  | 8.6  | 8.4  | 8.3  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 9.0                                                                                                      | 8.8  | 8.6  | 8.4  | 8.3  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 9.0                                                                                                      | 8.8  | 8.6  | 8.4  | 8.3  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 9.0                                                                                                      | 8.8  | 8.6  | 8.4  | 8.3  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 10.3                                                                                                     | 10.1 | 9.9  | 9.7  | 7.5  | 5.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 7.7                                                                                                      | 7.5  | 7.3  | 7.1  | 7.1  | 5.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 9.0                                                                                                      | 8.8  | 8.6  | 8.4  | 8.3  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 10.3                                                                                                     | 10.1 | 9.9  | 9.7  | 7.5  | 5.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 7.7                                                                                                      | 7.5  | 7.3  | 7.1  | 7.1  | 5.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 12.1                                                                                                     | 11.9 | 11.6 | 11.4 | 8.8  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 9.0                                                                                                      | 8.8  | 8.6  | 8.4  | 8.3  | 6.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 45       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.    | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|--------------|------------|-----------------------|--------------------------|---------------------|
| 1        | 16Cr-12Ni-2Mo       | Forgings              | SA-965       | F316       | S31600                | ...                      | ...                 |
| 2        | 16Cr-12Ni-2Mo       | Forgings              | SA-965       | F316       | S31600                | ...                      | ...                 |
| 3        | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316H      | S31609                | ...                      | >5                  |
| 4        | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316H      | S31609                | ...                      | >5                  |
| 5        | 16Cr-12Ni-2Mo       | Forgings              | SA-965       | F316H      | S31609                | ...                      | ...                 |
| 6        | 16Cr-12Ni-2Mo       | Forgings              | SA-965       | F316H      | S31609                | ...                      | ...                 |
| 7        | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316       | S31600                | ...                      | ≤5                  |
| 8        | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316       | S31600                | ...                      | ≤5                  |
| 9        | 16Cr-12Ni-2Mo       | Smls. tube            | SA-213       | TP316      | S31600                | ...                      | ...                 |
| 10       | 16Cr-12Ni-2Mo       | Smls. tube            | SA-213       | TP316      | S31600                | ...                      | ...                 |
| 11       | 16Cr-12Ni-2Mo       | Plate                 | SA-240       | 316        | S31600                | ...                      | ...                 |
| 12       | 16Cr-12Ni-2Mo       | Plate                 | SA-240       | 316        | S31600                | ...                      | ...                 |
| 13       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316      | S31600                | ...                      | ...                 |
| 14       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316      | S31600                | ...                      | ...                 |
| (25) 15  | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316      | S31600                | ...                      | ...                 |
| (25) 16  | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316      | S31600                | ...                      | ...                 |
| 17       | 16Cr-12Ni-2Mo       | Smls. & wld. pipe     | SA-312       | TP316      | S31600                | ...                      | ...                 |
| 18       | 16Cr-12Ni-2Mo       | Smls. & wld. pipe     | SA-312       | TP316      | S31600                | ...                      | ...                 |
| (25) 19  | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-312       | TP316      | S31600                | ...                      | ...                 |
| (25) 20  | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-312       | TP316      | S31600                | ...                      | ...                 |
| 21       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-358       | 316        | S31600                | 1                        | ...                 |
| (25) 22  | 16Cr-12Ni-2Mo       | Smls. pipe            | SA-376       | TP316      | S31600                | ...                      | ...                 |
| (25) 23  | 16Cr-12Ni-2Mo       | Smls. pipe            | SA-376       | TP316      | S31600                | ...                      | ...                 |
| 24       | 16Cr-12Ni-2Mo       | Smls. & wld. fittings | SA-403       | 316        | S31600                | ...                      | ...                 |
| 25       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-409       | TP316      | S31600                | ...                      | ...                 |
| (25) 26  | 16Cr-12Ni-2Mo       | Bar                   | SA-479       | 316        | S31600                | ...                      | ...                 |
| (25) 27  | 16Cr-12Ni-2Mo       | Bar                   | SA-479       | 316        | S31600                | ...                      | ...                 |
| 28       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-688       | TP316      | S31600                | ...                      | ...                 |
| 29       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-688       | TP316      | S31600                | ...                      | ...                 |
| 30       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-688       | TP316      | S31600                | ...                      | ...                 |
| 31       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-813       | TP316      | S31600                | ...                      | ...                 |
| 32       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-814       | TP316      | S31600                | ...                      | ...                 |
| (25) 33  | 16Cr-12Ni-2Mo       | Bar                   | SA/JIS G4303 | SUS316     | ...                   | ...                      | ...                 |
| 34       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316H      | S31609                | ...                      | ≤5                  |
| 35       | 16Cr-12Ni-2Mo       | Forgings              | SA-182       | F316H      | S31609                | ...                      | ≤5                  |
| 36       | 16Cr-12Ni-2Mo       | Smls. tube            | SA-213       | TP316H     | S31609                | ...                      | ...                 |
| 37       | 16Cr-12Ni-2Mo       | Smls. tube            | SA-213       | TP316H     | S31609                | ...                      | ...                 |
| 38       | 16Cr-12Ni-2Mo       | Plate                 | SA-240       | 316H       | S31609                | ...                      | ...                 |
| 39       | 16Cr-12Ni-2Mo       | Plate                 | SA-240       | 316H       | S31609                | ...                      | ...                 |
| (25) 40  | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316H     | S31609                | ...                      | ...                 |
| (25) 41  | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316H     | S31609                | ...                      | ...                 |
| 42       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316H     | S31609                | ...                      | ...                 |
| 43       | 16Cr-12Ni-2Mo       | Wld. tube             | SA-249       | TP316H     | S31609                | ...                      | ...                 |
| 44       | 16Cr-12Ni-2Mo       | Smls. & wld. pipe     | SA-312       | TP316H     | S31609                | ...                      | ...                 |
| 45       | 16Cr-12Ni-2Mo       | Smls. & wld. pipe     | SA-312       | TP316H     | S31609                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                            |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|----------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                      |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                            |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                            |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                            |
| 1                                  | 8     | 1         | 70                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-2                        | G5, G12, T8                |
| 2                                  | 8     | 1         | 70                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, T9                    |
| 3                                  | 8     | 1         | 70                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, G12, T8                |
| 4                                  | 8     | 1         | 70                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T9                         |
| 5                                  | 8     | 1         | 70                         | 30                       | NP                    | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 6                                  | 8     | 1         | 70                         | 30                       | NP                    | NP  | 1500   | NP  | HA-2                        | T9                         |
| 7                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, G12, T8                |
| 8                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G12, T9                    |
| 9                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, G12, T8                |
| 10                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G12, T9                    |
| 11                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-2                        | G5, G12, T8                |
| 12                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, T9                    |
| 13                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | NP     | NP  | HA-2                        | G12, T9, W13               |
| 14                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | NP     | NP  | HA-2                        | G5, G12, T8, W12, W13      |
| 15                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T7           |
| 16                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, G24, T9               |
| 17                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-2                        | G5, G12, T8, W12, W13, W14 |
| 18                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, T9, W13, W14          |
| 19                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T7           |
| 20                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, G24, T9               |
| 21                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 22                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-2                        | G5, G12, T8, W12           |
| 23                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, T9                    |
| 24                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 1500   | 650 | HA-2                        | G5, G12, T8, W12, W14      |
| 25                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 26                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-2                        | G5, G12, G22, T8           |
| 27                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, G22, T9               |
| 28                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 29                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T7           |
| 30                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G24, T9               |
| 31                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 32                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 33                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, G12, G22, T8           |
| 34                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 35                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T9                         |
| 36                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 37                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T9                         |
| 38                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 39                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T9                         |
| 40                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G5, G24, T7                |
| 41                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G24, T9                    |
| 42                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | NP     | NP  | HA-2                        | T9, W13                    |
| 43                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | NP     | NP  | HA-2                        | G5, T8, W12, W13           |
| 44                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, T8, W12, W13           |
| 45                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T9, W13                    |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ... | 20.0 | ... | 19.4 | 19.2 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 2        | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 3        | 20.0                                                                                                     | ... | 20.0 | ... | 19.4 | 19.2 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 4        | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 5        | 20.0                                                                                                     | ... | 20.0 | ... | 19.4 | 19.2 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 6        | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 7        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 8        | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 9        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 10       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 11       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 12       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 13       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 14       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 15       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 16.4 | 15.3 | 14.5 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 | 13.2 |
| 16       | 17.0                                                                                                     | ... | 14.7 | ... | 13.2 | 12.1 | 11.3 | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 | 9.9  | 9.8  |
| 17       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 18       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 19       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 16.4 | 15.3 | 14.5 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 | 13.2 |
| 20       | 17.0                                                                                                     | ... | 14.7 | ... | 13.2 | 12.1 | 11.3 | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 | 9.9  | 9.8  |
| 21       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 22       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 23       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 24       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 25       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 26       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 27       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 28       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 29       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 16.4 | 15.3 | 14.5 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 | 13.2 |
| 30       | 17.0                                                                                                     | ... | 14.7 | ... | 13.2 | 12.1 | 11.3 | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 | 9.9  | 9.8  |
| 31       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 32       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 33       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 34       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 35       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 36       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 37       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 38       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 39       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 40       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 16.4 | 15.3 | 14.5 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 | 13.2 |
| 41       | 17.0                                                                                                     | ... | 14.7 | ... | 13.2 | 12.1 | 11.3 | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 | 9.9  | 9.8  |
| 42       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 43       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 44       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 45       | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |          |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650     |
| 1        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 2        | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 3        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 4        | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 5        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 6        | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 7        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 8        | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 9        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 10       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 11       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 12       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 13       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 14       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 15       | 13.1                                                                                                     | 13.0 | 12.9 | 10.5 | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ... (25) |
| 16       | 9.7                                                                                                      | 9.6  | 9.5  | 9.4  | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ... (25) |
| 17       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 18       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 19       | 13.1                                                                                                     | 13.0 | 12.9 | 10.5 | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ... (25) |
| 20       | 9.7                                                                                                      | 9.6  | 9.5  | 9.4  | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ... (25) |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...      |
| 22       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ... (25) |
| 23       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ... (25) |
| 24       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...      |
| 26       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ... (25) |
| 27       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ... (25) |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...      |
| 29       | 13.1                                                                                                     | 13.0 | 12.9 | 10.5 | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ...      |
| 30       | 9.7                                                                                                      | 9.6  | 9.5  | 9.4  | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ...      |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...      |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...      |
| 33       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ... (25) |
| 34       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 35       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 36       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 37       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 38       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 39       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 40       | 13.1                                                                                                     | 13.0 | 12.9 | 10.5 | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ... (25) |
| 41       | 9.7                                                                                                      | 9.6  | 9.5  | 9.4  | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ... (25) |
| 42       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 43       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 44       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |
| 45       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...      |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.     | Type/Grade      | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|---------------|-----------------|-----------------------|--------------------------|---------------------|
| (25) 1   | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-312        | TP316H          | S31609                | ...                      | ...                 |
| (25) 2   | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-312        | TP316H          | S31609                | ...                      | ...                 |
| 3        | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-358        | 316H            | S31609                | 1                        | ...                 |
| (25) 4   | 16Cr-12Ni-2Mo       | Smls. pipe            | SA-376        | TP316H          | S31609                | ...                      | ...                 |
| (25) 5   | 16Cr-12Ni-2Mo       | Smls. pipe            | SA-376        | TP316H          | S31609                | ...                      | ...                 |
| 6        | 16Cr-12Ni-2Mo       | Smls. & wld. fittings | SA-403        | 316H            | S31609                | ...                      | ...                 |
| (25) 7   | 16Cr-12Ni-2Mo       | Bar                   | SA-479        | 316H            | S31609                | ...                      | ...                 |
| (25) 8   | 16Cr-12Ni-2Mo       | Bar                   | SA-479        | 316H            | S31609                | ...                      | ...                 |
| 9        | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-813        | TP316H          | S31609                | ...                      | ...                 |
| 10       | 16Cr-12Ni-2Mo       | Wld. pipe             | SA-814        | TP316H          | S31609                | ...                      | ...                 |
| 11       | 16Cr-12Ni-2Mo       | Plate                 | SA/EN 10028-7 | X2CrNiMo17-12-2 | ...                   | ...                      | ≤3                  |
| 12       | 16Cr-12Ni-2Mo       | Plate                 | SA/EN 10028-7 | X2CrNiMo17-12-2 | ...                   | ...                      | ≤3                  |
| 13       | 16Cr-12Ni-2Mo       | Plate                 | SA/EN 10028-7 | X5CrNiMo17-12-2 | ...                   | ...                      | ≤3                  |
| 14       | 16Cr-12Ni-2Mo       | Plate                 | SA/EN 10028-7 | X5CrNiMo17-12-2 | ...                   | ...                      | ≤3                  |
| 15       | 16Cr-12Ni-2Mo-Cb    | Plate                 | SA-240        | 316Cb           | S31640                | ...                      | ...                 |
| 16       | 16Cr-12Ni-2Mo-Cb    | Plate                 | SA-240        | 316Cb           | S31640                | ...                      | ...                 |
| 17       | 16Cr-12Ni-2Mo-N     | Forgings              | SA-182        | F316LN          | S31653                | ...                      | >5                  |
| 18       | 16Cr-12Ni-2Mo-N     | Forgings              | SA-965        | F316LN          | S31653                | ...                      | ...                 |
| 19       | 16Cr-12Ni-2Mo-N     | Forgings              | SA-182        | F316LN          | S31653                | ...                      | ≤5                  |
| 20       | 16Cr-12Ni-2Mo-N     | Smls. tube            | SA-213        | TP316LN         | S31653                | ...                      | ...                 |
| 21       | 16Cr-12Ni-2Mo-N     | Plate                 | SA-240        | 316LN           | S31653                | ...                      | ...                 |
| 22       | 16Cr-12Ni-2Mo-N     | Wld. tube             | SA-249        | TP316LN         | S31653                | ...                      | ...                 |
| 23       | 16Cr-12Ni-2Mo-N     | Smls. & wld. pipe     | SA-312        | TP316LN         | S31653                | ...                      | ...                 |
| 24       | 16Cr-12Ni-2Mo-N     | Wld. pipe             | SA-358        | 316LN           | S31653                | 1                        | ...                 |
| 25       | 16Cr-12Ni-2Mo-N     | Smls. pipe            | SA-376        | TP316LN         | S31653                | ...                      | ...                 |
| 26       | 16Cr-12Ni-2Mo-N     | Fittings              | SA-403        | 316LN           | S31653                | ...                      | ...                 |
| 27       | 16Cr-12Ni-2Mo-N     | Bar                   | SA-479        | 316LN           | S31653                | ...                      | ...                 |
| 28       | 16Cr-12Ni-2Mo-N     | Wld. tube             | SA-688        | TP316LN         | S31653                | ...                      | ...                 |
| 29       | 16Cr-12Ni-2Mo-N     | Forgings              | SA-182        | F316N           | S31651                | ...                      | ...                 |
| 30       | 16Cr-12Ni-2Mo-N     | Smls. tube            | SA-213        | TP316N          | S31651                | ...                      | ...                 |
| 31       | 16Cr-12Ni-2Mo-N     | Smls. tube            | SA-213        | TP316N          | S31651                | ...                      | ...                 |
| 32       | 16Cr-12Ni-2Mo-N     | Plate                 | SA-240        | 316N            | S31651                | ...                      | ...                 |
| 33       | 16Cr-12Ni-2Mo-N     | Plate                 | SA-240        | 316N            | S31651                | ...                      | ...                 |
| 34       | 16Cr-12Ni-2Mo-N     | Wld. tube             | SA-249        | TP316N          | S31651                | ...                      | ...                 |
| 35       | 16Cr-12Ni-2Mo-N     | Wld. tube             | SA-249        | TP316N          | S31651                | ...                      | ...                 |
| (25) 36  | 16Cr-12Ni-2Mo-N     | Wld. tube             | SA-249        | TP316N          | S31651                | ...                      | ...                 |
| (25) 37  | 16Cr-12Ni-2Mo-N     | Wld. tube             | SA-249        | TP316N          | S31651                | ...                      | ...                 |
| 38       | 16Cr-12Ni-2Mo-N     | Smls. & wld. pipe     | SA-312        | TP316N          | S31651                | ...                      | ...                 |
| 39       | 16Cr-12Ni-2Mo-N     | Smls. & wld. pipe     | SA-312        | TP316N          | S31651                | ...                      | ...                 |
| (25) 40  | 16Cr-12Ni-2Mo-N     | Wld. pipe             | SA-312        | TP316N          | S31651                | ...                      | ...                 |
| (25) 41  | 16Cr-12Ni-2Mo-N     | Wld. pipe             | SA-312        | TP316N          | S31651                | ...                      | ...                 |
| 42       | 16Cr-12Ni-2Mo-N     | Wld. pipe             | SA-358        | 316N            | S31651                | 1                        | ...                 |
| (25) 43  | 16Cr-12Ni-2Mo-N     | Smls. pipe            | SA-376        | TP316N          | S31651                | ...                      | ...                 |
| (25) 44  | 16Cr-12Ni-2Mo-N     | Smls. pipe            | SA-376        | TP316N          | S31651                | ...                      | ...                 |
| 45       | 16Cr-12Ni-2Mo-N     | Smls. & wld. fittings | SA-403        | 316N            | S31651                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                            |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|----------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                      |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                            |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                            |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                            |
| 1                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G5, G24, T7                |
| 2                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G24, T9                    |
| 3                                  | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 4                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 5                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T9                         |
| 6                                  | 8     | 1         | 75                         | 30                       | NP                    | 800 | 1500   | NP  | HA-2                        | G5, G12, T8, W12, W14      |
| 7                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | NP     | NP  | HA-2                        | G5, T8                     |
| 8                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | NP     | NP  | HA-2                        | T9                         |
| 9                                  | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 10                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 11                                 | 8     | 1         | 75                         | 32                       | NP                    | NP  | 850    | 650 | HA-4                        | G5, G30                    |
| 12                                 | 8     | 1         | 75                         | 32                       | NP                    | NP  | 850    | 650 | HA-4                        | G30                        |
| 13                                 | 8     | 1         | 75                         | 32                       | NP                    | NP  | 1022   | 650 | HA-2                        | G5, G12, G30               |
| 14                                 | 8     | 1         | 75                         | 32                       | NP                    | NP  | 1022   | 650 | HA-2                        | G12, G30                   |
| 15                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, T8                |
| 16                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, T9                    |
| 17                                 | 8     | 1         | 70                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 18                                 | 8     | 1         | 70                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 19                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 20                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 21                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 22                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 23                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 24                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 25                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 26                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 27                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 28                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 29                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | NP     | NP  | HA-2                        | G5                         |
| 30                                 | 8     | 1         | 80                         | 35                       | 1200                  | 800 | 1200   | NP  | HA-2                        | G5, G12, T7                |
| 31                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | NP  | HA-2                        | G12, T8                    |
| 32                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | 1200   | 650 | HA-2                        | G5, G12, T7                |
| 33                                 | 8     | 1         | 80                         | 35                       | NP                    | NP  | 1200   | 650 | HA-2                        | G12, T8                    |
| 34                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | NP     | NP  | HA-2                        | G5, G12, T7, W13           |
| 35                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | NP     | NP  | HA-2                        | G12, T8, W13               |
| 36                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-2                        | G12, G24, T8               |
| 37                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-2                        | G5, G12, G24, T7           |
| 38                                 | 8     | 1         | 80                         | 35                       | 1200                  | 800 | 1200   | 650 | HA-2                        | G5, G12, T7, W12, W13, W14 |
| 39                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-2                        | G12, T8, W13, W14          |
| 40                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-2                        | G12, G24, T8               |
| 41                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-2                        | G5, G12, G24, T7           |
| 42                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 43                                 | 8     | 1         | 80                         | 35                       | 1200                  | 800 | 1200   | 650 | HA-2                        | G5, G12, T7                |
| 44                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-2                        | G12, T8                    |
| 45                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | 1200   | 650 | HA-2                        | G5, G12, T7, W12, W14      |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 16.4 | 15.3 | 14.5 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 | 13.2 |
| 2        | 17.0                                                                                                     | ... | 14.7 | ... | 13.2 | 12.1 | 11.3 | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 | 9.9  | 9.8  |
| 3        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 4        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 5        | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 6        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 7        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 8        | 20.0                                                                                                     | ... | 17.3 | ... | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 9        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 10       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 11       | 21.3                                                                                                     | ... | 21.3 | ... | 21.3 | 20.1 | 18.8 | 17.9 | 17.6 | 17.2 | 16.9 | 16.6 | 16.2 | ...  |
| 12       | 21.3                                                                                                     | ... | 18.1 | ... | 16.2 | 14.9 | 13.9 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.0 | ...  |
| 13       | 21.3                                                                                                     | ... | 21.3 | ... | 21.3 | 20.5 | 19.1 | 18.1 | 17.7 | 17.4 | 17.2 | 16.9 | 16.7 | 16.6 |
| 14       | 21.3                                                                                                     | ... | 18.4 | ... | 16.6 | 15.2 | 14.2 | 13.4 | 13.1 | 12.9 | 12.7 | 12.5 | 12.4 | 12.3 |
| 15       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.4 | 17.8 | 16.8 | 16.5 | 16.2 | 16.0 | 15.9 | 15.8 | 15.7 |
| 16       | 20.0                                                                                                     | ... | 17.7 | ... | 15.8 | 14.3 | 13.2 | 12.4 | 12.2 | 12.0 | 11.9 | 11.8 | 11.7 | 11.6 |
| 17       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 17.9 | 17.2 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 18       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 17.9 | 17.2 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 19       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 20       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 21       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 22       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 23       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 24       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 25       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 26       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 27       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 28       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 18.9 | 17.5 | 16.5 | 16.0 | 15.6 | 15.2 | 14.8 | ...  | ...  |
| 29       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | ...  | ...  |
| 30       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |
| 31       | 22.9                                                                                                     | ... | 20.7 | ... | 19.0 | 17.6 | 16.5 | 15.6 | 15.2 | 14.9 | 14.5 | 14.2 | 13.9 | 13.7 |
| 32       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |
| 33       | 22.9                                                                                                     | ... | 20.7 | ... | 19.0 | 17.6 | 16.5 | 15.6 | 15.2 | 14.9 | 14.5 | 14.2 | 13.9 | 13.7 |
| 34       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |
| 35       | 22.9                                                                                                     | ... | 20.7 | ... | 19.0 | 17.6 | 16.5 | 15.6 | 15.2 | 14.9 | 14.5 | 14.2 | 13.9 | 13.7 |
| 36       | 19.4                                                                                                     | ... | 17.6 | ... | 16.1 | 15.0 | 14.0 | 13.3 | 12.9 | 12.6 | 12.3 | 12.1 | 11.9 | 11.6 |
| 37       | 19.4                                                                                                     | ... | 19.4 | ... | 18.7 | 18.2 | 18.1 | 17.9 | 17.4 | 17.0 | 16.7 | 16.3 | 16.0 | 15.7 |
| 38       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |
| 39       | 22.9                                                                                                     | ... | 20.7 | ... | 19.0 | 17.6 | 16.5 | 15.6 | 15.2 | 14.9 | 14.5 | 14.2 | 13.9 | 13.7 |
| 40       | 19.4                                                                                                     | ... | 17.6 | ... | 16.1 | 15.0 | 14.0 | 13.3 | 12.9 | 12.6 | 12.3 | 12.1 | 11.9 | 11.6 |
| 41       | 19.4                                                                                                     | ... | 19.4 | ... | 18.7 | 18.2 | 18.1 | 17.9 | 17.4 | 17.0 | 16.7 | 16.3 | 16.0 | 15.7 |
| 42       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | ...  | ...  |
| 43       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |
| 44       | 22.9                                                                                                     | ... | 20.7 | ... | 19.0 | 17.6 | 16.5 | 15.6 | 15.2 | 14.9 | 14.5 | 14.2 | 13.9 | 13.7 |
| 45       | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 13.1                                                                                                     | 13.0 | 12.9 | 10.5 | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ...  |
| 2        | 9.7                                                                                                      | 9.6  | 9.5  | 9.4  | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.4  | 1.1  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 5        | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 6        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 7        | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 8        | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 16.4                                                                                                     | 16.3 | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 12.1                                                                                                     | 12.0 | 11.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 15.5                                                                                                     | 15.3 | 15.1 | 12.3 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 16       | 11.5                                                                                                     | 11.4 | 11.2 | 11.0 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 13.4                                                                                                     | 13.2 | 12.9 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 13.4                                                                                                     | 13.2 | 12.9 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 13.4                                                                                                     | 13.2 | 12.9 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 11.4                                                                                                     | 11.2 | 11.0 | 10.5 | 8.3  | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 15.4                                                                                                     | 15.1 | 13.4 | 10.5 | 8.3  | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 13.4                                                                                                     | 13.2 | 12.9 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 11.4                                                                                                     | 11.2 | 11.0 | 10.5 | 8.3  | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 15.4                                                                                                     | 15.1 | 13.4 | 10.5 | 8.3  | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 13.4                                                                                                     | 13.2 | 12.9 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form        | Spec. No.     | Type/Grade       | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|---------------------|---------------|------------------|-----------------------|--------------------------|---------------------|
| (25) 1   | 16Cr-12Ni-2Mo-N     | Bar                 | SA-479        | 316N             | S31651                | ...                      | ...                 |
| (25) 2   | 16Cr-12Ni-2Mo-N     | Bar                 | SA-479        | 316N             | S31651                | ...                      | ...                 |
| 3        | 16Cr-12Ni-2Mo-N     | Wld. tube           | SA-688        | TP316N           | S31651                | ...                      | ...                 |
| 4        | 16Cr-12Ni-2Mo-N     | Wld. pipe           | SA-813        | TP316N           | S31651                | ...                      | ...                 |
| 5        | 16Cr-12Ni-2Mo-N     | Wld. pipe           | SA-814        | TP316N           | S31651                | ...                      | ...                 |
| 6        | 16Cr-12Ni-2Mo-N     | Forgings            | SA-965        | F316N            | S31651                | ...                      | ...                 |
| 7        | 16Cr-12Ni-2Mo-N     | Forgings            | SA-965        | F316N            | S31651                | ...                      | ...                 |
| 8        | 16Cr-12Ni-2Mo-N     | Plate               | SA/EN 10028-7 | X2CrNiMoN17-11-2 | ...                   | ...                      | ≤3                  |
| 9        | 16Cr-12Ni-2Mo-N     | Plate               | SA/EN 10028-7 | X2CrNiMoN17-13-3 | ...                   | ...                      | ≤3                  |
| 10       | 16Cr-12Ni-2Mo-Ti    | Plate               | SA-240        | 316Ti            | S31635                | ...                      | ...                 |
| 11       | 16Cr-12Ni-2Mo-Ti    | Plate               | SA-240        | 316Ti            | S31635                | ...                      | ...                 |
| 12       | 17Cr-4Ni-6Mn        | Plate               | SA-240        | 201-1            | S20100                | ...                      | ...                 |
| 13       | 17Cr-4Ni-6Mn        | Plate               | SA-240        | 201-1            | S20100                | ...                      | ...                 |
| 14       | 17Cr-4Ni-6Mn        | Plate               | SA-666        | 201-1            | S20100                | ...                      | ...                 |
| 15       | 17Cr-4Ni-6Mn        | Plate               | SA-666        | 201-1            | S20100                | ...                      | ...                 |
| 16       | 17Cr-4Ni-6Mn        | Plate               | SA-240        | 201-2            | S20100                | ...                      | ...                 |
| 17       | 17Cr-4Ni-6Mn        | Plate               | SA-666        | 201-2            | S20100                | ...                      | ...                 |
| 18       | 17Cr-7Ni            | Plate, sheet, strip | SA-240        | 301              | S30100                | ...                      | ...                 |
| 19       | 17Cr-7Ni            | Plate, sheet, strip | SA-240        | 301              | S30100                | ...                      | ...                 |
| 20       | 17.5Cr-17.5Ni-5.3Si | Plate               | SA-240        | ...              | S30601                | Sol. ann.                | ...                 |
| 21       | 17.5Cr-17.5Ni-5.3Si | Plate               | SA-240        | ...              | S30601                | Sol. ann.                | ...                 |
| 22       | 18Cr-3Ni-12Mn       | Plate               | SA-240        | XM-29            | S24000                | ...                      | ...                 |
| 23       | 18Cr-3Ni-12Mn       | Plate               | SA-240        | XM-29            | S24000                | ...                      | ...                 |
| 24       | 18Cr-3Ni-12Mn       | Wld. tube           | SA-249        | XM-29            | S24000                | ...                      | ...                 |
| 25       | 18Cr-3Ni-12Mn       | Wld. tube           | SA-249        | XM-29            | S24000                | ...                      | ...                 |
| 26       | 18Cr-3Ni-12Mn       | Wld. pipe           | SA-312        | XM-29            | S24000                | ...                      | ...                 |
| 27       | 18Cr-3Ni-12Mn       | Wld. pipe           | SA-312        | XM-29            | S24000                | ...                      | ...                 |
| 28       | 18Cr-3Ni-12Mn       | Bar                 | SA-479        | XM-29            | S24000                | ...                      | ...                 |
| 29       | 18Cr-3Ni-12Mn       | Bar                 | SA-479        | XM-29            | S24000                | ...                      | ...                 |
| 30       | 18Cr-3Ni-12Mn       | Wld. tube           | SA-688        | TPXM-29          | S24000                | ...                      | ...                 |
| 31       | 18Cr-3Ni-12Mn       | Wld. tube           | SA-688        | TPXM-29          | S24000                | ...                      | ...                 |
| 32       | 18Cr-5Ni-3Mo        | Smls. tube          | SA-789        | ...              | S31500                | ...                      | ...                 |
| 33       | 18Cr-5Ni-3Mo        | Wld. tube           | SA-789        | ...              | S31500                | ...                      | ...                 |
| 34       | 18Cr-5Ni-3Mo        | Smls. pipe          | SA-790        | ...              | S31500                | ...                      | ...                 |
| 35       | 18Cr-5Ni-3Mo        | Wld. pipe           | SA-790        | ...              | S31500                | ...                      | ...                 |
| 36       | 18Cr-8Ni            | Forgings            | SA-182        | F304L            | S30403                | ...                      | >5                  |
| 37       | 18Cr-8Ni            | Forgings            | SA-182        | F304L            | S30403                | ...                      | >5                  |
| 38       | 18Cr-8Ni            | Forgings            | SA-965        | F304L            | S30403                | ...                      | ...                 |
| 39       | 18Cr-8Ni            | Forgings            | SA-965        | F304L            | S30403                | ...                      | ...                 |
| 40       | 18Cr-8Ni            | Forgings            | SA-182        | F304L            | S30403                | ...                      | ≤5                  |
| 41       | 18Cr-8Ni            | Forgings            | SA-182        | F304L            | S30403                | ...                      | ≤5                  |
| 42       | 18Cr-8Ni            | Smls. tube          | SA-213        | TP304L           | S30403                | ...                      | ...                 |
| 43       | 18Cr-8Ni            | Smls. tube          | SA-213        | TP304L           | S30403                | ...                      | ...                 |
| 44       | 18Cr-8Ni            | Plate               | SA-240        | 304L             | S30403                | ...                      | ...                 |
| 45       | 18Cr-8Ni            | Plate               | SA-240        | 304L             | S30403                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |     |        |     |                             |             |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|-------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes       |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |             |
|                                    |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |             |
| 1                                  | 8     | 1         | 80                         | 35                       | 1200                                          | 800 | NP     | NP  | HA-2                        | G5, G12, T7 |
| 2                                  | 8     | 1         | 80                         | 35                       | 1200                                          | NP  | NP     | NP  | HA-2                        | G12, T8     |
| 3                                  | 8     | 1         | 80                         | 35                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12     |
| 4                                  | 8     | 1         | 80                         | 35                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12     |
| 5                                  | 8     | 1         | 80                         | 35                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12     |
| 6                                  | 8     | 1         | 80                         | 35                       | NP                                            | 800 | 1200   | 650 | HA-2                        | G5, G12, T7 |
| 7                                  | 8     | 1         | 80                         | 35                       | NP                                            | NP  | 1200   | 650 | HA-2                        | G12, T8     |
| 8                                  | 8     | 1         | 84                         | 41                       | NP                                            | NP  | 800    | 650 | HA-2                        | G5, G30     |
| 9                                  | 8     | 1         | 84                         | 41                       | NP                                            | NP  | 800    | 650 | HA-2                        | G5, G30     |
| 10                                 | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, T8 |
| 11                                 | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T9     |
| 12                                 | 8     | 3         | 75                         | 38                       | NP                                            | NP  | 300    | 300 | HA-2                        | ...         |
| 13                                 | 8     | 3         | 75                         | 38                       | NP                                            | NP  | 300    | 300 | HA-2                        | G5          |
| 14                                 | 8     | 3         | 75                         | 38                       | NP                                            | NP  | 300    | 300 | HA-2                        | ...         |
| 15                                 | 8     | 3         | 75                         | 38                       | NP                                            | NP  | 300    | 300 | HA-2                        | G5          |
| 16                                 | 8     | 3         | 95                         | 45                       | NP                                            | NP  | 300    | 300 | HA-6                        | ...         |
| 17                                 | 8     | 3         | 95                         | 45                       | NP                                            | NP  | 300    | 300 | HA-6                        | ...         |
| 18                                 | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 800    | NP  | HA-1                        | G5          |
| 19                                 | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 800    | NP  | HA-1                        | ...         |
| 20                                 | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 500    | NP  | HA-1                        | G5, H6      |
| 21                                 | 8     | 1         | 78                         | 37                       | NP                                            | NP  | 500    | NP  | HA-1                        | H6          |
| 22                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G5          |
| 23                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | ...         |
| 24                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G5, G24     |
| 25                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G24         |
| 26                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G5, G24     |
| 27                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G24         |
| 28                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G5, G22     |
| 29                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G22         |
| 30                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G5, G24     |
| 31                                 | 8     | 3         | 100                        | 55                       | NP                                            | NP  | 800    | 650 | HA-6                        | G24         |
| 32                                 | 10H   | 1         | 92                         | 64                       | NP                                            | NP  | 750    | 650 | HA-5                        | G19         |
| 33                                 | 10H   | 1         | 92                         | 64                       | NP                                            | NP  | 750    | 650 | HA-5                        | G19, G24    |
| 34                                 | 10H   | 1         | 92                         | 64                       | NP                                            | NP  | 750    | 650 | HA-5                        | G19         |
| 35                                 | 10H   | 1         | 92                         | 64                       | NP                                            | NP  | 750    | 650 | HA-5                        | G19, G24    |
| 36                                 | 8     | 1         | 65                         | 25                       | 800                                           | 800 | 1200   | 650 | HA-3                        | G5, G21, T4 |
| 37                                 | 8     | 1         | 65                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, T6     |
| 38                                 | 8     | 1         | 65                         | 25                       | 800                                           | 800 | 1200   | 650 | HA-3                        | G5, G21, T4 |
| 39                                 | 8     | 1         | 65                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, T6     |
| 40                                 | 8     | 1         | 70                         | 25                       | 800                                           | 800 | 1200   | 650 | HA-3                        | G5, G21, T4 |
| 41                                 | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, T6     |
| 42                                 | 8     | 1         | 70                         | 25                       | 800                                           | 800 | 1200   | NP  | HA-3                        | G5, G21, T4 |
| 43                                 | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | NP  | HA-3                        | G21, T6     |
| 44                                 | 8     | 1         | 70                         | 25                       | 800                                           | 800 | 1200   | 650 | HA-3                        | G5, G21, T4 |
| 45                                 | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, T6     |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |
| 2        | 22.9                                                                                                     | ... | 20.7 | ... | 19.0 | 17.6 | 16.5 | 15.6 | 15.2 | 14.9 | 14.5 | 14.2 | 13.9 | 13.7 |
| 3        | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | ...  | ...  |
| 4        | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | ...  | ...  |
| 5        | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | ...  | ...  |
| 6        | 22.9                                                                                                     | ... | 22.9 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.5 | 20.0 | 19.6 | 19.2 | 18.8 | 18.5 |
| 7        | 22.9                                                                                                     | ... | 20.7 | ... | 19.0 | 17.6 | 16.5 | 15.6 | 15.2 | 14.9 | 14.5 | 14.2 | 13.9 | 13.7 |
| 8        | 24.0                                                                                                     | ... | 24.0 | ... | 24.0 | 23.7 | 22.8 | 22.3 | 21.7 | 21.1 | 20.6 | 20.1 | ...  | ...  |
| 9        | 24.0                                                                                                     | ... | 24.0 | ... | 24.0 | 23.7 | 22.8 | 22.3 | 21.7 | 21.1 | 20.6 | 20.1 | ...  | ...  |
| 10       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 19.4 | 17.8 | 16.8 | 16.5 | 16.2 | 16.0 | 15.9 | 15.8 | 15.7 |
| 11       | 20.0                                                                                                     | ... | 17.7 | ... | 15.8 | 14.3 | 13.2 | 12.4 | 12.2 | 12.0 | 11.9 | 11.8 | 11.7 | 11.6 |
| 12       | 21.4                                                                                                     | ... | 18.7 | ... | 16.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 21.4                                                                                                     | ... | 18.7 | ... | 17.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 21.4                                                                                                     | ... | 18.7 | ... | 16.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 21.4                                                                                                     | ... | 18.7 | ... | 17.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 27.1                                                                                                     | ... | 22.8 | ... | 19.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 27.1                                                                                                     | ... | 22.8 | ... | 19.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 20.0                                                                                                     | ... | 17.5 | ... | 15.7 | 15.4 | 15.4 | 15.4 | 15.4 | 15.3 | 15.0 | 14.6 | ...  | ...  |
| 19       | 20.0                                                                                                     | ... | 16.1 | ... | 14.4 | 13.5 | 13.0 | 12.5 | 12.2 | 11.9 | 11.5 | 11.1 | ...  | ...  |
| 20       | 22.3                                                                                                     | ... | 22.3 | ... | 21.1 | 20.0 | 18.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 22.3                                                                                                     | ... | 20.3 | ... | 18.1 | 16.5 | 15.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 28.6                                                                                                     | ... | 27.9 | ... | 26.0 | 24.9 | 24.3 | 23.8 | 23.4 | 23.0 | 22.4 | 21.8 | ...  | ...  |
| 23       | 28.6                                                                                                     | ... | 27.9 | ... | 25.0 | 21.9 | 20.1 | 19.2 | 18.8 | 18.5 | 18.2 | 17.8 | ...  | ...  |
| 24       | 24.3                                                                                                     | ... | 23.7 | ... | 22.1 | 21.2 | 20.7 | 20.2 | 19.9 | 19.5 | 19.1 | 18.5 | ...  | ...  |
| 25       | 24.3                                                                                                     | ... | 23.7 | ... | 21.3 | 18.7 | 17.1 | 16.3 | 16.0 | 15.7 | 15.4 | 15.1 | ...  | ...  |
| 26       | 24.3                                                                                                     | ... | 23.7 | ... | 22.1 | 21.2 | 20.7 | 20.2 | 19.9 | 19.5 | 19.1 | 18.5 | ...  | ...  |
| 27       | 24.3                                                                                                     | ... | 23.7 | ... | 21.3 | 18.7 | 17.1 | 16.3 | 16.0 | 15.7 | 15.4 | 15.1 | ...  | ...  |
| 28       | 28.6                                                                                                     | ... | 27.9 | ... | 26.0 | 24.9 | 24.3 | 23.8 | 23.4 | 23.0 | 22.4 | 21.8 | ...  | ...  |
| 29       | 28.6                                                                                                     | ... | 27.9 | ... | 25.0 | 21.9 | 20.1 | 19.2 | 18.8 | 18.5 | 18.2 | 17.8 | ...  | ...  |
| 30       | 24.3                                                                                                     | ... | 23.7 | ... | 22.1 | 21.2 | 20.7 | 20.2 | 19.9 | 19.5 | 19.1 | 18.5 | ...  | ...  |
| 31       | 24.3                                                                                                     | ... | 23.7 | ... | 21.3 | 18.7 | 17.1 | 16.3 | 16.0 | 15.7 | 15.4 | 15.1 | ...  | ...  |
| 32       | 26.3                                                                                                     | ... | 25.4 | ... | 24.4 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | ...  | ...  | ...  |
| 33       | 22.3                                                                                                     | ... | 21.6 | ... | 20.7 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | ...  | ...  | ...  |
| 34       | 26.3                                                                                                     | ... | 25.4 | ... | 24.4 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | ...  | ...  | ...  |
| 35       | 22.3                                                                                                     | ... | 21.6 | ... | 20.7 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | ...  | ...  | ...  |
| 36       | 16.7                                                                                                     | ... | 16.7 | ... | 16.2 | 15.6 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 37       | 16.7                                                                                                     | ... | 14.3 | ... | 12.8 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.7  | 9.5  | 9.3  |
| 38       | 16.7                                                                                                     | ... | 16.7 | ... | 16.2 | 15.6 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 39       | 16.7                                                                                                     | ... | 14.3 | ... | 12.8 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.7  | 9.5  | 9.3  |
| 40       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 41       | 16.7                                                                                                     | ... | 14.3 | ... | 12.8 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.7  | 9.5  | 9.3  |
| 42       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 43       | 16.7                                                                                                     | ... | 14.3 | ... | 12.8 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.7  | 9.5  | 9.3  |
| 44       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 45       | 16.7                                                                                                     | ... | 14.3 | ... | 12.8 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.7  | 9.5  | 9.3  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 13.4                                                                                                     | 13.2 | 12.9 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 18.1                                                                                                     | 17.8 | 15.8 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 13.4                                                                                                     | 13.2 | 12.9 | 12.3 | 9.8  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 15.5                                                                                                     | 15.3 | 15.1 | 12.3 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 11       | 11.5                                                                                                     | 11.4 | 11.2 | 11.0 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 9.1                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 9.1                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 9.1                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 9.1                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 9.1                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.     | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|---------------|------------|-----------------------|--------------------------|---------------------|
| 1        | 18Cr-8Ni            | Wld. tube             | SA-249        | TP304L     | S30403                | ...                      | ...                 |
| 2        | 18Cr-8Ni            | Wld. tube             | SA-249        | TP304L     | S30403                | ...                      | ...                 |
| 3        | 18Cr-8Ni            | Wld. tube             | SA-249        | TP304L     | S30403                | ...                      | ...                 |
| 4        | 18Cr-8Ni            | Smls. & wld. pipe     | SA-312        | TP304L     | S30403                | ...                      | ...                 |
| 5        | 18Cr-8Ni            | Smls. pipe            | SA-312        | TP304L     | S30403                | ...                      | ...                 |
| 6        | 18Cr-8Ni            | Wld. pipe             | SA-312        | TP304L     | S30403                | ...                      | ...                 |
| 7        | 18Cr-8Ni            | Wld. pipe             | SA-312        | TP304L     | S30403                | ...                      | ...                 |
| 8        | 18Cr-8Ni            | Wld. pipe             | SA-358        | 304L       | S30403                | 1                        | ...                 |
| 9        | 18Cr-8Ni            | Smls. & wld. fittings | SA-403        | 304L       | S30403                | ...                      | ...                 |
| 10       | 18Cr-8Ni            | Wld. pipe             | SA-409        | TP304L     | S30403                | ...                      | ...                 |
| 11       | 18Cr-8Ni            | Bar                   | SA-479        | 304L       | S30403                | ...                      | ...                 |
| 12       | 18Cr-8Ni            | Bar                   | SA-479        | 304L       | S30403                | ...                      | ...                 |
| 13       | 18Cr-8Ni            | Wld. tube             | SA-688        | TP304L     | S30403                | ...                      | ...                 |
| 14       | 18Cr-8Ni            | Wld. tube             | SA-688        | TP304L     | S30403                | ...                      | ...                 |
| 15       | 18Cr-8Ni            | Wld. tube             | SA-688        | TP304L     | S30403                | ...                      | ...                 |
| 16       | 18Cr-8Ni            | Wld. pipe             | SA-813        | TP304L     | S30403                | ...                      | ...                 |
| 17       | 18Cr-8Ni            | Wld. pipe             | SA-814        | TP304L     | S30403                | ...                      | ...                 |
| 18       | 18Cr-8Ni            | Bar                   | SA/JIS G4303  | SUS304L    | ...                   | ...                      | ...                 |
| 19       | 18Cr-8Ni            | Forgings              | SA-182        | F304       | S30400                | ...                      | >5                  |
| 20       | 18Cr-8Ni            | Forgings              | SA-182        | F304       | S30400                | ...                      | >5                  |
| 21       | 18Cr-8Ni            | Forgings              | SA-182        | F304H      | S30409                | ...                      | >5                  |
| 22       | 18Cr-8Ni            | Forgings              | SA-182        | F304H      | S30409                | ...                      | >5                  |
| 23       | 18Cr-8Ni            | Castings              | SA-351        | CF3        | J92500                | ...                      | ...                 |
| 24       | 18Cr-8Ni            | Castings              | SA-351        | CF3        | J92500                | ...                      | ...                 |
| (25) 25  | 18Cr-8Ni            | Castings              | SA-351        | CF8        | J92600                | ...                      | ...                 |
| (25) 26  | 18Cr-8Ni            | Castings              | SA-351        | CF8        | J92600                | ...                      | ...                 |
| 27       | 18Cr-8Ni            | Castings              | SA-351        | CF8        | J92600                | ...                      | ...                 |
| 28       | 18Cr-8Ni            | Smls. pipe            | SA-376        | TP304      | S30400                | ...                      | ≥8                  |
| 29       | 18Cr-8Ni            | Smls. pipe            | SA-376        | TP304      | S30400                | ...                      | ≥8                  |
| 30       | 18Cr-8Ni            | Cast pipe             | SA-451        | CPF3       | J92500                | ...                      | ...                 |
| 31       | 18Cr-8Ni            | Cast pipe             | SA-451        | CPF8       | J92600                | ...                      | ...                 |
| 32       | 18Cr-8Ni            | Forgings              | SA-965        | F304       | S30400                | ...                      | ...                 |
| 33       | 18Cr-8Ni            | Forgings              | SA-965        | F304       | S30400                | ...                      | ...                 |
| 34       | 18Cr-8Ni            | Forgings              | SA-965        | F304H      | S30409                | ...                      | ...                 |
| 35       | 18Cr-8Ni            | Forgings              | SA-965        | F304H      | S30409                | ...                      | ...                 |
| 36       | 18Cr-8Ni            | Plate                 | SA/EN 10028-7 | X2CrNi18-9 | ...                   | ...                      | ≤3                  |
| 37       | 18Cr-8Ni            | Plate                 | SA/EN 10028-7 | X2CrNi18-9 | ...                   | ...                      | ≤3                  |
| 38       | 18Cr-8Ni            | Forgings              | SA-182        | F304       | S30400                | ...                      | ≤5                  |
| 39       | 18Cr-8Ni            | Forgings              | SA-182        | F304       | S30400                | ...                      | ≤5                  |
| 40       | 18Cr-8Ni            | Forgings              | SA-182        | F304H      | S30409                | ...                      | ≤5                  |
| 41       | 18Cr-8Ni            | Forgings              | SA-182        | F304H      | S30409                | ...                      | ≤5                  |
| 42       | 18Cr-8Ni            | Smls. tube            | SA-213        | TP304      | S30400                | ...                      | ...                 |
| 43       | 18Cr-8Ni            | Smls. tube            | SA-213        | TP304      | S30400                | ...                      | ...                 |
| 44       | 18Cr-8Ni            | Smls. tube            | SA-213        | TP304H     | S30409                | ...                      | ...                 |
| 45       | 18Cr-8Ni            | Smls. tube            | SA-213        | TP304H     | S30409                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                                               |     |        |     |                             |                                |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|--------------------------------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes                          |
|                                           |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |                                |
|                                           |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                                |
| 1                                         | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, W12                        |
| 2                                         | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G5, G21, G24, T4               |
| 3                                         | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, G24, T6                   |
| 4                                         | 8     | 1         | 70                         | 25                       | 800                                           | 800 | 1200   | 650 | HA-3                        | G5, G21, T4, W12, W14          |
| 5                                         | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, T6                        |
| 6                                         | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G5, G21, G24, T4               |
| 7                                         | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, G24, T6                   |
| 8                                         | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, W12                        |
| 9                                         | 8     | 1         | 70                         | 25                       | NP                                            | 800 | 1200   | 650 | HA-3                        | G5, T4, W12, W14               |
| 10                                        | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, W12                        |
| 11                                        | 8     | 1         | 70                         | 25                       | 800                                           | 800 | 1200   | 650 | HA-3                        | G5, G21, G22, T4               |
| 12                                        | 8     | 1         | 70                         | 25                       | 800                                           | NP  | 1200   | 650 | HA-3                        | G21, G22, T6                   |
| 13                                        | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, W12                        |
| 14                                        | 8     | 1         | 70                         | 25                       | NP                                            | NP  | 1200   | 650 | HA-3                        | G5, G24, T4                    |
| 15                                        | 8     | 1         | 70                         | 25                       | NP                                            | NP  | 1200   | 650 | HA-3                        | G24, T6                        |
| 16                                        | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, W12                        |
| 17                                        | 8     | 1         | 70                         | 25                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, W12                        |
| 18                                        | 8     | 1         | 70                         | 25                       | 800                                           | 800 | 1200   | NP  | HA-3                        | G5, G21, G22, T4               |
| 19                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-1                        | G5, G12, T7                    |
| 20                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-1                        | G12, T8                        |
| 21                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-1                        | G5, T7                         |
| 22                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-1                        | T8                             |
| 23                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 800    | 650 | HA-3                        | G1, G5, G16, G17, G19          |
| 24                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 800    | 650 | HA-3                        | G1, G19                        |
| 25                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-1                        | G1, G5, G12, G16, G17, G19, T6 |
| 26                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-1                        | G1, G12, G19, T7               |
| 27                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-1                        | G1, G5, G12, G19, T6           |
| 28                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-1                        | G5, G12, S9, T7                |
| 29                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-1                        | G12, S9, T8                    |
| 30                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, G16, G17, G19              |
| 31                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | NP     | NP  | HA-1                        | G5, G16, G17, G19              |
| 32                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-1                        | G5, G12, T7                    |
| 33                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-1                        | G12, T8                        |
| 34                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-1                        | G5, T7                         |
| 35                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | NP  | HA-1                        | T8                             |
| 36                                        | 8     | 1         | 72.5                       | 29                       | NP                                            | NP  | 1022   | 650 | HA-3                        | G5, G30, T4                    |
| 37                                        | 8     | 1         | 72.5                       | 29                       | NP                                            | NP  | 1022   | 650 | HA-3                        | G30, T6                        |
| 38                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-1                        | G12, T8                        |
| 39                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-1                        | G5, G12, T7                    |
| 40                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-1                        | T8                             |
| 41                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-1                        | G5, T7                         |
| 42                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-1                        | G12, T8                        |
| 43                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-1                        | G5, G12, T7                    |
| 44                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-1                        | T8                             |
| 45                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-1                        | G5, T7                         |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | ...  | ...  |
| 2        | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 13.4 | 12.5 | 11.9 | 11.7 | 11.4 | 11.3 | 11.1 | 10.9 | 10.1 |
| 3        | 14.2                                                                                                     | ... | 12.1 | ... | 10.9 | 9.9  | 9.3  | 8.8  | 8.6  | 8.5  | 8.3  | 8.2  | 8.1  | 7.9  |
| 4        | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 5        | 16.7                                                                                                     | ... | 14.3 | ... | 12.8 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.7  | 9.5  | 9.3  |
| 6        | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 13.4 | 12.5 | 11.9 | 11.7 | 11.4 | 11.3 | 11.1 | 10.9 | 10.1 |
| 7        | 14.2                                                                                                     | ... | 12.1 | ... | 10.9 | 9.9  | 9.3  | 8.8  | 8.6  | 8.5  | 8.3  | 8.2  | 8.1  | 7.9  |
| 8        | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | ...  | ...  |
| 9        | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 10       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | ...  | ...  |
| 11       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 12       | 16.7                                                                                                     | ... | 14.3 | ... | 12.8 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.7  | 9.5  | 9.3  |
| 13       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | ...  | ...  |
| 14       | 14.2                                                                                                     | ... | 14.2 | ... | 14.2 | 13.4 | 12.5 | 11.9 | 11.7 | 11.4 | 11.3 | 11.1 | 10.9 | 10.1 |
| 15       | 14.2                                                                                                     | ... | 12.1 | ... | 10.9 | 9.9  | 9.3  | 8.8  | 8.6  | 8.5  | 8.3  | 8.2  | 8.1  | 7.9  |
| 16       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | ...  | ...  |
| 17       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | ...  | ...  |
| 18       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | 15.8 | 14.7 | 14.0 | 13.7 | 13.5 | 13.3 | 13.0 | 12.8 | 11.9 |
| 19       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 20       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 21       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 22       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 23       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 24       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | ...  | ...  |
| 25       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 26       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 27       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 28       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 29       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 30       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 31       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 32       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 33       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 34       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 35       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 36       | 19.3                                                                                                     | ... | 19.3 | ... | 19.3 | 18.3 | 17.1 | 16.2 | 15.9 | 15.6 | 15.4 | 15.2 | 14.9 | 11.9 |
| 37       | 19.3                                                                                                     | ... | 16.5 | ... | 14.9 | 13.6 | 12.6 | 12.0 | 11.8 | 11.6 | 11.4 | 11.2 | 11.0 | 10.8 |
| 38       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 39       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 40       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 41       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 42       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 43       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 44       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 45       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 8.4                                                                                                      | 6.6  | 5.4  | 4.3  | 3.4  | 2.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 7.7                                                                                                      | 6.6  | 5.4  | 4.3  | 3.4  | 2.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 9.1                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 8.4                                                                                                      | 6.6  | 5.4  | 4.3  | 3.4  | 2.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 7.7                                                                                                      | 6.6  | 5.4  | 4.3  | 3.4  | 2.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 9.1                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 8.4                                                                                                      | 6.6  | 5.4  | 4.3  | 3.4  | 2.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 7.7                                                                                                      | 6.6  | 5.4  | 4.3  | 3.4  | 2.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 9.9                                                                                                      | 7.8  | 6.3  | 5.1  | 4.0  | 3.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 20       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 21       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 22       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 14.3                                                                                                     | 12.2 | 9.5  | 7.5  | 6.0  | 4.8  | 3.9  | 3.3  | 2.7  | 2.3  | 2.0  | 1.7  | ...  | ...  | ...  |
| 26       | 10.6                                                                                                     | 10.4 | 9.5  | 7.5  | 6.0  | 4.8  | 3.9  | 3.3  | 2.7  | 2.3  | 2.0  | 1.7  | ...  | ...  | ...  |
| 27       | 14.3                                                                                                     | 12.2 | 9.5  | 7.5  | 6.0  | 4.8  | 3.9  | 3.3  | 2.7  | 2.3  | 2.0  | 1.7  | ...  | ...  | ...  |
| 28       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 29       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 33       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 34       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 35       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 36       | 9.9                                                                                                      | 7.8  | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 10.6                                                                                                     | 7.8  | 6.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 39       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 40       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 41       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 42       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 43       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 44       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 45       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy Desig./UNS No. | Class/Condition/Temp | Size/Thickness, in. |
|----------|---------------------|-----------------------|-----------|------------|----------------------|----------------------|---------------------|
| 1        | 18Cr-8Ni            | Plate                 | SA-240    | 302        | S30200               | ...                  | ...                 |
| 2        | 18Cr-8Ni            | Plate                 | SA-240    | 302        | S30200               | ...                  | ...                 |
| 3        | 18Cr-8Ni            | Plate                 | SA-240    | 304        | S30400               | ...                  | ...                 |
| (25) 4   | 18Cr-8Ni            | Plate                 | SA-240    | 304        | S30400               | ...                  | ...                 |
| 5        | 18Cr-8Ni            | Plate                 | SA-240    | 304H       | S30409               | ...                  | ...                 |
| 6        | 18Cr-8Ni            | Plate                 | SA-240    | 304H       | S30409               | ...                  | ...                 |
| 7        | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304      | S30400               | ...                  | ...                 |
| 8        | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304      | S30400               | ...                  | ...                 |
| (25) 9   | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304      | S30400               | ...                  | ...                 |
| (25) 10  | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304      | S30400               | ...                  | ...                 |
| 11       | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304H     | S30409               | ...                  | ...                 |
| 12       | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304H     | S30409               | ...                  | ...                 |
| (25) 13  | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304H     | S30409               | ...                  | ...                 |
| (25) 14  | 18Cr-8Ni            | Wld. tube             | SA-249    | TP304H     | S30409               | ...                  | ...                 |
| 15       | 18Cr-8Ni            | Smls. & wld. pipe     | SA-312    | TP304      | S30400               | ...                  | ...                 |
| 16       | 18Cr-8Ni            | Smls. & wld. pipe     | SA-312    | TP304      | S30400               | ...                  | ...                 |
| (25) 17  | 18Cr-8Ni            | Wld. pipe             | SA-312    | TP304      | S30400               | ...                  | ...                 |
| (25) 18  | 18Cr-8Ni            | Wld. pipe             | SA-312    | TP304      | S30400               | ...                  | ...                 |
| 19       | 18Cr-8Ni            | Smls. & wld. pipe     | SA-312    | TP304H     | S30409               | ...                  | ...                 |
| 20       | 18Cr-8Ni            | Smls. & wld. pipe     | SA-312    | TP304H     | S30409               | ...                  | ...                 |
| (25) 21  | 18Cr-8Ni            | Wld. pipe             | SA-312    | TP304H     | S30409               | ...                  | ...                 |
| (25) 22  | 18Cr-8Ni            | Wld. pipe             | SA-312    | TP304H     | S30409               | ...                  | ...                 |
| 23       | 18Cr-8Ni            | Wld. pipe             | SA-358    | 304        | S30400               | 1                    | ...                 |
| 24       | 18Cr-8Ni            | Wld. pipe             | SA-358    | 304H       | S30409               | 1                    | ...                 |
| 25       | 18Cr-8Ni            | Wld. pipe             | SA-358    | 304LN      | S30453               | 1                    | ...                 |
| (25) 26  | 18Cr-8Ni            | Smls. pipe            | SA-376    | TP304      | S30400               | ...                  | <8                  |
| (25) 27  | 18Cr-8Ni            | Smls. pipe            | SA-376    | TP304      | S30400               | ...                  | <8                  |
| (25) 28  | 18Cr-8Ni            | Smls. pipe            | SA-376    | TP304H     | S30409               | ...                  | ...                 |
| (25) 29  | 18Cr-8Ni            | Smls. pipe            | SA-376    | TP304H     | S30409               | ...                  | ...                 |
| 30       | 18Cr-8Ni            | Smls. & wld. fittings | SA-403    | 304        | S30400               | ...                  | ...                 |
| 31       | 18Cr-8Ni            | Smls. & wld. fittings | SA-403    | 304H       | S30409               | ...                  | ...                 |
| 32       | 18Cr-8Ni            | Wld. pipe             | SA-409    | TP304      | S30400               | ...                  | ...                 |
| 33       | 18Cr-8Ni            | Bar                   | SA-479    | 302        | S30200               | ...                  | ...                 |
| 34       | 18Cr-8Ni            | Bar                   | SA-479    | 302        | S30200               | ...                  | ...                 |
| 35       | 18Cr-8Ni            | Bar                   | SA-479    | 304        | S30400               | ...                  | ...                 |
| 36       | 18Cr-8Ni            | Bar                   | SA-479    | 304        | S30400               | ...                  | ...                 |
| 37       | 18Cr-8Ni            | Bar                   | SA-479    | 304H       | S30409               | ...                  | ...                 |
| 38       | 18Cr-8Ni            | Bar                   | SA-479    | 304H       | S30409               | ...                  | ...                 |
| 39       | 18Cr-8Ni            | Wld. tube             | SA-688    | TP304      | S30400               | ...                  | ...                 |
| 40       | 18Cr-8Ni            | Wld. tube             | SA-688    | TP304      | S30400               | ...                  | ...                 |
| 41       | 18Cr-8Ni            | Wld. tube             | SA-688    | TP304      | S30400               | ...                  | ...                 |
| 42       | 18Cr-8Ni            | Wld. pipe             | SA-813    | TP304      | S30400               | ...                  | ...                 |
| 43       | 18Cr-8Ni            | Wld. pipe             | SA-813    | TP304H     | S30409               | ...                  | ...                 |
| 44       | 18Cr-8Ni            | Wld. pipe             | SA-814    | TP304      | S30400               | ...                  | ...                 |
| 45       | 18Cr-8Ni            | Wld. pipe             | SA-814    | TP304H     | S30409               | ...                  | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                            |  |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|----------------------------|--|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                      |  |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                            |  |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                            |  |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                            |  |
| 1                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 750    | 650 | HA-1                        | G5                         |  |
| 2                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 750    | 650 | HA-1                        | ...                        |  |
| 3                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G12, T8                    |  |
| 4                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-1                        | G5, G12, T7                |  |
| 5                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-1                        | G5, T7                     |  |
| 6                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | T8                         |  |
| 7                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | NP     | NP  | HA-1                        | G12, T8, W13               |  |
| 8                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | NP     | NP  | HA-1                        | G5, G12, T7, W12, W13      |  |
| 9                                  | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G5, G12, G24, T7           |  |
| 10                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G12, G24, T8               |  |
| 11                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | NP     | NP  | HA-1                        | T8, W13                    |  |
| 12                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | NP     | NP  | HA-1                        | G5, T7, W12, W13           |  |
| 13                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | G5, G24, T7                |  |
| 14                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | G24, T8                    |  |
| 15                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-1                        | G5, G12, T7, W12, W13, W14 |  |
| 16                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G12, T8, W13, W14          |  |
| 17                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G5, G12, G24, T7           |  |
| 18                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G12, G24, T8               |  |
| 19                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-1                        | G5, T7, W12, W13, W14      |  |
| 20                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | T8, W13, W14               |  |
| 21                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | G5, G24, T7                |  |
| 22                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | G24, T8                    |  |
| 23                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 24                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 25                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 26                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-1                        | G5, G12, S11, T7           |  |
| 27                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G12, S11, T8               |  |
| 28                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-1                        | G5, T7                     |  |
| 29                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | T8                         |  |
| 30                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 1500   | 650 | HA-1                        | G5, G12, T7, W12, W14      |  |
| 31                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 1500   | NP  | HA-1                        | G5, T7, W12, W14           |  |
| 32                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 33                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 750    | 650 | HA-1                        | G5, G24                    |  |
| 34                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 750    | 650 | HA-1                        | G22                        |  |
| 35                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-1                        | G5, G12, G22, T7           |  |
| 36                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-1                        | G12, G22, T8               |  |
| 37                                 | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-1                        | G5, G22, T7                |  |
| 38                                 | 8     | 1         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-1                        | G22, T8                    |  |
| 39                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 40                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-1                        | G5, G12, G24, T7           |  |
| 41                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-1                        | G12, G24, T8               |  |
| 42                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 43                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 44                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |
| 45                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | ...  | ...  | ...  |
| 2        | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | ...  | ...  | ...  |
| 3        | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 4        | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 5        | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 6        | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 7        | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 8        | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 9        | 17.0                                                                                                     | ... | 17.0 | ... | 16.1 | 15.5 | 14.8 | 14.1 | 13.8 | 13.5 | 13.2 | 12.9 | 12.6 | 12.4 |
| 10       | 17.0                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 11.0 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 11       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 12       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 13       | 17.0                                                                                                     | ... | 17.0 | ... | 16.1 | 15.5 | 14.8 | 14.1 | 13.8 | 13.5 | 13.2 | 12.9 | 12.6 | 12.4 |
| 14       | 17.0                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 11.0 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 15       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 16       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 17       | 17.0                                                                                                     | ... | 17.0 | ... | 16.1 | 15.5 | 14.8 | 14.1 | 13.8 | 13.5 | 13.2 | 12.9 | 12.6 | 12.4 |
| 18       | 17.0                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 11.0 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 19       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 20       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 21       | 17.0                                                                                                     | ... | 17.0 | ... | 16.1 | 15.5 | 14.8 | 14.1 | 13.8 | 13.5 | 13.2 | 12.9 | 12.6 | 12.4 |
| 22       | 17.0                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 11.0 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 23       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 24       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 25       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 26       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 27       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 28       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 29       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 30       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 31       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 32       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 33       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 34       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | ...  | ...  | ...  |
| 35       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 36       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 37       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 38       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 39       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 40       | 17.0                                                                                                     | ... | 17.0 | ... | 16.1 | 15.5 | 14.8 | 14.1 | 13.8 | 13.5 | 13.2 | 12.9 | 12.6 | 12.4 |
| 41       | 17.0                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 11.0 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 42       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 43       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 44       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 45       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 4        | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 5        | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 6        | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 7        | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 8        | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 9        | 12.1                                                                                                     | 11.9 | 10.5 | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 10       | 9.0                                                                                                      | 8.8  | 8.6  | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 11       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 12       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 13       | 12.1                                                                                                     | 11.9 | 10.5 | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 14       | 9.0                                                                                                      | 8.8  | 8.6  | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 15       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 16       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 17       | 12.1                                                                                                     | 11.9 | 10.5 | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 18       | 9.0                                                                                                      | 8.8  | 8.6  | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 19       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 20       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 21       | 12.1                                                                                                     | 11.9 | 10.5 | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 22       | 9.0                                                                                                      | 8.8  | 8.6  | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 27       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 28       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 29       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 30       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 31       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 36       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 37       | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 38       | 10.6                                                                                                     | 10.4 | 10.1 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 12.1                                                                                                     | 11.9 | 10.5 | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 41       | 9.0                                                                                                      | 8.8  | 8.6  | 8.3  | 6.6  | 5.2  | 4.0  | 3.1  | 2.5  | 2.0  | 1.6  | 1.2  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.     | Type/Grade  | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|---------------|-------------|-----------------------|--------------------------|---------------------|
| 1        | 18Cr-8Ni            | Bar                   | SA/JIS G4303  | SUS302      | ...                   | ...                      | ...                 |
| 2        | 18Cr-8Ni            | Bar                   | SA/JIS G4303  | SUS304      | ...                   | ...                      | ...                 |
| 3        | 18Cr-8Ni            | Plate                 | SA/EN 10028-7 | X5CrNi18-10 | ...                   | ...                      | ≤3                  |
| 4        | 18Cr-8Ni            | Plate                 | SA/EN 10028-7 | X5CrNi18-10 | ...                   | ...                      | ≤3                  |
| 5        | 18Cr-8Ni            | Castings              | SA-351        | CF3A        | J92500                | ...                      | ...                 |
| 6        | 18Cr-8Ni            | Castings              | SA-351        | CF3A        | J92500                | ...                      | ...                 |
| 7        | 18Cr-8Ni            | Castings              | SA-351        | CF8A        | J92600                | ...                      | ...                 |
| 8        | 18Cr-8Ni            | Castings              | SA-351        | CF8A        | J92600                | ...                      | ...                 |
| 9        | 18Cr-8Ni            | Cast pipe             | SA-451        | CPF3A       | J92500                | ...                      | ...                 |
| 10       | 18Cr-8Ni            | Cast pipe             | SA-451        | CPF8A       | J92600                | ...                      | ...                 |
| 11       | 18Cr-8Ni-N          | Forgings              | SA-182        | F304LN      | S30453                | ...                      | >5                  |
| 12       | 18Cr-8Ni-N          | Forgings              | SA-965        | F304LN      | S30453                | ...                      | ...                 |
| 13       | 18Cr-8Ni-N          | Forgings              | SA-182        | F304LN      | S30453                | ...                      | ≤5                  |
| 14       | 18Cr-8Ni-N          | Smls. tube            | SA-213        | TP304LN     | S30453                | ...                      | ...                 |
| 15       | 18Cr-8Ni-N          | Plate                 | SA-240        | 304LN       | S30453                | ...                      | ...                 |
| 16       | 18Cr-8Ni-N          | Wld. tube             | SA-249        | TP304LN     | S30453                | ...                      | ...                 |
| 17       | 18Cr-8Ni-N          | Smls. & wld. pipe     | SA-312        | TP304LN     | S30453                | ...                      | ...                 |
| 18       | 18Cr-8Ni-N          | Smls. pipe            | SA-376        | TP304LN     | S30453                | ...                      | ...                 |
| 19       | 18Cr-8Ni-N          | Smls. & wld. fittings | SA-403        | 304LN       | S30453                | WP                       | ...                 |
| 20       | 18Cr-8Ni-N          | Bar                   | SA-479        | 304LN       | S30453                | ...                      | ...                 |
| 21       | 18Cr-8Ni-N          | Wld. tube             | SA-688        | TP304LN     | S30453                | ...                      | ...                 |
| 22       | 18Cr-8Ni-N          | Wld. pipe             | SA-813        | TP304LN     | S30453                | ...                      | ...                 |
| 23       | 18Cr-8Ni-N          | Wld. pipe             | SA-814        | TP304LN     | S30453                | ...                      | ...                 |
| 24       | 18Cr-8Ni-N          | Forgings              | SA-182        | F304N       | S30451                | ...                      | ...                 |
| 25       | 18Cr-8Ni-N          | Smls. tube            | SA-213        | TP304N      | S30451                | ...                      | ...                 |
| 26       | 18Cr-8Ni-N          | Smls. tube            | SA-213        | TP304N      | S30451                | ...                      | ...                 |
| 27       | 18Cr-8Ni-N          | Plate                 | SA-240        | 304N        | S30451                | ...                      | ...                 |
| 28       | 18Cr-8Ni-N          | Plate                 | SA-240        | 304N        | S30451                | ...                      | ...                 |
| 29       | 18Cr-8Ni-N          | Wld. tube             | SA-249        | TP304N      | S30451                | ...                      | ...                 |
| 30       | 18Cr-8Ni-N          | Wld. tube             | SA-249        | TP304N      | S30451                | ...                      | ...                 |
| (25) 31  | 18Cr-8Ni-N          | Wld. tube             | SA-249        | TP304N      | S30451                | ...                      | ...                 |
| (25) 32  | 18Cr-8Ni-N          | Wld. tube             | SA-249        | TP304N      | S30451                | ...                      | ...                 |
| 33       | 18Cr-8Ni-N          | Wld. tube             | SA-249        | TP304N      | S30451                | ...                      | ...                 |
| 34       | 18Cr-8Ni-N          | Smls. & wld. pipe     | SA-312        | TP304N      | S30451                | ...                      | ...                 |
| 35       | 18Cr-8Ni-N          | Smls. & wld. pipe     | SA-312        | TP304N      | S30451                | ...                      | ...                 |
| (25) 36  | 18Cr-8Ni-N          | Wld. pipe             | SA-312        | TP304N      | S30451                | ...                      | ...                 |
| (25) 37  | 18Cr-8Ni-N          | Wld. pipe             | SA-312        | TP304N      | S30451                | ...                      | ...                 |
| 38       | 18Cr-8Ni-N          | Wld. pipe             | SA-358        | 304N        | S30451                | 1                        | ...                 |
| (25) 39  | 18Cr-8Ni-N          | Smls. pipe            | SA-376        | TP304N      | S30451                | ...                      | ...                 |
| (25) 40  | 18Cr-8Ni-N          | Smls. pipe            | SA-376        | TP304N      | S30451                | ...                      | ...                 |
| 41       | 18Cr-8Ni-N          | Smls. & wld. fittings | SA-403        | 304N        | S30451                | ...                      | ...                 |
| 42       | 18Cr-8Ni-N          | Bar                   | SA-479        | 304N        | S30451                | ...                      | ...                 |
| 43       | 18Cr-8Ni-N          | Bar                   | SA-479        | 304N        | S30451                | ...                      | ...                 |
| 44       | 18Cr-8Ni-N          | Wld. tube             | SA-688        | TP304N      | S30451                | ...                      | ...                 |
| 45       | 18Cr-8Ni-N          | Wld. tube             | SA-688        | TP304N      | S30451                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                            |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|----------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                      |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                            |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                            |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                            |
| 1                                  | 8     | 1         | 75                         | 30                       | NP                    | 800 | 750    | NP  | HA-1                        | G5, G24                    |
| 2                                  | 8     | 1         | 75                         | 30                       | 1500                  | 800 | 1500   | NP  | HA-1                        | G5, G12, G22, T7           |
| 3                                  | 8     | 1         | 75                         | 31                       | NP                    | NP  | 1022   | 650 | HA-1                        | G5, G12, G30, H1, T7       |
| 4                                  | 8     | 1         | 75                         | 31                       | NP                    | NP  | 1022   | 650 | HA-1                        | G12, G30                   |
| 5                                  | 8     | 1         | 77                         | 35                       | NP                    | 650 | 700    | 650 | HA-3                        | G1, G5, G16, G17, G19      |
| 6                                  | 8     | 1         | 77                         | 35                       | NP                    | NP  | 700    | 650 | HA-3                        | G1, G19                    |
| 7                                  | 8     | 1         | 77                         | 35                       | NP                    | 650 | 650    | 650 | HA-1                        | G1, G5, G16, G17, G19      |
| 8                                  | 8     | 1         | 77                         | 35                       | NP                    | NP  | 650    | 650 | HA-1                        | G1, G19                    |
| 9                                  | 8     | 1         | 77                         | 35                       | NP                    | 650 | NP     | NP  | HA-3                        | G5, G16, G17, G19          |
| 10                                 | 8     | 1         | 77                         | 35                       | NP                    | 650 | NP     | NP  | HA-1                        | G5, G16, G17, G19          |
| 11                                 | 8     | 1         | 70                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5                         |
| 12                                 | 8     | 1         | 70                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5                         |
| 13                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5                         |
| 14                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5                         |
| 15                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5                         |
| 16                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5, W12, W14               |
| 17                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5, W12, W14               |
| 18                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5                         |
| 19                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5, W12, W14               |
| 20                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5                         |
| 21                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5, W12, W14               |
| 22                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5, W12, W14               |
| 23                                 | 8     | 1         | 75                         | 30                       | NP                    | 800 | 800    | NP  | HA-1                        | G5, W12, W14               |
| 24                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | NP     | NP  | HA-1                        | G5                         |
| 25                                 | 8     | 1         | 80                         | 35                       | 1200                  | 800 | 1200   | NP  | HA-1                        | G5, G12, T7                |
| 26                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | NP  | HA-1                        | G12, T8                    |
| 27                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | 1200   | 650 | HA-1                        | G5, G12, T7                |
| 28                                 | 8     | 1         | 80                         | 35                       | NP                    | NP  | 1200   | 650 | HA-1                        | G12, T8                    |
| 29                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | NP     | NP  | HA-1                        | G5, G12, T7, W13           |
| 30                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | NP     | NP  | HA-1                        | G12, T8, W13               |
| 31                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | NP     | NP  | HA-1                        | G5, G12, G24, T5           |
| 32                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-1                        | G12, G24, T8               |
| 33                                 | 8     | 1         | 80                         | 35                       | NP                    | NP  | 1200   | 650 | HA-1                        | G5, G12, G24, T5           |
| 34                                 | 8     | 1         | 80                         | 35                       | 1200                  | 800 | 1200   | 650 | HA-1                        | G5, G12, T7, W12, W13, W14 |
| 35                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-1                        | G12, T8, W13, W14          |
| 36                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-1                        | G5, G12, G24, T5           |
| 37                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-1                        | G12, G24, T8               |
| 38                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |
| 39                                 | 8     | 1         | 80                         | 35                       | 1200                  | 800 | 1200   | 650 | HA-1                        | G5, G12, T7                |
| 40                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | 1200   | 650 | HA-1                        | G12, T8                    |
| 41                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | 1200   | 650 | HA-1                        | G5, T7, W12, W14           |
| 42                                 | 8     | 1         | 80                         | 35                       | 1200                  | NP  | NP     | NP  | HA-1                        | G12, T8                    |
| 43                                 | 8     | 1         | 80                         | 35                       | 1200                  | 800 | NP     | NP  | HA-1                        | G5, G12, T7                |
| 44                                 | 8     | 1         | 80                         | 35                       | NP                    | 800 | NP     | NP  | HA-1                        | G5, W12                    |
| 45                                 | 8     | 1         | 80                         | 35                       | NP                    | NP  | 1200   | 650 | HA-1                        | G5, G12, G24, T7           |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 2        | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 3        | 20.3                                                                                                     | ... | 20.3 | ... | 20.3 | 18.9 | 17.7 | 16.8 | 16.4 | 16.1 | 15.7 | 15.4 | 15.1 | 14.8 |
| 4        | 20.3                                                                                                     | ... | 16.9 | ... | 15.2 | 14.0 | 13.1 | 12.5 | 12.2 | 11.9 | 11.7 | 11.4 | 11.2 | 11.0 |
| 5        | 22.0                                                                                                     | ... | 20.8 | ... | 19.4 | 18.8 | 18.6 | 18.6 | 18.6 | 18.5 | ...  | ...  | ...  | ...  |
| 6        | 22.0                                                                                                     | ... | 19.5 | ... | 17.5 | 16.1 | 15.1 | 14.3 | 14.0 | 13.7 | ...  | ...  | ...  | ...  |
| 7        | 22.0                                                                                                     | ... | 20.8 | ... | 19.4 | 18.8 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ...  |
| 8        | 22.0                                                                                                     | ... | 19.5 | ... | 17.5 | 16.1 | 15.1 | 14.3 | 14.0 | ...  | ...  | ...  | ...  | ...  |
| 9        | 22.0                                                                                                     | ... | 20.8 | ... | 19.4 | 18.8 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ...  |
| 10       | 22.0                                                                                                     | ... | 20.8 | ... | 19.4 | 18.8 | 18.6 | 18.6 | 18.6 | ...  | ...  | ...  | ...  | ...  |
| 11       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 12       | 20.0                                                                                                     | ... | 18.9 | ... | 17.7 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 13       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 14       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 15       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 16       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 17       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 18       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 19       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 20       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 21       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 22       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 23       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 24       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | ...  | ...  |
| 25       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 26       | 22.9                                                                                                     | ... | 19.1 | ... | 16.7 | 15.1 | 14.0 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.1 | 11.8 |
| 27       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 28       | 22.9                                                                                                     | ... | 19.1 | ... | 16.7 | 15.1 | 14.0 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.1 | 11.8 |
| 29       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 30       | 22.9                                                                                                     | ... | 19.1 | ... | 16.7 | 15.1 | 14.0 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.1 | 11.8 |
| 31       | 19.4                                                                                                     | ... | 19.4 | ... | 18.5 | 17.3 | 16.0 | 15.2 | 14.9 | 14.6 | 14.4 | 14.1 | 13.8 | 13.6 |
| 32       | 19.4                                                                                                     | ... | 16.2 | ... | 14.2 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.0 |
| 33       | 19.4                                                                                                     | ... | 19.4 | ... | 18.5 | 17.3 | 16.0 | 15.2 | 14.9 | 14.6 | 14.4 | 14.1 | 13.8 | 13.6 |
| 34       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 35       | 22.9                                                                                                     | ... | 19.1 | ... | 16.7 | 15.1 | 14.0 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.1 | 11.8 |
| 36       | 19.4                                                                                                     | ... | 19.4 | ... | 18.5 | 17.3 | 16.0 | 15.2 | 14.9 | 14.6 | 14.4 | 14.1 | 13.8 | 13.6 |
| 37       | 19.4                                                                                                     | ... | 16.2 | ... | 14.2 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.0 |
| 38       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | ...  | ...  |
| 39       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 40       | 22.9                                                                                                     | ... | 19.1 | ... | 16.7 | 15.1 | 14.0 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.1 | 11.8 |
| 41       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 42       | 22.9                                                                                                     | ... | 19.1 | ... | 16.7 | 15.1 | 14.0 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.1 | 11.8 |
| 43       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 44       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | ...  | ...  |
| 45       | 19.4                                                                                                     | ... | 19.4 | ... | 18.5 | 17.3 | 16.0 | 15.2 | 14.9 | 14.6 | 14.4 | 14.1 | 13.8 | 13.6 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 14.3                                                                                                     | 14.0 | 12.4 | 9.8  | 7.7  | 6.1  | 4.7  | 3.7  | 2.9  | 2.3  | 1.8  | 1.4  | ...  | ...  | ...  |
| 3        | 14.5                                                                                                     | 14.2 | 12.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 10.7                                                                                                     | 10.5 | 10.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 11.6                                                                                                     | 11.3 | 11.0 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 11.6                                                                                                     | 11.3 | 11.0 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 11.6                                                                                                     | 11.3 | 11.0 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 13.3                                                                                                     | 13.0 | 10.5 | 8.3  | 6.6  | 5.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | 9.8                                                                                                      | 9.6  | 9.4  | 8.3  | 6.6  | 5.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 33       | 13.3                                                                                                     | 13.0 | 10.5 | 8.3  | 6.6  | 5.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 11.6                                                                                                     | 11.3 | 11.0 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 13.3                                                                                                     | 13.0 | 10.5 | 8.3  | 6.6  | 5.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 37       | 9.8                                                                                                      | 9.6  | 9.4  | 8.3  | 6.6  | 5.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 40       | 11.6                                                                                                     | 11.3 | 11.0 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 41       | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 11.6                                                                                                     | 11.3 | 11.0 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 13.3                                                                                                     | 13.0 | 10.5 | 8.3  | 6.6  | 5.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form      | Spec. No.     | Type/Grade   | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-------------------|---------------|--------------|-----------------------|--------------------------|---------------------|
| 1        | 18Cr-8Ni-N          | Wld. tube         | SA-688        | TP304N       | S30451                | ...                      | ...                 |
| 2        | 18Cr-8Ni-N          | Wld. pipe         | SA-813        | TP304N       | S30451                | ...                      | ...                 |
| 3        | 18Cr-8Ni-N          | Wld. pipe         | SA-814        | TP304N       | S30451                | ...                      | ...                 |
| 4        | 18Cr-8Ni-N          | Forgings          | SA-965        | F304N        | S30451                | ...                      | ...                 |
| 5        | 18Cr-8Ni-N          | Forgings          | SA-965        | F304N        | S30451                | ...                      | ...                 |
| 6        | 18Cr-8Ni-N          | Plate             | SA/EN 10028-7 | X2CrNiN18-10 | ...                   | ...                      | ≤3                  |
| 7        | 18Cr-8Ni-N          | Plate             | SA/EN 10028-7 | X5CrNiN19-9  | ...                   | ...                      | ≤3                  |
| 8        | 18Cr-8Ni-N          | Plate             | SA/EN 10028-7 | X5CrNiN19-9  | ...                   | ...                      | ≤3                  |
| 9        | 18Cr-8Ni-4Si-N      | Bar               | SA-479        | ...          | S21800                | ...                      | ...                 |
| 10       | 18Cr-9Ni-3Cu-Cb-N   | Smls. tube        | SA-213        | ...          | S30432                | ...                      | ...                 |
| 11       | 18Cr-9Ni-3Cu-Cb-N   | Smls. tube        | SA-213        | ...          | S30432                | ...                      | ...                 |
| (25) 12  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F348H        | S34809                | ...                      | ...                 |
| (25) 13  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F348H        | S34809                | ...                      | ...                 |
| 14       | 18Cr-10Ni-Cb        | Castings          | SA-351        | CF8C         | J92710                | ...                      | ...                 |
| 15       | 18Cr-10Ni-Cb        | Castings          | SA-351        | CF8C         | J92710                | ...                      | ...                 |
| 16       | 18Cr-10Ni-Cb        | Castings          | SA-351        | CF8C         | J92710                | ...                      | ...                 |
| 17       | 18Cr-10Ni-Cb        | Cast pipe         | SA-451        | CPF8C        | J92710                | ...                      | ...                 |
| 18       | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F347         | S34700                | ...                      | >5                  |
| (25) 19  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F347         | S34700                | ...                      | ...                 |
| (25) 20  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F347         | S34700                | ...                      | ...                 |
| (25) 21  | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F347H        | S34709                | ...                      | >5                  |
| (25) 22  | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F347H        | S34709                | ...                      | >5                  |
| (25) 23  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F347H        | S34709                | ...                      | ...                 |
| (25) 24  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F347H        | S34709                | ...                      | ...                 |
| 25       | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F348         | S34800                | ...                      | >5                  |
| 26       | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F348         | S34800                | ...                      | >5                  |
| (25) 27  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F348         | S34800                | ...                      | ...                 |
| (25) 28  | 18Cr-10Ni-Cb        | Forgings          | SA-965        | F348         | S34800                | ...                      | ...                 |
| 29       | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F348H        | S34809                | ...                      | >5                  |
| 30       | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F348H        | S34809                | ...                      | >5                  |
| (25) 31  | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F347         | S34700                | ...                      | ≤5                  |
| (25) 32  | 18Cr-10Ni-Cb        | Forgings          | SA-182        | F347         | S34700                | ...                      | ≤5                  |
| (25) 33  | 18Cr-10Ni-Cb        | Smls. tube        | SA-213        | TP347        | S34700                | ...                      | ...                 |
| (25) 34  | 18Cr-10Ni-Cb        | Smls. tube        | SA-213        | TP347        | S34700                | ...                      | ...                 |
| 35       | 18Cr-10Ni-Cb        | Plate             | SA-240        | 347          | S34700                | ...                      | ...                 |
| 36       | 18Cr-10Ni-Cb        | Plate             | SA-240        | 347          | S34700                | ...                      | ...                 |
| 37       | 18Cr-10Ni-Cb        | Wld. tube         | SA-249        | TP347        | S34700                | ...                      | ...                 |
| 38       | 18Cr-10Ni-Cb        | Wld. tube         | SA-249        | TP347        | S34700                | ...                      | ...                 |
| (25) 39  | 18Cr-10Ni-Cb        | Wld. tube         | SA-249        | TP347        | S34700                | ...                      | ...                 |
| (25) 40  | 18Cr-10Ni-Cb        | Wld. tube         | SA-249        | TP347        | S34700                | ...                      | ...                 |
| 41       | 18Cr-10Ni-Cb        | Smls. & wld. pipe | SA-312        | TP347        | S34700                | ...                      | ...                 |
| 42       | 18Cr-10Ni-Cb        | Smls. & wld. pipe | SA-312        | TP347        | S34700                | ...                      | ...                 |
| (25) 43  | 18Cr-10Ni-Cb        | Wld. pipe         | SA-312        | TP347        | S34700                | ...                      | ...                 |
| (25) 44  | 18Cr-10Ni-Cb        | Wld. pipe         | SA-312        | TP347        | S34700                | ...                      | ...                 |
| (25) 45  | 18Cr-10Ni-Cb        | Wld. pipe         | SA-358        | 347          | S34700                | 1                        | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                                               |     |        |     |                             |                            |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|----------------------------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes                      |
|                                           |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                            |
| 1                                         | 8     | 1         | 80                         | 35                       | NP                                            | NP  | 1200   | 650 | HA-1                        | G12, G24, T8               |
| 2                                         | 8     | 1         | 80                         | 35                       | NP                                            | 800 | NP     | NP  | HA-1                        | G5, W12                    |
| 3                                         | 8     | 1         | 80                         | 35                       | NP                                            | 800 | NP     | NP  | HA-1                        | G5, W12                    |
| 4                                         | 8     | 1         | 80                         | 35                       | NP                                            | 800 | 1200   | 650 | HA-1                        | G5, G12, T7                |
| 5                                         | 8     | 1         | 80                         | 35                       | NP                                            | NP  | 1200   | 650 | HA-1                        | G12, T8                    |
| 6                                         | 8     | 1         | 80                         | 39                       | NP                                            | NP  | 800    | 650 | HA-1                        | G5, G30                    |
| 7                                         | 8     | 1         | 80                         | 39                       | NP                                            | NP  | 1022   | 650 | HA-1                        | G5, G12, G30, T7           |
| 8                                         | 8     | 1         | 80                         | 39                       | NP                                            | NP  | 1022   | 650 | HA-1                        | G12, G30                   |
| 9                                         | 8     | 3         | 95                         | 50                       | NP                                            | 800 | NP     | NP  | HA-6                        | ...                        |
| 10                                        | 8     | 1         | 86                         | 34                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, T12                    |
| 11                                        | 8     | 1         | 86                         | 34                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T12                        |
| 12                                        | 8     | 1         | 65                         | 25                       | NP                                            | NP  | 1500   | NP  | HA-2                        | G5, T9                     |
| 13                                        | 8     | 1         | 65                         | 25                       | NP                                            | NP  | 1500   | NP  | HA-2                        | T9                         |
| 14                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, G16, G17, G19          |
| 15                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G1, G5, G12, G19, T7       |
| 16                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G1, G12, G19, T7           |
| 17                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, G16, G17, G19          |
| 18                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T7                |
| 19                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T7                |
| 20                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 21                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | T9                         |
| 22                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 23                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | NP  | HA-2                        | T9                         |
| 24                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 25                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | T7                         |
| 26                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T7                |
| 27                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, T7                |
| 28                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 29                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | T9                         |
| 30                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 31                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, T6                |
| 32                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7                    |
| 33                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, T6                |
| 34                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7                    |
| 35                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T6                |
| 36                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 37                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G12, T7, W13               |
| 38                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, G12, T6, W12, W13      |
| 39                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T6           |
| 40                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G24, T7               |
| 41                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T6, W12, W13, W14 |
| 42                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7, W13, W14          |
| 43                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T6           |
| 44                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G24, T7               |
| 45                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 19.4                                                                                                     | ... | 16.2 | ... | 14.2 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.0 |
| 2        | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | ...  | ...  |
| 3        | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | ...  | ...  |
| 4        | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.3 | 18.9 | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 | 16.3 | 16.0 |
| 5        | 22.9                                                                                                     | ... | 19.1 | ... | 16.7 | 15.1 | 14.0 | 13.3 | 13.0 | 12.8 | 12.5 | 12.3 | 12.1 | 11.8 |
| 6        | 22.8                                                                                                     | ... | 22.8 | ... | 22.3 | 21.4 | 21.1 | 21.1 | 21.1 | 20.7 | 20.2 | 19.8 | ...  | ...  |
| 7        | 22.8                                                                                                     | ... | 22.8 | ... | 22.8 | 22.7 | 21.1 | 20.0 | 19.6 | 19.3 | 18.9 | 18.6 | 18.2 | 17.8 |
| 8        | 22.8                                                                                                     | ... | 21.3 | ... | 18.7 | 16.8 | 15.6 | 14.8 | 14.5 | 14.3 | 14.0 | 13.8 | 13.5 | 13.2 |
| 9        | 27.1                                                                                                     | ... | 25.9 | ... | 22.1 | 19.8 | 18.4 | 17.6 | 17.3 | 17.1 | 16.9 | 16.8 | ...  | ...  |
| 10       | 22.7                                                                                                     | ... | 22.7 | ... | 22.7 | 22.7 | 21.9 | 21.1 | 20.7 | 20.4 | 20.1 | 19.8 | 19.5 | 19.2 |
| 11       | 22.7                                                                                                     | ... | 19.8 | ... | 18.2 | 17.1 | 16.3 | 15.6 | 15.3 | 15.1 | 14.9 | 14.6 | 14.4 | 14.2 |
| 12       | 16.7                                                                                                     | ... | 16.7 | ... | 16.3 | 15.4 | 14.9 | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | 14.5 | 14.5 |
| 13       | 16.7                                                                                                     | ... | 15.3 | ... | 14.3 | 13.3 | 12.5 | 11.9 | 11.7 | 11.5 | 11.4 | 11.3 | 11.2 | 11.2 |
| 14       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | ...  | ...  |
| 15       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.8 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 16       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 17       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | ...  | ...  |
| 18       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.8 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 19       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.8 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 20       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 21       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 22       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 23       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 24       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 25       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 26       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.8 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 27       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.8 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 28       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 29       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 30       | 20.0                                                                                                     | ... | 19.1 | ... | 17.6 | 16.6 | 16.0 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 | 15.6 |
| 31       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 32       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 33       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 34       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 35       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 36       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 37       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 38       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 39       | 17.0                                                                                                     | ... | 17.0 | ... | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 40       | 17.0                                                                                                     | ... | 15.6 | ... | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 41       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 42       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 43       | 17.0                                                                                                     | ... | 17.0 | ... | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 44       | 17.0                                                                                                     | ... | 15.6 | ... | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 45       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 9.8                                                                                                      | 9.6  | 9.4  | 8.3  | 6.6  | 5.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 15.6                                                                                                     | 15.2 | 12.4 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 11.6                                                                                                     | 11.3 | 11.0 | 9.8  | 7.7  | 6.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 17.4                                                                                                     | 17.0 | 12.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 12.9                                                                                                     | 12.6 | 12.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 18.9                                                                                                     | 18.6 | 18.3 | 18.1 | 14.7 | 11.4 | 8.7  | 6.5  | 4.7  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  |
| 11       | 14.0                                                                                                     | 13.8 | 13.6 | 13.4 | 13.2 | 11.4 | 8.7  | 6.5  | 4.7  | 3.3  | 2.2  | 1.5  | ...  | ...  | ...  |
| 12       | 14.4                                                                                                     | 14.2 | 14.0 | 13.7 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 13       | 11.2                                                                                                     | 11.2 | 11.1 | 11.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 15.5                                                                                                     | 15.3 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 16       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 15.5                                                                                                     | 15.3 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 19       | 15.5                                                                                                     | 15.3 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 20       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 21       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 22       | 15.5                                                                                                     | 15.3 | 15.1 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 23       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 24       | 15.5                                                                                                     | 15.3 | 15.1 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 25       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 26       | 15.5                                                                                                     | 15.3 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 27       | 15.5                                                                                                     | 15.3 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 28       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 29       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 30       | 15.5                                                                                                     | 15.3 | 15.1 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 31       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 32       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 33       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 34       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 35       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 36       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 37       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 38       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 39       | 14.1                                                                                                     | 13.6 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | (25) |
| 40       | 11.4                                                                                                     | 11.4 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | (25) |
| 41       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 42       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 43       | 14.1                                                                                                     | 13.6 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | (25) |
| 44       | 11.4                                                                                                     | 11.4 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | (25) |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.    | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|--------------|------------|-----------------------|--------------------------|---------------------|
| (25) 1   | 18Cr-10Ni-Cb        | Smls. pipe            | SA-376       | TP347      | S34700                | ...                      | ...                 |
| (25) 2   | 18Cr-10Ni-Cb        | Smls. pipe            | SA-376       | TP347      | S34700                | ...                      | ...                 |
| 3        | 18Cr-10Ni-Cb        | Smls. & wld. fittings | SA-403       | 347        | S34700                | ...                      | ...                 |
| (25) 4   | 18Cr-10Ni-Cb        | Wld. pipe             | SA-409       | TP347      | S34700                | ...                      | ...                 |
| 5        | 18Cr-10Ni-Cb        | Bar                   | SA-479       | 347        | S34700                | ...                      | ...                 |
| 6        | 18Cr-10Ni-Cb        | Bar                   | SA-479       | 347        | S34700                | ...                      | ...                 |
| (25) 7   | 18Cr-10Ni-Cb        | Wld. pipe             | SA-813       | TP347      | S34700                | ...                      | ...                 |
| 8        | 18Cr-10Ni-Cb        | Bar                   | SA/JIS G4303 | SUS347     | ...                   | ...                      | ...                 |
| (25) 9   | 18Cr-10Ni-Cb        | Forgings              | SA-182       | F347H      | S34709                | ...                      | ≤5                  |
| (25) 10  | 18Cr-10Ni-Cb        | Forgings              | SA-182       | F347H      | S34709                | ...                      | ≤5                  |
| (25) 11  | 18Cr-10Ni-Cb        | Smls. tube            | SA-213       | TP347H     | S34709                | ...                      | ...                 |
| (25) 12  | 18Cr-10Ni-Cb        | Smls. tube            | SA-213       | TP347H     | S34709                | ...                      | ...                 |
| (25) 13  | 18Cr-10Ni-Cb        | Plate                 | SA-240       | 347H       | S34709                | ...                      | ...                 |
| (25) 14  | 18Cr-10Ni-Cb        | Plate                 | SA-240       | 347H       | S34709                | ...                      | ...                 |
| 15       | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP347H     | S34709                | ...                      | ...                 |
| 16       | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP347H     | S34709                | ...                      | ...                 |
| (25) 17  | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP347H     | S34709                | ...                      | ...                 |
| (25) 18  | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP347H     | S34709                | ...                      | ...                 |
| (25) 19  | 18Cr-10Ni-Cb        | Smls. & wld. pipe     | SA-312       | TP347H     | S34709                | ...                      | ...                 |
| (25) 20  | 18Cr-10Ni-Cb        | Smls. & wld. pipe     | SA-312       | TP347H     | S34709                | ...                      | ...                 |
| (25) 21  | 18Cr-10Ni-Cb        | Wld. pipe             | SA-312       | TP347H     | S34709                | ...                      | ...                 |
| (25) 22  | 18Cr-10Ni-Cb        | Wld. pipe             | SA-312       | TP347H     | S34709                | ...                      | ...                 |
| (25) 23  | 18Cr-10Ni-Cb        | Smls. pipe            | SA-376       | TP347H     | S34709                | ...                      | ...                 |
| (25) 24  | 18Cr-10Ni-Cb        | Smls. pipe            | SA-376       | TP347H     | S34709                | ...                      | ...                 |
| (25) 25  | 18Cr-10Ni-Cb        | Smls. & wld. fittings | SA-403       | 347H       | S34709                | ...                      | ...                 |
| (25) 26  | 18Cr-10Ni-Cb        | Bar                   | SA-479       | 347H       | S34709                | ...                      | ...                 |
| (25) 27  | 18Cr-10Ni-Cb        | Bar                   | SA-479       | 347H       | S34709                | ...                      | ...                 |
| (25) 28  | 18Cr-10Ni-Cb        | Wld. pipe             | SA-813       | TP347H     | S34709                | ...                      | ...                 |
| 29       | 18Cr-10Ni-Cb        | Wld. pipe             | SA-814       | TP347H     | S34709                | ...                      | ...                 |
| 30       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213       | TP347LN    | S34751                | ...                      | ...                 |
| 31       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213       | TP347LN    | S34751                | ...                      | ...                 |
| 32       | 18Cr-10Ni-Cb        | Smls. pipe            | SA-312       | TP347LN    | S34751                | ...                      | ...                 |
| 33       | 18Cr-10Ni-Cb        | Smls. pipe            | SA-312       | TP347LN    | S34751                | ...                      | ...                 |
| 34       | 18Cr-10Ni-Cb        | Forgings              | SA-182       | F348       | S34800                | ...                      | ≤5                  |
| 35       | 18Cr-10Ni-Cb        | Forgings              | SA-182       | F348       | S34800                | ...                      | ≤5                  |
| 36       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213       | TP348      | S34800                | ...                      | ...                 |
| 37       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213       | TP348      | S34800                | ...                      | ...                 |
| 38       | 18Cr-10Ni-Cb        | Plate                 | SA-240       | 348        | S34800                | ...                      | ...                 |
| 39       | 18Cr-10Ni-Cb        | Plate                 | SA-240       | 348        | S34800                | ...                      | ...                 |
| 40       | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP348      | S34800                | ...                      | ...                 |
| 41       | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP348      | S34800                | ...                      | ...                 |
| (25) 42  | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP348      | S34800                | ...                      | ...                 |
| (25) 43  | 18Cr-10Ni-Cb        | Wld. tube             | SA-249       | TP348      | S34800                | ...                      | ...                 |
| 44       | 18Cr-10Ni-Cb        | Smls. & wld. pipe     | SA-312       | TP348      | S34800                | ...                      | ...                 |
| 45       | 18Cr-10Ni-Cb        | Smls. pipe            | SA-312       | TP348      | S34800                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                                               |     |        |     |                             |                       |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|-----------------------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes                 |
|                                           |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                       |
| 1                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T6           |
| 2                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7               |
| 3                                         | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T6, W12, W14 |
| 4                                         | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12               |
| 5                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, G22, T6      |
| 6                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G22, T7          |
| 7                                         | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12               |
| 8                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, G22, T6      |
| 9                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                |
| 10                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T9                    |
| 11                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                |
| 12                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T9                    |
| 13                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                |
| 14                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T9                    |
| 15                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, T8, W12, W13      |
| 16                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | T9, W13               |
| 17                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, G24, T8           |
| 18                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G24, T9               |
| 19                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8, W12, W13, W14 |
| 20                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T9, W13, W14          |
| 21                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, G24, T8           |
| 22                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G24, T9               |
| 23                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                |
| 24                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T9                    |
| 25                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, T8, W12, W14      |
| 26                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, T8                |
| 27                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | T9                    |
| 28                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12               |
| 29                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12               |
| 30                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1100   | NP  | HA-2                        | G5, T8                |
| 31                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1100   | NP  | HA-2                        | ...                   |
| 32                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1100   | NP  | HA-2                        | G5, T8                |
| 33                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1100   | NP  | HA-2                        | ...                   |
| 34                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, T6           |
| 35                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7               |
| 36                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, T6           |
| 37                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7               |
| 38                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T6           |
| 39                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T7               |
| 40                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G12, T7, W13          |
| 41                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, G12, T6, W12, W13 |
| 42                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T6      |
| 43                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G24, T7          |
| 44                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T6, W12, W14 |
| 45                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7               |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 2        | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 3        | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 4        | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 5        | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 6        | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 7        | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 8        | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 9        | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 10       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 11       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 12       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 13       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 14       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 15       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 16       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 17       | 17.0                                                                                                     | ... | 17.0 | ... | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 18       | 17.0                                                                                                     | ... | 15.6 | ... | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 19       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 20       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 21       | 17.0                                                                                                     | ... | 17.0 | ... | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 22       | 17.0                                                                                                     | ... | 15.6 | ... | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 23       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 24       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 25       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 26       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 27       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 28       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 29       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 30       | 20.0                                                                                                     | ... | 20.0 | ... | 19.1 | 17.8 | 16.9 | 16.5 | 16.4 | 16.3 | 16.3 | 16.3 | 16.3 | 16.2 |
| 31       | 20.0                                                                                                     | ... | 17.7 | ... | 16.0 | 14.6 | 13.6 | 12.9 | 12.7 | 12.6 | 12.5 | 12.4 | 12.4 | 12.4 |
| 32       | 20.0                                                                                                     | ... | 20.0 | ... | 19.1 | 17.8 | 16.9 | 16.5 | 16.4 | 16.3 | 16.3 | 16.3 | 16.3 | 16.2 |
| 33       | 20.0                                                                                                     | ... | 17.7 | ... | 16.0 | 14.6 | 13.6 | 12.9 | 12.7 | 12.6 | 12.5 | 12.4 | 12.4 | 12.4 |
| 34       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 35       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 36       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 37       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 38       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 39       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 40       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 41       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 42       | 17.0                                                                                                     | ... | 17.0 | ... | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 43       | 17.0                                                                                                     | ... | 15.6 | ... | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 44       | 20.0                                                                                                     | ... | 20.0 | ... | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 45       | 20.0                                                                                                     | ... | 18.4 | ... | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 2        | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 3        | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 5        | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 6        | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 8        | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 9        | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 10       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 11       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 12       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 13       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 14       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 15       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 16       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 17       | 14.1                                                                                                     | 14.0 | 13.7 | 12.0 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | (25) |
| 18       | 11.4                                                                                                     | 11.4 | 11.4 | 11.3 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | (25) |
| 19       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 20       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 21       | 14.1                                                                                                     | 14.0 | 13.7 | 12.0 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | (25) |
| 22       | 11.4                                                                                                     | 11.4 | 11.4 | 11.3 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | (25) |
| 23       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 24       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 25       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 26       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 27       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | (25) |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 30       | 16.1                                                                                                     | 15.8 | 15.6 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | 12.4                                                                                                     | 12.4 | 12.3 | 12.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | 16.1                                                                                                     | 15.8 | 15.6 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 33       | 12.4                                                                                                     | 12.4 | 12.3 | 12.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 34       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 35       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 36       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 37       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 38       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 39       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 40       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 41       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 42       | 14.1                                                                                                     | 13.6 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | (25) |
| 43       | 11.4                                                                                                     | 11.4 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | (25) |
| 44       | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |
| 45       | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | (25) |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.            |
|----------|---------------------|-----------------------|-----------|------------|-----------------------|--------------------------|--------------------------------|
| 1        | 18Cr-10Ni-Cb        | Wld. pipe             | SA-312    | TP348      | S34800                | ...                      | ...                            |
| 2        | 18Cr-10Ni-Cb        | Wld. pipe             | SA-312    | TP348      | S34800                | ...                      | ...                            |
| 3        | 18Cr-10Ni-Cb        | Wld. pipe             | SA-358    | 348        | S34800                | 1                        | ...                            |
| 4        | 18Cr-10Ni-Cb        | Smls. pipe            | SA-376    | TP348      | S34800                | ...                      | ...                            |
| 5        | 18Cr-10Ni-Cb        | Smls. pipe            | SA-376    | TP348      | S34800                | ...                      | ...                            |
| 6        | 18Cr-10Ni-Cb        | Smls. & wld. fittings | SA-403    | 348        | S34800                | ...                      | ...                            |
| 7        | 18Cr-10Ni-Cb        | Wld. pipe             | SA-409    | TP348      | S34800                | ...                      | ...                            |
| 8        | 18Cr-10Ni-Cb        | Bar                   | SA-479    | 348        | S34800                | ...                      | ...                            |
| 9        | 18Cr-10Ni-Cb        | Bar                   | SA-479    | 348        | S34800                | ...                      | ...                            |
| 10       | 18Cr-10Ni-Cb        | Wld. pipe             | SA-813    | TP348      | S34800                | ...                      | ...                            |
| 11       | 18Cr-10Ni-Cb        | Wld. pipe             | SA-814    | TP348      | S34800                | ...                      | ...                            |
| 12       | 18Cr-10Ni-Cb        | Forgings              | SA-182    | F348H      | S34809                | ...                      | ≤5                             |
| 13       | 18Cr-10Ni-Cb        | Forgings              | SA-182    | F348H      | S34809                | ...                      | ≤5                             |
| 14       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213    | TP348H     | S34809                | ...                      | ...                            |
| 15       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213    | TP348H     | S34809                | ...                      | ...                            |
| 16       | 18Cr-10Ni-Cb        | Plate                 | SA-240    | 348H       | S34809                | ...                      | ...                            |
| 17       | 18Cr-10Ni-Cb        | Wld. tube             | SA-249    | TP348H     | S34809                | ...                      | ...                            |
| 18       | 18Cr-10Ni-Cb        | Wld. tube             | SA-249    | TP348H     | S34809                | ...                      | ...                            |
| (25) 19  | 18Cr-10Ni-Cb        | Wld. tube             | SA-249    | TP348H     | S34809                | ...                      | ...                            |
| (25) 20  | 18Cr-10Ni-Cb        | Wld. tube             | SA-249    | TP348H     | S34809                | ...                      | ...                            |
| 21       | 18Cr-10Ni-Cb        | Smls. & wld. pipe     | SA-312    | TP348H     | S34809                | ...                      | ...                            |
| 22       | 18Cr-10Ni-Cb        | Smls. pipe            | SA-312    | TP348H     | S34809                | ...                      | ...                            |
| 23       | 18Cr-10Ni-Cb        | Wld. pipe             | SA-312    | TP348H     | S34809                | ...                      | ...                            |
| 24       | 18Cr-10Ni-Cb        | Wld. pipe             | SA-312    | TP348H     | S34809                | ...                      | ...                            |
| 25       | 18Cr-10Ni-Cb        | Smls. & wld. fittings | SA-403    | 348H       | S34809                | ...                      | ...                            |
| 26       | 18Cr-10Ni-Cb        | Bar                   | SA-479    | 348H       | S34809                | ...                      | ...                            |
| 27       | 18Cr-10Ni-Cb        | Bar                   | SA-479    | 348H       | S34809                | ...                      | ...                            |
| 28       | 18Cr-10Ni-Cb        | Wld. pipe             | SA-813    | TP348H     | S34809                | ...                      | ...                            |
| 29       | 18Cr-10Ni-Cb        | Wld. pipe             | SA-814    | TP348H     | S34809                | ...                      | ...                            |
| 30       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213    | TP347HFG   | S34710                | ...                      | ...                            |
| 31       | 18Cr-10Ni-Cb        | Smls. tube            | SA-213    | TP347HFG   | S34710                | ...                      | ...                            |
| 32       | 18Cr-10Ni-Ti        | Smls. pipe            | SA-312    | TP321      | S32100                | ...                      | > <sup>3</sup> / <sub>8</sub>  |
| 33       | 18Cr-10Ni-Ti        | Smls. pipe            | SA-312    | TP321      | S32100                | ...                      | > <sup>3</sup> / <sub>8</sub>  |
| 34       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-312    | TP321      | S32100                | ...                      | > <sup>3</sup> / <sub>8</sub>  |
| 35       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-312    | TP321      | S32100                | ...                      | > <sup>3</sup> / <sub>8</sub>  |
| (25) 36  | 18Cr-10Ni-Ti        | Smls. pipe            | SA-376    | TP321      | S32100                | ...                      | > <sup>3</sup> / <sub>8</sub>  |
| (25) 37  | 18Cr-10Ni-Ti        | Smls. pipe            | SA-376    | TP321      | S32100                | ...                      | > <sup>3</sup> / <sub>8</sub>  |
| 38       | 18Cr-10Ni-Ti        | Smls. pipe            | SA-312    | TP321H     | S32109                | ...                      | > <sup>3</sup> / <sub>16</sub> |
| 39       | 18Cr-10Ni-Ti        | Smls. pipe            | SA-312    | TP321H     | S32109                | ...                      | > <sup>3</sup> / <sub>16</sub> |
| 40       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-312    | TP321H     | S32109                | ...                      | > <sup>3</sup> / <sub>16</sub> |
| 41       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-312    | TP321H     | S32109                | ...                      | > <sup>3</sup> / <sub>16</sub> |
| (25) 42  | 18Cr-10Ni-Ti        | Smls. pipe            | SA-376    | TP321H     | S32109                | ...                      | > <sup>3</sup> / <sub>8</sub>  |
| 43       | 18Cr-10Ni-Ti        | Forgings              | SA-182    | F321       | S32100                | ...                      | >5                             |
| 44       | 18Cr-10Ni-Ti        | Forgings              | SA-182    | F321       | S32100                | ...                      | >5                             |
| (25) 45  | 18Cr-10Ni-Ti        | Forgings              | SA-965    | F321       | S32100                | ...                      | ...                            |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                                               |     |        |     |                             |                            |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|----------------------------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes                      |
|                                           |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                            |
| 1                                         | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T6           |
| 2                                         | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T7               |
| 3                                         | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 4                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, H1, T6            |
| 5                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, H1, T7                |
| 6                                         | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, H2, T6, W12, W14  |
| 7                                         | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 8                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, G22, H1, T6       |
| 9                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G22, H1, T7           |
| 10                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, H1, W12                |
| 11                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 12                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 13                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T9                         |
| 14                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, H2, T8                 |
| 15                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | H2, T9                     |
| 16                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, H2                     |
| 17                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, T8, W12, W13           |
| 18                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | T9, W13                    |
| 19                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, G24, T8                |
| 20                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G24, T9                    |
| 21                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, H2, T8, W12, W14       |
| 22                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | H2, T9                     |
| 23                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | NP  | HA-2                        | G5, G24, H2, T8            |
| 24                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | NP  | HA-2                        | G24, H2, T9                |
| 25                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, H2, T8, W12, W14       |
| 26                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, H2, T8                 |
| 27                                        | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | H2, T9                     |
| 28                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, H2, W12                |
| 29                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 30                                        | 8     | 1         | 80                         | 30                       | 1350                                          | NP  | NP     | NP  | HA-2                        | G5, T9                     |
| 31                                        | 8     | 1         | 80                         | 30                       | 1350                                          | NP  | NP     | NP  | HA-2                        | T9                         |
| 32                                        | 8     | 1         | 70                         | 25                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, T7                |
| 33                                        | 8     | 1         | 70                         | 25                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7                    |
| 34                                        | 8     | 1         | 70                         | 25                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, T7, W12, W13, W14 |
| 35                                        | 8     | 1         | 70                         | 25                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7, W13, W14          |
| 36                                        | 8     | 1         | 70                         | 25                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T7                |
| 37                                        | 8     | 1         | 70                         | 25                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 38                                        | 8     | 1         | 70                         | 25                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 39                                        | 8     | 1         | 70                         | 25                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                         |
| 40                                        | 8     | 1         | 70                         | 25                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8, W12, W13, W14      |
| 41                                        | 8     | 1         | 70                         | 25                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8, W13, W14               |
| 42                                        | 8     | 1         | 70                         | 25                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 43                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, G12, T6                |
| 44                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7                    |
| 45                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T6                |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 17.0                                                                                                     | ...  | 17.0 | ...  | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 2        | 17.0                                                                                                     | ...  | 15.6 | ...  | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 3        | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 4        | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 5        | 20.0                                                                                                     | ...  | 18.4 | ...  | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 6        | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 7        | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 8        | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.2 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 9        | 20.0                                                                                                     | ...  | 18.4 | ...  | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 10       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 11       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 12       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 13       | 20.0                                                                                                     | ...  | 18.4 | ...  | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 14       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 15       | 20.0                                                                                                     | ...  | 18.4 | ...  | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 16       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 17       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 18       | 20.0                                                                                                     | ...  | 18.4 | ...  | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 19       | 17.0                                                                                                     | ...  | 17.0 | ...  | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 20       | 17.0                                                                                                     | ...  | 15.6 | ...  | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 21       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 22       | 20.0                                                                                                     | ...  | 18.4 | ...  | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 23       | 17.0                                                                                                     | ...  | 17.0 | ...  | 16.0 | 15.1 | 14.6 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.3 | 14.2 |
| 24       | 17.0                                                                                                     | ...  | 15.6 | ...  | 14.6 | 13.6 | 12.8 | 12.2 | 11.9 | 11.8 | 11.6 | 11.5 | 11.5 | 11.4 |
| 25       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 26       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | 16.8 | 16.7 |
| 27       | 20.0                                                                                                     | ...  | 18.4 | ...  | 17.1 | 16.0 | 15.0 | 14.3 | 14.0 | 13.8 | 13.7 | 13.6 | 13.5 | 13.4 |
| 28       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 29       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.8 | 17.8 | 17.1 | 16.9 | 16.8 | 16.8 | 16.8 | 16.8 | ...  | ...  |
| 30       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 19.1 | 19.0 | 18.9 | 18.8 | 18.6 | 18.3 | 18.1 |
| 31       | 20.0                                                                                                     | ...  | 18.1 | ...  | 16.9 | 15.9 | 15.2 | 14.6 | 14.4 | 14.1 | 13.9 | 13.8 | 13.6 | 13.4 |
| 32       | 16.7                                                                                                     | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.1 | 15.2 | 14.9 | 14.6 | 14.3 | 14.1 | 13.9 | 13.8 |
| 33       | 16.7                                                                                                     | 15.6 | 15.0 | 14.4 | 13.8 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.2 |
| 34       | 16.7                                                                                                     | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.1 | 15.2 | 14.9 | 14.6 | 14.3 | 14.1 | 13.9 | 13.8 |
| 35       | 16.7                                                                                                     | 15.6 | 15.0 | 14.4 | 13.8 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.2 |
| 36       | 16.7                                                                                                     | ...  | 16.7 | ...  | 16.7 | 16.7 | 16.1 | 15.2 | 14.9 | 14.6 | 14.3 | 14.1 | 13.9 | 13.8 |
| 37       | 16.7                                                                                                     | ...  | 15.0 | ...  | 13.8 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.2 |
| 38       | 16.7                                                                                                     | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.1 | 15.2 | 14.9 | 14.6 | 14.3 | 14.1 | 13.9 | 13.8 |
| 39       | 16.7                                                                                                     | 15.6 | 15.0 | 14.4 | 13.8 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.2 |
| 40       | 16.7                                                                                                     | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.1 | 15.2 | 14.9 | 14.6 | 14.3 | 14.1 | 13.9 | 13.8 |
| 41       | 16.7                                                                                                     | 15.6 | 15.0 | 14.4 | 13.8 | 12.8 | 11.9 | 11.3 | 11.0 | 10.8 | 10.6 | 10.5 | 10.3 | 10.2 |
| 42       | 16.7                                                                                                     | ...  | 16.7 | ...  | 16.7 | 16.7 | 16.1 | 15.2 | 14.9 | 14.6 | 14.3 | 14.1 | 13.9 | 13.8 |
| 43       | 20.0                                                                                                     | ...  | 19.0 | ...  | 17.8 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 44       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 45       | 20.0                                                                                                     | ...  | 19.0 | ...  | 17.8 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 14.1                                                                                                     | 13.6 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | ...  |
| 2        | 11.4                                                                                                     | 11.4 | 10.3 | 7.8  | 5.2  | 3.8  | 2.8  | 1.9  | 1.3  | 1.0  | 0.77 | 0.68 | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 5        | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 6        | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 16.6                                                                                                     | 16.0 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 9        | 13.4                                                                                                     | 13.4 | 12.1 | 9.1  | 6.1  | 4.4  | 3.3  | 2.2  | 1.5  | 1.2  | 0.90 | 0.80 | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 13       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 14       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 15       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 18       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 19       | 14.1                                                                                                     | 14.0 | 13.7 | 12.0 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | (25) |
| 20       | 11.4                                                                                                     | 11.4 | 11.4 | 11.3 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | (25) |
| 21       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 22       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 23       | 14.1                                                                                                     | 14.0 | 13.7 | 12.0 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | ...  |
| 24       | 11.4                                                                                                     | 11.4 | 11.4 | 11.3 | 8.9  | 6.7  | 5.0  | 3.7  | 2.7  | 2.1  | 1.6  | 1.1  | ...  | ...  | ...  |
| 25       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 26       | 16.6                                                                                                     | 16.4 | 16.2 | 14.1 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 27       | 13.4                                                                                                     | 13.4 | 13.4 | 13.3 | 10.5 | 7.9  | 5.9  | 4.4  | 3.2  | 2.5  | 1.8  | 1.3  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 17.9                                                                                                     | 17.7 | 17.5 | 16.6 | 12.8 | 9.7  | 7.3  | 5.4  | 4.0  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 13.3                                                                                                     | 13.1 | 13.0 | 12.8 | 12.8 | 9.7  | 7.3  | 5.4  | 4.0  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 13.6                                                                                                     | 13.5 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 33       | 10.1                                                                                                     | 10.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 34       | 13.6                                                                                                     | 13.5 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 35       | 10.1                                                                                                     | 10.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 36       | 13.6                                                                                                     | 13.5 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | (25) |
| 37       | 10.1                                                                                                     | 10.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | (25) |
| 38       | 13.6                                                                                                     | 13.5 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 39       | 10.1                                                                                                     | 10.0 | 9.9  | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 40       | 13.6                                                                                                     | 13.5 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 41       | 10.1                                                                                                     | 10.0 | 9.9  | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 42       | 13.6                                                                                                     | 13.5 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | (25) |
| 43       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 44       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 45       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | (25) |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.     | Type/Grade    | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.           |
|----------|---------------------|-----------------------|---------------|---------------|-----------------------|--------------------------|-------------------------------|
| (25) 1   | 18Cr-10Ni-Ti        | Forgings              | SA-965        | F321          | S32100                | ...                      | ...                           |
| (25) 2   | 18Cr-10Ni-Ti        | Forgings              | SA-182        | F321H         | S32109                | ...                      | >5                            |
| (25) 3   | 18Cr-10Ni-Ti        | Forgings              | SA-182        | F321H         | S32109                | ...                      | >5                            |
| (25) 4   | 18Cr-10Ni-Ti        | Forgings              | SA-965        | F321H         | S32109                | ...                      | ...                           |
| (25) 5   | 18Cr-10Ni-Ti        | Forgings              | SA-965        | F321H         | S32109                | ...                      | ...                           |
| 6        | 18Cr-10Ni-Ti        | Plate                 | SA/EN 10028-7 | X6CrNiTi18-10 | ...                   | ...                      | ≤3                            |
| 7        | 18Cr-10Ni-Ti        | Plate                 | SA/EN 10028-7 | X6CrNiTi18-10 | ...                   | ...                      | ≤3                            |
| 8        | 18Cr-10Ni-Ti        | Forgings              | SA-182        | F321          | S32100                | ...                      | ≤5                            |
| 9        | 18Cr-10Ni-Ti        | Forgings              | SA-182        | F321          | S32100                | ...                      | ≤5                            |
| 10       | 18Cr-10Ni-Ti        | Forgings              | SA-182        | F321          | S32100                | ...                      | ≤5                            |
| 11       | 18Cr-10Ni-Ti        | Smls. tube            | SA-213        | TP321         | S32100                | ...                      | ...                           |
| 12       | 18Cr-10Ni-Ti        | Smls. tube            | SA-213        | TP321         | S32100                | ...                      | ...                           |
| 13       | 18Cr-10Ni-Ti        | Smls. tube            | SA-213        | TP321         | S32100                | ...                      | ...                           |
| 14       | 18Cr-10Ni-Ti        | Plate                 | SA-240        | 321           | S32100                | ...                      | ...                           |
| 15       | 18Cr-10Ni-Ti        | Plate                 | SA-240        | 321           | S32100                | ...                      | ...                           |
| 16       | 18Cr-10Ni-Ti        | Plate                 | SA-240        | 321           | S32100                | ...                      | ...                           |
| 17       | 18Cr-10Ni-Ti        | Wld. tube             | SA-249        | TP321         | S32100                | ...                      | ...                           |
| 18       | 18Cr-10Ni-Ti        | Wld. tube             | SA-249        | TP321         | S32100                | ...                      | ...                           |
| (25) 19  | 18Cr-10Ni-Ti        | Wld. tube             | SA-249        | TP321         | S32100                | ...                      | ...                           |
| (25) 20  | 18Cr-10Ni-Ti        | Wld. tube             | SA-249        | TP321         | S32100                | ...                      | ...                           |
| 21       | 18Cr-10Ni-Ti        | Smls. pipe            | SA-312        | TP321         | S32100                | ...                      | ≤ <sup>3</sup> / <sub>8</sub> |
| 22       | 18Cr-10Ni-Ti        | Smls. pipe            | SA-312        | TP321         | S32100                | ...                      | ≤ <sup>3</sup> / <sub>8</sub> |
| 23       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-312        | TP321         | S32100                | ...                      | ≤ <sup>3</sup> / <sub>8</sub> |
| 24       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-312        | TP321         | S32100                | ...                      | ≤ <sup>3</sup> / <sub>8</sub> |
| (25) 25  | 18Cr-10Ni-Ti        | Wld. pipe             | SA-358        | 321           | S32100                | 1                        | ...                           |
| (25) 26  | 18Cr-10Ni-Ti        | Smls. pipe            | SA-376        | TP321         | S32100                | ...                      | ≤ <sup>3</sup> / <sub>8</sub> |
| (25) 27  | 18Cr-10Ni-Ti        | Smls. pipe            | SA-376        | TP321         | S32100                | ...                      | ≤ <sup>3</sup> / <sub>8</sub> |
| 28       | 18Cr-10Ni-Ti        | Smls. pipe            | SA-376        | TP321         | S32100                | ...                      | ≤ <sup>3</sup> / <sub>8</sub> |
| 29       | 18Cr-10Ni-Ti        | Smls. & wld. fittings | SA-403        | 321           | S32100                | ...                      | ...                           |
| 30       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-409        | TP321         | S32100                | ...                      | ...                           |
| (25) 31  | 18Cr-10Ni-Ti        | Bar                   | SA-479        | 321           | S32100                | ...                      | ...                           |
| (25) 32  | 18Cr-10Ni-Ti        | Bar                   | SA-479        | 321           | S32100                | ...                      | ...                           |
| (25) 33  | 18Cr-10Ni-Ti        | Bar                   | SA-479        | 321           | S32100                | ...                      | ...                           |
| (25) 34  | 18Cr-10Ni-Ti        | Wld. pipe             | SA-813        | TP321         | S32100                | ...                      | ...                           |
| 35       | 18Cr-10Ni-Ti        | Wld. pipe             | SA-814        | TP321         | S32100                | ...                      | ...                           |
| (25) 36  | 18Cr-10Ni-Ti        | Bar                   | SA/JIS G4303  | SUS321        | ...                   | ...                      | ...                           |
| (25) 37  | 18Cr-10Ni-Ti        | Forgings              | SA-182        | F321H         | S32109                | ...                      | ≤5                            |
| (25) 38  | 18Cr-10Ni-Ti        | Forgings              | SA-182        | F321H         | S32109                | ...                      | ≤5                            |
| (25) 39  | 18Cr-10Ni-Ti        | Smls. tube            | SA-213        | TP321H        | S32109                | ...                      | ...                           |
| (25) 40  | 18Cr-10Ni-Ti        | Smls. tube            | SA-213        | TP321H        | S32109                | ...                      | ...                           |
| (25) 41  | 18Cr-10Ni-Ti        | Plate                 | SA-240        | 321H          | S32109                | ...                      | ...                           |
| (25) 42  | 18Cr-10Ni-Ti        | Plate                 | SA-240        | 321H          | S32109                | ...                      | ...                           |
| 43       | 18Cr-10Ni-Ti        | Wld. tube             | SA-249        | TP321H        | S32109                | ...                      | ...                           |
| 44       | 18Cr-10Ni-Ti        | Wld. tube             | SA-249        | TP321H        | S32109                | ...                      | ...                           |
| (25) 45  | 18Cr-10Ni-Ti        | Wld. tube             | SA-249        | TP321H        | S32109                | ...                      | ...                           |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |     |        |     |                             |                            |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|----------------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes                      |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |                            |
|                                    |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                            |
| 1                                  | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 2                                  | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 3                                  | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                         |
| 4                                  | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 5                                  | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 1500   | NP  | HA-2                        | T8                         |
| 6                                  | 8     | 1         | 73                         | 29                       | NP                                            | NP  | 1022   | 650 | HA-2                        | G5, G12, G30, T6           |
| 7                                  | 8     | 1         | 73                         | 29                       | NP                                            | NP  | 1022   | 650 | HA-2                        | G12, G30, T7               |
| 8                                  | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G5, G12, T7                |
| 9                                  | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 10                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T6                |
| 11                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G5, G12, T7                |
| 12                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7                    |
| 13                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, G12, T6                |
| 14                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G5, G12, T7                |
| 15                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 16                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T6                |
| 17                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G12, T7, W13               |
| 18                                 | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, G12, T7, W12, W13      |
| 19                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T7           |
| 20                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G24, T7               |
| 21                                 | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T7                |
| 22                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T7                    |
| 23                                 | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T7, W12, W13, W14 |
| 24                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | T7, W13, W14               |
| 25                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 26                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G5, G12, T7                |
| 27                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G12, T7                    |
| 28                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, G12, T6                |
| 29                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T6, W12, W14      |
| 30                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 31                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | G5, G12, T7                |
| 32                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G22, T7               |
| 33                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, G22, T6           |
| 34                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 35                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                    |
| 36                                 | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, G12, G22, T6           |
| 37                                 | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 38                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                         |
| 39                                 | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 40                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                         |
| 41                                 | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                     |
| 42                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                         |
| 43                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | NP     | NP  | HA-2                        | T8, W13                    |
| 44                                 | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | NP     | NP  | HA-2                        | G5, T8, W12, W13           |
| 45                                 | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, G24, T8                |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 2        | 20.0                                                                                                     | ...  | 19.0 | ...  | 17.8 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 3        | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 4        | 20.0                                                                                                     | ...  | 19.0 | ...  | 17.8 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 5        | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 6        | 19.3                                                                                                     | ...  | 19.3 | ...  | 19.3 | 19.3 | 18.7 | 17.7 | 17.2 | 16.9 | 16.6 | 16.4 | 16.2 | 16.0 |
| 7        | 19.3                                                                                                     | ...  | 17.4 | ...  | 16.0 | 14.8 | 13.8 | 13.1 | 12.8 | 12.5 | 12.3 | 12.1 | 12.0 | 11.9 |
| 8        | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 9        | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 10       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 11       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 12       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 13       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 14       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 15       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 16       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 17       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 18       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 19       | 17.0                                                                                                     | ...  | 17.0 | ...  | 16.2 | 15.9 | 15.9 | 15.5 | 15.2 | 14.9 | 14.6 | 14.4 | 14.2 | 14.1 |
| 20       | 17.0                                                                                                     | ...  | 15.3 | ...  | 14.1 | 13.0 | 12.2 | 11.5 | 11.2 | 11.0 | 10.8 | 10.7 | 10.5 | 10.4 |
| 21       | 20.0                                                                                                     | 20.0 | 20.0 | 19.6 | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 22       | 20.0                                                                                                     | 18.7 | 18.0 | 17.2 | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 23       | 20.0                                                                                                     | 20.0 | 20.0 | 19.6 | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 24       | 20.0                                                                                                     | 18.7 | 18.0 | 17.2 | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 25       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | ...  | ...  |
| 26       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 27       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 28       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 29       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 30       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | ...  | ...  |
| 31       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 32       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 33       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 34       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | ...  | ...  |
| 35       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | ...  | ...  |
| 36       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 37       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 38       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 39       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 40       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 41       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 42       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 43       | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 44       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 45       | 17.0                                                                                                     | ...  | 17.0 | ...  | 16.2 | 15.9 | 15.9 | 15.5 | 15.2 | 14.9 | 14.6 | 14.4 | 14.2 | 14.1 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 2        | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 3        | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 4        | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 5        | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 6        | 15.8                                                                                                     | 14.9 | 9.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 11.7                                                                                                     | 11.6 | 9.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 9        | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 10       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 11       | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 12       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 13       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 14       | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 15       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 16       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 17       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 18       | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 19       | 13.9                                                                                                     | 13.8 | 8.2  | 5.9  | 4.3  | 3.1  | 2.2  | 1.4  | 0.9  | 0.68 | 0.43 | 0.26 | ...  | ...  | ...  |
| 20       | 10.3                                                                                                     | 10.2 | 8.2  | 5.9  | 4.3  | 3.1  | 2.2  | 1.4  | 0.9  | 0.68 | 0.43 | 0.26 | ...  | ...  | ...  |
| 21       | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 22       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 23       | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 24       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 27       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 28       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 29       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 16.4                                                                                                     | 16.2 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 32       | 12.1                                                                                                     | 12.0 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 33       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 16.4                                                                                                     | 14.9 | 9.6  | 6.9  | 5.0  | 3.6  | 2.6  | 1.7  | 1.1  | 0.80 | 0.50 | 0.30 | ...  | ...  | ...  |
| 37       | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 38       | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 39       | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 40       | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 41       | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 42       | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 43       | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 44       | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 45       | 13.9                                                                                                     | 13.8 | 10.5 | 7.7  | 5.9  | 4.6  | 3.5  | 2.7  | 2.1  | 1.6  | 1.3  | 0.94 | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| (25)     | 1 18Cr-10Ni-Ti      | Wld. tube             | SA-249    | TP321H     | S32109                | ...                      | ...                 |
|          | 2 18Cr-10Ni-Ti      | Smls. pipe            | SA-312    | TP321H     | S32109                | ...                      | $\leq \frac{3}{16}$ |
|          | 3 18Cr-10Ni-Ti      | Smls. pipe            | SA-312    | TP321H     | S32109                | ...                      | $\leq \frac{3}{16}$ |
|          | 4 18Cr-10Ni-Ti      | Wld. pipe             | SA-312    | TP321H     | S32109                | ...                      | $\leq \frac{3}{16}$ |
|          | 5 18Cr-10Ni-Ti      | Wld. pipe             | SA-312    | TP321H     | S32109                | ...                      | $\leq \frac{3}{16}$ |
| (25)     | 6 18Cr-10Ni-Ti      | Smls. pipe            | SA-376    | TP321H     | S32109                | ...                      | $\leq \frac{3}{8}$  |
| (25)     | 7 18Cr-10Ni-Ti      | Smls. pipe            | SA-376    | TP321H     | S32109                | ...                      | $\leq \frac{3}{8}$  |
| (25)     | 8 18Cr-10Ni-Ti      | Smls. & wld. fittings | SA-403    | 321H       | S32109                | ...                      | ...                 |
| (25)     | 9 18Cr-10Ni-Ti      | Bar                   | SA-479    | 321H       | S32109                | ...                      | ...                 |
|          | 10 18Cr-10Ni-Ti     | Bar                   | SA-479    | 321H       | S32109                | ...                      | ...                 |
| (25)     | 11 18Cr-10Ni-Ti     | Wld. pipe             | SA-813    | TP321H     | S32109                | ...                      | ...                 |
|          | 12 18Cr-10Ni-Ti     | Wld. pipe             | SA-814    | TP321H     | S32109                | ...                      | ...                 |
|          | 13 18Cr-11Ni        | Plate                 | SA-240    | 305        | S30500                | ...                      | ...                 |
|          | 14 18Cr-12Ni-2Mo    | Castings              | SA-351    | CF3M       | J92800                | ...                      | ...                 |
|          | 15 18Cr-12Ni-2Mo    | Castings              | SA-351    | CF3M       | J92800                | ...                      | ...                 |
|          | 16 18Cr-12Ni-2Mo    | Cast pipe             | SA-451    | CPF3M      | J92800                | ...                      | ...                 |
| (25)     | 17 18Cr-12Ni-2Mo    | Castings              | SA-351    | CF8M       | J92900                | ...                      | ...                 |
| (25)     | 18 18Cr-12Ni-2Mo    | Castings              | SA-351    | CF8M       | J92900                | ...                      | ...                 |
|          | 19 18Cr-12Ni-2Mo    | Cast pipe             | SA-451    | CPF8M      | J92900                | ...                      | ...                 |
|          | 20 18Cr-13Ni-3Mo    | Forgings              | SA-182    | F317L      | S31703                | ...                      | >5                  |
|          | 21 18Cr-13Ni-3Mo    | Forgings              | SA-182    | F317L      | S31703                | ...                      | >5                  |
|          | 22 18Cr-13Ni-3Mo    | Forgings              | SA-182    | F317L      | S31703                | ...                      | $\leq 5$            |
|          | 23 18Cr-13Ni-3Mo    | Forgings              | SA-182    | F317L      | S31703                | ...                      | $\leq 5$            |
|          | 24 18Cr-13Ni-3Mo    | Forgings              | SA-182    | F317       | S31700                | ...                      | $\leq 5$            |
|          | 25 18Cr-13Ni-3Mo    | Forgings              | SA-182    | F317       | S31700                | ...                      | $\leq 5$            |
|          | 26 18Cr-13Ni-3Mo    | Plate                 | SA-240    | 317        | S31700                | ...                      | ...                 |
|          | 27 18Cr-13Ni-3Mo    | Plate                 | SA-240    | 317        | S31700                | ...                      | ...                 |
|          | 28 18Cr-13Ni-3Mo    | Plate                 | SA-240    | 317L       | S31703                | ...                      | ...                 |
|          | 29 18Cr-13Ni-3Mo    | Plate                 | SA-240    | 317L       | S31703                | ...                      | ...                 |
|          | 30 18Cr-13Ni-3Mo    | Wld. tube             | SA-249    | TP317      | S31700                | ...                      | ...                 |
|          | 31 18Cr-13Ni-3Mo    | Wld. tube             | SA-249    | TP317      | S31700                | ...                      | ...                 |
|          | 32 18Cr-13Ni-3Mo    | Wld. tube             | SA-249    | TP317      | S31700                | ...                      | ...                 |
|          | 33 18Cr-13Ni-3Mo    | Wld. tube             | SA-249    | TP317L     | S31703                | ...                      | ...                 |
|          | 34 18Cr-13Ni-3Mo    | Wld. tube             | SA-249    | TP317L     | S31703                | ...                      | ...                 |
|          | 35 18Cr-13Ni-3Mo    | Smls. & wld. pipe     | SA-312    | TP317      | S31700                | ...                      | ...                 |
|          | 36 18Cr-13Ni-3Mo    | Smls. pipe            | SA-312    | TP317      | S31700                | ...                      | ...                 |
|          | 37 18Cr-13Ni-3Mo    | Wld. pipe             | SA-312    | TP317      | S31700                | ...                      | ...                 |
|          | 38 18Cr-13Ni-3Mo    | Wld. pipe             | SA-312    | TP317      | S31700                | ...                      | ...                 |
|          | 39 18Cr-13Ni-3Mo    | Smls. pipe            | SA-312    | TP317L     | S31703                | ...                      | ...                 |
|          | 40 18Cr-13Ni-3Mo    | Smls. pipe            | SA-312    | TP317L     | S31703                | ...                      | ...                 |
|          | 41 18Cr-13Ni-3Mo    | Wld. pipe             | SA-312    | TP317L     | S31703                | ...                      | ...                 |
|          | 42 18Cr-13Ni-3Mo    | Wld. pipe             | SA-312    | TP317L     | S31703                | ...                      | ...                 |
|          | 43 18Cr-13Ni-3Mo    | Smls. & wld. fittings | SA-403    | 317        | S31700                | ...                      | ...                 |
|          | 44 18Cr-13Ni-3Mo    | Fittings              | SA-403    | 317L       | S31703                | CR                       | ...                 |
|          | 45 18Cr-13Ni-3Mo    | Fittings              | SA-403    | 317L       | S31703                | CR                       | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                                               |     |        |     |                             |                                |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|--------------------------------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes                          |
|                                           |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |                                |
|                                           |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                                |
| 1                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G24, T8                        |
| 2                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                         |
| 3                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                             |
| 4                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8, W12, W13, W14          |
| 5                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8, W13, W14                   |
| 6                                         | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T8                         |
| 7                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                             |
| 8                                         | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | NP  | HA-2                        | G5, T8, W12, W14               |
| 9                                         | 8     | 1         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T8                             |
| 10                                        | 8     | 1         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, H2, T8                     |
| 11                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                        |
| 12                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                        |
| 13                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-1                        | G5                             |
| 14                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 850    | 650 | HA-4                        | G1, G5, G16, G17, G19          |
| 15                                        | 8     | 1         | 70                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G1, G19                        |
| 16                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 800    | NP  | HA-4                        | G1, G5, G16, G17, G19          |
| 17                                        | 8     | 1         | 70                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G1, G5, G12, G16, G17, G19, T6 |
| 18                                        | 8     | 1         | 70                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G1, G12, G19, T8               |
| 19                                        | 8     | 1         | 70                         | 30                       | NP                                            | 800 | 800    | NP  | HA-2                        | G1, G5, G16, G17, G19          |
| 20                                        | 8     | 1         | 65                         | 25                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5                             |
| 21                                        | 8     | 1         | 65                         | 25                       | NP                                            | NP  | 850    | 650 | HA-4                        | ...                            |
| 22                                        | 8     | 1         | 70                         | 25                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5                             |
| 23                                        | 8     | 1         | 70                         | 25                       | NP                                            | NP  | 850    | 650 | HA-4                        | ...                            |
| 24                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, T8                    |
| 25                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T9                        |
| 26                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, T8                    |
| 27                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T9                        |
| 28                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5                             |
| 29                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | ...                            |
| 30                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                        |
| 31                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T8               |
| 32                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T9                   |
| 33                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5, G24                        |
| 34                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G24                            |
| 35                                        | 8     | 1         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T8, W12, W14          |
| 36                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T9                        |
| 37                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T8               |
| 38                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T9                   |
| 39                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5                             |
| 40                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | ...                            |
| 41                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5, G24                        |
| 42                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G24                            |
| 43                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, T8, W14               |
| 44                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G5, G24                        |
| 45                                        | 8     | 1         | 75                         | 30                       | NP                                            | NP  | 850    | 650 | HA-4                        | G24                            |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 17.0                                                                                                     | ...  | 15.3 | ...  | 14.1 | 13.0 | 12.2 | 11.5 | 11.2 | 11.0 | 10.8 | 10.7 | 10.5 | 10.4 |
| 2        | 20.0                                                                                                     | 20.0 | 20.0 | 19.6 | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 3        | 20.0                                                                                                     | 18.7 | 18.0 | 17.2 | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 4        | 20.0                                                                                                     | 20.0 | 20.0 | 19.6 | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 5        | 20.0                                                                                                     | 18.7 | 18.0 | 17.2 | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 6        | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 7        | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 8        | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 9        | 20.0                                                                                                     | ...  | 18.0 | ...  | 16.5 | 15.3 | 14.3 | 13.5 | 13.2 | 13.0 | 12.7 | 12.6 | 12.4 | 12.3 |
| 10       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | 16.7 | 16.5 |
| 11       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | ...  | ...  |
| 12       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.1 | 18.7 | 18.7 | 18.3 | 17.9 | 17.5 | 17.2 | 16.9 | ...  | ...  |
| 13       | 20.0                                                                                                     | ...  | 20.0 | ...  | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ...  | ...  |
| 14       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.4 | 19.2 | 17.9 | 17.0 | 16.6 | 16.3 | 16.0 | 15.8 | 15.7 | ...  |
| 15       | 20.0                                                                                                     | ...  | 17.2 | ...  | 15.5 | 14.2 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.7 | 11.6 | ...  |
| 16       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.4 | 19.2 | 17.9 | 17.0 | 16.6 | 16.3 | 16.1 | 15.8 | ...  | ...  |
| 17       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.4 | 19.2 | 17.9 | 17.0 | 16.6 | 16.3 | 16.0 | 15.8 | 15.7 | 15.5 |
| 18       | 20.0                                                                                                     | ...  | 17.2 | ...  | 15.5 | 14.2 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.7 | 11.6 | 11.5 |
| 19       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.4 | 19.2 | 17.9 | 17.0 | 16.6 | 16.3 | 16.0 | 15.8 | ...  | ...  |
| 20       | 16.7                                                                                                     | ...  | 16.7 | ...  | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | ...  |
| 21       | 16.7                                                                                                     | ...  | 14.2 | ...  | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | ...  |
| 22       | 16.7                                                                                                     | ...  | 16.7 | ...  | 16.7 | 15.7 | 14.8 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | 12.7 | ...  |
| 23       | 16.7                                                                                                     | ...  | 14.2 | ...  | 12.7 | 11.7 | 10.9 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | ...  |
| 24       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 25       | 20.0                                                                                                     | ...  | 17.3 | ...  | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 26       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 27       | 20.0                                                                                                     | ...  | 17.3 | ...  | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 28       | 20.0                                                                                                     | ...  | 20.0 | ...  | 19.6 | 18.9 | 17.7 | 16.9 | 16.5 | 16.2 | 15.8 | 15.5 | 15.2 | ...  |
| 29       | 20.0                                                                                                     | ...  | 17.0 | ...  | 15.2 | 14.0 | 13.1 | 12.5 | 12.2 | 12.0 | 11.7 | 11.5 | 11.3 | ...  |
| 30       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | ...  | ...  |
| 31       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.4 | 15.3 | 14.5 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 | 13.2 |
| 32       | 17.0                                                                                                     | ...  | 14.7 | ...  | 13.2 | 12.1 | 11.3 | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 | 9.9  | 9.8  |
| 33       | 17.0                                                                                                     | ...  | 17.0 | ...  | 16.7 | 16.0 | 15.1 | 14.3 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  |
| 34       | 17.0                                                                                                     | ...  | 14.5 | ...  | 12.9 | 11.9 | 11.2 | 10.6 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | ...  |
| 35       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 36       | 20.0                                                                                                     | ...  | 17.3 | ...  | 15.6 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 37       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.4 | 15.3 | 14.5 | 14.1 | 13.9 | 13.7 | 13.5 | 13.4 | 13.2 |
| 38       | 17.0                                                                                                     | ...  | 14.7 | ...  | 13.2 | 12.1 | 11.3 | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 | 9.9  | 9.8  |
| 39       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 19.6 | 18.9 | 17.7 | 16.9 | 16.5 | 16.2 | 15.8 | 15.5 | 15.2 | ...  |
| 40       | 20.0                                                                                                     | 18.2 | 17.0 | 16.0 | 15.2 | 14.0 | 13.1 | 12.5 | 12.2 | 12.0 | 11.7 | 11.5 | 11.3 | ...  |
| 41       | 17.0                                                                                                     | 17.0 | 17.0 | 16.7 | 16.0 | 15.1 | 14.3 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  | ...  |
| 42       | 17.0                                                                                                     | 15.5 | 14.5 | 13.6 | 12.9 | 11.9 | 11.2 | 10.6 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | ...  |
| 43       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.3 | 18.0 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 44       | 17.0                                                                                                     | ...  | 17.0 | ...  | 16.7 | 16.0 | 15.1 | 14.3 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  |
| 45       | 17.0                                                                                                     | ...  | 14.5 | ...  | 12.9 | 11.9 | 11.2 | 10.6 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 10.3                                                                                                     | 10.2 | 10.1 | 7.7  | 5.9  | 4.6  | 3.5  | 2.7  | 2.1  | 1.6  | 1.3  | 0.94 | ...  | ...  | ...  |
| 2        | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 3        | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 4        | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 5        | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 6        | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 7        | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 8        | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 9        | 12.1                                                                                                     | 12.0 | 11.9 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 10       | 16.4                                                                                                     | 16.2 | 12.3 | 9.1  | 6.9  | 5.4  | 4.1  | 3.2  | 2.5  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 15.4                                                                                                     | 14.9 | 11.5 | 8.9  | 6.9  | 5.4  | 4.3  | 3.4  | 2.8  | 2.3  | 1.9  | 1.6  | ...  | ...  | ...  |
| 18       | 11.4                                                                                                     | 11.3 | 11.2 | 8.9  | 6.9  | 5.4  | 4.3  | 3.4  | 2.8  | 2.3  | 1.9  | 1.6  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 25       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 26       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 27       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 13.1                                                                                                     | 13.0 | 12.9 | 10.5 | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 32       | 9.7                                                                                                      | 9.6  | 9.5  | 9.4  | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 36       | 11.4                                                                                                     | 11.3 | 11.2 | 11.1 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 37       | 13.1                                                                                                     | 13.0 | 12.9 | 10.5 | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 38       | 9.7                                                                                                      | 9.6  | 9.5  | 9.4  | 8.3  | 6.3  | 4.7  | 3.5  | 2.6  | 1.9  | 1.5  | 1.1  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 15.4                                                                                                     | 15.3 | 15.1 | 12.4 | 9.8  | 7.4  | 5.5  | 4.1  | 3.1  | 2.3  | 1.7  | 1.3  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form      | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-S                     | ...                 |
| 2        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-S                     | ...                 |
| 3        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-W                     | ...                 |
| 4        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-W                     | ...                 |
| 5        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-WU                    | ...                 |
| 6        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-WU                    | ...                 |
| 7        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-WX                    | ...                 |
| 8        | 18Cr-13Ni-3Mo       | Fittings          | SA-403    | 317L       | S31703                | WP-WX                    | ...                 |
| 9        | 18Cr-15Ni-4Si       | Forgings          | SA-182    | ...        | S30600                | Sol. ann.                | ...                 |
| 10       | 18Cr-15Ni-4Si       | Forgings          | SA-182    | ...        | S30600                | Sol. ann.                | ...                 |
| 11       | 18Cr-15Ni-4Si       | Plate             | SA-240    | ...        | S30600                | Sol. ann.                | ≤2                  |
| 12       | 18Cr-15Ni-4Si       | Plate             | SA-240    | ...        | S30600                | Sol. ann.                | ≤2                  |
| 13       | 18Cr-15Ni-4Si       | Smls. & wld. pipe | SA-312    | ...        | S30600                | Sol. ann.                | ...                 |
| 14       | 18Cr-15Ni-4Si       | Smls. & wld. pipe | SA-312    | ...        | S30600                | Sol. ann.                | ...                 |
| 15       | 18Cr-15Ni-4Si       | Wld. pipe         | SA-312    | ...        | S30600                | Sol. ann.                | ...                 |
| 16       | 18Cr-15Ni-4Si       | Wld. pipe         | SA-312    | ...        | S30600                | Sol. ann.                | ...                 |
| 17       | 18Cr-15Ni-4Si       | Bar               | SA-479    | ...        | S30600                | Sol. ann.                | ≤4                  |
| 18       | 18Cr-15Ni-4Si       | Bar               | SA-479    | ...        | S30600                | Sol. ann.                | ≤4                  |
| 19       | 18Cr-18Ni-2Si       | Smls. tube        | SA-213    | XM-15      | S38100                | ...                      | ...                 |
| 20       | 18Cr-18Ni-2Si       | Smls. tube        | SA-213    | XM-15      | S38100                | ...                      | ...                 |
| 21       | 18Cr-18Ni-2Si       | Plate             | SA-240    | XM-15      | S38100                | ...                      | ...                 |
| 22       | 18Cr-18Ni-2Si       | Plate             | SA-240    | XM-15      | S38100                | ...                      | ...                 |
| 23       | 18Cr-18Ni-2Si       | Wld. tube         | SA-249    | TPXM-15    | S38100                | ...                      | ...                 |
| 24       | 18Cr-18Ni-2Si       | Wld. tube         | SA-249    | TPXM-15    | S38100                | ...                      | ...                 |
| 25       | 18Cr-18Ni-2Si       | Wld. pipe         | SA-312    | TPXM-15    | S38100                | ...                      | ...                 |
| 26       | 18Cr-18Ni-2Si       | Wld. pipe         | SA-312    | TPXM-15    | S38100                | ...                      | ...                 |
| 27       | 18Cr-20Ni-5.5Si     | Smls. tube        | SA-213    | ...        | S32615                | Sol. ann.                | ...                 |
| 28       | 18Cr-20Ni-5.5Si     | Smls. tube        | SA-213    | ...        | S32615                | Sol. ann.                | ...                 |
| 29       | 18Cr-20Ni-5.5Si     | Plate             | SA-240    | ...        | S32615                | Sol. ann.                | ...                 |
| 30       | 18Cr-20Ni-5.5Si     | Plate             | SA-240    | ...        | S32615                | Sol. ann.                | ...                 |
| 31       | 18Cr-20Ni-5.5Si     | Smls. & wld. pipe | SA-312    | ...        | S32615                | Sol. ann.                | ...                 |
| 32       | 18Cr-20Ni-5.5Si     | Smls. & wld. pipe | SA-312    | ...        | S32615                | Sol. ann.                | ...                 |
| 33       | 18Cr-20Ni-5.5Si     | Wld. pipe         | SA-312    | ...        | S32615                | Sol. ann.                | ...                 |
| 34       | 18Cr-20Ni-5.5Si     | Wld. pipe         | SA-312    | ...        | S32615                | Sol. ann.                | ...                 |
| 35       | 18Cr-20Ni-5.5Si     | Bar               | SA-479    | ...        | S32615                | Sol. ann.                | ...                 |
| 36       | 18Cr-20Ni-5.5Si     | Bar               | SA-479    | ...        | S32615                | Sol. ann.                | ...                 |
| 37       | 19Cr-9Ni-1/2Mo      | Castings          | SA-351    | CF10       | J92590                | ...                      | ...                 |
| 38       | 19Cr-9Ni-1/2Mo      | Castings          | SA-351    | CF10       | J92590                | ...                      | ...                 |
| 39       | 19Cr-9Ni-2Mo        | Castings          | SA-351    | CF10M      | ...                   | ...                      | ...                 |
| 40       | 19Cr-9Ni-2Mo        | Castings          | SA-351    | CF10M      | ...                   | ...                      | ...                 |
| 41       | 19Cr-10Ni-3Mo       | Castings          | SA-351    | CG8M       | J93000                | ...                      | ...                 |
| 42       | 19Cr-10Ni-3Mo       | Castings          | SA-351    | CG8M       | J93000                | ...                      | ...                 |
| 43       | 19Cr-15Ni-4Mo       | Smls. tube        | SA-213    | ...        | S31725                | ...                      | ...                 |
| 44       | 19Cr-15Ni-4Mo       | Smls. tube        | SA-213    | ...        | S31725                | ...                      | ...                 |
| 45       | 19Cr-15Ni-4Mo       | Plate             | SA-240    | ...        | S31725                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                 |  |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|-----------------|--|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes           |  |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                 |  |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                 |  |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                 |  |
| 1                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | G5              |  |
| 2                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | ...             |  |
| 3                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | G5, G24         |  |
| 4                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | G24             |  |
| 5                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | G5, G24         |  |
| 6                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | G24             |  |
| 7                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | G5, G24         |  |
| 8                                  | 8     | 1         | 75                         | 30                       | NP                    | NP  | 850    | 650 | HA-4                        | G24             |  |
| 9                                  | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | G5, H6          |  |
| 10                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | H6              |  |
| 11                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | G5, H6          |  |
| 12                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | H6              |  |
| 13                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | G5, H6          |  |
| 14                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | H6              |  |
| 15                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | G5, G24, H6     |  |
| 16                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | G24, H6         |  |
| 17                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | G5, H6          |  |
| 18                                 | 8     | 1         | 78                         | 35                       | NP                    | NP  | 300    | NP  | HA-2                        | H6              |  |
| 19                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | G5              |  |
| 20                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | ...             |  |
| 21                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | G5              |  |
| 22                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | ...             |  |
| 23                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | G5, G24         |  |
| 24                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | G24             |  |
| 25                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 950    | 650 | HA-2                        | G5, G24         |  |
| 26                                 | 8     | 1         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | G24             |  |
| 27                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | G5, H6          |  |
| 28                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | H6              |  |
| 29                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | G5, H6          |  |
| 30                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | H6              |  |
| 31                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | G5, H6          |  |
| 32                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | H6              |  |
| 33                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | G5, G24, H6     |  |
| 34                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | G24, H6         |  |
| 35                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | G5, H6          |  |
| 36                                 | 8     | 1         | 80                         | 32                       | NP                    | NP  | 400    | NP  | HA-2                        | H6              |  |
| 37                                 | 8     | 1         | 70                         | 30                       | NP                    | NP  | 1500   | 650 | HA-1                        | G1, G5, G19, T6 |  |
| 38                                 | 8     | 1         | 70                         | 30                       | NP                    | NP  | 1500   | 650 | HA-1                        | G1, G19, T7     |  |
| 39                                 | 8     | 1         | 70                         | 30                       | NP                    | NP  | 1500   | NP  | HA-2                        | G1, G5, G19, T6 |  |
| 40                                 | 8     | 1         | 70                         | 30                       | NP                    | NP  | 1500   | NP  | HA-2                        | G1, G19, T8     |  |
| 41                                 | 8     | 1         | 75                         | 35                       | NP                    | NP  | 1000   | 650 | HA-2                        | G1, G5, G19     |  |
| 42                                 | 8     | 1         | 75                         | 35                       | NP                    | NP  | 1000   | 650 | HA-2                        | G1, G19         |  |
| 43                                 | 8     | 4         | 75                         | 30                       | NP                    | NP  | 400    | 400 | HA-4                        | G5              |  |
| 44                                 | 8     | 4         | 75                         | 30                       | NP                    | NP  | 400    | 400 | HA-4                        | ...             |  |
| 45                                 | 8     | 4         | 75                         | 30                       | NP                    | NP  | 400    | 400 | HA-4                        | G5              |  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ... | 20.0 | ... | 19.6 | 18.9 | 17.7 | 16.9 | 16.5 | 16.2 | 15.8 | 15.5 | 15.2 | ...  |
| 2        | 20.0                                                                                                     | ... | 17.0 | ... | 15.2 | 14.0 | 13.1 | 12.5 | 12.2 | 12.0 | 11.7 | 11.5 | 11.3 | ...  |
| 3        | 17.0                                                                                                     | ... | 17.0 | ... | 16.7 | 16.0 | 15.1 | 14.3 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  |
| 4        | 17.0                                                                                                     | ... | 14.5 | ... | 12.9 | 11.9 | 11.2 | 10.6 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | ...  |
| 5        | 17.0                                                                                                     | ... | 17.0 | ... | 16.7 | 16.0 | 15.1 | 14.3 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  |
| 6        | 17.0                                                                                                     | ... | 14.5 | ... | 12.9 | 11.9 | 11.2 | 10.6 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | ...  |
| 7        | 17.0                                                                                                     | ... | 17.0 | ... | 16.7 | 16.0 | 15.1 | 14.3 | 14.0 | 13.7 | 13.5 | 13.2 | 12.9 | ...  |
| 8        | 17.0                                                                                                     | ... | 14.5 | ... | 12.9 | 11.9 | 11.2 | 10.6 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | ...  |
| 9        | 22.3                                                                                                     | ... | 21.3 | ... | 19.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 22.3                                                                                                     | ... | 17.9 | ... | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 22.3                                                                                                     | ... | 21.3 | ... | 19.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 22.3                                                                                                     | ... | 17.9 | ... | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 22.3                                                                                                     | ... | 21.3 | ... | 19.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 22.3                                                                                                     | ... | 17.9 | ... | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 19.0                                                                                                     | ... | 18.1 | ... | 16.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 19.0                                                                                                     | ... | 15.2 | ... | 13.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 22.3                                                                                                     | ... | 21.3 | ... | 19.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 22.3                                                                                                     | ... | 17.9 | ... | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 20       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 21       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 22       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 |
| 23       | 17.0                                                                                                     | ... | 17.0 | ... | 16.1 | 15.5 | 14.8 | 14.1 | 13.8 | 13.5 | 13.2 | 12.9 | 12.6 | 12.4 |
| 24       | 17.0                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 11.0 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 25       | 17.0                                                                                                     | ... | 17.0 | ... | 16.1 | 15.5 | 14.8 | 14.1 | 13.8 | 13.5 | 13.2 | 12.9 | 12.6 | 12.4 |
| 26       | 17.0                                                                                                     | ... | 14.2 | ... | 12.7 | 11.7 | 11.0 | 10.4 | 10.2 | 10.0 | 9.8  | 9.6  | 9.4  | 9.2  |
| 27       | 21.3                                                                                                     | ... | 21.3 | ... | 21.3 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 21.3                                                                                                     | ... | 17.6 | ... | 16.5 | 15.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 21.3                                                                                                     | ... | 21.3 | ... | 21.3 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 21.3                                                                                                     | ... | 17.6 | ... | 16.5 | 15.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 21.3                                                                                                     | ... | 21.3 | ... | 21.3 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 21.3                                                                                                     | ... | 17.6 | ... | 16.5 | 15.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 18.1                                                                                                     | ... | 18.1 | ... | 18.1 | 17.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 18.1                                                                                                     | ... | 15.0 | ... | 14.0 | 13.1 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 21.3                                                                                                     | ... | 21.3 | ... | 21.3 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 21.3                                                                                                     | ... | 17.6 | ... | 16.5 | 15.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 20.0                                                                                                     | ... | 19.0 | ... | 17.7 | 17.2 | 17.0 | 16.5 | 16.2 | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 |
| 38       | 20.0                                                                                                     | ... | 16.7 | ... | 15.0 | 13.8 | 12.9 | 12.2 | 12.0 | 11.7 | 11.5 | 11.3 | 11.1 | 10.8 |
| 39       | 20.0                                                                                                     | ... | 20.0 | ... | 19.5 | 19.3 | 17.9 | 17.0 | 16.6 | 16.3 | 16.1 | 15.9 | 15.7 | 15.5 |
| 40       | 20.0                                                                                                     | ... | 17.5 | ... | 15.7 | 14.3 | 13.3 | 12.6 | 12.3 | 12.1 | 11.9 | 11.8 | 11.6 | 11.5 |
| 41       | 21.4                                                                                                     | ... | 20.8 | ... | 19.6 | 19.1 | 18.4 | 17.5 | 17.1 | 16.8 | 16.6 | 16.4 | 16.2 | 16.0 |
| 42       | 21.4                                                                                                     | ... | 18.8 | ... | 16.4 | 14.7 | 13.6 | 12.9 | 12.7 | 12.5 | 12.3 | 12.1 | 12.0 | 11.8 |
| 43       | 20.0                                                                                                     | ... | 20.0 | ... | 19.6 | 18.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 20.0                                                                                                     | ... | 16.9 | ... | 15.2 | 14.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 20.0                                                                                                     | ... | 20.0 | ... | 19.6 | 18.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 14.3                                                                                                     | 14.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 10.6                                                                                                     | 10.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 14.3                                                                                                     | 14.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 10.6                                                                                                     | 10.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 12.1                                                                                                     | 11.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 9.0                                                                                                      | 8.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 12.1                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 9.0                                                                                                      | 8.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 14.4                                                                                                     | 12.2 | 9.5  | 7.5  | 6.0  | 4.8  | 3.9  | 3.3  | 2.7  | 2.3  | 2.0  | 1.7  | ...  | ...  | ...  |
| 38       | 10.6                                                                                                     | 10.4 | 9.5  | 7.5  | 6.0  | 4.8  | 3.9  | 3.3  | 2.7  | 2.3  | 2.0  | 1.7  | ...  | ...  | ...  |
| 39       | 15.3                                                                                                     | 14.9 | 11.5 | 8.9  | 6.9  | 5.4  | 4.3  | 3.4  | 2.8  | 2.3  | 1.9  | 1.6  | ...  | ...  | ...  |
| 40       | 11.4                                                                                                     | 11.3 | 11.2 | 8.9  | 6.9  | 5.4  | 4.3  | 3.4  | 2.8  | 2.3  | 1.9  | 1.6  | ...  | ...  | ...  |
| 41       | 15.7                                                                                                     | 12.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 11.6                                                                                                     | 11.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in.   |
|----------|---------------------|--------------|-----------|------------|-----------------------|--------------------------|-----------------------|
| 1        | 19Cr-15Ni-4Mo       | Plate        | SA-240    | ...        | S31725                | ...                      | ...                   |
| 2        | 19Cr-15Ni-4Mo       | Wld. tube    | SA-249    | ...        | S31725                | ...                      | ...                   |
| 3        | 19Cr-15Ni-4Mo       | Wld. tube    | SA-249    | ...        | S31725                | ...                      | ...                   |
| 4        | 19Cr-15Ni-4Mo       | Smls. pipe   | SA-312    | ...        | S31725                | ...                      | ...                   |
| 5        | 19Cr-15Ni-4Mo       | Smls. pipe   | SA-312    | ...        | S31725                | ...                      | ...                   |
| 6        | 19Cr-15Ni-4Mo       | Wld. pipe    | SA-312    | ...        | S31725                | ...                      | ...                   |
| 7        | 19Cr-15Ni-4Mo       | Wld. pipe    | SA-312    | ...        | S31725                | ...                      | ...                   |
| 8        | 19Cr-15Ni-4Mo       | Wld. pipe    | SA-358    | ...        | S31725                | ...                      | ...                   |
| 9        | 19Cr-15Ni-4Mo       | Wld. pipe    | SA-358    | ...        | S31725                | ...                      | ...                   |
| 10       | 19Cr-15Ni-4Mo       | Smls. pipe   | SA-376    | ...        | S31725                | ...                      | ...                   |
| 11       | 19Cr-15Ni-4Mo       | Smls. pipe   | SA-376    | ...        | S31725                | ...                      | ...                   |
| 12       | 19Cr-15Ni-4Mo       | Fittings     | SA-403    | ...        | S31725                | ...                      | ...                   |
| 13       | 19Cr-15Ni-4Mo       | Wld. pipe    | SA-409    | ...        | S31725                | ...                      | ...                   |
| 14       | 19Cr-15Ni-4Mo       | Wld. pipe    | SA-409    | ...        | S31725                | ...                      | ...                   |
| 15       | 19Cr-15Ni-4Mo       | Bar          | SA-479    | ...        | S31725                | ...                      | ...                   |
| 16       | 19Cr-15Ni-4Mo       | Bar          | SA-479    | ...        | S31725                | ...                      | ...                   |
| 17       | 20Cr-3Ni-1.5Mo-N    | Plate        | SA-240    | ...        | S32003                | ...                      | $t > \frac{3}{16}$    |
| 18       | 20Cr-3Ni-1.5Mo-N    | Wld. pipe    | SA-790    | ...        | S32003                | ...                      | ...                   |
| 19       | 20Cr-3Ni-1.5Mo-N    | Sheet        | SA-240    | ...        | S32003                | ...                      | $t \leq \frac{3}{16}$ |
| 20       | 20Cr-3Ni-1.5Mo-N    | Smls. tube   | SA-789    | ...        | S32003                | ...                      | $t \leq \frac{3}{16}$ |
| 21       | 20Cr-3Ni-1.5Mo-N    | Wld. tube    | SA-789    | ...        | S32003                | ...                      | $t \leq \frac{3}{16}$ |
| 22       | 20Cr-3Ni-1.5Mo-N    | Smls. tube   | SA-789    | ...        | S32003                | ...                      | $t > \frac{3}{16}$    |
| 23       | 20Cr-3Ni-1.5Mo-N    | Wld. tube    | SA-789    | ...        | S32003                | ...                      | $t > \frac{3}{16}$    |
| 24       | 20Cr-10Ni           | Bar          | SA-479    | ER308      | S30880                | ...                      | ...                   |
| 25       | 20Cr-18Ni-6Mo       | Castings     | SA-351    | CK3MCuN    | J93254                | ...                      | ...                   |
| 26       | 20Cr-18Ni-6Mo       | Castings     | SA-351    | CK3MCuN    | J93254                | ...                      | ...                   |
| 27       | 20Cr-18Ni-6Mo       | Forgings     | SA-182    | F44        | S31254                | ...                      | ...                   |
| 28       | 20Cr-18Ni-6Mo       | Forgings     | SA-182    | F44        | S31254                | ...                      | ...                   |
| 29       | 20Cr-18Ni-6Mo       | Fittings     | SA-403    | ...        | S31254                | ...                      | ...                   |
| 30       | 20Cr-18Ni-6Mo       | Smls. tube   | SA-213    | ...        | S31254                | ...                      | $t > 0.187$           |
| 31       | 20Cr-18Ni-6Mo       | Smls. tube   | SA-213    | ...        | S31254                | ...                      | $t > 0.187$           |
| 32       | 20Cr-18Ni-6Mo       | Plate        | SA-240    | ...        | S31254                | ...                      | $> \frac{3}{16}$      |
| 33       | 20Cr-18Ni-6Mo       | Plate        | SA-240    | ...        | S31254                | ...                      | $> \frac{3}{16}$      |
| 34       | 20Cr-18Ni-6Mo       | Wld. tube    | SA-249    | ...        | S31254                | ...                      | $t > 0.187$           |
| 35       | 20Cr-18Ni-6Mo       | Wld. tube    | SA-249    | ...        | S31254                | ...                      | $t > 0.187$           |
| 36       | 20Cr-18Ni-6Mo       | Smls. pipe   | SA-312    | ...        | S31254                | ...                      | $t > 0.187$           |
| 37       | 20Cr-18Ni-6Mo       | Smls. pipe   | SA-312    | ...        | S31254                | ...                      | $t > 0.187$           |
| 38       | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-312    | ...        | S31254                | ...                      | $t > 0.187$           |
| 39       | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-312    | ...        | S31254                | ...                      | $t > 0.187$           |
| 40       | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-358    | ...        | S31254                | ...                      | $t \geq 0.187$        |
| 41       | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-358    | ...        | S31254                | ...                      | $t \geq 0.187$        |
| 42       | 20Cr-18Ni-6Mo       | Smls. tube   | SA-213    | ...        | S31254                | ...                      | $t \leq 0.187$        |
| 43       | 20Cr-18Ni-6Mo       | Smls. tube   | SA-213    | ...        | S31254                | ...                      | $t \leq 0.187$        |
| 44       | 20Cr-18Ni-6Mo       | Wld. tube    | SA-249    | ...        | S31254                | ...                      | $t \leq 0.187$        |
| 45       | 20Cr-18Ni-6Mo       | Wld. tube    | SA-249    | ...        | S31254                | ...                      | $t \leq 0.187$        |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                                               |     |        |     |                             |          |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|----------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes    |
|                                           |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |          |
|                                           |       |           |                            |                          |                                               |     |        |     |                             |          |
| 1                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | ...      |
| 2                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G5, G24  |
| 3                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G24      |
| 4                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | NP  | HA-4                        | G5       |
| 5                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | NP  | HA-4                        | ...      |
| 6                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | NP  | HA-4                        | G5, G24  |
| 7                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | NP  | HA-4                        | G24      |
| 8                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G5, G24  |
| 9                                         | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G24      |
| 10                                        | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G5       |
| 11                                        | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | ...      |
| 12                                        | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G5, W14  |
| 13                                        | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G5, G24  |
| 14                                        | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G24      |
| 15                                        | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | G5       |
| 16                                        | 8     | 4         | 75                         | 30                       | NP                                            | NP  | 400    | 400 | HA-4                        | ...      |
| 17                                        | 10H   | 1         | 95                         | 65                       | NP                                            | NP  | 650    | NP  | HA-5                        | G19      |
| 18                                        | 10H   | 1         | 95                         | 65                       | NP                                            | NP  | 650    | NP  | HA-5                        | G19, G24 |
| 19                                        | 10H   | 1         | 100                        | 70                       | NP                                            | NP  | 650    | NP  | HA-5                        | G19      |
| 20                                        | 10H   | 1         | 100                        | 70                       | NP                                            | NP  | 650    | NP  | HA-5                        | G19      |
| 21                                        | 10H   | 1         | 100                        | 70                       | NP                                            | NP  | 650    | NP  | HA-5                        | G19, G24 |
| 22                                        | 10H   | 1         | 95                         | 65                       | NP                                            | NP  | 650    | NP  | HA-5                        | G19      |
| 23                                        | 10H   | 1         | 95                         | 65                       | NP                                            | NP  | 650    | NP  | HA-5                        | G19, G24 |
| 24                                        | ...   | ...       | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5       |
| 25                                        | 8     | 4         | 80                         | 38                       | NP                                            | 750 | 750    | 650 | HA-2                        | G1, G5   |
| 26                                        | 8     | 4         | 80                         | 38                       | NP                                            | NP  | 750    | 650 | HA-2                        | G1       |
| 27                                        | 8     | 4         | 94                         | 44                       | NP                                            | 750 | 750    | 650 | HA-2                        | G5       |
| 28                                        | 8     | 4         | 94                         | 44                       | NP                                            | NP  | 750    | 650 | HA-2                        | ...      |
| 29                                        | 8     | 4         | 94                         | 44                       | NP                                            | 750 | NP     | NP  | HA-2                        | G5, W12  |
| 30                                        | 8     | 4         | 95                         | 45                       | NP                                            | NP  | 750    | NP  | HA-2                        | G5       |
| 31                                        | 8     | 4         | 95                         | 45                       | NP                                            | NP  | 750    | NP  | HA-2                        | ...      |
| 32                                        | 8     | 4         | 95                         | 45                       | NP                                            | 750 | 750    | 650 | HA-2                        | G5       |
| 33                                        | 8     | 4         | 95                         | 45                       | NP                                            | NP  | 750    | 650 | HA-2                        | ...      |
| 34                                        | 8     | 4         | 95                         | 45                       | NP                                            | 750 | 750    | 650 | HA-2                        | G5, G24  |
| 35                                        | 8     | 4         | 95                         | 45                       | NP                                            | NP  | 750    | 650 | HA-2                        | G24      |
| 36                                        | 8     | 4         | 95                         | 45                       | NP                                            | 750 | 750    | NP  | HA-2                        | G5       |
| 37                                        | 8     | 4         | 95                         | 45                       | NP                                            | NP  | 750    | NP  | HA-2                        | ...      |
| 38                                        | 8     | 4         | 95                         | 45                       | NP                                            | 750 | 750    | NP  | HA-2                        | G5, G24  |
| 39                                        | 8     | 4         | 95                         | 45                       | NP                                            | NP  | 750    | NP  | HA-2                        | G24      |
| 40                                        | 8     | 4         | 95                         | 45                       | NP                                            | 750 | 750    | 650 | HA-2                        | G5, G24  |
| 41                                        | 8     | 4         | 95                         | 45                       | NP                                            | NP  | 750    | 650 | HA-2                        | G24      |
| 42                                        | 8     | 4         | 98                         | 45                       | NP                                            | NP  | 750    | NP  | HA-2                        | G5       |
| 43                                        | 8     | 4         | 98                         | 45                       | NP                                            | NP  | 750    | NP  | HA-2                        | ...      |
| 44                                        | 8     | 4         | 98                         | 45                       | NP                                            | 750 | 750    | 650 | HA-2                        | G5, G24  |
| 45                                        | 8     | 4         | 98                         | 45                       | NP                                            | NP  | 750    | 650 | HA-2                        | G24      |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |     |     |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|-----|-----|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850 | 900 |
| 1        | 20.0                                                                                                     | ... | 16.9 | ... | 15.2 | 14.0 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 2        | 17.0                                                                                                     | ... | 17.0 | ... | 16.6 | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 3        | 17.0                                                                                                     | ... | 14.4 | ... | 12.9 | 11.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 4        | 20.0                                                                                                     | ... | 20.0 | ... | 19.6 | 18.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 5        | 20.0                                                                                                     | ... | 16.9 | ... | 15.2 | 14.0 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 6        | 17.0                                                                                                     | ... | 17.0 | ... | 16.6 | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 7        | 17.0                                                                                                     | ... | 14.4 | ... | 12.9 | 11.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 8        | 17.0                                                                                                     | ... | 17.0 | ... | 16.6 | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 9        | 17.0                                                                                                     | ... | 14.4 | ... | 12.9 | 11.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 10       | 20.0                                                                                                     | ... | 20.0 | ... | 19.6 | 18.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 11       | 20.0                                                                                                     | ... | 16.9 | ... | 15.2 | 14.0 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 12       | 20.0                                                                                                     | ... | 20.0 | ... | 19.6 | 18.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 13       | 17.0                                                                                                     | ... | 17.0 | ... | 16.6 | 16.1 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 14       | 17.0                                                                                                     | ... | 14.4 | ... | 12.9 | 11.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 15       | 20.0                                                                                                     | ... | 20.0 | ... | 19.6 | 18.9 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 16       | 20.0                                                                                                     | ... | 16.9 | ... | 15.2 | 14.0 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... |
| 17       | 27.1                                                                                                     | ... | 26.3 | ... | 24.8 | 24.5 | 24.5 | 24.5 | 24.5 | ...  | ...  | ...  | ... | ... |
| 18       | 23.1                                                                                                     | ... | 22.4 | ... | 21.0 | 20.8 | 20.8 | 20.8 | 20.8 | ...  | ...  | ...  | ... | ... |
| 19       | 28.6                                                                                                     | ... | 27.7 | ... | 26.1 | 25.8 | 25.8 | 25.8 | 25.8 | ...  | ...  | ...  | ... | ... |
| 20       | 28.6                                                                                                     | ... | 27.7 | ... | 26.1 | 25.8 | 25.8 | 25.8 | 25.8 | ...  | ...  | ...  | ... | ... |
| 21       | 24.3                                                                                                     | ... | 23.5 | ... | 22.1 | 21.9 | 21.9 | 21.9 | 21.9 | ...  | ...  | ...  | ... | ... |
| 22       | 27.1                                                                                                     | ... | 26.3 | ... | 24.8 | 24.5 | 24.5 | 24.5 | 24.5 | ...  | ...  | ...  | ... | ... |
| 23       | 23.1                                                                                                     | ... | 22.4 | ... | 21.0 | 20.8 | 20.8 | 20.8 | 20.8 | ...  | ...  | ...  | ... | ... |
| 24       | 20.0                                                                                                     | ... | 20.0 | ... | 18.9 | 18.3 | 17.5 | 16.6 | 16.2 | 15.8 | 15.5 | 15.2 | ... | ... |
| 25       | 22.9                                                                                                     | ... | 22.9 | ... | 21.7 | 20.7 | 20.0 | 19.6 | 19.4 | 19.3 | 19.2 | ...  | ... | ... |
| 26       | 22.9                                                                                                     | ... | 20.7 | ... | 18.5 | 17.1 | 16.1 | 15.4 | 15.2 | 15.1 | 15.0 | ...  | ... | ... |
| 27       | 26.9                                                                                                     | ... | 26.9 | ... | 25.5 | 24.3 | 23.5 | 23.0 | 22.8 | 22.7 | 22.6 | ...  | ... | ... |
| 28       | 26.9                                                                                                     | ... | 23.9 | ... | 21.4 | 19.8 | 18.6 | 17.9 | 17.6 | 17.4 | 17.3 | ...  | ... | ... |
| 29       | 26.9                                                                                                     | ... | 26.9 | ... | 25.5 | 24.3 | 23.5 | 23.0 | 22.8 | 22.7 | 22.6 | ...  | ... | ... |
| 30       | 27.1                                                                                                     | ... | 27.1 | ... | 25.8 | 24.6 | 23.7 | 23.2 | 23.1 | 23.0 | 22.9 | ...  | ... | ... |
| 31       | 27.1                                                                                                     | ... | 24.5 | ... | 21.9 | 20.3 | 19.1 | 18.3 | 18.0 | 17.9 | 17.7 | ...  | ... | ... |
| 32       | 27.1                                                                                                     | ... | 27.1 | ... | 25.8 | 24.6 | 23.7 | 23.2 | 23.1 | 23.0 | 22.9 | ...  | ... | ... |
| 33       | 27.1                                                                                                     | ... | 24.5 | ... | 21.9 | 20.2 | 19.1 | 18.3 | 18.0 | 17.8 | 17.7 | ...  | ... | ... |
| 34       | 23.1                                                                                                     | ... | 23.1 | ... | 21.9 | 20.9 | 20.2 | 19.7 | 19.6 | 19.5 | 19.4 | ...  | ... | ... |
| 35       | 23.1                                                                                                     | ... | 20.8 | ... | 18.6 | 17.2 | 16.2 | 15.5 | 15.3 | 15.2 | 15.1 | ...  | ... | ... |
| 36       | 27.1                                                                                                     | ... | 27.1 | ... | 25.8 | 24.6 | 23.7 | 23.2 | 23.1 | 23.0 | 22.9 | ...  | ... | ... |
| 37       | 27.1                                                                                                     | ... | 24.5 | ... | 21.9 | 20.3 | 19.1 | 18.3 | 18.0 | 17.9 | 17.7 | ...  | ... | ... |
| 38       | 23.1                                                                                                     | ... | 23.1 | ... | 21.9 | 20.9 | 20.2 | 19.7 | 19.6 | 19.5 | 19.4 | ...  | ... | ... |
| 39       | 23.1                                                                                                     | ... | 20.8 | ... | 18.6 | 17.2 | 16.2 | 15.5 | 15.3 | 15.2 | 15.1 | ...  | ... | ... |
| 40       | 23.1                                                                                                     | ... | 23.1 | ... | 21.9 | 20.9 | 20.2 | 19.7 | 19.6 | 19.5 | 19.4 | ...  | ... | ... |
| 41       | 23.1                                                                                                     | ... | 20.8 | ... | 18.6 | 17.2 | 16.2 | 15.5 | 15.3 | 15.2 | 15.1 | ...  | ... | ... |
| 42       | 28.0                                                                                                     | ... | 28.0 | ... | 26.6 | 25.4 | 24.5 | 23.9 | 23.8 | 23.7 | 23.6 | ...  | ... | ... |
| 43       | 28.0                                                                                                     | ... | 24.5 | ... | 21.9 | 20.3 | 19.1 | 18.3 | 18.0 | 17.9 | 17.7 | ...  | ... | ... |
| 44       | 23.8                                                                                                     | ... | 23.8 | ... | 22.6 | 21.6 | 20.8 | 20.4 | 20.2 | 20.1 | 20.1 | ...  | ... | ... |
| 45       | 23.8                                                                                                     | ... | 20.8 | ... | 18.6 | 17.2 | 16.2 | 15.5 | 15.3 | 15.2 | 15.1 | ...  | ... | ... |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|--------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 20Cr-18Ni-6Mo       | Smls. pipe   | SA-312    | ...        | S31254                | ...                      | $t \leq 0.187$      |
| 2        | 20Cr-18Ni-6Mo       | Smls. pipe   | SA-312    | ...        | S31254                | ...                      | $t \leq 0.187$      |
| 3        | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-312    | ...        | S31254                | ...                      | $t \leq 0.187$      |
| 4        | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-312    | ...        | S31254                | ...                      | $t \leq 0.187$      |
| 5        | 20Cr-18Ni-6Mo       | Plate        | SA-240    | ...        | S31254                | ...                      | $\leq \frac{3}{16}$ |
| 6        | 20Cr-18Ni-6Mo       | Plate        | SA-240    | ...        | S31254                | ...                      | $\leq \frac{3}{16}$ |
| 7        | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-358    | ...        | S31254                | ...                      | $t < 0.187$         |
| 8        | 20Cr-18Ni-6Mo       | Wld. pipe    | SA-358    | ...        | S31254                | ...                      | $t < 0.187$         |
| 9        | 20.5Cr-8.8Ni-Mo-N   | Plate        | SA-240    | ...        | S31655                | ...                      | ...                 |
| 10       | 20.5Cr-8.8Ni-Mo-N   | Plate        | SA-240    | ...        | S31655                | ...                      | ...                 |
| 11       | 21Cr-5Mn-1.5Ni-Cu-N | Plate        | SA-240    | ...        | S32101                | ...                      | $> \frac{3}{16}$    |
| 12       | 21Cr-5Mn-1.5Ni-Cu-N | Bar          | SA-479    | ...        | S32101                | ...                      | ...                 |
| 13       | 21Cr-5Mn-1.5Ni-Cu-N | Smls. tube   | SA-789    | ...        | S32101                | ...                      | $> \frac{3}{16}$    |
| 14       | 21Cr-5Mn-1.5Ni-Cu-N | Wld. tube    | SA-789    | ...        | S32101                | ...                      | $> \frac{3}{16}$    |
| 15       | 21Cr-5Mn-1.5Ni-Cu-N | Smls. pipe   | SA-790    | ...        | S32101                | ...                      | $> \frac{3}{16}$    |
| 16       | 21Cr-5Mn-1.5Ni-Cu-N | Wld. pipe    | SA-790    | ...        | S32101                | ...                      | $> \frac{3}{16}$    |
| 17       | 21Cr-5Mn-1.5Ni-Cu-N | Fittings     | SA-815    | ...        | S32101                | ...                      | ...                 |
| 18       | 21Cr-5Mn-1.5Ni-Cu-N | Sheet, strip | SA-240    | ...        | S32101                | ...                      | $\leq \frac{3}{16}$ |
| 19       | 21Cr-5Mn-1.5Ni-Cu-N | Smls. tube   | SA-789    | ...        | S32101                | ...                      | $\leq \frac{3}{16}$ |
| 20       | 21Cr-5Mn-1.5Ni-Cu-N | Wld. tube    | SA-789    | ...        | S32101                | ...                      | $\leq \frac{3}{16}$ |
| 21       | 21Cr-5Mn-1.5Ni-Cu-N | Smls. pipe   | SA-790    | ...        | S32101                | ...                      | $\leq \frac{3}{16}$ |
| 22       | 21Cr-5Mn-1.5Ni-Cu-N | Wld. pipe    | SA-790    | ...        | S32101                | ...                      | $\leq \frac{3}{16}$ |
| 23       | 21Cr-6Ni-9Mn        | Forgings     | SA-182    | FXM-11     | S21904                | ...                      | ...                 |
| 24       | 21Cr-6Ni-9Mn        | Smls. pipe   | SA-312    | TPXM-11    | S21904                | ...                      | ...                 |
| 25       | 21Cr-6Ni-9Mn        | Smls. pipe   | SA-312    | TPXM-11    | S21904                | ...                      | ...                 |
| 26       | 21Cr-6Ni-9Mn        | Wld. pipe    | SA-312    | TPXM-11    | S21904                | ...                      | ...                 |
| 27       | 21Cr-6Ni-9Mn        | Wld. pipe    | SA-312    | TPXM-11    | S21904                | ...                      | ...                 |
| 28       | 21Cr-6Ni-9Mn        | Plate        | SA-666    | XM-11      | S21904                | ...                      | ...                 |
| 29       | 21Cr-6Ni-9Mn        | Plate        | SA-666    | XM-11      | S21904                | ...                      | ...                 |
| 30       | 21Cr-6Ni-9Mn        | Forgings     | SA-965    | FXM-11     | S21904                | ...                      | ...                 |
| 31       | 21Cr-6Ni-9Mn        | Forgings     | SA-965    | FXM-11     | S21904                | ...                      | ...                 |
| 32       | 21Cr-11Ni-N         | Forgings     | SA-182    | F45        | S30815                | ...                      | ...                 |
| 33       | 21Cr-11Ni-N         | Forgings     | SA-182    | F45        | S30815                | ...                      | ...                 |
| 34       | 21Cr-11Ni-N         | Smls. tube   | SA-213    | ...        | S30815                | ...                      | ...                 |
| 35       | 21Cr-11Ni-N         | Smls. tube   | SA-213    | ...        | S30815                | ...                      | ...                 |
| 36       | 21Cr-11Ni-N         | Plate        | SA-240    | ...        | S30815                | ...                      | ...                 |
| 37       | 21Cr-11Ni-N         | Plate        | SA-240    | ...        | S30815                | ...                      | ...                 |
| 38       | 21Cr-11Ni-N         | Wld. tube    | SA-249    | ...        | S30815                | ...                      | ...                 |
| 39       | 21Cr-11Ni-N         | Wld. tube    | SA-249    | ...        | S30815                | ...                      | ...                 |
| 40       | 21Cr-11Ni-N         | Smls. pipe   | SA-312    | ...        | S30815                | ...                      | ...                 |
| 41       | 21Cr-11Ni-N         | Smls. pipe   | SA-312    | ...        | S30815                | ...                      | ...                 |
| 42       | 21Cr-11Ni-N         | Wld. pipe    | SA-312    | ...        | S30815                | ...                      | ...                 |
| 43       | 21Cr-11Ni-N         | Wld. pipe    | SA-312    | ...        | S30815                | ...                      | ...                 |
| 44       | 21Cr-11Ni-N         | Bar          | SA-479    | ...        | S30815                | ...                      | ...                 |
| 45       | 21Cr-11Ni-N         | Bar          | SA-479    | ...        | S30815                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                 |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|-----------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes           |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                 |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                 |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                 |
| 1                                  | 8     | 4         | 98                         | 45                       | NP                    | 750 | 750    | NP  | HA-2                        | G5              |
| 2                                  | 8     | 4         | 98                         | 45                       | NP                    |     | 750    | NP  | HA-2                        | ...             |
| 3                                  | 8     | 4         | 98                         | 45                       | NP                    | 750 | 750    | NP  | HA-2                        | G5, G24         |
| 4                                  | 8     | 4         | 98                         | 45                       | NP                    | NP  | 750    | NP  | HA-2                        | G24             |
| 5                                  | 8     | 4         | 100                        | 45                       | NP                    | 750 | 750    | 650 | HA-2                        | G5              |
| 6                                  | 8     | 4         | 100                        | 45                       | NP                    | NP  | 750    | 650 | HA-2                        | ...             |
| 7                                  | 8     | 4         | 100                        | 45                       | NP                    | 750 | 750    | 650 | HA-2                        | G5              |
| 8                                  | 8     | 4         | 100                        | 45                       | NP                    | NP  | 750    | 650 | HA-2                        |                 |
| 9                                  | 8     | 3         | 92                         | 45                       | NP                    | NP  | 850    | NP  | HA-2                        | G5              |
| 10                                 | 8     | 3         | 92                         | 45                       | NP                    | NP  | 850    | NP  | HA-2                        | ...             |
| 11                                 | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19             |
| 12                                 | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19             |
| 13                                 | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19             |
| 14                                 | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24        |
| 15                                 | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19             |
| 16                                 | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24        |
| 17                                 | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, W14        |
| 18                                 | 10H   | 1         | 101                        | 77                       | NP                    | NP  | 600    | NP  | HA-5                        | G19             |
| 19                                 | 10H   | 1         | 101                        | 77                       | NP                    | NP  | 600    | NP  | HA-5                        | G19             |
| 20                                 | 10H   | 1         | 101                        | 77                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24        |
| 21                                 | 10H   | 1         | 101                        | 77                       | NP                    | NP  | 600    | NP  | HA-5                        | G19             |
| 22                                 | 10H   | 1         | 101                        | 77                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24        |
| 23                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | ...             |
| 24                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | G5              |
| 25                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | ...             |
| 26                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | G5, G24         |
| 27                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | G24             |
| 28                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | G5              |
| 29                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | ...             |
| 30                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | G5              |
| 31                                 | 8     | 3         | 90                         | 50                       | NP                    | NP  | 600    | 600 | HA-6                        | ...             |
| 32                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G5, G6, T5      |
| 33                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G6, T6          |
| 34                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G5, G6, T5      |
| 35                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G6, T6          |
| 36                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G5, G6, T5      |
| 37                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G6, T6          |
| 38                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G5, G6, G24, T5 |
| 39                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G6, G24, T6     |
| 40                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G5, G6, T5      |
| 41                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G6, T6          |
| 42                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G5, G6, G24, T5 |
| 43                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G6, G24, T6     |
| 44                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G5, G6, T5      |
| 45                                 | 8     | 2         | 87                         | 45                       | 1650                  | NP  | 1650   | 650 | HA-6                        | G6, T6          |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 28.0                                                                                                     | ... | 28.0 | ... | 26.6 | 25.4 | 24.5 | 23.9 | 23.8 | 23.7 | 23.6 | ...  | ...  | ...  |
| 2        | 28.0                                                                                                     | ... | 24.5 | ... | 21.9 | 20.3 | 19.1 | 18.3 | 18.0 | 17.9 | 17.7 | ...  | ...  | ...  |
| 3        | 23.8                                                                                                     | ... | 23.8 | ... | 22.6 | 21.6 | 20.8 | 20.4 | 20.2 | 20.1 | 20.1 | ...  | ...  | ...  |
| 4        | 23.8                                                                                                     | ... | 20.8 | ... | 18.6 | 17.2 | 16.2 | 15.5 | 15.3 | 15.2 | 15.1 | ...  | ...  | ...  |
| 5        | 28.6                                                                                                     | ... | 28.6 | ... | 27.2 | 25.9 | 25.0 | 24.4 | 24.3 | 24.1 | 23.9 | ...  | ...  | ...  |
| 6        | 28.6                                                                                                     | ... | 24.5 | ... | 21.9 | 20.2 | 19.1 | 18.3 | 18.0 | 17.8 | 17.7 | ...  | ...  | ...  |
| 7        | 24.3                                                                                                     | ... | 24.3 | ... | 23.1 | 22.0 | 21.3 | 20.8 | 20.6 | 20.5 | 20.3 | ...  | ...  | ...  |
| 8        | 24.3                                                                                                     | ... | 20.8 | ... | 18.7 | 17.2 | 16.2 | 15.5 | 15.2 | 15.2 | 15.1 | ...  | ...  | ...  |
| 9        | 26.3                                                                                                     | ... | 25.9 | ... | 24.3 | 23.2 | 22.5 | 22.1 | 21.9 | 21.7 | 21.5 | 21.3 | 21.0 | ...  |
| 10       | 26.3                                                                                                     | ... | 23.9 | ... | 21.1 | 19.3 | 18.2 | 17.4 | 17.1 | 16.8 | 16.4 | 16.1 | 15.7 | ...  |
| 11       | 26.9                                                                                                     | ... | 26.9 | ... | 25.6 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 26.9                                                                                                     | ... | 26.9 | ... | 25.6 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 26.9                                                                                                     | ... | 26.9 | ... | 25.6 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 22.8                                                                                                     | ... | 21.1 | ... | 19.8 | 19.1 | 19.1 | 19.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 26.9                                                                                                     | ... | 26.9 | ... | 25.6 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 22.8                                                                                                     | ... | 21.1 | ... | 19.8 | 19.1 | 19.1 | 19.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 26.9                                                                                                     | ... | 26.9 | ... | 25.6 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 28.9                                                                                                     | ... | 28.9 | ... | 27.5 | 26.5 | 26.5 | 26.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 28.9                                                                                                     | ... | 28.9 | ... | 27.5 | 26.5 | 26.5 | 26.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 24.5                                                                                                     | ... | 24.5 | ... | 23.4 | 22.6 | 22.6 | 22.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 28.9                                                                                                     | ... | 28.9 | ... | 27.5 | 26.5 | 26.5 | 26.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 24.5                                                                                                     | ... | 24.5 | ... | 23.4 | 22.6 | 22.6 | 22.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 25.7                                                                                                     | ... | 25.7 | ... | 22.0 | 19.6 | 18.1 | 17.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 25.7                                                                                                     | ... | 25.7 | ... | 24.0 | 22.8 | 22.0 | 21.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 25.7                                                                                                     | ... | 25.7 | ... | 22.0 | 19.6 | 18.1 | 17.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 21.9                                                                                                     | ... | 21.9 | ... | 20.4 | 19.4 | 18.7 | 18.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 21.9                                                                                                     | ... | 21.9 | ... | 18.7 | 16.6 | 15.3 | 14.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 25.7                                                                                                     | ... | 25.7 | ... | 24.0 | 22.8 | 22.0 | 21.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 25.7                                                                                                     | ... | 25.7 | ... | 22.0 | 19.6 | 18.1 | 17.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 25.7                                                                                                     | ... | 25.7 | ... | 24.0 | 22.8 | 22.0 | 21.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 25.7                                                                                                     | ... | 25.7 | ... | 22.0 | 19.6 | 18.1 | 17.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 24.9                                                                                                     | ... | 24.7 | ... | 23.3 | 22.4 | 21.8 | 21.4 | 21.2 | 21.0 | 20.8 | 20.6 | 20.3 | 20.0 |
| 33       | 24.9                                                                                                     | ... | 24.7 | ... | 22.0 | 19.9 | 18.5 | 17.7 | 17.4 | 17.2 | 17.0 | 16.8 | 16.6 | 16.4 |
| 34       | 24.9                                                                                                     | ... | 24.7 | ... | 23.3 | 22.4 | 21.8 | 21.4 | 21.2 | 21.0 | 20.8 | 20.6 | 20.3 | 20.0 |
| 35       | 24.9                                                                                                     | ... | 24.7 | ... | 22.0 | 19.9 | 18.5 | 17.7 | 17.4 | 17.2 | 17.0 | 16.8 | 16.6 | 16.4 |
| 36       | 24.9                                                                                                     | ... | 24.7 | ... | 23.3 | 22.4 | 21.8 | 21.4 | 21.2 | 21.0 | 20.8 | 20.6 | 20.3 | 20.0 |
| 37       | 24.9                                                                                                     | ... | 24.7 | ... | 22.0 | 19.9 | 18.5 | 17.7 | 17.4 | 17.2 | 17.0 | 16.8 | 16.6 | 16.4 |
| 38       | 21.1                                                                                                     | ... | 21.0 | ... | 19.8 | 19.1 | 18.5 | 18.2 | 18.0 | 17.8 | 17.7 | 17.5 | 17.3 | 17.0 |
| 39       | 21.1                                                                                                     | ... | 21.0 | ... | 18.7 | 16.9 | 15.8 | 15.0 | 14.8 | 14.6 | 14.5 | 14.3 | 14.2 | 14.0 |
| 40       | 24.9                                                                                                     | ... | 24.7 | ... | 23.3 | 22.4 | 21.8 | 21.4 | 21.2 | 21.0 | 20.8 | 20.6 | 20.3 | 20.0 |
| 41       | 24.9                                                                                                     | ... | 24.7 | ... | 22.0 | 19.9 | 18.5 | 17.7 | 17.4 | 17.2 | 17.0 | 16.8 | 16.6 | 16.4 |
| 42       | 21.1                                                                                                     | ... | 21.0 | ... | 19.8 | 19.1 | 18.5 | 18.2 | 18.0 | 17.8 | 17.7 | 17.5 | 17.3 | 17.0 |
| 43       | 21.1                                                                                                     | ... | 21.0 | ... | 18.7 | 16.9 | 15.8 | 15.0 | 14.8 | 14.6 | 14.5 | 14.3 | 14.2 | 14.0 |
| 44       | 24.9                                                                                                     | ... | 24.7 | ... | 23.3 | 22.4 | 21.8 | 21.4 | 21.2 | 21.0 | 20.8 | 20.6 | 20.3 | 20.0 |
| 45       | 24.9                                                                                                     | ... | 24.7 | ... | 22.0 | 19.9 | 18.5 | 17.7 | 17.4 | 17.2 | 17.0 | 16.8 | 16.6 | 16.4 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 19.1                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 33       | 16.2                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 34       | 19.1                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 35       | 16.2                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 36       | 19.1                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 37       | 16.2                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 38       | 16.3                                                                                                     | 12.7 | 9.9  | 7.7  | 5.9  | 4.4  | 3.4  | 2.6  | 2.0  | 1.6  | 1.4  | 1.1  | 0.85 | 0.73 | 0.60 |
| 39       | 13.8                                                                                                     | 12.7 | 9.9  | 7.7  | 5.9  | 4.4  | 3.4  | 2.6  | 2.0  | 1.6  | 1.4  | 1.1  | 0.85 | 0.73 | 0.60 |
| 40       | 19.1                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 41       | 16.2                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 42       | 16.3                                                                                                     | 12.7 | 9.9  | 7.7  | 5.9  | 4.4  | 3.4  | 2.6  | 2.0  | 1.6  | 1.4  | 1.1  | 0.85 | 0.73 | 0.60 |
| 43       | 13.8                                                                                                     | 12.7 | 9.9  | 7.7  | 5.9  | 4.4  | 3.4  | 2.6  | 2.0  | 1.6  | 1.4  | 1.1  | 0.85 | 0.73 | 0.60 |
| 44       | 19.1                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |
| 45       | 16.2                                                                                                     | 14.9 | 11.6 | 9.0  | 6.9  | 5.2  | 4.0  | 3.1  | 2.4  | 1.9  | 1.6  | 1.3  | 1.0  | 0.86 | 0.71 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 22Cr-2Ni-Mo-N       | Forgings              | SA-182    | F66        | S32202                | ...                      | ...                 |
| 2        | 22Cr-2Ni-Mo-N       | Plate                 | SA-240    | ...        | S32202                | ...                      | ...                 |
| 3        | 22Cr-2Ni-Mo-N       | Bar                   | SA-479    | ...        | S32202                | ...                      | ...                 |
| 4        | 22Cr-2Ni-Mo-N       | Smls. tube            | SA-789    | ...        | S32202                | ...                      | ...                 |
| 5        | 22Cr-2Ni-Mo-N       | Wld. tube             | SA-789    | ...        | S32202                | ...                      | ...                 |
| 6        | 22Cr-2Ni-Mo-N       | Smls. pipe            | SA-790    | ...        | S32202                | ...                      | ...                 |
| 7        | 22Cr-2Ni-Mo-N       | Wld. pipe             | SA-790    | ...        | S32202                | ...                      | ...                 |
| 8        | 22Cr-2Ni-Mo-N       | Smls. fittings        | SA-815    | ...        | S32202                | ...                      | ...                 |
| 9        | 22Cr-2Ni-Mo-N       | Wld. fittings         | SA-815    | ...        | S32202                | ...                      | ...                 |
| 10       | 22Cr-5Ni-3Mo-N      | Castings              | SA-995    | 4A         | J92205                | ...                      | ...                 |
| 11       | 22Cr-5Ni-3Mo-N      | Forgings              | SA-182    | F51        | S31803                | ...                      | ...                 |
| 12       | 22Cr-5Ni-3Mo-N      | Plate                 | SA-240    | ...        | S31803                | ...                      | ...                 |
| 13       | 22Cr-5Ni-3Mo-N      | Bar                   | SA-479    | ...        | S31803                | ...                      | ...                 |
| 14       | 22Cr-5Ni-3Mo-N      | Smls. tube            | SA-789    | ...        | S31803                | ...                      | ...                 |
| 15       | 22Cr-5Ni-3Mo-N      | Wld. tube             | SA-789    | ...        | S31803                | ...                      | ...                 |
| 16       | 22Cr-5Ni-3Mo-N      | Smls. pipe            | SA-790    | ...        | S31803                | ...                      | ...                 |
| 17       | 22Cr-5Ni-3Mo-N      | Wld. pipe             | SA-790    | ...        | S31803                | ...                      | ...                 |
| 18       | 22Cr-5Ni-3Mo-N      | Smls. fittings        | SA-815    | ...        | S31803                | ...                      | ...                 |
| 19       | 22Cr-5Ni-3Mo-N      | Wld. fittings         | SA-815    | ...        | S31803                | ...                      | ...                 |
| 20       | 22Cr-5Ni-3Mo-N      | Smls. & wld. fittings | SA-815    | ...        | S31803                | ...                      | ...                 |
| 21       | 22Cr-5Ni-3Mo-N      | Plate                 | SA-240    | ...        | S32205                | ...                      | ...                 |
| 22       | 22Cr-5Ni-3Mo-N      | Bar                   | SA-479    | ...        | S32205                | ...                      | ...                 |
| 23       | 22Cr-5Ni-3Mo-N      | Smls. & wld. pipe     | SA-790    | ...        | S32205                | ...                      | ...                 |
| 24       | 22Cr-5Ni-3Mo-N      | Smls. pipe            | SA-790    | ...        | S32205                | ...                      | ...                 |
| 25       | 22Cr-5Ni-3Mo-N      | Wld. pipe             | SA-790    | ...        | S32205                | ...                      | ...                 |
| 26       | 22Cr-5Ni-3Mo-N      | Smls. & wld. fittings | SA-815    | ...        | S32205                | ...                      | ...                 |
| 27       | 22Cr-5Ni-3Mo-N      | Smls. fittings        | SA-815    | ...        | S32205                | ...                      | ...                 |
| 28       | 22Cr-5Ni-3Mo-N      | Wld. fittings         | SA-815    | ...        | S32205                | ...                      | ...                 |
| 29       | 22Cr-5Ni-3Mo-N      | Forgings              | SA-182    | F60        | S32205                | ...                      | ...                 |
| 30       | 22Cr-5Ni-3Mo-N      | Smls. & wld. tube     | SA-789    | ...        | S32205                | ...                      | ...                 |
| 31       | 22Cr-5Ni-3Mo-N      | Smls. tube            | SA-789    | ...        | S32205                | ...                      | ...                 |
| 32       | 22Cr-5Ni-3Mo-N      | Wld. tube             | SA-789    | ...        | S32205                | ...                      | ...                 |
| 33       | 22Cr-13Ni-5Mn       | Castings              | SA-351    | CG6MMN     | J93790                | ...                      | ...                 |
| 34       | 22Cr-13Ni-5Mn       | Forgings              | SA-182    | FXM-19     | S20910                | ...                      | ...                 |
| 35       | 22Cr-13Ni-5Mn       | Smls. tube            | SA-213    | XM-19      | S20910                | ...                      | ...                 |
| 36       | 22Cr-13Ni-5Mn       | Plate                 | SA-240    | XM-19      | S20910                | ...                      | ...                 |
| 37       | 22Cr-13Ni-5Mn       | Wld. tube             | SA-249    | TPXM-19    | S20910                | ...                      | ...                 |
| 38       | 22Cr-13Ni-5Mn       | Wld. tube             | SA-249    | TPXM-19    | S20910                | ...                      | ...                 |
| 39       | 22Cr-13Ni-5Mn       | Smls. & wld. pipe     | SA-312    | TPXM-19    | S20910                | ...                      | ...                 |
| 40       | 22Cr-13Ni-5Mn       | Smls. pipe            | SA-312    | TPXM-19    | S20910                | ...                      | ...                 |
| 41       | 22Cr-13Ni-5Mn       | Wld. pipe             | SA-312    | TPXM-19    | S20910                | ...                      | ...                 |
| 42       | 22Cr-13Ni-5Mn       | Wld. pipe             | SA-358    | XM-19      | S20910                | 1                        | ...                 |
| 43       | 22Cr-13Ni-5Mn       | Smls. & wld. fittings | SA-403    | XM-19      | S20910                | ...                      | ...                 |
| 44       | 22Cr-13Ni-5Mn       | Bar                   | SA-479    | XM-19      | S20910                | ...                      | ...                 |
| 45       | 22Cr-13Ni-5Mn       | Wld. pipe             | SA-813    | TPXM-19    | S20910                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                  |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes            |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                  |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                  |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                  |
| 1                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19              |
| 2                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19              |
| 3                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19              |
| 4                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19              |
| 5                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24         |
| 6                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19              |
| 7                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24         |
| 8                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19              |
| 9                                  | 10H   | 1         | 94                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G3, G19          |
| 10                                 | 10H   | 1         | 90                         | 60                       | NP                    | NP  | 500    | NP  | HA-5                        | G1, G19          |
| 11                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | 600    | 600 | HA-5                        | G19              |
| 12                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | 600    | 600 | HA-5                        | G19              |
| 13                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | 600    | NP  | HA-5                        | G19              |
| 14                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | 600    | 600 | HA-5                        | G19              |
| 15                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | 600    | 600 | HA-5                        | G19, G24         |
| 16                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | 600    | 600 | HA-5                        | G19              |
| 17                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | 600    | 600 | HA-5                        | G19, G24         |
| 18                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | NP     | NP  | HA-5                        | G19              |
| 19                                 | 10H   | 1         | 90                         | 65                       | 600                   | NP  | NP     | NP  | HA-5                        | G19, G24         |
| 20                                 | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, W14         |
| 21                                 | 10H   | 1         | 95                         | 65                       | NP                    | 600 | 600    | 600 | HA-5                        | G19              |
| 22                                 | 10H   | 1         | 95                         | 65                       | NP                    | 600 | 600    | NP  | HA-5                        | G19              |
| 23                                 | 10H   | 1         | 95                         | 65                       | NP                    | 600 | NP     | NP  | HA-5                        | G19, W12         |
| 24                                 | 10H   | 1         | 95                         | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19              |
| 25                                 | 10H   | 1         | 95                         | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24         |
| 26                                 | 10H   | 1         | 95                         | 65                       | NP                    | 600 | NP     | NP  | HA-5                        | G19, W12         |
| 27                                 | 10H   | 1         | 95                         | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19              |
| 28                                 | 10H   | 1         | 95                         | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24         |
| 29                                 | 10H   | 1         | 95                         | 70                       | NP                    | 600 | 600    | 600 | HA-5                        | G19              |
| 30                                 | 10H   | 1         | 95                         | 70                       | NP                    | 600 | NP     | NP  | HA-5                        | G19, W12         |
| 31                                 | 10H   | 1         | 95                         | 70                       | NP                    | NP  | 600    | 600 | HA-5                        | G19              |
| 32                                 | 10H   | 1         | 95                         | 70                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24         |
| 33                                 | 8     | 3         | 85                         | 42.5                     | NP                    | NP  | 1050   | 650 | HA-2                        | G1               |
| 34                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | 1200   | 650 | HA-6                        | G5, T8           |
| 35                                 | 8     | 3         | 100                        | 55                       | NP                    | NP  | 1200   | NP  | HA-6                        | T8               |
| 36                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | 1200   | 650 | HA-6                        | G5, T8           |
| 37                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | NP     | NP  | HA-6                        | G5, W12          |
| 38                                 | 8     | 3         | 100                        | 55                       | NP                    | NP  | 1200   | 650 | HA-6                        | G24, T8          |
| 39                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | NP     | NP  | HA-6                        | G5, W12          |
| 40                                 | 8     | 3         | 100                        | 55                       | NP                    | NP  | 1200   | 650 | HA-6                        | T8               |
| 41                                 | 8     | 3         | 100                        | 55                       | NP                    | NP  | 1200   | 650 | HA-6                        | G24, T8          |
| 42                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | NP     | NP  | HA-6                        | G5, W12          |
| 43                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | 1200   | 650 | HA-6                        | G5, T8, W12, W14 |
| 44                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | 1200   | 650 | HA-6                        | G5, G22, T8      |
| 45                                 | 8     | 3         | 100                        | 55                       | NP                    | 800 | NP     | NP  | HA-6                        | G5, W12          |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 26.9                                                                                                     | 26.9 | 26.6 | 25.5 | 24.9 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 26.9                                                                                                     | 26.9 | 26.6 | 25.5 | 24.9 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 26.9                                                                                                     | 26.9 | 26.6 | 25.5 | 24.9 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 26.9                                                                                                     | 26.9 | 26.6 | 25.5 | 24.9 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 22.8                                                                                                     | 22.8 | 22.6 | 21.7 | 21.1 | 21.0 | 21.0 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 26.9                                                                                                     | 26.9 | 26.6 | 25.5 | 24.9 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 22.8                                                                                                     | 22.8 | 22.6 | 21.7 | 21.1 | 21.0 | 21.0 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 26.9                                                                                                     | 26.9 | 26.6 | 25.5 | 24.9 | 24.7 | 24.7 | 24.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 22.8                                                                                                     | 22.8 | 22.6 | 21.7 | 21.1 | 21.0 | 21.0 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 25.7                                                                                                     | 25.7 | 25.7 | 25.2 | 24.6 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 23.9 | 23.3 | 23.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 23.9 | 23.3 | 23.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 23.9 | 23.3 | 23.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 23.9 | 23.3 | 23.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 21.9                                                                                                     | ...  | 21.9 | ...  | 21.1 | 20.3 | 19.8 | 19.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 23.9 | 23.3 | 23.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 21.9                                                                                                     | ...  | 21.9 | ...  | 21.1 | 20.3 | 19.8 | 19.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 23.9 | 23.3 | 23.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 21.9                                                                                                     | ...  | 21.9 | ...  | 21.1 | 20.3 | 19.8 | 19.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 23.9 | 23.3 | 23.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 23.1                                                                                                     | ...  | 23.0 | ...  | 22.3 | 21.4 | 20.9 | 20.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 23.1                                                                                                     | ...  | 23.0 | ...  | 22.3 | 21.4 | 20.9 | 20.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 27.1                                                                                                     | ...  | 27.1 | ...  | 26.2 | 25.2 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 23.1                                                                                                     | ...  | 23.0 | ...  | 22.3 | 21.4 | 20.9 | 20.7 | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 19.4                                                                                                     | ...  | 19.3 | ...  | 17.8 | 16.8 | 16.0 | 15.4 | 15.2 | 14.9 | 14.7 | 14.6 | 14.4 | 14.2 |
| 34       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | 23.9 | 23.6 |
| 35       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.0 | 24.6 | 24.2 | 23.9 | 23.5 | 23.3 | 23.0 |
| 36       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | 23.9 | 23.6 |
| 37       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | ...  | ...  |
| 38       | 24.3                                                                                                     | ...  | 24.1 | ...  | 22.9 | 22.1 | 21.6 | 21.2 | 20.9 | 20.6 | 20.3 | 20.0 | 19.8 | 19.5 |
| 39       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | ...  | ...  |
| 40       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.0 | 24.6 | 24.2 | 23.9 | 23.5 | 23.3 | 23.0 |
| 41       | 24.3                                                                                                     | ...  | 24.1 | ...  | 22.9 | 22.1 | 21.6 | 21.2 | 20.9 | 20.6 | 20.3 | 20.0 | 19.8 | 19.5 |
| 42       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | ...  | ...  |
| 43       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | 23.9 | 23.6 |
| 44       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | 23.9 | 23.6 |
| 45       | 28.6                                                                                                     | ...  | 28.4 | ...  | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 14.1                                                                                                     | 13.9 | 13.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 23.2                                                                                                     | 22.8 | 22.3 | 20.4 | 13.0 | 8.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 22.7                                                                                                     | 22.5 | 22.2 | 20.4 | 13.0 | 8.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 23.2                                                                                                     | 22.8 | 22.3 | 20.4 | 13.0 | 8.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 19.3                                                                                                     | 19.1 | 18.9 | 17.3 | 11.1 | 7.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 22.7                                                                                                     | 22.5 | 22.2 | 20.4 | 13.0 | 8.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 19.3                                                                                                     | 19.1 | 18.9 | 17.3 | 11.1 | 7.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 23.2                                                                                                     | 22.8 | 22.3 | 20.4 | 13.0 | 8.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 23.2                                                                                                     | 22.8 | 22.3 | 20.4 | 13.0 | 8.3  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 22Cr-13Ni-5Mn       | Wld. pipe             | SA-814    | TPXM-19    | S20910                | ...                      | ...                 |
| 2        | 23Cr-4Ni-Mo-Cu-N    | Plate                 | SA-240    | ...        | S32304                | ...                      | ...                 |
| 3        | 23Cr-4Ni-Mo-Cu-N    | Smls. tube            | SA-789    | ...        | S32304                | ...                      | >1                  |
| 4        | 23Cr-4Ni-Mo-Cu-N    | Wld. tube             | SA-789    | ...        | S32304                | ...                      | >1                  |
| 5        | 23Cr-4Ni-Mo-Cu-N    | Smls. pipe            | SA-790    | ...        | S32304                | ...                      | ...                 |
| 6        | 23Cr-4Ni-Mo-Cu-N    | Wld. pipe             | SA-790    | ...        | S32304                | ...                      | ...                 |
| 7        | 23Cr-4Ni-Mo-Cu-N    | Smls. tube            | SA-789    | ...        | S32304                | ...                      | ≤1                  |
| 8        | 23Cr-4Ni-Mo-Cu-N    | Wld. tube             | SA-789    | ...        | S32304                | ...                      | ≤1                  |
| 9        | 23Cr-12Ni           | Smls. & wld. fittings | SA-403    | 309        | S30900                | ...                      | ...                 |
| 10       | 23Cr-12Ni           | Smls. tube            | SA-213    | TP309S     | S30908                | ...                      | ...                 |
| 11       | 23Cr-12Ni           | Smls. tube            | SA-213    | TP309S     | S30908                | ...                      | ...                 |
| 12       | 23Cr-12Ni           | Plate                 | SA-240    | 309S       | S30908                | ...                      | ...                 |
| 13       | 23Cr-12Ni           | Plate                 | SA-240    | 309S       | S30908                | ...                      | ...                 |
| 14       | 23Cr-12Ni           | Wld. tube             | SA-249    | TP309S     | S30908                | ...                      | ...                 |
| 15       | 23Cr-12Ni           | Wld. tube             | SA-249    | TP309S     | S30908                | ...                      | ...                 |
| 16       | 23Cr-12Ni           | Smls. & wld. pipe     | SA-312    | TP309S     | S30908                | ...                      | ...                 |
| 17       | 23Cr-12Ni           | Smls. pipe            | SA-312    | TP309S     | S30908                | ...                      | ...                 |
| 18       | 23Cr-12Ni           | Wld. pipe             | SA-312    | TP309S     | S30908                | ...                      | ...                 |
| 19       | 23Cr-12Ni           | Wld. pipe             | SA-312    | TP309S     | S30908                | ...                      | ...                 |
| (25) 20  | 23Cr-12Ni           | Wld. pipe             | SA-312    | TP309S     | S30908                | ...                      | ...                 |
| (25) 21  | 23Cr-12Ni           | Wld. pipe             | SA-312    | TP309S     | S30908                | ...                      | ...                 |
| 22       | 23Cr-12Ni           | Wld. pipe             | SA-358    | 309S       | S30908                | 1                        | ...                 |
| 23       | 23Cr-12Ni           | Bar                   | SA-479    | 309S       | S30908                | ...                      | ...                 |
| 24       | 23Cr-12Ni           | Bar                   | SA-479    | 309S       | S30908                | ...                      | ...                 |
| 25       | 23Cr-12Ni           | Wld. pipe             | SA-813    | TP309S     | S30908                | ...                      | ...                 |
| 26       | 23Cr-12Ni           | Wld. pipe             | SA-813    | TP309S     | S30908                | ...                      | ...                 |
| 27       | 23Cr-12Ni           | Wld. pipe             | SA-814    | TP309S     | S30908                | ...                      | ...                 |
| 28       | 23Cr-12Ni           | Wld. pipe             | SA-814    | TP309S     | S30908                | ...                      | ...                 |
| 29       | 23Cr-12Ni           | Smls. tube            | SA-213    | TP309H     | S30909                | ...                      | ...                 |
| 30       | 23Cr-12Ni           | Smls. tube            | SA-213    | TP309H     | S30909                | ...                      | ...                 |
| (25) 31  | 23Cr-12Ni           | Plate                 | SA-240    | 309H       | S30909                | ...                      | ...                 |
| (25) 32  | 23Cr-12Ni           | Plate                 | SA-240    | 309H       | S30909                | ...                      | ...                 |
| 33       | 23Cr-12Ni           | Wld. tube             | SA-249    | TP309H     | S30909                | ...                      | ...                 |
| 34       | 23Cr-12Ni           | Wld. tube             | SA-249    | TP309H     | S30909                | ...                      | ...                 |
| 35       | 23Cr-12Ni           | Wld. tube             | SA-249    | TP309H     | S30909                | ...                      | ...                 |
| 36       | 23Cr-12Ni           | Smls. pipe            | SA-312    | TP309H     | S30909                | ...                      | ...                 |
| 37       | 23Cr-12Ni           | Smls. pipe            | SA-312    | TP309H     | S30909                | ...                      | ...                 |
| (25) 38  | 23Cr-12Ni           | Wld. pipe             | SA-312    | TP309H     | S30909                | ...                      | ...                 |
| (25) 39  | 23Cr-12Ni           | Wld. pipe             | SA-312    | TP309H     | S30909                | ...                      | ...                 |
| 40       | 23Cr-12Ni           | Bar                   | SA-479    | 309H       | S30909                | ...                      | ...                 |
| 41       | 23Cr-12Ni           | Bar                   | SA-479    | 309H       | S30909                | ...                      | ...                 |
| 42       | 23Cr-12Ni-Cb        | Smls. tube            | SA-213    | TP309Cb    | S30940                | ...                      | ...                 |
| 43       | 23Cr-12Ni-Cb        | Smls. tube            | SA-213    | TP309Cb    | S30940                | ...                      | ...                 |
| 44       | 23Cr-12Ni-Cb        | Plate                 | SA-240    | 309Cb      | S30940                | ...                      | ...                 |
| 45       | 23Cr-12Ni-Cb        | Plate                 | SA-240    | 309Cb      | S30940                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                       |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|-----------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                 |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                       |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                       |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                       |
| 1                                  | 8     | 3         | 100                        | 55                       | NP                    | 800 | NP     | NP  | HA-6                        | G5, W12               |
| 2                                  | 10H   | 1         | 87                         | 58                       | NP                    | NP  | 600    | 600 | HA-6                        | G19                   |
| 3                                  | 10H   | 1         | 87                         | 58                       | NP                    | NP  | 600    | 600 | HA-6                        | G19                   |
| 4                                  | 10H   | 1         | 87                         | 58                       | NP                    | NP  | 600    | 600 | HA-6                        | G19, G24              |
| 5                                  | 10H   | 1         | 87                         | 58                       | NP                    | NP  | 600    | 600 | HA-6                        | G19                   |
| 6                                  | 10H   | 1         | 87                         | 58                       | NP                    | NP  | 600    | 600 | HA-6                        | G19, G24              |
| 7                                  | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19                   |
| 8                                  | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24              |
| 9                                  | 8     | 2         | 75                         | 30                       | NP                    | 800 | 1500   | 650 | HA-2                        | G5, G12, T5, W12, W14 |
| 10                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G5, G12, T5           |
| 11                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, T6               |
| 12                                 | 8     | 2         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-2                        | G5, G12, T5           |
| 13                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, T6               |
| 14                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 15                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 16                                 | 8     | 2         | 75                         | 30                       | 1500                  | 800 | 1500   | 650 | HA-2                        | G5, G12, T5, W12, W14 |
| 17                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, T6               |
| 18                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | NP     | NP  | HA-2                        | G5, G12, T5, W13      |
| 19                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | NP     | NP  | HA-2                        | G12, T6, W13          |
| 20                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 21                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 22                                 | 8     | 2         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12               |
| 23                                 | 8     | 2         | 75                         | 30                       | 1000                  | NP  | 1000   | 650 | HA-2                        | G5, G12, G22, T5      |
| 24                                 | 8     | 2         | 75                         | 30                       | 1000                  | NP  | 1000   | 650 | HA-2                        | G12, G22, T6          |
| 25                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 26                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 27                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 28                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 29                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G5, T6                |
| 30                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T7                    |
| 31                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G5, T6                |
| 32                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T7                    |
| 33                                 | 8     | 2         | 75                         | 30                       | NP                    | 800 | NP     | NP  | HA-2                        | G5, W12               |
| 34                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | NP  | HA-2                        | G5, G24, T6           |
| 35                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | NP  | HA-2                        | G24, T7               |
| 36                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G5, T6                |
| 37                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T7                    |
| 38                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G5, G24, T6           |
| 39                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G24, T7               |
| 40                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | G5, T6                |
| 41                                 | 8     | 2         | 75                         | 30                       | 1500                  | NP  | 1500   | NP  | HA-2                        | T7                    |
| 42                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, T5           |
| 43                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, T6               |
| 44                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, T5           |
| 45                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, T6               |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 28.6                                                                                                     | ... | 28.4 | ... | 26.9 | 26.0 | 25.5 | 25.1 | 24.9 | 24.7 | 24.5 | 24.2 | ...  | ...  |
| 2        | 24.9                                                                                                     | ... | 24.0 | ... | 22.5 | 21.7 | 21.3 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 24.9                                                                                                     | ... | 24.0 | ... | 22.5 | 21.7 | 21.3 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 21.1                                                                                                     | ... | 20.4 | ... | 19.1 | 18.5 | 18.1 | 17.9 | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 24.9                                                                                                     | ... | 24.0 | ... | 22.5 | 21.7 | 21.3 | 21.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 21.1                                                                                                     | ... | 20.4 | ... | 19.1 | 18.5 | 18.1 | 17.9 | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 28.6                                                                                                     | ... | 27.6 | ... | 25.9 | 25.0 | 24.6 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 24.3                                                                                                     | ... | 23.4 | ... | 22.0 | 21.3 | 20.9 | 20.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 10       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 11       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 12       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 13       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 14       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 15       | 17.0                                                                                                     | ... | 14.9 | ... | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 16       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 17       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 18       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 19       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 20       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 21       | 17.0                                                                                                     | ... | 14.9 | ... | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 22       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | ...  | ...  |
| 23       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 24       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 25       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 26       | 17.0                                                                                                     | ... | 14.9 | ... | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 27       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 28       | 17.0                                                                                                     | ... | 14.9 | ... | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 29       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 30       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 31       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 32       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 33       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | ...  | ...  |
| 34       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 35       | 17.0                                                                                                     | ... | 14.9 | ... | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 36       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 37       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 38       | 17.0                                                                                                     | ... | 17.0 | ... | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 39       | 17.0                                                                                                     | ... | 14.9 | ... | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 40       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 41       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 42       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 43       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 44       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 45       | 20.0                                                                                                     | ... | 17.5 | ... | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 10       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 11       | 12.5                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 12       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 13       | 12.5                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 14       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 15       | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 16       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 17       | 12.5                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 18       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 19       | 12.5                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 20       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | (25) |
| 21       | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | (25) |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 15.9                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 12.5                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 26       | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 27       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 28       | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 29       | 16.9                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | ...  |
| 30       | 12.5                                                                                                     | 12.3 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | ...  |
| 31       | 16.9                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | (25) |
| 32       | 12.5                                                                                                     | 12.3 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | (25) |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 14.4                                                                                                     | 11.7 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | ...  |
| 35       | 10.6                                                                                                     | 10.4 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | ...  |
| 36       | 16.9                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | ...  |
| 37       | 12.5                                                                                                     | 12.3 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | ...  |
| 38       | 14.4                                                                                                     | 11.7 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | (25) |
| 39       | 10.6                                                                                                     | 10.4 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | (25) |
| 40       | 16.9                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | ...  |
| 41       | 12.5                                                                                                     | 12.3 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 1.0  | 0.75 | ...  | ...  | ...  |
| 42       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 43       | 12.5                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 44       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 45       | 12.5                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition   | Product Form      | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|-----------------------|-------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 23Cr-12Ni-Cb          | Wld. tube         | SA-249    | TP309Cb    | S30940                | ...                      | ...                 |
| 2        | 23Cr-12Ni-Cb          | Wld. tube         | SA-249    | TP309Cb    | S30940                | ...                      | ...                 |
| 3        | 23Cr-12Ni-Cb          | Smls. & wld. pipe | SA-312    | TP309Cb    | S30940                | ...                      | ...                 |
| 4        | 23Cr-12Ni-Cb          | Smls. pipe        | SA-312    | TP309Cb    | S30940                | ...                      | ...                 |
| 5        | 23Cr-12Ni-Cb          | Wld. pipe         | SA-312    | TP309Cb    | S30940                | ...                      | ...                 |
| 6        | 23Cr-12Ni-Cb          | Wld. pipe         | SA-312    | TP309Cb    | S30940                | ...                      | ...                 |
| 7        | 23Cr-12Ni-Cb          | Bar               | SA-479    | 309Cb      | S30940                | ...                      | ...                 |
| 8        | 23Cr-12Ni-Cb          | Bar               | SA-479    | 309Cb      | S30940                | ...                      | ...                 |
| 9        | 23Cr-12Ni-Cb          | Wld. pipe         | SA-813    | TP309Cb    | S30940                | ...                      | ...                 |
| 10       | 23Cr-12Ni-Cb          | Wld. pipe         | SA-813    | TP309Cb    | S30940                | ...                      | ...                 |
| 11       | 23Cr-12Ni-Cb          | Wld. pipe         | SA-814    | TP309Cb    | S30940                | ...                      | ...                 |
| 12       | 23Cr-12Ni-Cb          | Wld. pipe         | SA-814    | TP309Cb    | S30940                | ...                      | ...                 |
| 13       | 23Cr-25Ni-5.5Mo-N     | Forgings          | SA-182    | ...        | S32053                | ...                      | ...                 |
| 14       | 23Cr-25Ni-5.5Mo-N     | Forgings          | SA-182    | ...        | S32053                | ...                      | ...                 |
| 15       | 23Cr-25Ni-5.5Mo-N     | Plate             | SA-240    | ...        | S32053                | ...                      | ...                 |
| 16       | 23Cr-25Ni-5.5Mo-N     | Plate             | SA-240    | ...        | S32053                | ...                      | ...                 |
| 17       | 23Cr-25Ni-5.5Mo-N     | Wld. tube         | SA-249    | ...        | S32053                | ...                      | ...                 |
| 18       | 23Cr-25Ni-5.5Mo-N     | Wld. tube         | SA-249    | ...        | S32053                | ...                      | ...                 |
| 19       | 23Cr-25Ni-5.5Mo-N     | Smls. & wld. pipe | SA-312    | ...        | S32053                | ...                      | ...                 |
| 20       | 23Cr-25Ni-5.5Mo-N     | Smls. & wld. pipe | SA-312    | ...        | S32053                | ...                      | ...                 |
| 21       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-358    | ...        | S32053                | ...                      | ...                 |
| 22       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-358    | ...        | S32053                | ...                      | ...                 |
| 23       | 23Cr-25Ni-5.5Mo-N     | Fittings          | SA-403    | ...        | S32053                | ...                      | ...                 |
| 24       | 23Cr-25Ni-5.5Mo-N     | Fittings          | SA-403    | ...        | S32053                | ...                      | ...                 |
| 25       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-409    | ...        | S32053                | ...                      | ...                 |
| 26       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-409    | ...        | S32053                | ...                      | ...                 |
| 27       | 23Cr-25Ni-5.5Mo-N     | Bar               | SA-479    | ...        | S32053                | ...                      | ...                 |
| 28       | 23Cr-25Ni-5.5Mo-N     | Bar               | SA-479    | ...        | S32053                | ...                      | ...                 |
| 29       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-813    | ...        | S32053                | ...                      | ...                 |
| 30       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-813    | ...        | S32053                | ...                      | ...                 |
| 31       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-814    | ...        | S32053                | ...                      | ...                 |
| 32       | 23Cr-25Ni-5.5Mo-N     | Wld. pipe         | SA-814    | ...        | S32053                | ...                      | ...                 |
| 33       | 24Cr-10Ni-4Mo-N       | Castings          | SA-995    | 2A         | J93345                | ...                      | ...                 |
| 34       | 24Cr-22Ni-6Mo-2W-Cu-N | Forgings          | SA-182    | F58        | S31266                | ...                      | ...                 |
| 35       | 24Cr-22Ni-6Mo-2W-Cu-N | Smls. tube        | SA-213    | ...        | S31266                | ...                      | ...                 |
| 36       | 24Cr-22Ni-6Mo-2W-Cu-N | Plate             | SA-240    | ...        | S31266                | ...                      | ...                 |
| (25) 37  | 24Cr-22Ni-6Mo-2W-Cu-N | Wld. tube         | SA-249    | ...        | S31266                | ...                      | ...                 |
| 38       | 24Cr-22Ni-6Mo-2W-Cu-N | Smls. pipe        | SA-312    | ...        | S31266                | ...                      | ...                 |
| (25) 39  | 24Cr-22Ni-6Mo-2W-Cu-N | Wld. pipe         | SA-312    | ...        | S31266                | ...                      | ...                 |
| (25) 40  | 24Cr-22Ni-6Mo-2W-Cu-N | Wld. pipe         | SA-358    | ...        | S31266                | ...                      | ...                 |
| 41       | 24Cr-22Ni-6Mo-2W-Cu-N | Smls. fittings    | SA-403    | ...        | S31266                | ...                      | ...                 |
| 42       | 24Cr-22Ni-6Mo-2W-Cu-N | Wld. fittings     | SA-403    | ...        | S31266                | ...                      | ...                 |
| 43       | 24Cr-22Ni-6Mo-2W-Cu-N | Bar, shapes       | SA-479    | ...        | S31266                | ...                      | ...                 |
| (25) 44  | 24Cr-22Ni-6Mo-2W-Cu-N | Wld. pipe         | SA-813    | ...        | S31266                | ...                      | ...                 |
| 45       | 25Cr-4Ni-4Mo-Ti       | Plate             | SA-240    | ...        | S44635                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |     |        |     |                             |                       |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|-----------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes                 |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |                       |
|                                    |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                       |
| 1                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 2                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 3                                  | 8     | 2         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T5, W12      |
| 4                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T6               |
| 5                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 6                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 7                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1000   | 650 | HA-2                        | G5, G12, G22          |
| 8                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1000   | 650 | HA-2                        | G12, G22              |
| 9                                  | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 10                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 11                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G13, G24, T5 |
| 12                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 13                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5                    |
| 14                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | ...                   |
| 15                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5                    |
| 16                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | ...                   |
| 17                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5, W12               |
| 18                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | W12                   |
| 19                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5, W12               |
| 20                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | W12                   |
| 21                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5, W12               |
| 22                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | W12                   |
| 23                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5                    |
| 24                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | ...                   |
| 25                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5, W12               |
| 26                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | W12                   |
| 27                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5                    |
| 28                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | ...                   |
| 29                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5, G12, W12          |
| 30                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G12, W12              |
| 31                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G5, G12, W12          |
| 32                                 | 8     | 4         | 93                         | 43                       | NP                                            | NP  | 662    | NP  | NFN-12                      | G12, W12              |
| 33                                 | 10H   | 1         | 95                         | 65                       | NP                                            | NP  | 600    | 600 | HA-5                        | G1, G19               |
| 34                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G19                   |
| 35                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G5, G19               |
| 36                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G19                   |
| 37                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G5, G19, G24          |
| 38                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G5, G19               |
| 39                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G5, G19, G24          |
| 40                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G19, G24              |
| 41                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G5, G19               |
| 42                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G3, G5, G19           |
| 43                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G5, G19               |
| 44                                 | 45    | ...       | 109                        | 61                       | NP                                            | NP  | 800    | NP  | HA-10                       | G5, G19, G24          |
| 45                                 | 10I   | 1         | 90                         | 75                       | NP                                            | NP  | 500    | 500 | HA-5                        | G19                   |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 2        | 17.0                                                                                                     | ...  | 14.9 | ...  | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 3        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 4        | 20.0                                                                                                     | ...  | 17.5 | ...  | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 5        | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 6        | 17.0                                                                                                     | ...  | 14.9 | ...  | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 7        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 20.0 | 19.4 | 18.8 | 18.5 | 18.2 | 18.0 | 17.7 | 17.5 | 17.2 |
| 8        | 20.0                                                                                                     | ...  | 17.5 | ...  | 16.1 | 15.1 | 14.4 | 13.9 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 |
| 9        | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 10       | 17.0                                                                                                     | ...  | 14.9 | ...  | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 11       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 17.0 | 16.5 | 15.9 | 15.7 | 15.5 | 15.3 | 15.1 | 14.8 | 14.6 |
| 12       | 17.0                                                                                                     | ...  | 14.9 | ...  | 13.7 | 12.8 | 12.2 | 11.8 | 11.6 | 11.5 | 11.3 | 11.2 | 11.0 | 10.8 |
| 13       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.0 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 14       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 15       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 16       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 17       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 18       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 19       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 20       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 21       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 22       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 23       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 24       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 25       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 26       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 27       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 28       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 29       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 30       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 31       | 26.5                                                                                                     | ...  | 26.5 | ...  | 25.1 | 23.9 | 23.3 | 22.3 | 22.0 | 21.8 | ...  | ...  | ...  | ...  |
| 32       | 26.5                                                                                                     | ...  | 24.2 | ...  | 21.9 | 20.8 | 19.3 | 18.5 | 18.2 | 17.9 | ...  | ...  | ...  | ...  |
| 33       | 27.1                                                                                                     | ...  | 27.1 | ...  | 25.1 | 24.2 | 24.2 | 24.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 31.1                                                                                                     | 31.1 | 30.8 | 29.8 | 28.9 | 27.7 | 26.9 | 26.3 | 26.1 | 25.9 | 25.7 | 25.4 | ...  | ...  |
| 35       | 31.1                                                                                                     | 31.1 | 30.8 | 29.8 | 28.9 | 27.7 | 26.9 | 26.3 | 26.1 | 25.9 | 25.7 | 25.4 | ...  | ...  |
| 36       | 31.1                                                                                                     | 31.1 | 30.8 | 29.8 | 28.9 | 27.7 | 26.9 | 26.3 | 26.1 | 25.9 | 25.7 | 25.4 | ...  | ...  |
| 37       | 26.5                                                                                                     | 26.5 | 26.1 | 25.3 | 24.6 | 23.5 | 22.8 | 22.4 | 22.2 | 22.0 | 21.8 | 21.6 | ...  | ...  |
| 38       | 31.1                                                                                                     | 31.1 | 30.8 | 29.8 | 28.9 | 27.7 | 26.9 | 26.3 | 26.1 | 25.9 | 25.7 | 25.4 | ...  | ...  |
| 39       | 26.5                                                                                                     | 26.5 | 26.1 | 25.3 | 24.6 | 23.5 | 22.8 | 22.4 | 22.2 | 22.0 | 21.8 | 21.6 | ...  | ...  |
| 40       | 26.5                                                                                                     | 26.5 | 26.1 | 25.3 | 24.6 | 23.5 | 22.8 | 22.4 | 22.2 | 22.0 | 21.8 | 21.6 | ...  | ...  |
| 41       | 31.1                                                                                                     | 31.1 | 30.8 | 29.8 | 28.9 | 27.7 | 26.9 | 26.3 | 26.1 | 25.9 | 25.7 | 25.4 | ...  | ...  |
| 42       | 26.5                                                                                                     | 26.5 | 26.1 | 25.3 | 24.6 | 23.5 | 22.8 | 22.4 | 22.2 | 22.0 | 21.8 | 21.6 | ...  | ...  |
| 43       | 31.1                                                                                                     | 31.1 | 30.8 | 29.8 | 28.9 | 27.7 | 26.9 | 26.3 | 26.1 | 25.9 | 25.7 | 25.4 | ...  | ...  |
| 44       | 26.5                                                                                                     | 26.5 | 26.1 | 25.3 | 24.6 | 23.5 | 22.8 | 22.4 | 22.2 | 22.0 | 21.8 | 21.6 | ...  | ...  |
| 45       | 25.7                                                                                                     | ...  | 24.9 | ...  | 23.5 | 22.5 | 22.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 2        | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 3        | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 4        | 12.5                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 5        | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 6        | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 7        | 15.9                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 12.5                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 10       | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 11       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 12       | 10.6                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition     | Product Form          | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|-------------------------|-----------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 25Cr-4Ni-4Mo-Ti         | Wld. tube             | SA-268    | ...        | S44635                | ...                      | ...                 |
| 2        | 25Cr-5Ni-3Mo-2Cu        | Castings              | SA-995    | 1B         | J93372                | ...                      | ...                 |
| 3        | 25Cr-5Ni-3Mo-2Cu        | Plate                 | SA-240    | ...        | S32550                | ...                      | ...                 |
| 4        | 25Cr-5Ni-3Mo-2Cu        | Bar                   | SA-479    | ...        | S32550                | ...                      | ...                 |
| 5        | 25Cr-5Ni-3Mo-2Cu        | Smls. tube            | SA-789    | ...        | S32550                | ...                      | ...                 |
| 6        | 25Cr-5Ni-3Mo-2Cu        | Wld. tube             | SA-789    | ...        | S32550                | ...                      | ...                 |
| 7        | 25Cr-5Ni-3Mo-2Cu        | Smls. pipe            | SA-790    | ...        | S32550                | ...                      | ...                 |
| 8        | 25Cr-5Ni-3Mo-2Cu        | Wld. pipe             | SA-790    | ...        | S32550                | ...                      | ...                 |
| 9        | 25Cr-6Ni-Mo-N           | Forgings              | SA-182    | ...        | S32506                | ...                      | ...                 |
| 10       | 25Cr-6Ni-Mo-N           | Plate, sheet          | SA-240    | ...        | S32506                | ...                      | ...                 |
| 11       | 25Cr-6Ni-Mo-N           | Bar                   | SA-479    | ...        | S32506                | ...                      | ...                 |
| 12       | 25Cr-6Ni-Mo-N           | Smls. tube            | SA-789    | ...        | S32506                | ...                      | ...                 |
| 13       | 25Cr-6Ni-Mo-N           | Wld. tube             | SA-789    | ...        | S32506                | ...                      | ...                 |
| 14       | 25Cr-6Ni-Mo-N           | Smls. pipe            | SA-790    | ...        | S32506                | ...                      | ...                 |
| 15       | 25Cr-6Ni-Mo-N           | Wld. pipe             | SA-790    | ...        | S32506                | ...                      | ...                 |
| 16       | 25Cr-6Ni-Mo-N           | Plate                 | SA-240    | ...        | S31200                | ...                      | ...                 |
| 17       | 25Cr-6.5Ni-3Mo-N        | Smls. tube            | SA-789    | ...        | S31260                | ...                      | ...                 |
| 18       | 25Cr-6.5Ni-3Mo-N        | Wld. tube             | SA-789    | ...        | S31260                | ...                      | ...                 |
| 19       | 25Cr-6.5Ni-3Mo-N        | Smls. pipe            | SA-790    | ...        | S31260                | ...                      | ...                 |
| 20       | 25Cr-6.5Ni-3Mo-N        | Wld. pipe             | SA-790    | ...        | S31260                | ...                      | ...                 |
| 21       | 25Cr-6.5Ni-3Mo-N        | Plate                 | SA-240    | ...        | S31260                | ...                      | ...                 |
| 22       | 25Cr-7Ni-3Mo-W-Cu-N     | Forgings              | SA-182    | F54        | S39274                | ...                      | ...                 |
| 23       | 25Cr-7Ni-3Mo-W-Cu-N     | Smls. tube            | SA-789    | ...        | S39274                | ...                      | ...                 |
| 24       | 25Cr-7Ni-3Mo-W-Cu-N     | Wld. tube             | SA-789    | ...        | S39274                | ...                      | ...                 |
| 25       | 25Cr-7Ni-3Mo-W-Cu-N     | Smls. pipe            | SA-790    | ...        | S39274                | ...                      | ...                 |
| 26       | 25Cr-7Ni-3Mo-W-Cu-N     | Wld. pipe             | SA-790    | ...        | S39274                | ...                      | ...                 |
| 27       | 25Cr-7Ni-4Mo-N          | Forgings              | SA-182    | F53        | S32750                | ...                      | ...                 |
| 28       | 25Cr-7Ni-4Mo-N          | Plate, sheet          | SA-240    | ...        | S32750                | ...                      | ...                 |
| 29       | 25Cr-7Ni-4Mo-N          | Smls. tube            | SA-789    | ...        | S32750                | ...                      | ...                 |
| 30       | 25Cr-7Ni-4Mo-N          | Wld. tube             | SA-789    | ...        | S32750                | ...                      | ...                 |
| 31       | 25Cr-7Ni-4Mo-N          | Smls. pipe            | SA-790    | ...        | S32750                | ...                      | ...                 |
| 32       | 25Cr-7Ni-4Mo-N          | Wld. pipe             | SA-790    | ...        | S32750                | ...                      | ...                 |
| (25) 33  | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Castings              | SA-995    | CD3MWCuN   | J93380                | ...                      | ...                 |
| (25) 34  | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Forgings              | SA-182    | F55        | S32760                | ...                      | ...                 |
| 35       | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Plate                 | SA-240    | ...        | S32760                | ...                      | ...                 |
| 36       | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Bar                   | SA-479    | ...        | S32760                | Annealed                 | ...                 |
| 37       | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Smls. tube            | SA-789    | ...        | S32760                | ...                      | ...                 |
| 38       | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Wld. tube             | SA-789    | ...        | S32760                | ...                      | ...                 |
| 39       | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Smls. pipe            | SA-790    | ...        | S32760                | ...                      | ...                 |
| 40       | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Wld. pipe             | SA-790    | ...        | S32760                | ...                      | ...                 |
| 41       | 25Cr-7.5Ni-3.5Mo-N-Cu-W | Smls. & wld. fittings | SA-815    | ...        | S32760                | ...                      | ...                 |
| 42       | 25Cr-12Ni               | Castings              | SA-351    | CH8        | J93400                | ...                      | ...                 |
| 43       | 25Cr-12Ni               | Castings              | SA-351    | CH8        | J93400                | ...                      | ...                 |
| 44       | 25Cr-12Ni               | Cast pipe             | SA-451    | CPH8       | J93400                | ...                      | ...                 |
| 45       | 25Cr-12Ni               | Castings              | SA-351    | CH20       | J93402                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature Limits |       |           |                            |                          |                       |     |        |     |                             |                                |
|-------------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|--------------------------------|
| Line No.                                  | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                          |
|                                           |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                                |
|                                           |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                                |
|                                           |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                                |
| 1                                         | 10I   | 1         | 90                         | 75                       | NP                    | NP  | 500    | 500 | HA-5                        | G19, G24                       |
| 2                                         | 10H   | 1         | 100                        | 70                       | NP                    | 600 | NP     | NP  | HA-5                        | G19, G29                       |
| 3                                         | 10H   | 1         | 110                        | 80                       | NP                    | NP  | 500    | 500 | HA-5                        | G19                            |
| 4                                         | 10H   | 1         | 110                        | 80                       | NP                    | NP  | 500    | 500 | HA-5                        | G19                            |
| 5                                         | 10H   | 1         | 110                        | 80                       | NP                    | NP  | 500    | 500 | HA-5                        | G19                            |
| 6                                         | 10H   | 1         | 110                        | 80                       | NP                    | NP  | 500    | 500 | HA-5                        | G19, G24                       |
| 7                                         | 10H   | 1         | 110                        | 80                       | NP                    | NP  | 500    | 500 | HA-5                        | G19                            |
| 8                                         | 10H   | 1         | 110                        | 80                       | NP                    | NP  | 500    | 500 | HA-5                        | G19, G24                       |
| 9                                         | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 10                                        | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 11                                        | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 12                                        | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 13                                        | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24                       |
| 14                                        | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 15                                        | 10H   | 1         | 90                         | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19, G24                       |
| 16                                        | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 600    | 600 | HA-5                        | G19                            |
| 17                                        | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 650    | 650 | HA-5                        | G19                            |
| 18                                        | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 650    | 650 | HA-5                        | G19, G24                       |
| 19                                        | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 650    | 650 | HA-5                        | G19                            |
| 20                                        | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 650    | 650 | HA-5                        | G19, G24                       |
| 21                                        | 10H   | 1         | 100                        | 70                       | NP                    | NP  | 650    | 650 | HA-5                        | G19                            |
| 22                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 650    | 650 | HA-8                        | G19                            |
| 23                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 650    | 650 | HA-8                        | G19                            |
| 24                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 650    | 650 | HA-8                        | G19, G24                       |
| 25                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 650    | 650 | HA-8                        | G19                            |
| 26                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 650    | 650 | HA-8                        | G19, G24                       |
| 27                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 28                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 29                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 600    | 600 | HA-5                        | G19                            |
| 30                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24                       |
| 31                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 600    | 600 | HA-5                        | G19                            |
| 32                                        | 10H   | 1         | 116                        | 80                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24                       |
| 33                                        | 10H   | 1         | 100                        | 65                       | NP                    | NP  | 600    | NP  | HA-5                        | G19                            |
| 34                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19                            |
| 35                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19                            |
| 36                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19                            |
| 37                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19                            |
| 38                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19, G24                       |
| 39                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19                            |
| 40                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19, G24                       |
| 41                                        | 10H   | 1         | 109                        | 80                       | NP                    | NP  | 600    | NP  | HA-9                        | G19, W14                       |
| 42                                        | 8     | 2         | 65                         | 28                       | NP                    | 800 | 1500   | 650 | HA-3                        | G1, G5, G12, G16, G17, G19, T6 |
| 43                                        | 8     | 2         | 65                         | 28                       | NP                    | NP  | 1500   | 650 | HA-3                        | G1, G12, G19, T7               |
| 44                                        | 8     | 2         | 65                         | 28                       | NP                    | 800 | NP     | NP  | HA-3                        | G5, G16, G17, G19              |
| 45                                        | 8     | 2         | 70                         | 30                       | NP                    | 800 | 1500   | 650 | HA-2                        | G1, G5, G12, G16, G17, T6      |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 21.9                                                                                                     | ...  | 21.2 | ...  | 19.9 | 19.1 | 18.7 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 28.6                                                                                                     | ...  | 28.6 | ...  | 27.9 | 27.5 | 27.5 | 27.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 31.4                                                                                                     | ...  | 31.3 | ...  | 29.5 | 28.6 | 28.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 31.4                                                                                                     | ...  | 31.3 | ...  | 29.5 | 28.6 | 28.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 31.4                                                                                                     | ...  | 31.3 | ...  | 29.5 | 28.6 | 28.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 26.7                                                                                                     | ...  | 26.6 | ...  | 25.1 | 24.3 | 24.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 31.4                                                                                                     | ...  | 31.3 | ...  | 29.5 | 28.6 | 28.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 26.7                                                                                                     | ...  | 26.6 | ...  | 25.1 | 24.3 | 24.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.4 | 24.1 | 24.1 | 24.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.4 | 24.1 | 24.1 | 24.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.4 | 24.1 | 24.1 | 24.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.4 | 24.1 | 24.1 | 24.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.4 | 24.1 | 24.1 | 24.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.4 | 24.1 | 24.1 | 24.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.4 | 24.1 | 24.1 | 24.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 28.6                                                                                                     | ...  | 28.6 | ...  | 27.1 | 26.3 | 26.1 | 26.1 | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 28.6                                                                                                     | ...  | 28.5 | ...  | 27.1 | 26.4 | 26.3 | 26.3 | 26.3 | ...  | ...  | ...  | ...  | ...  |
| 18       | 24.3                                                                                                     | ...  | 24.3 | ...  | 23.0 | 22.5 | 22.4 | 22.4 | 22.4 | ...  | ...  | ...  | ...  | ...  |
| 19       | 28.6                                                                                                     | ...  | 28.5 | ...  | 27.1 | 26.4 | 26.3 | 26.3 | 26.3 | ...  | ...  | ...  | ...  | ...  |
| 20       | 24.3                                                                                                     | ...  | 24.3 | ...  | 23.0 | 22.5 | 22.4 | 22.4 | 22.4 | ...  | ...  | ...  | ...  | ...  |
| 21       | 28.6                                                                                                     | ...  | 28.5 | ...  | 27.1 | 26.4 | 26.3 | 26.3 | 26.3 | ...  | ...  | ...  | ...  | ...  |
| 22       | 33.1                                                                                                     | ...  | 33.1 | ...  | 31.6 | 31.4 | 31.4 | 31.4 | 31.4 | ...  | ...  | ...  | ...  | ...  |
| 23       | 33.1                                                                                                     | ...  | 33.1 | ...  | 31.6 | 31.4 | 31.4 | 31.4 | 31.4 | ...  | ...  | ...  | ...  | ...  |
| 24       | 28.2                                                                                                     | ...  | 28.2 | ...  | 26.8 | 26.7 | 26.7 | 26.7 | 26.7 | ...  | ...  | ...  | ...  | ...  |
| 25       | 33.1                                                                                                     | ...  | 33.1 | ...  | 31.6 | 31.4 | 31.4 | 31.4 | 31.4 | ...  | ...  | ...  | ...  | ...  |
| 26       | 28.2                                                                                                     | ...  | 28.2 | ...  | 26.8 | 26.7 | 26.7 | 26.7 | 26.7 | ...  | ...  | ...  | ...  | ...  |
| 27       | 33.1                                                                                                     | ...  | 33.0 | ...  | 31.2 | 30.1 | 29.6 | 29.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 33.1                                                                                                     | ...  | 33.0 | ...  | 31.2 | 30.1 | 29.6 | 29.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 33.1                                                                                                     | ...  | 33.0 | ...  | 31.2 | 30.1 | 29.6 | 29.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 28.2                                                                                                     | ...  | 28.0 | ...  | 26.5 | 25.6 | 25.2 | 25.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 33.1                                                                                                     | ...  | 33.0 | ...  | 31.2 | 30.1 | 29.6 | 29.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 28.2                                                                                                     | ...  | 28.0 | ...  | 26.5 | 25.6 | 25.2 | 25.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 28.6                                                                                                     | 28.5 | 28.4 | 27.7 | 26.9 | 26.6 | 26.6 | 26.6 | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 31.1                                                                                                     | ...  | 30.2 | ...  | 29.2 | 29.2 | 29.2 | 29.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 31.1                                                                                                     | ...  | 30.2 | ...  | 29.2 | 29.2 | 29.2 | 29.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 31.1                                                                                                     | ...  | 30.2 | ...  | 29.2 | 29.2 | 29.2 | 29.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 31.1                                                                                                     | ...  | 30.2 | ...  | 29.2 | 29.2 | 29.2 | 29.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 26.5                                                                                                     | ...  | 25.7 | ...  | 24.8 | 24.8 | 24.8 | 24.8 | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 31.1                                                                                                     | ...  | 30.2 | ...  | 29.2 | 29.2 | 29.2 | 29.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 26.5                                                                                                     | ...  | 25.7 | ...  | 24.8 | 24.8 | 24.8 | 24.8 | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 31.1                                                                                                     | ...  | 30.2 | ...  | 29.2 | 29.2 | 29.2 | 29.2 | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 18.6                                                                                                     | ...  | 17.0 | ...  | 15.8 | 15.4 | 15.4 | 15.4 | 15.3 | 15.2 | 15.0 | 14.8 | 14.4 | 13.9 |
| 43       | 18.6                                                                                                     | ...  | 15.3 | ...  | 14.1 | 13.5 | 13.1 | 12.7 | 12.4 | 12.1 | 11.8 | 11.4 | 11.0 | 10.7 |
| 44       | 18.6                                                                                                     | ...  | 17.0 | ...  | 15.8 | 15.4 | 15.4 | 15.4 | 15.3 | 15.2 | 15.0 | 14.8 | ...  | ...  |
| 45       | 20.0                                                                                                     | ...  | 18.3 | ...  | 17.0 | 16.6 | 16.6 | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | 15.5 | 14.9 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 13.2                                                                                                     | 11.1 | 8.5  | 6.5  | 5.0  | 3.8  | 2.9  | 2.3  | 1.8  | 1.3  | 0.90 | 0.80 | ...  | ...  | ...  |
| 43       | 10.3                                                                                                     | 9.9  | 8.5  | 6.5  | 5.0  | 3.8  | 2.9  | 2.3  | 1.8  | 1.3  | 0.90 | 0.80 | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 14.3                                                                                                     | 11.1 | 8.5  | 6.5  | 5.0  | 3.8  | 2.9  | 2.3  | 1.8  | 1.3  | 0.90 | 0.80 | ...  | ...  | ...  |

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(25)

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No.    | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|---------------------|-----------------------|--------------|------------|-----------------------|--------------------------|---------------------|
| 1        | 25Cr-12Ni           | Castings              | SA-351       | CH20       | J93402                | ...                      | ...                 |
| 2        | 25Cr-12Ni           | Cast pipe             | SA-451       | CPH20      | J93402                | ...                      | ...                 |
| 3        | 25Cr-20Ni           | Castings              | SA-351       | CK20       | J94202                | ...                      | ...                 |
| 4        | 25Cr-20Ni           | Castings              | SA-351       | CK20       | J94202                | ...                      | ...                 |
| 5        | 25Cr-20Ni           | Cast pipe             | SA-451       | CPK20      | J94202                | ...                      | ...                 |
| 6        | 25Cr-20Ni           | Forgings              | SA-182       | F310       | S31000                | ...                      | >5                  |
| 7        | 25Cr-20Ni           | Forgings              | SA-182       | F310       | S31000                | ...                      | ≤5                  |
| 8        | 25Cr-20Ni           | Forgings              | SA-965       | F310       | S31000                | ...                      | ...                 |
| 9        | 25Cr-20Ni           | Smls. tube            | SA-213       | ...        | S31002                | ...                      | ...                 |
| 10       | 25Cr-20Ni           | Smls. tube            | SA-213       | ...        | S31002                | ...                      | ...                 |
| 11       | 25Cr-20Ni           | Smls. pipe            | SA-312       | ...        | S31002                | ...                      | ...                 |
| 12       | 25Cr-20Ni           | Smls. pipe            | SA-312       | ...        | S31002                | ...                      | ...                 |
| 13       | 25Cr-20Ni           | Smls. tube            | SA-213       | TP310S     | S31008                | ...                      | ...                 |
| 14       | 25Cr-20Ni           | Smls. tube            | SA-213       | TP310S     | S31008                | ...                      | ...                 |
| 15       | 25Cr-20Ni           | Plate                 | SA-240       | 310S       | S31008                | ...                      | ...                 |
| 16       | 25Cr-20Ni           | Plate                 | SA-240       | 310S       | S31008                | ...                      | ...                 |
| 17       | 25Cr-20Ni           | Wld. tube             | SA-249       | TP310S     | S31008                | ...                      | ...                 |
| 18       | 25Cr-20Ni           | Wld. tube             | SA-249       | TP310S     | S31008                | ...                      | ...                 |
| 19       | 25Cr-20Ni           | Smls. & wld. pipe     | SA-312       | TP310S     | S31008                | ...                      | ...                 |
| 20       | 25Cr-20Ni           | Smls. pipe            | SA-312       | TP310S     | S31008                | ...                      | ...                 |
| (25) 21  | 25Cr-20Ni           | Wld. pipe             | SA-312       | TP310S     | S31008                | ...                      | ...                 |
| (25) 22  | 25Cr-20Ni           | Wld. pipe             | SA-312       | TP310S     | S31008                | ...                      | ...                 |
| 23       | 25Cr-20Ni           | Wld. pipe             | SA-358       | 310S       | S31008                | 1                        | ...                 |
| 24       | 25Cr-20Ni           | Smls. & wld. fittings | SA-403       | 310S       | S31008                | ...                      | ...                 |
| 25       | 25Cr-20Ni           | Bar                   | SA-479       | 310S       | S31008                | ...                      | ...                 |
| 26       | 25Cr-20Ni           | Bar                   | SA-479       | 310S       | S31008                | ...                      | ...                 |
| 27       | 25Cr-20Ni           | Wld. pipe             | SA-813       | TP310S     | S31008                | ...                      | ...                 |
| 28       | 25Cr-20Ni           | Wld. pipe             | SA-813       | TP310S     | S31008                | ...                      | ...                 |
| 29       | 25Cr-20Ni           | Wld. pipe             | SA-814       | TP310S     | S31008                | ...                      | ...                 |
| 30       | 25Cr-20Ni           | Wld. pipe             | SA-814       | TP310S     | S31008                | ...                      | ...                 |
| 31       | 25Cr-20Ni           | Bar                   | SA/JIS G4303 | SUS310S    | ...                   | ...                      | ...                 |
| 32       | 25Cr-20Ni           | Smls. tube            | SA-213       | TP310H     | S31009                | ...                      | ...                 |
| 33       | 25Cr-20Ni           | Plate                 | SA-240       | 310H       | S31009                | ...                      | ...                 |
| 34       | 25Cr-20Ni           | Plate                 | SA-240       | 310H       | S31009                | ...                      | ...                 |
| 35       | 25Cr-20Ni           | Wld. tube             | SA-249       | TP310H     | S31009                | ...                      | ...                 |
| 36       | 25Cr-20Ni           | Wld. tube             | SA-249       | TP310H     | S31009                | ...                      | ...                 |
| 37       | 25Cr-20Ni           | Wld. tube             | SA-249       | TP310H     | S31009                | ...                      | ...                 |
| 38       | 25Cr-20Ni           | Smls. pipe            | SA-312       | TP310H     | S31009                | ...                      | ...                 |
| 39       | 25Cr-20Ni           | Smls. pipe            | SA-312       | TP310H     | S31009                | ...                      | ...                 |
| (25) 40  | 25Cr-20Ni           | Wld. pipe             | SA-312       | TP310H     | S31009                | ...                      | ...                 |
| (25) 41  | 25Cr-20Ni           | Wld. pipe             | SA-312       | TP310H     | S31009                | ...                      | ...                 |
| 42       | 25Cr-20Ni           | Bar                   | SA-479       | 310H       | S31009                | ...                      | ...                 |
| 43       | 25Cr-20Ni           | Bar                   | SA-479       | 310H       | S31009                | ...                      | ...                 |
| 44       | 25Cr-20Ni-Cb        | Smls. tube            | SA-213       | TP310Cb    | S31040                | ...                      | ...                 |
| 45       | 25Cr-20Ni-Cb        | Smls. tube            | SA-213       | TP310Cb    | S31040                | ...                      | ...                 |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                                               |     |        |     |                             |                           |  |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------------------------------|-----|--------|-----|-----------------------------|---------------------------|--|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                                        |     |        |     | External Pressure Chart No. | Notes                     |  |
|                                    |       |           |                            |                          | (NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     |                             |                           |  |
|                                    |       |           |                            |                          | I                                             | III | VIII-1 | XII |                             |                           |  |
| 1                                  | 8     | 2         | 70                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G1, G12, T7               |  |
| 2                                  | 8     | 2         | 70                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, G16, G17              |  |
| 3                                  | 8     | 2         | 65                         | 28                       | NP                                            | 800 | 1500   | 650 | HA-3                        | G1, G5, G12, G16, G17, T6 |  |
| 4                                  | 8     | 2         | 65                         | 28                       | NP                                            | NP  | 1500   | 650 | HA-3                        | G1, G12, T8               |  |
| 5                                  | 8     | 2         | 65                         | 28                       | NP                                            | 800 | NP     | NP  | HA-3                        | G5, G16, G17              |  |
| 6                                  | 8     | 2         | 70                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5                        |  |
| 7                                  | 8     | 2         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, G14, T5          |  |
| 8                                  | 8     | 2         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T5               |  |
| 9                                  | 8     | 2         | 73                         | 30                       | NP                                            | NP  | 842    | NP  | HA-2                        | G5                        |  |
| 10                                 | 8     | 2         | 73                         | 30                       | NP                                            | NP  | 842    | NP  | HA-2                        | ...                       |  |
| 11                                 | 8     | 2         | 73                         | 30                       | NP                                            | NP  | 842    | NP  | HA-2                        | G5                        |  |
| 12                                 | 8     | 2         | 73                         | 30                       | NP                                            | NP  | 842    | NP  | HA-2                        | ...                       |  |
| 13                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G5, G12, T5               |  |
| 14                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T6                   |  |
| 15                                 | 8     | 2         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T5               |  |
| 16                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T6                   |  |
| 17                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5          |  |
| 18                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T6              |  |
| 19                                 | 8     | 2         | 75                         | 30                       | 1500                                          | 800 | 1500   | 650 | HA-2                        | G5, G12, T5, W12, W14     |  |
| 20                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, T6                   |  |
| 21                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G5, G12, G14, G24, T5     |  |
| 22                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | 650 | HA-2                        | G12, G14, G24, T6         |  |
| 23                                 | 8     | 2         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                   |  |
| 24                                 | 8     | 2         | 75                         | 30                       | NP                                            | 800 | 1500   | 650 | HA-2                        | G5, G12, T5, W12, W14     |  |
| 25                                 | 8     | 2         | 75                         | 30                       | 1000                                          | NP  | 1000   | 650 | HA-2                        | G12, G22, T6              |  |
| 26                                 | 8     | 2         | 75                         | 30                       | 1000                                          | 800 | 1000   | 650 | HA-2                        | G5, G12, G22, T5          |  |
| 27                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5          |  |
| 28                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T6              |  |
| 29                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5          |  |
| 30                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, G24, T6              |  |
| 31                                 | 8     | 2         | 75                         | 30                       | 1000                                          | 800 | 1000   | NP  | HA-2                        | G5, G12, G22, T5          |  |
| 32                                 | 8     | 2         | 75                         | 30                       | 1500                                          | 800 | 1500   | NP  | HA-2                        | G5, T6                    |  |
| 33                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, T6                    |  |
| 34                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T7                        |  |
| 35                                 | 8     | 2         | 75                         | 30                       | NP                                            | 800 | NP     | NP  | HA-2                        | G5, W12                   |  |
| 36                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | NP  | HA-2                        | G5, G12, G24, T6          |  |
| 37                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | NP  | HA-2                        | G12, G24, T7              |  |
| 38                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, T6                    |  |
| 39                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T7                        |  |
| 40                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, G24, T6               |  |
| 41                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G24, T7                   |  |
| 42                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | G5, T6                    |  |
| 43                                 | 8     | 2         | 75                         | 30                       | 1500                                          | NP  | 1500   | NP  | HA-2                        | T7                        |  |
| 44                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G5, G12, T5               |  |
| 45                                 | 8     | 2         | 75                         | 30                       | NP                                            | NP  | 1500   | 650 | HA-2                        | G12, T6                   |  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ...  | 16.3 | ...  | 15.1 | 14.5 | 14.0 | 13.6 | 13.3 | 12.9 | 12.6 | 12.2 | 11.8 | 11.4 |
| 2        | 20.0                                                                                                     | ...  | 18.3 | ...  | 17.0 | 16.6 | 16.6 | 16.6 | 16.5 | 16.4 | 16.2 | 15.9 | ...  | ...  |
| 3        | 18.6                                                                                                     | ...  | 17.0 | ...  | 15.8 | 15.4 | 15.4 | 15.4 | 15.3 | 15.2 | 15.0 | 14.8 | 14.4 | 13.9 |
| 4        | 18.6                                                                                                     | ...  | 15.3 | ...  | 14.1 | 13.5 | 13.1 | 12.7 | 12.4 | 12.1 | 11.8 | 11.4 | 11.0 | 10.7 |
| 5        | 18.6                                                                                                     | ...  | 17.0 | ...  | 15.8 | 15.4 | 15.4 | 15.4 | 15.3 | 15.2 | 15.0 | 14.8 | ...  | ...  |
| 6        | 20.0                                                                                                     | ...  | 19.8 | ...  | 18.9 | 18.6 | 18.5 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | ...  | ...  |
| 7        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 8        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 9        | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 19.3 | 18.7 | 18.3 | 18.1 | 17.9 | 17.4 | 17.0 | 16.6 | ...  |
| 10       | 20.0                                                                                                     | 18.6 | 17.9 | 17.3 | 16.7 | 15.7 | 14.9 | 14.1 | 13.7 | 13.3 | 12.9 | 12.6 | 12.3 | ...  |
| 11       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 19.3 | 18.7 | 18.3 | 18.1 | 17.9 | 17.4 | 17.0 | 16.6 | ...  |
| 12       | 20.0                                                                                                     | 18.6 | 17.9 | 17.3 | 16.7 | 15.7 | 14.9 | 14.1 | 13.7 | 13.3 | 12.9 | 12.6 | 12.3 | ...  |
| 13       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 14       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 15       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 16       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 17       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 18       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 19       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 20       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 21       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 22       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 23       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | ...  | ...  |
| 24       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 25       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 26       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 27       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 28       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 29       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 30       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 31       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 32       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 33       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 34       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 35       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | ...  | ...  |
| 36       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 37       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 38       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 39       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 40       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 41       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 42       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 43       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 44       | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 45       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 11.0                                                                                                     | 10.6 | 8.5  | 6.5  | 5.0  | 3.8  | 2.9  | 2.3  | 1.8  | 1.3  | 0.90 | 0.80 | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 13.2                                                                                                     | 11.3 | 9.8  | 8.5  | 7.3  | 6.0  | 4.8  | 3.5  | 2.4  | 1.6  | 1.1  | 0.80 | ...  | ...  | ...  |
| 4        | 10.3                                                                                                     | 9.9  | 9.5  | 8.5  | 7.3  | 6.0  | 4.8  | 3.5  | 2.4  | 1.6  | 1.1  | 0.80 | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 8        | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 14       | 12.3                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 15       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 16       | 12.3                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 17       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 18       | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 19       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 20       | 12.3                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 21       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 22       | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 25       | 12.3                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 15.9                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 28       | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 29       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 30       | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 31       | 15.9                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 16.7                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 0.97 | 0.75 | ...  | ...  | ...  |
| 33       | 16.7                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 0.97 | 0.75 | ...  | ...  | ...  |
| 34       | 12.3                                                                                                     | 12.1 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 0.97 | 0.75 | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 14.2                                                                                                     | 11.7 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | ...  |
| 37       | 10.5                                                                                                     | 10.3 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | ...  |
| 38       | 16.7                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 0.97 | 0.75 | ...  | ...  | ...  |
| 39       | 12.3                                                                                                     | 12.1 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 0.97 | 0.75 | ...  | ...  | ...  |
| 40       | 14.2                                                                                                     | 11.7 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | ...  |
| 41       | 10.5                                                                                                     | 10.3 | 8.8  | 6.5  | 4.7  | 3.4  | 2.6  | 1.9  | 1.4  | 1.1  | 0.82 | 0.64 | ...  | ...  | ...  |
| 42       | 16.7                                                                                                     | 13.8 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 0.97 | 0.75 | ...  | ...  | ...  |
| 43       | 12.3                                                                                                     | 12.1 | 10.3 | 7.6  | 5.5  | 4.0  | 3.0  | 2.2  | 1.7  | 1.3  | 0.97 | 0.75 | ...  | ...  | ...  |
| 44       | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 45       | 12.3                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition   | Product Form      | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|-----------------------|-------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 25Cr-20Ni-Cb          | Plate             | SA-240    | 310Cb      | S31040                | ...                      | ...                 |
| 2        | 25Cr-20Ni-Cb          | Plate             | SA-240    | 310Cb      | S31040                | ...                      | ...                 |
| 3        | 25Cr-20Ni-Cb          | Wld. tube         | SA-249    | TP310Cb    | S31040                | ...                      | ...                 |
| 4        | 25Cr-20Ni-Cb          | Wld. tube         | SA-249    | TP310Cb    | S31040                | ...                      | ...                 |
| 5        | 25Cr-20Ni-Cb          | Smls. & wld. pipe | SA-312    | TP310Cb    | S31040                | ...                      | ...                 |
| 6        | 25Cr-20Ni-Cb          | Smls. pipe        | SA-312    | TP310Cb    | S31040                | ...                      | ...                 |
| 7        | 25Cr-20Ni-Cb          | Wld. pipe         | SA-312    | TP310Cb    | S31040                | ...                      | ...                 |
| 8        | 25Cr-20Ni-Cb          | Wld. pipe         | SA-312    | TP310Cb    | S31040                | ...                      | ...                 |
| 9        | 25Cr-20Ni-Cb          | Bar               | SA-479    | 310Cb      | S31040                | ...                      | ...                 |
| 10       | 25Cr-20Ni-Cb          | Bar               | SA-479    | 310Cb      | S31040                | ...                      | ...                 |
| 11       | 25Cr-20Ni-Cb          | Wld. pipe         | SA-813    | TP310Cb    | S31040                | ...                      | ...                 |
| 12       | 25Cr-20Ni-Cb          | Wld. pipe         | SA-813    | TP310Cb    | S31040                | ...                      | ...                 |
| 13       | 25Cr-20Ni-Cb          | Wld. pipe         | SA-814    | TP310Cb    | S31040                | ...                      | ...                 |
| 14       | 25Cr-20Ni-Cb          | Wld. pipe         | SA-814    | TP310Cb    | S31040                | ...                      | ...                 |
| 15       | 25Cr-20Ni-Cb-N        | Smls. tube        | SA-213    | TP310HCbN  | S31042                | ...                      | ...                 |
| 16       | 25Cr-20Ni-Cb-N        | Smls. tube        | SA-213    | TP310HCbN  | S31042                | ...                      | ...                 |
| 17       | 25Cr-22Ni-2Mo-N       | Forgings          | SA-182    | F310MoLN   | S31050                | ...                      | ...                 |
| 18       | 25Cr-22Ni-2Mo-N       | Forgings          | SA-182    | F310MoLN   | S31050                | ...                      | ...                 |
| 19       | 25Cr-22Ni-2Mo-N       | Smls. tube        | SA-213    | TP310MoLN  | S31050                | ...                      | 0.250 < t ≤ 1.250   |
| 20       | 25Cr-22Ni-2Mo-N       | Smls. tube        | SA-213    | TP310MoLN  | S31050                | ...                      | 0.250 < t ≤ 1.250   |
| 21       | 25Cr-22Ni-2Mo-N       | Plate             | SA-240    | 310MoLN    | S31050                | ...                      | t > 0.250           |
| 22       | 25Cr-22Ni-2Mo-N       | Plate             | SA-240    | 310MoLN    | S31050                | ...                      | t > 0.250           |
| 23       | 25Cr-22Ni-2Mo-N       | Wld. tube         | SA-249    | TP310MoLN  | S31050                | ...                      | 0.250 < t ≤ 1.250   |
| 24       | 25Cr-22Ni-2Mo-N       | Wld. tube         | SA-249    | TP310MoLN  | S31050                | ...                      | 0.250 < t ≤ 1.250   |
| 25       | 25Cr-22Ni-2Mo-N       | Wld. pipe         | SA-312    | TP310MoLN  | S31050                | ...                      | 0.250 < t ≤ 1.250   |
| 26       | 25Cr-22Ni-2Mo-N       | Wld. pipe         | SA-312    | TP310MoLN  | S31050                | ...                      | 0.250 < t ≤ 1.250   |
| 27       | 25Cr-22Ni-2Mo-N       | Smls. tube        | SA-213    | TP310MoLN  | S31050                | ...                      | ≤0.250, wall        |
| 28       | 25Cr-22Ni-2Mo-N       | Smls. tube        | SA-213    | TP310MoLN  | S31050                | ...                      | ≤0.250, wall        |
| 29       | 25Cr-22Ni-2Mo-N       | Plate             | SA-240    | 310MoLN    | S31050                | ...                      | t ≤ 0.250           |
| 30       | 25Cr-22Ni-2Mo-N       | Plate             | SA-240    | 310MoLN    | S31050                | ...                      | t ≤ 0.250           |
| 31       | 25Cr-22Ni-2Mo-N       | Wld. tube         | SA-249    | TP310MoLN  | S31050                | ...                      | ≤0.250, wall        |
| 32       | 25Cr-22Ni-2Mo-N       | Wld. tube         | SA-249    | TP310MoLN  | S31050                | ...                      | ≤0.250, wall        |
| 33       | 25Cr-22Ni-2Mo-N       | Wld. pipe         | SA-312    | TP310MoLN  | S31050                | ...                      | ≤0.250, wall        |
| 34       | 25Cr-22Ni-2Mo-N       | Wld. pipe         | SA-312    | TP310MoLN  | S31050                | ...                      | ≤0.250, wall        |
| 35       | 26Cr-4Ni-Mo           | Plate             | SA-240    | 329        | S32900                | ...                      | ...                 |
| 36       | 26Cr-4Ni-Mo           | Wld. tube         | SA-789    | ...        | S32900                | ...                      | ...                 |
| 37       | 26Cr-4Ni-Mo           | Smls. tube        | SA-789    | ...        | S32900                | ...                      | ...                 |
| 38       | 26Cr-4Ni-Mo           | Wld. pipe         | SA-790    | ...        | S32900                | ...                      | ...                 |
| 39       | 26Cr-4Ni-Mo           | Smls. pipe        | SA-790    | ...        | S32900                | ...                      | ...                 |
| 40       | 26Cr-4Ni-Mo-N         | Plate             | SA-240    | ...        | S32950                | ...                      | ...                 |
| 41       | 26Cr-4Ni-Mo-N         | Wld. tube         | SA-789    | ...        | S32950                | ...                      | ...                 |
| 42       | 26Cr-4Ni-Mo-N         | Smls. tube        | SA-789    | ...        | S32950                | ...                      | ...                 |
| 43       | 26Cr-4Ni-Mo-N         | Wld. pipe         | SA-790    | ...        | S32950                | ...                      | ...                 |
| 44       | 26Cr-4Ni-Mo-N         | Smls. pipe        | SA-790    | ...        | S32950                | ...                      | ...                 |
| 45       | 27Cr-7.5Ni-4.5Mo-Co-N | Smls. tube        | SA-789    | ...        | S32707                | ...                      | ...                 |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Applicability and Max. Temperature |       |           |                            |                          |                       |     |        |     |                             |                       |
|------------------------------------|-------|-----------|----------------------------|--------------------------|-----------------------|-----|--------|-----|-----------------------------|-----------------------|
| Line No.                           | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Limits                |     |        |     | External Pressure Chart No. | Notes                 |
|                                    |       |           |                            |                          | (NP = Not Permitted)  |     |        |     |                             |                       |
|                                    |       |           |                            |                          | (SPT = Supports Only) |     |        |     |                             |                       |
|                                    |       |           |                            |                          | I                     | III | VIII-1 | XII |                             |                       |
| 1                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, T5           |
| 2                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, T6               |
| 3                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 4                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 5                                  | 8     | 2         | 75                         | 30                       | NP                    | 800 | 1500   | 650 | HA-2                        | G5, G12, T5, W12, W14 |
| 6                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, T6               |
| 7                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 8                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G14, G24, T6     |
| 9                                  | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | G5, G12, G22, T5      |
| 10                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1000   | 650 | HA-2                        | G12, G22, T6          |
| 11                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 12                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 13                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G5, G12, G24, T5      |
| 14                                 | 8     | 2         | 75                         | 30                       | NP                    | NP  | 1500   | 650 | HA-2                        | G12, G24, T6          |
| 15                                 | 8     | 3         | 95                         | 43                       | 1350                  | NP  | NP     | NP  | HA-2                        | G5, G12, S4, T8       |
| 16                                 | 8     | 3         | 95                         | 43                       | 1350                  | NP  | NP     | NP  | HA-2                        | G12, S4, T9           |
| 17                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 600    | 600 | HA-2                        | G5                    |
| 18                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 600    | 600 | HA-2                        | ...                   |
| 19                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 900    | 650 | HA-2                        | G5                    |
| 20                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 900    | 650 | HA-2                        | ...                   |
| 21                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 600    | 600 | HA-2                        | G5                    |
| 22                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 600    | 600 | HA-2                        | ...                   |
| 23                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 900    | 650 | HA-2                        | G5, G24               |
| 24                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 900    | 650 | HA-2                        | G24                   |
| 25                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 900    | 650 | HA-2                        | G5, G24               |
| 26                                 | 8     | 2         | 78                         | 37                       | NP                    | NP  | 900    | 650 | HA-2                        | G24                   |
| 27                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 900    | 650 | HA-2                        | G5                    |
| 28                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 900    | 650 | HA-2                        | ...                   |
| 29                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 600    | 600 | HA-2                        | G5                    |
| 30                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 600    | 600 | HA-2                        | ...                   |
| 31                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 900    | 650 | HA-2                        | G5, G24               |
| 32                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 900    | 650 | HA-2                        | G24                   |
| 33                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 900    | 650 | HA-2                        | G5, G24               |
| 34                                 | 8     | 2         | 84                         | 39                       | NP                    | NP  | 900    | 650 | HA-2                        | G24                   |
| 35                                 | 10H   | 1         | 90                         | 70                       | NP                    | NP  | 500    | 500 | HA-5                        | G19                   |
| 36                                 | 10H   | 1         | 90                         | 70                       | NP                    | NP  | 500    | 500 | HA-5                        | G19, G24              |
| 37                                 | 10H   | 1         | 90                         | 70                       | NP                    | NP  | 500    | 500 | HA-5                        | G19                   |
| 38                                 | 10H   | 1         | 90                         | 70                       | NP                    | NP  | 500    | 500 | HA-5                        | G19, G24              |
| 39                                 | 10H   | 1         | 90                         | 70                       | NP                    | NP  | 500    | 500 | HA-5                        | G19                   |
| 40                                 | 10H   | 1         | 100                        | 70                       | NP                    | NP  | 600    | 600 | HA-5                        | G19                   |
| 41                                 | 10H   | 1         | 100                        | 70                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24              |
| 42                                 | 10H   | 1         | 100                        | 70                       | NP                    | NP  | 600    | 600 | HA-5                        | G19                   |
| 43                                 | 10H   | 1         | 100                        | 70                       | NP                    | NP  | 600    | 600 | HA-5                        | G19, G24              |
| 44                                 | 10H   | 1         | 100                        | 70                       | NP                    | NP  | 600    | 600 | HA-5                        | G19                   |
| 45                                 | 10H   | 1         | 133                        | 101                      | NP                    | NP  | 500    | NP  | HA-5                        | G19                   |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650  | 700  | 750  | 800  | 850  | 900  |
| 1        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 2        | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 3        | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 4        | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 5        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 6        | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 7        | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 8        | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 9        | 20.0                                                                                                     | ...  | 20.0 | ...  | 20.0 | 19.9 | 19.3 | 18.5 | 18.2 | 17.9 | 17.7 | 17.4 | 17.2 | 16.9 |
| 10       | 20.0                                                                                                     | ...  | 17.6 | ...  | 16.1 | 15.1 | 14.3 | 13.7 | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 |
| 11       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 12       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 13       | 17.0                                                                                                     | ...  | 17.0 | ...  | 17.0 | 16.9 | 16.4 | 15.7 | 15.5 | 15.2 | 15.0 | 14.8 | 14.6 | 14.4 |
| 14       | 17.0                                                                                                     | ...  | 15.0 | ...  | 13.7 | 12.8 | 12.1 | 11.7 | 11.5 | 11.3 | 11.1 | 11.0 | 10.8 | 10.7 |
| 15       | 27.1                                                                                                     | ...  | 26.9 | ...  | 25.4 | 24.6 | 24.2 | 24.0 | 23.9 | 23.8 | 23.7 | 23.6 | 23.4 | 23.1 |
| 16       | 27.1                                                                                                     | ...  | 24.0 | ...  | 21.7 | 20.2 | 19.2 | 18.5 | 18.3 | 18.1 | 17.8 | 17.6 | 17.4 | 17.1 |
| 17       | 22.3                                                                                                     | ...  | 22.0 | ...  | 20.8 | 20.0 | 19.5 | 19.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 22.3                                                                                                     | ...  | 21.0 | ...  | 19.1 | 17.8 | 16.8 | 15.9 | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 22.3                                                                                                     | ...  | 22.0 | ...  | 20.8 | 20.0 | 19.5 | 19.0 | 18.8 | 18.7 | 18.5 | 18.4 | 18.2 | 17.9 |
| 20       | 22.3                                                                                                     | ...  | 21.0 | ...  | 19.1 | 17.8 | 16.8 | 15.9 | 15.5 | 15.1 | 14.8 | 14.4 | 14.0 | 13.7 |
| 21       | 22.3                                                                                                     | ...  | 22.0 | ...  | 20.8 | 20.0 | 19.5 | 19.0 | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 22.3                                                                                                     | ...  | 21.0 | ...  | 19.1 | 17.8 | 16.8 | 15.9 | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 18.9                                                                                                     | ...  | 18.7 | ...  | 17.7 | 17.0 | 16.5 | 16.2 | 16.0 | 15.9 | 15.8 | 15.6 | 15.5 | 15.2 |
| 24       | 18.9                                                                                                     | ...  | 17.8 | ...  | 16.2 | 15.1 | 14.3 | 13.5 | 13.2 | 12.9 | 12.5 | 12.2 | 11.9 | 11.7 |
| 25       | 18.9                                                                                                     | ...  | 18.7 | ...  | 17.7 | 17.0 | 16.5 | 16.2 | 16.0 | 15.9 | 15.8 | 15.6 | 15.5 | 15.2 |
| 26       | 18.9                                                                                                     | ...  | 17.8 | ...  | 16.2 | 15.1 | 14.3 | 13.5 | 13.2 | 12.9 | 12.5 | 12.2 | 11.9 | 11.7 |
| 27       | 24.0                                                                                                     | ...  | 23.7 | ...  | 22.4 | 21.6 | 21.0 | 20.5 | 20.3 | 20.1 | 20.0 | 19.8 | 19.6 | 19.3 |
| 28       | 24.0                                                                                                     | ...  | 22.1 | ...  | 20.1 | 18.7 | 17.7 | 16.8 | 16.4 | 16.0 | 15.6 | 15.2 | 14.8 | 14.5 |
| 29       | 24.0                                                                                                     | ...  | 23.7 | ...  | 22.4 | 21.6 | 21.0 | 20.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 24.0                                                                                                     | ...  | 22.1 | ...  | 20.1 | 18.7 | 17.7 | 16.8 | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 20.4                                                                                                     | ...  | 20.2 | ...  | 19.1 | 18.3 | 17.8 | 17.4 | 17.3 | 17.1 | 17.0 | 16.8 | 16.6 | 16.4 |
| 32       | 20.4                                                                                                     | ...  | 18.8 | ...  | 17.1 | 15.9 | 15.0 | 14.3 | 13.9 | 13.6 | 13.2 | 12.9 | 12.6 | 12.3 |
| 33       | 20.4                                                                                                     | ...  | 20.2 | ...  | 19.1 | 18.3 | 17.8 | 17.4 | 17.3 | 17.1 | 17.0 | 16.8 | 16.6 | 16.4 |
| 34       | 20.4                                                                                                     | ...  | 18.8 | ...  | 17.1 | 15.9 | 15.0 | 14.3 | 13.9 | 13.6 | 13.2 | 12.9 | 12.6 | 12.3 |
| 35       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 21.9                                                                                                     | ...  | 21.9 | ...  | 21.0 | 20.6 | 20.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 21.9                                                                                                     | ...  | 21.9 | ...  | 21.0 | 20.6 | 20.6 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 25.7                                                                                                     | ...  | 25.7 | ...  | 24.8 | 24.3 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 28.6                                                                                                     | ...  | 28.5 | ...  | 27.0 | 26.4 | 26.4 | 26.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 24.3                                                                                                     | ...  | 24.2 | ...  | 23.0 | 22.5 | 22.5 | 22.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 28.6                                                                                                     | ...  | 28.5 | ...  | 27.0 | 26.4 | 26.4 | 26.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 24.3                                                                                                     | ...  | 24.2 | ...  | 23.0 | 22.5 | 22.5 | 22.5 | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 28.6                                                                                                     | ...  | 28.5 | ...  | 27.0 | 26.4 | 26.4 | 26.4 | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 38.0                                                                                                     | 38.0 | 38.0 | 38.0 | 37.7 | 36.9 | 35.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 2        | 12.3                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 3        | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 4        | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 5        | 15.9                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 6        | 12.3                                                                                                     | 9.9  | 7.1  | 5.0  | 3.6  | 2.5  | 1.5  | 0.80 | 0.50 | 0.40 | 0.30 | 0.20 | ...  | ...  | ...  |
| 7        | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 8        | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 9        | 15.9                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 12.3                                                                                                     | 9.9  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 12       | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 13       | 13.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 14       | 10.5                                                                                                     | 8.4  | 6.0  | 4.3  | 3.1  | 2.1  | 1.3  | 0.68 | 0.43 | 0.34 | 0.26 | 0.17 | ...  | ...  | ...  |
| 15       | 22.8                                                                                                     | 22.4 | 22.0 | 18.4 | 13.6 | 10.1 | 7.6  | 5.7  | 4.3  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 16.9                                                                                                     | 16.6 | 16.3 | 16.1 | 13.6 | 10.1 | 7.6  | 5.7  | 4.3  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3;\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition   | Product Form        | Spec. No. | Type/Grade | Alloy Desig./ UNS No. | Class/ Condition/ Temper | Size/Thickness, in. |
|----------|-----------------------|---------------------|-----------|------------|-----------------------|--------------------------|---------------------|
| 1        | 27Cr-7.5Ni-4.5Mo-Co-N | Smls. pipe          | SA-790    | ...        | S32707                | ...                      | ...                 |
| 2        | 29Cr-6.5Ni-2Mo-N      | Plate, sheet, strip | SA-240    | ...        | S32906                | ...                      | ≥0.40               |
| 3        | 29Cr-6.5Ni-2Mo-N      | Bar                 | SA-479    | ...        | S32906                | ...                      | ...                 |
| 4        | 29Cr-6.5Ni-2Mo-N      | Smls. tube          | SA-789    | ...        | S32906                | ...                      | ≥0.40               |
| 5        | 29Cr-6.5Ni-2Mo-N      | Smls. pipe          | SA-790    | ...        | S32906                | ...                      | ≥0.40               |
| 6        | 29Cr-6.5Ni-2Mo-N      | Plate, sheet, strip | SA-240    | ...        | S32906                | ...                      | <0.40               |
| 7        | 29Cr-6.5Ni-2Mo-N      | Smls. tube          | SA-789    | ...        | S32906                | ...                      | <0.40               |
| 8        | 29Cr-6.5Ni-2Mo-N      | Smls. pipe          | SA-790    | ...        | S32906                | ...                      | <0.40               |



**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3;\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | P-No. | Group No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes |
|----------|-------|-----------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|-----|--------|-----|-----------------------------|-------|
|          |       |           |                            |                          | I                                                                                          | III | VIII-1 | XII |                             |       |
| 1        | 10H   | 1         | 133                        | 101                      | NP                                                                                         | NP  | 500    | NP  | HA-5                        | G19   |
| 2        | 10H   | 1         | 109                        | 80                       | NP                                                                                         | NP  | 600    | 600 | HA-5                        | G19   |
| 3        | 10H   | 1         | 109                        | 80                       | NP                                                                                         | NP  | 600    | 600 | HA-5                        | G19   |
| 4        | 10H   | 1         | 109                        | 80                       | NP                                                                                         | NP  | 600    | 600 | HA-5                        | G19   |
| 5        | 10H   | 1         | 109                        | 80                       | NP                                                                                         | NP  | 600    | 600 | HA-5                        | G19   |
| 6        | 10H   | 1         | 116                        | 94                       | NP                                                                                         | NP  | 600    | 600 | HA-5                        | G19   |
| 7        | 10H   | 1         | 116                        | 94                       | NP                                                                                         | NP  | 600    | 600 | HA-5                        | G19   |
| 8        | 10H   | 1         | 116                        | 94                       | NP                                                                                         | NP  | 600    | 600 | HA-5                        | G19   |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3;\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 400  | 500  | 600  | 650 | 700 | 750 | 800 | 850 | 900 |
| 1        | 38.0                                                                                                     | 38.0 | 38.0 | 38.0 | 37.7 | 36.9 | 35.3 | ...  | ... | ... | ... | ... | ... | ... |
| 2        | 31.1                                                                                                     | ...  | 31.1 | ...  | 29.6 | 28.7 | 28.3 | 28.3 | ... | ... | ... | ... | ... | ... |
| 3        | 31.1                                                                                                     | ...  | 31.1 | ...  | 29.6 | 28.7 | 28.3 | 28.3 | ... | ... | ... | ... | ... | ... |
| 4        | 31.1                                                                                                     | ...  | 31.1 | ...  | 29.6 | 28.7 | 28.3 | 28.3 | ... | ... | ... | ... | ... | ... |
| 5        | 31.1                                                                                                     | ...  | 31.1 | ...  | 29.6 | 28.7 | 28.3 | 28.3 | ... | ... | ... | ... | ... | ... |
| 6        | 33.1                                                                                                     | ...  | 33.1 | ...  | 31.5 | 30.6 | 30.1 | 30.1 | ... | ... | ... | ... | ... | ... |
| 7        | 33.1                                                                                                     | ...  | 33.1 | ...  | 31.5 | 30.6 | 30.1 | 30.1 | ... | ... | ... | ... | ... | ... |
| 8        | 33.1                                                                                                     | ...  | 33.1 | ...  | 31.5 | 30.6 | 30.1 | 30.1 | ... | ... | ... | ... | ... | ... |

**Table 1A (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3;\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Ferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 950                                                                                                      | 1000 | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**NOTES TO TABLE 1A****GENERAL NOTES**

- (25) (a) The following abbreviations are used: N, Normalized; Norm. rld., Normalized rolled; NT, Normalized and tempered; QT, Quenched and tempered; Smls., Seamless; Sol. ann., Solution annealed; and Wld., Welded.
- (b) The stress values in this Table may be interpolated to determine values for intermediate temperatures. The values at intermediate temperatures shall be rounded to the same number of decimal places as the value at the higher temperature between which values are being interpolated. The rounding rule is: when the next digit beyond the last place to be retained is less than 5, retain unchanged the digit in the last place retained; when the digit next beyond the last place to be retained is 5 or greater, increase by 1 the digit in the last place retained.
- (c) The properties of steels are influenced by the processing history, heat treatment, melting practice, and level of residual elements. See Nonmandatory Appendix A for more information.
- (d) Where a size limit appears in the Size/Thickness column, the limit applies to the dimension appropriate to the product form: wall thickness of tubing, pipe, pipe fittings, and hollow forgings; thickness of plate, flat bar and forgings, and polygonal bar; diameter of solid bar and bolting; and thickest cross-section of other pressure parts, e.g., castings and forgings.
- (e) Stress values for 100°F are applicable for colder temperatures when the toughness requirements of Section III, VIII, or XII are met.
- (f) An alternative typeface is used for stress values obtained from time-dependent properties (see Notes T1 through T12).
- (g) Where specifications, grades, classes, and types are listed in this Table, and where the material specification in Section II, Part A or Part B is a dual-unit specification (e.g., SA-516/SA-516M), the values listed in this Table shall be applicable to either the customary U.S. version of the material specification or the SI units version of the material specification. For example, the values listed for SA-516 Grade 70 shall be used when SA-516M Grade 485 is used in construction.

**NOTES – GENERAL REQUIREMENTS**

- G1 To these stress values a casting quality factor as specified in PG-25 of Section I; UG-24 of Section VIII, Division 1; or TM-190 of Section XII shall be applied.
- G2 These stress values include a joint efficiency factor of 0.60.
- G3 These stress values include a joint efficiency factor of 0.85.
- G4 For Section I applications, these stresses apply when used for boiler, water wall, superheater, and economizer tubes that are enclosed within a setting. A joint efficiency factor of 0.85 is included in values above 850°F.
- G5 Due to the relatively low yield strength of these materials, these higher stress values were established at temperatures where the short-time tensile properties govern to permit the use of these alloys where slightly greater deformation is acceptable. The stress values in this range exceed 66<sup>2</sup>/<sub>3</sub>% but do not exceed 90% of the yield strength at temperature. Use of these stresses may result in dimensional changes due to permanent strain. These stress values are not recommended for the flanges of gasketed joints or other applications where slight amounts of distortion can cause leakage or malfunction. For Section III applications, Table Y-2 lists multiplying factors that, when applied to the yield strength values shown in Table Y-1, will give allowable stress values that will result in lower levels of permanent strain.
- G6 Creep-fatigue, thermal ratcheting, and environmental effects are increasingly significant failure modes at temperatures in excess of 1500°F and shall be considered in the design.
- G7 For Section VIII applications, these stress values are based on expected minimum values of 45,000 psi tensile strength and yield strength of 20,000 psi resulting from loss of strength due to thermal treatment required for the glass coating operation. UG-85 does not apply.
- G8 These stress values are established from a consideration of strength only and will be satisfactory for average service. For bolted joints where freedom from leakage over a long period of time without retightening is required, lower stress values may be necessary as determined from the flexibility of the flange and bolts and corresponding relaxation properties.
- G9 For Section III applications, the use of these materials shall be limited to materials for tanks covered in Subsections NC and ND, component supports, and for nonpressure-retaining attachments (NC/ND-2190).
- G10 Upon prolonged exposure to temperatures above 800°F, the carbide phase of carbon steel may be converted to graphite. See Nonmandatory Appendix A, A-201 and A-202.
- G11 Upon prolonged exposure to temperatures above 875°F, the carbide phase of carbon-molybdenum steel may be converted to graphite. See Nonmandatory Appendix A, A-201 and A-202.
- G12 At temperatures above 1000°F, these stress values apply only when the carbon is 0.04% or higher on heat analysis.
- G13 These stress values at 1050°F and above shall be used only when the grain size is ASTM No. 6 or coarser.
- G14 These stress values shall be used when the grain size is not determined or is determined to be finer than ASTM No. 6.
- G15 For Section I applications, use is limited to stays as defined in PG-13 except as permitted by PG-11.
- G16 For Section III Class 3 applications, these S values do not include a casting quality factor. Statically and centrifugally cast products meeting the requirements of NC-2570 shall receive a casting quality factor of 1.00.
- G17 For Section III Class 3 applications, statically and centrifugally cast products meeting the requirements of NC-2571(a) and (b), and cast pipe fittings, pumps, and valves with inlet piping connections of 2 in. nominal pipe size and less, shall receive a casting quality factor of 1.00. Other casting quality factors shall be in accordance with the following:
- (a) for visual examination, 0.80
  - (b) for magnetic particle examination, 0.85
  - (c) for liquid penetrant examination, 0.85
  - (d) for radiography, 1.00
  - (e) for ultrasonic examination, 1.00
  - (f) for magnetic particle or liquid penetrant plus ultrasonic examination or radiography, 1.00
- G18 See Table Y-1 for yield strength values as a function of thickness over this range. Allowable stresses are independent of yield strength in this thickness range.

**NOTES TO TABLE 1A (CONT'D)****NOTES – GENERAL REQUIREMENTS (CONT'D)**

- G19 This steel may be expected to develop embrittlement after service at moderately elevated temperature; see Nonmandatory Appendix A, A-207 and A-208.
- G20 These stresses are based on weld metal properties.
- G21 For Section I, use is limited to PEB-5.3. See PG-5.5 for cautionary note.
- G22 For Section I applications, use of external pressure charts for material in the form of bar stock is permitted for stiffening rings only.
- G23 For temperatures above the maximum temperature shown on the external pressure chart for this material, Fig. CS-2 may be used for the design using this material.
- G24 A factor of 0.85 has been applied in arriving at the maximum allowable stress values in tension for this material. Divide tabulated values by 0.85 for maximum allowable longitudinal tensile stress.
- G25 For Section III applications, for both Class 2 and Class 3, the completed vessel after final heat treatment shall be examined by the ultrasonic method in accordance with NB-2542 except that angle beam examination in both the circumferential and the axial directions may be performed in lieu of the straight beam examination in the axial direction. The tensile strength shall not exceed 125,000 psi.
- G26 Material that conforms to Class 10, 11, or 12 is not permitted.
- G27 Material that conforms to Class 11 or 12 is not permitted.
- G28 Supplementary Requirement S15 of SA-781, Alternate Mechanical Test Coupons and Specimen Locations for Castings, is mandatory.
- G29 For Section III applications, impact testing in accordance with the requirements of NC-2300 is required for Class 2 components and in accordance with ND-2300 for Class 3 components.
- G30 These stresses apply to all product forms (C, H, and P) as defined in SA/EN 10028-7.

**NOTES – HEAT TREATMENT REQUIREMENTS**

- H1 For temperatures above 1000°F, these stress values may be used only if the material is heat treated by heating to the minimum temperature specified in the material specification, but not lower than 1900°F, and quenching in water or rapidly cooling by other means.
- H2 For temperatures above 1000°F, these stress values may be used only if the material is heat treated by heating to a minimum temperature of 2000°F, and quenching in water or rapidly cooling by other means.
- (25) H3 DELETED
- (25) H4 DELETED
- H5 For Section III applications, if heat treatment is performed after forming or fabrication, it shall be performed at 1500°F to 1850°F for a period of time not to exceed 10 min at temperature, followed by rapid cooling.
- H6 Material shall be solution annealed at 2010°F to 2140°F, followed by a rapid cooling in water or air.

**NOTES – SIZE REQUIREMENTS**

- S1 For Section I applications, stress values at temperatures of 850°F and above are permissible but, except for tubular products 3 in. O.D. or less enclosed within the boiler setting, use of these materials at these temperatures is not current practice.
- S2 For Section I applications, stress values at temperatures of 900°F and above are permissible but, except for tubular products 3 in. O.D. or less enclosed within the boiler setting, use of these materials at these temperatures is not current practice.
- S3 For Section I applications, stress values at temperatures of 1000°F and above are permissible but, except for tubular products 3 in. O.D. or less enclosed within the boiler setting, use of these materials at these temperatures is not current practice.
- S4 For Section I applications, stress values at temperatures of 1150°F and above are permissible but, except for tubular products 3 in. O.D. or less enclosed within the boiler setting, use of these materials at these temperatures is not current practice.
- S5 Material that conforms to Class 10, 11, or 12 is not permitted when the nominal thickness of the material exceeds  $\frac{3}{4}$  in.
- S6 Material that conforms to Class 10, 11, or 12 is not permitted when the nominal thickness of the material exceeds  $1\frac{1}{4}$  in.
- S7 The maximum thickness of unheat-treated forgings shall not exceed  $3\frac{3}{4}$  in. The maximum thickness as-heat-treated may be 4 in.
- S8 The maximum section thickness shall not exceed 3 in. for double-normalized-and-tempered forgings, or 5 in. for quenched-and-tempered forgings.
- S9 Both NPS 8 and larger, and schedule 140 and heavier.
- S10 The maximum pipe size shall be NPS 4 and the maximum thickness in any pipe size shall be schedule 80.
- S11 Either NPS 8 and larger and less than schedule 140 wall, or less than NPS 8 and all wall thicknesses.

**NOTES – TIME-DEPENDENT PROPERTIES [See General Note (f)]**

- T1 Allowable stresses for temperatures of 700°F and above are values obtained from time-dependent properties.
- T2 Allowable stresses for temperatures of 750°F and above are values obtained from time-dependent properties.
- T3 Allowable stresses for temperatures of 850°F and above are values obtained from time-dependent properties.
- T4 Allowable stresses for temperatures of 900°F and above are values obtained from time-dependent properties.
- T5 Allowable stresses for temperatures of 950°F and above are values obtained from time-dependent properties.
- T6 Allowable stresses for temperatures of 1000°F and above are values obtained from time-dependent properties.
- T7 Allowable stresses for temperatures of 1050°F and above are values obtained from time-dependent properties.
- T8 Allowable stresses for temperatures of 1100°F and above are values obtained from time-dependent properties.
- T9 Allowable stresses for temperatures of 1150°F and above are values obtained from time-dependent properties.
- T10 Allowable stresses for temperatures of 800°F and above are values obtained from time-dependent properties.
- T11 Allowable stresses for temperatures of 650°F and above are values obtained from time-dependent properties.
- T12 Allowable stresses for temperatures of 1200°F and above are values obtained from time-dependent properties.

**NOTES – WELDING REQUIREMENTS**

- W1 Not for welded construction.
- W2 Not for welded construction in Section III.

**NOTES TO TABLE 1A (CONT'D)****NOTES – WELDING REQUIREMENTS (CONT'D)**

- W3 Welded.
- W4 Nonwelded, or welded if the tensile strength of the Section IX reduced section tension test is not less than 100 ksi.
- W5 Welded, with the tensile strength of the Section IX reduced tension test less than 100 ksi but not less than 95 ksi.
- W6 This material may be welded by the resistance technique.
- W7 In welded construction for temperatures above 850°F, the weld metal shall have a carbon content of greater than 0.05%.
- W8 Welding and oxygen or other thermal cutting processes are not permitted when carbon content exceeds 0.35% by heat analysis.
- W9 For Section I applications, for pressure retaining welds in 2¼Cr-1Mo materials, other than circumferential butt welds less than or equal to 3½ in. in outside diameter, when the design metal temperatures exceed 850°F, the weld metal shall have a carbon content greater than 0.05%.
- W10 For Section III applications, material that conforms to Class 10, 13, 20, 23, 30, 33, 40, 43, 50, or 53 is not permitted for Class 2 and Class 3 construction when a weld efficiency factor of 1.00 is used in accordance with Note W12.
- W11 For Section VIII applications, Section IX, QW-250 Variables QW-404.12, QW-406.3, QW-407.2, and QW-409.1 shall also apply to this material. These variables shall be applied in accordance with the rules for welding of Part UF.
- W12 These *S* values do not include a longitudinal weld efficiency factor. For Section III applications, for materials welded without filler metal, ultrasonic examination, radiographic examination, or eddy current examination, in accordance with NC-2550, shall provide a longitudinal weld efficiency factor of 1.00. Materials welded with filler metal meeting the requirements of NC-2560 shall receive a longitudinal weld efficiency factor of 1.00. Other longitudinal weld efficiency factors shall be in accordance with the following:
- (a) for single butt weld, with filler metal, 0.80
  - (b) for single or double butt weld, without filler metal, 0.85
  - (c) for double butt weld, with filler metal, 0.90
  - (d) for single or double butt weld, with radiography, 1.00
- W13 For Section I applications, electric resistance and autogenous welded tubing may be used with these stresses, provided the following additional restrictions and requirements are met:
- (a) The tubing shall be used for boiler, waterwall, superheater, and economizer tubes that are enclosed within the setting.
  - (b) The maximum outside diameter shall be 3½ in.
  - (c) The weld seam of each tube shall be subjected to an angle beam ultrasonic inspection per SA-450/SA-1016.
  - (d) A complete volumetric inspection of the entire length of each tube shall be performed in accordance with SA-450/SA-1016.
  - (e) Material test reports shall be supplied.
- W14 These *S* values do not include a weld factor. For Section VIII, Division 1 and Section XII applications using welds made without filler metal, the tabulated tensile stress values shall be multiplied by 0.85. For welds made with filler metal, consult UW-12 for Section VIII, Division 1, or TW-130.4 for Section XII, as applicable.
- W15 The Nondestructive Electric Test requirements of SA-53 Type E pipe are required for all sizes. The pipe shall be additionally marked "NDE" and so noted on the material certification.

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**Table 1B**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
 (\*See Maximum Temperature Limits for Restrictions on Class)

| Line No. | Nominal Composition | Product Form             | Spec. No.  | Type/Grade | Alloy Desig./UNS No. | Class/Condition/ Temper |
|----------|---------------------|--------------------------|------------|------------|----------------------|-------------------------|
| 1        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | O                       |
| 2        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | O                       |
| 3        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | H112                    |
| 4        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | H112                    |
| 5        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | H112                    |
| 6        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | H12                     |
| 7        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | H12                     |
| 8        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | H14                     |
| 9        | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3003          | H14                     |
| 10       | ...                 | Drawn smls. tube         | SB-210     | ...        | Alclad 3003          | O                       |
| 11       | ...                 | Drawn smls. tube         | SB-210     | ...        | Alclad 3003          | H113                    |
| 12       | ...                 | Drawn smls. tube         | SB-210     | ...        | Alclad 3003          | H14                     |
| 13       | ...                 | Drawn smls. tube         | SB-210     | ...        | Alclad 3003          | H18                     |
| 14       | ...                 | Cond. & heat exch. tubes | SB-234     | ...        | Alclad 3003          | H14                     |
| 15       | ...                 | Cond. & heat exch. tubes | SB-234     | ...        | Alclad 3003          | H25                     |
| 16       | ...                 | Smls. extr. tube         | SB-241     | ...        | Alclad 3003          | O                       |
| 17       | ...                 | Smls. extr. tube         | SB-241     | ...        | Alclad 3003          | H112                    |
| 18       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | O                       |
| 19       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | O                       |
| 20       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | H112                    |
| 21       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | H112                    |
| 22       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | H32                     |
| 23       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | H32                     |
| 24       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | H34                     |
| 25       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 3004          | H34                     |
| 26       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T4                      |
| 27       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T451                    |
| 28       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T451                    |
| 29       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T4 wld.                 |
| 30       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T451 wld.               |
| 31       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T6                      |
| 32       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T651                    |
| 33       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T651                    |
| 34       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T651                    |
| 35       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T6 wld.                 |
| 36       | ...                 | Plate, sheet             | SB-209     | ...        | Alclad 6061          | T651 wld.               |
| 37       | ...                 | Castings                 | SB-26      | ...        | A02040               | T4                      |
| 38       | ...                 | Castings                 | SB-108     | ...        | A02040               | T4                      |
| 39       | ...                 | Castings                 | SB-26      | ...        | A03560               | T71                     |
| 40       | ...                 | Castings                 | SB-26      | ...        | A03560               | T6                      |
| 41       | ...                 | Castings                 | SB-108     | ...        | A03560               | T6                      |
| 42       | ...                 | Castings                 | SB/EN 1706 | ...        | AC-42000-S           | T6                      |
| 43       | ...                 | Castings                 | SB-26      | ...        | A24430               | F                       |
| 44       | ...                 | Plate, sheet             | SB-209     | ...        | A91060               | O                       |
| 45       | ...                 | Plate, sheet             | SB-209     | ...        | A91060               | H112                    |



**Table 1B**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes        |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|--------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |              |
| 1        | 0.006-0.499          | 21    | 13                         | 4.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16          |
| 2        | 0.500-3.000          | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G25          |
| 3        | 0.250-0.499          | 21    | 16                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 4        | 0.500-2.000          | 21    | 15                         | 6                        | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-7                       | G26, W3      |
| 5        | 2.001-3.000          | 21    | 14.5                       | 6                        | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-7                       | G26, W3      |
| 6        | 0.017-0.499          | 21    | 16                         | 11                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 7        | 0.500-2.000          | 21    | 17                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G25, W3      |
| 8        | 0.009-0.499          | 21    | 19                         | 16                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 9        | 0.500-1.000          | 21    | 20                         | 17                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G25, W3      |
| 10       | 0.010-0.500          | 21    | 13                         | 4.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16          |
| 11       | 0.050-0.500          | 21    | 13                         | 4.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 12       | 0.010-0.500          | 21    | 19                         | 16                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | G16, W3      |
| 13       | 0.010-0.500          | 21    | 26                         | 23                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | G16, W3      |
| 14       | 0.010-0.200          | 21    | 19                         | 16                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | G16, W4      |
| 15       | 0.010-0.200          | 21    | 21                         | 18                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | G16, W4      |
| 16       | ...                  | 21    | 13                         | 4.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16          |
| 17       | ...                  | 21    | 13                         | 4.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 18       | 0.006-0.499          | 22    | 21                         | 8                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16          |
| 19       | 0.500-3.000          | 22    | 22                         | 8.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G25          |
| 20       | 0.250-0.499          | 22    | 22                         | 8.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 21       | 0.500-3.000          | 22    | 23                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G25, W3      |
| 22       | 0.017-0.499          | 22    | 27                         | 20                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 23       | 0.500-2.000          | 22    | 28                         | 21                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G25, W3      |
| 24       | 0.009-0.499          | 22    | 31                         | 24                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G16, W3      |
| 25       | 0.500-1.000          | 22    | 32                         | 25                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | G25, W3      |
| 26       | 0.010-0.249          | 23    | 27                         | 14                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G16, G24, W4 |
| 27       | 0.250-0.499          | 23    | 27                         | 14                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G16, G24, W4 |
| 28       | 0.500-3.000          | 23    | 30                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, G25, W4 |
| 29       | 0.010-0.249          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, W7      |
| 30       | 0.250-3.000          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, W7      |
| 31       | 0.010-0.249          | 23    | 38                         | 32                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G16, G24, W4 |
| 32       | 0.250-0.499          | 23    | 38                         | 32                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G16, G24, W4 |
| 33       | 0.500-4.000          | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, G25, W4 |
| 34       | 4.001-5.000          | 23    | 40                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, G26, W4 |
| 35       | 0.010-0.249          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, W7      |
| 36       | 0.250-5.000          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, W7      |
| 37       | ≤2.000               | ...   | 45                         | 28                       | NP                                                                                         | NP               | 150    | 150 | NFA-12                      | G15, W4      |
| 38       | ≤2.000               | ...   | 48                         | 29                       | NP                                                                                         | NP               | 150    | 150 | NFA-12                      | G15, W4      |
| 39       | ...                  | ...   | 25                         | 18                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | G15, W4      |
| 40       | ...                  | ...   | 30                         | 20                       | NP                                                                                         | 250 (Cl. 3 only) | 250    | 250 | NFA-12                      | G15, W4      |
| 41       | ...                  | ...   | 33                         | 22                       | NP                                                                                         | NP               | 250    | 250 | NFA-12                      | G15, W4      |
| 42       | ...                  | ...   | 32                         | 26                       | NP                                                                                         | NP               | 250    | NP  | NFA-12                      | G15, W4      |
| 43       | ...                  | ...   | 17                         | 6                        | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | G15, W4      |
| 44       | 0.006-3.000          | 21    | 8                          | 2.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3           |
| 45       | 0.250-0.499          | 21    | 11                         | 7                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W3       |

**Table 1B**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |     |     |      |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300 | 350 | 400  | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 3.0                                                                                                      | 2.9  | 2.8  | 2.7  | 2.2 | 1.6 | 1.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 3.3                                                                                                      | 3.2  | 3.1  | 3.0  | 2.2 | 1.6 | 1.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 4.6                                                                                                      | 4.5  | 4.2  | 3.9  | 3.3 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 4.0                                                                                                      | 3.9  | 3.8  | 3.6  | 2.2 | 1.6 | 1.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 4.0                                                                                                      | 3.9  | 3.8  | 3.5  | 2.2 | 1.6 | 1.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 4.6                                                                                                      | 4.6  | 4.5  | 4.2  | 3.3 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 4.9                                                                                                      | 4.9  | 4.8  | 4.5  | 3.3 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 5.4                                                                                                      | 5.4  | 5.4  | 5.2  | 3.9 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 5.7                                                                                                      | 5.7  | 5.7  | 5.5  | 3.9 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 3.0                                                                                                      | 2.9  | 2.8  | 2.7  | 2.2 | 1.6 | 1.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 3.0                                                                                                      | 2.9  | 2.8  | 2.7  | 2.2 | 1.6 | 1.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 5.4                                                                                                      | 5.4  | 5.4  | 5.2  | 3.9 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 7.4                                                                                                      | 7.4  | 7.3  | 6.9  | 4.8 | 3.2 | 2.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 5.4                                                                                                      | 5.4  | 5.4  | 5.2  | 3.9 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 6.0                                                                                                      | 6.0  | 6.0  | 5.7  | 3.9 | 2.7 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 3.0                                                                                                      | 2.9  | 2.8  | 2.7  | 2.2 | 1.6 | 1.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 3.0                                                                                                      | 2.9  | 2.8  | 2.7  | 2.2 | 1.6 | 1.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 5.3                                                                                                      | 5.3  | 5.3  | 5.3  | 4.5 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 5.7                                                                                                      | 5.7  | 5.7  | 5.7  | 4.5 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 5.7                                                                                                      | 5.7  | 5.7  | 5.7  | 4.6 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 4.6 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 7.7                                                                                                      | 7.7  | 7.7  | 7.7  | 5.2 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 5.2 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 8.9                                                                                                      | 8.9  | 8.9  | 8.9  | 5.2 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 9.1                                                                                                      | 9.1  | 9.1  | 9.1  | 5.2 | 3.4 | 2.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 7.7                                                                                                      | 7.7  | 7.7  | 7.6  | 6.2 | 5.7 | 4.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 7.7                                                                                                      | 7.7  | 7.7  | 7.6  | 6.2 | 5.7 | 4.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 8.6                                                                                                      | 8.6  | 8.6  | 8.5  | 6.2 | 5.7 | 4.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 7.6 | 5.7 | 4.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 7.6 | 5.7 | 4.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 7.6 | 5.7 | 4.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 11.4                                                                                                     | 11.4 | 11.4 | 11.1 | 7.4 | 5.7 | 4.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 8.4                                                                                                      | 7.1  | ...  | ...  | ... | ... | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 10.3                                                                                                     | 8.6  | ...  | ...  | ... | ... | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 7.2                                                                                                      | 7.2  | 7.2  | 6.3  | 5.4 | 4.1 | 2.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 8.6                                                                                                      | 8.6  | 8.6  | 6.3  | ... | ... | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 9.5                                                                                                      | 9.3  | 8.5  | 6.4  | ... | ... | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 9.1                                                                                                      | 9.1  | 9.1  | 9.1  | ... | ... | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 4.0                                                                                                      | 4.0  | 4.0  | 3.8  | 3.5 | 3.1 | 2.8  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 1.7                                                                                                      | 1.7  | 1.6  | 1.4  | 1.3 | 1.1 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 3.1                                                                                                      | 3.0  | 2.7  | 2.4  | 1.8 | 1.6 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
 (\*See Maximum Temperature Limits for Restrictions on Class)

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy Desig./UNS No. | Class/Condition/ Temper |
|----------|---------------------|--------------------------|-----------|------------|----------------------|-------------------------|
| 1        | ...                 | Plate, sheet             | SB-209    | ...        | A91060               | H112                    |
| 2        | ...                 | Plate, sheet             | SB-209    | ...        | A91060               | H112                    |
| 3        | ...                 | Plate, sheet             | SB-209    | ...        | A91060               | H12                     |
| 4        | ...                 | Plate, sheet             | SB-209    | ...        | A91060               | H14                     |
| 5        | ...                 | Drawn smls. tube         | SB-210    | ...        | A91060               | O                       |
| 6        | ...                 | Drawn smls. tube         | SB-210    | ...        | A91060               | H14                     |
| 7        | ...                 | Drawn smls. tube         | SB-210    | ...        | A91060               | H113                    |
| 8        | ...                 | Bar, rod, shapes         | SB-221    | ...        | A91060               | O                       |
| 9        | ...                 | Bar, rod, shapes         | SB-221    | ...        | A91060               | H112                    |
| 10       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A91060               | H14                     |
| 11       | ...                 | Smls. extr. tube         | SB-241    | ...        | A91060               | O                       |
| 12       | ...                 | Smls. extr. tube         | SB-241    | ...        | A91060               | H112                    |
| 13       | ...                 | Plate, sheet             | SB-209    | ...        | A91100               | O                       |
| 14       | ...                 | Plate, sheet             | SB-209    | ...        | A91100               | H112                    |
| 15       | ...                 | Plate, sheet             | SB-209    | ...        | A91100               | H112                    |
| 16       | ...                 | Plate, sheet             | SB-209    | ...        | A91100               | H112                    |
| 17       | ...                 | Plate, sheet             | SB-209    | ...        | A91100               | H12                     |
| 18       | ...                 | Plate, sheet             | SB-209    | ...        | A91100               | H14                     |
| 19       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A91100               | O                       |
| 20       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A91100               | H112                    |
| 21       | ...                 | Smls. extr. tube         | SB-241    | ...        | A91100               | O                       |
| 22       | ...                 | Smls. extr. tube         | SB-241    | ...        | A91100               | H112                    |
| 23       | ...                 | Die forgings             | SB-247    | ...        | A92014               | T4                      |
| 24       | ...                 | Die forgings             | SB-247    | ...        | A92014               | T6                      |
| 25       | ...                 | Die forgings             | SB-247    | ...        | A92014               | T6                      |
| 26       | ...                 | Bar, rod, wire           | SB-211    | ...        | A92024               | T4                      |
| 27       | ...                 | Bar, rod, wire           | SB-211    | ...        | A92024               | T4                      |
| 28       | ...                 | Bar, rod, wire           | SB-211    | ...        | A92024               | T4                      |
| 29       | ...                 | Bar, rod, wire           | SB-211    | ...        | A92024               | T4                      |
| 30       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A92024               | T3                      |
| 31       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A92024               | T3                      |
| 32       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A92024               | T3                      |
| 33       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A92024               | T3                      |
| 34       | ...                 | Plate, sheet             | SB-209    | ...        | A93003               | O                       |
| 35       | ...                 | Plate, sheet             | SB-209    | ...        | A93003               | H112                    |
| 36       | ...                 | Plate, sheet             | SB-209    | ...        | A93003               | H112                    |
| 37       | ...                 | Plate, sheet             | SB-209    | ...        | A93003               | H112                    |
| 38       | ...                 | Plate, sheet             | SB-209    | ...        | A93003               | H12                     |
| 39       | ...                 | Plate, sheet             | SB-209    | ...        | A93003               | H14                     |
| 40       | ...                 | Drawn smls. tube         | SB-210    | ...        | A93003               | O                       |
| 41       | ...                 | Drawn smls. tube         | SB-210    | ...        | A93003               | H113                    |
| 42       | ...                 | Drawn smls. tube         | SB-210    | ...        | A93003               | H12                     |
| 43       | ...                 | Drawn smls. tube         | SB-210    | ...        | A93003               | H14                     |
| 44       | ...                 | Drawn smls. tube         | SB-210    | ...        | A93003               | H18                     |
| 45       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A93003               | O                       |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes       |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|-------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |             |
| 1        | 0.500-1.000          | 21    | 10                         | 5                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 2        | 1.001-3.000          | 21    | 9                          | 4                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W3      |
| 3        | 0.017-2.000          | 21    | 11                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W3      |
| 4        | 0.009-1.000          | 21    | 12                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W3      |
| 5        | 0.018-0.500          | 21    | 8.5                        | 2.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3          |
| 6        | 0.018-0.500          | ...   | 12                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W3      |
| 7        | 0.018-0.500          | 21    | 8.5                        | 2.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W3      |
| 8        | ...                  | 21    | 8.5                        | 2.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G13, T3     |
| 9        | ...                  | 21    | 8.5                        | 2.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | G13, T3, W3 |
| 10       | 0.010-0.200          | 21    | 12                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W4      |
| 11       | ...                  | 21    | 8.5                        | 2.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3          |
| 12       | ...                  | 21    | 8.5                        | 2.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-7                       | T3, W3      |
| 13       | 0.006-3.000          | 21    | 11                         | 3.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4          |
| 14       | 0.250-0.499          | 21    | 13                         | 7                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 15       | 0.500-2.000          | 21    | 12                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 16       | 2.001-3.000          | 21    | 11.5                       | 4                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 17       | 0.017-2.000          | 21    | 14                         | 11                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 18       | 0.009-1.000          | 21    | 16                         | 14                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 19       | ...                  | 21    | 11                         | 3                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4          |
| 20       | ...                  | 21    | 11                         | 3                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 21       | ...                  | 21    | 11                         | 3                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4          |
| 22       | ...                  | 21    | 11                         | 3                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-7                       | T4, W3      |
| 23       | ≤4.000               | ...   | 55                         | 30                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | T3, W4      |
| 24       | ≤2.000               | ...   | 65                         | 56                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4      |
| 25       | 2.001-4.000          | ...   | 63                         | 54                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4      |
| 26       | 0.125-0.499          | ...   | 62                         | 45                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4      |
| 27       | 0.500-4.500          | ...   | 62                         | 42                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4      |
| 28       | 4.501-6.500          | ...   | 62                         | 40                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4      |
| 29       | 6.501-8.000          | ...   | 58                         | 38                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4      |
| 30       | ≤0.249               | ...   | 57                         | 42                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | G24, T2, W4 |
| 31       | 0.250-0.749          | ...   | 60                         | 44                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | G24, T2, W4 |
| 32       | 0.750-1.499          | ...   | 65                         | 46                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | G24, T2, W4 |
| 33       | ≥1.500               | ...   | 68                         | 48                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-6                       | G24, T2, W4 |
| 34       | 0.006-3.000          | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3          |
| 35       | 0.250-0.499          | 21    | 17                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-1                       | T4, W3      |
| 36       | 0.500-2.000          | 21    | 15                         | 6                        | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W3      |
| 37       | 2.001-3.000          | 21    | 14.5                       | 6                        | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W3      |
| 38       | 0.017-2.000          | 21    | 17                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-1                       | T4, W3      |
| 39       | 0.009-1.000          | 21    | 20                         | 17                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-2                       | T4, W3      |
| 40       | 0.010-0.500          | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3          |
| 41       | 0.010-0.500          | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W3      |
| 42       | 0.010-0.500          | 21    | 17                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-1                       | T4, W3      |
| 43       | 0.010-0.500          | 21    | 20                         | 17                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-2                       | T4, W3      |
| 44       | 0.010-0.500          | 21    | 27                         | 24                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-2                       | T4, W3      |
| 45       | ...                  | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3          |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |     |      |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350 | 400  | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 2.9                                                                                                      | 2.7  | 2.4  | 2.2  | 1.7  | 1.4 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 2.6                                                                                                      | 2.4  | 2.2  | 1.9  | 1.5  | 1.1 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 3.1                                                                                                      | 3.1  | 2.9  | 2.7  | 2.1  | 1.8 | 1.1  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 3.4                                                                                                      | 3.4  | 3.4  | 3.4  | 2.6  | 1.8 | 1.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 1.7                                                                                                      | 1.7  | 1.6  | 1.4  | 1.3  | 1.1 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 3.4                                                                                                      | 3.4  | 3.4  | 3.4  | 2.6  | 1.8 | 1.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 1.7                                                                                                      | 1.7  | 1.6  | 1.4  | 1.3  | 1.1 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 1.7                                                                                                      | 1.7  | 1.6  | 1.4  | 1.3  | 1.1 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 1.7                                                                                                      | 1.7  | 1.6  | 1.4  | 1.3  | 1.1 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 3.4                                                                                                      | 3.4  | 3.4  | 3.4  | 2.6  | 1.8 | 1.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 1.7                                                                                                      | 1.7  | 1.6  | 1.4  | 1.3  | 1.1 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 1.7                                                                                                      | 1.7  | 1.6  | 1.4  | 1.2  | 1.0 | 0.80 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 2.3                                                                                                      | 2.3  | 2.3  | 2.3  | 1.8  | 1.4 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 3.7                                                                                                      | 3.7  | 3.5  | 3.1  | 2.4  | 1.7 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 3.3                                                                                                      | 3.3  | 3.2  | 2.9  | 2.2  | 1.7 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 2.7                                                                                                      | 2.7  | 2.6  | 2.5  | 1.8  | 1.4 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 4.0                                                                                                      | 4.0  | 4.0  | 3.6  | 2.8  | 2.0 | 1.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 4.6                                                                                                      | 4.6  | 4.6  | 4.2  | 2.8  | 2.0 | 1.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 2.0                                                                                                      | 2.0  | 2.0  | 2.0  | 1.8  | 1.4 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 2.0                                                                                                      | 2.0  | 2.0  | 2.0  | 1.8  | 1.4 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 2.0                                                                                                      | 2.0  | 2.0  | 2.0  | 1.8  | 1.4 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 2.0                                                                                                      | 2.0  | 2.0  | 2.0  | 1.8  | 1.4 | 1.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 15.7                                                                                                     | 15.7 | 13.3 | 12.5 | 11.5 | 6.8 | 3.9  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 18.6                                                                                                     | 18.6 | 18.6 | 14.8 | 11.5 | 6.8 | 3.9  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 18.0                                                                                                     | 18.0 | 18.0 | 14.3 | 11.5 | 6.8 | 3.9  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 17.7                                                                                                     | 17.7 | 17.7 | 13.7 | 10.4 | 6.5 | 4.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 17.7                                                                                                     | 17.7 | 17.7 | 13.7 | 10.4 | 6.5 | 4.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 17.7                                                                                                     | 17.7 | 17.7 | 13.7 | 10.4 | 6.5 | 4.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 16.6                                                                                                     | 16.6 | 16.6 | 12.8 | 9.7  | 6.1 | 4.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 16.3                                                                                                     | 16.3 | 16.3 | 12.6 | 9.5  | 6.0 | 4.2  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 17.1                                                                                                     | 17.1 | 17.1 | 13.2 | 10.0 | 6.3 | 4.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 18.6                                                                                                     | 18.6 | 18.6 | 14.3 | 10.8 | 6.8 | 4.7  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 19.4                                                                                                     | 19.4 | 19.4 | 15.0 | 11.3 | 7.1 | 5.0  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 3.3                                                                                                      | 3.3  | 3.3  | 3.2  | 2.4  | 1.8 | 1.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 4.9                                                                                                      | 4.8  | 4.4  | 4.1  | 3.6  | 3.0 | 2.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 4.0                                                                                                      | 3.9  | 3.7  | 3.6  | 2.4  | 1.8 | 1.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 4.0                                                                                                      | 3.9  | 3.7  | 3.5  | 2.4  | 1.8 | 1.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 4.9                                                                                                      | 4.9  | 4.8  | 4.5  | 3.6  | 3.0 | 2.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 5.7                                                                                                      | 5.7  | 5.7  | 5.5  | 4.3  | 3.0 | 2.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 3.3                                                                                                      | 3.3  | 3.3  | 3.2  | 2.4  | 1.8 | 1.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 3.3                                                                                                      | 3.3  | 3.3  | 3.2  | 2.4  | 1.8 | 1.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 4.9                                                                                                      | 4.9  | 4.8  | 4.5  | 3.6  | 3.0 | 2.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 5.7                                                                                                      | 5.7  | 5.7  | 5.5  | 4.3  | 3.0 | 2.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 7.7                                                                                                      | 7.7  | 7.4  | 6.9  | 5.4  | 3.5 | 2.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 3.3                                                                                                      | 3.3  | 3.3  | 3.2  | 2.4  | 1.8 | 1.4  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
 (\*See Maximum Temperature Limits for Restrictions on Class)

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|--------------------------|-----------|------------|----------------------------|----------------------------|
| 1        | ...                 | Bar, rod, shapes         | SB-221    | ...        | A93003                     | H112                       |
| 2        | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A93003                     | H14                        |
| 3        | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A93003                     | H25                        |
| 4        | ...                 | Smls. extr. tube         | SB-241    | ...        | A93003                     | O                          |
| 5        | ...                 | Smls. extr. tube         | SB-241    | ...        | A93003                     | H112                       |
| 6        | ...                 | Smls. pipe               | SB-241    | ...        | A93003                     | H112                       |
| 7        | ...                 | Smls. pipe               | SB-241    | ...        | A93003                     | H18                        |
| 8        | ...                 | Die forgings             | SB-247    | ...        | A93003                     | H112                       |
| 9        | ...                 | Die forgings             | SB-247    | ...        | A93003                     | H112 wld.                  |
| 10       | ...                 | Plate, sheet             | SB-209    | ...        | A93004                     | O                          |
| 11       | ...                 | Plate, sheet             | SB-209    | ...        | A93004                     | H112                       |
| 12       | ...                 | Plate, sheet             | SB-209    | ...        | A93004                     | H32                        |
| 13       | ...                 | Plate, sheet             | SB-209    | ...        | A93004                     | H34                        |
| 14       | ...                 | Plate, sheet             | SB-209    | ...        | A95052                     | O                          |
| 15       | ...                 | Plate, sheet             | SB-209    | ...        | A95052                     | H112                       |
| 16       | ...                 | Plate, sheet             | SB-209    | ...        | A95052                     | H112                       |
| 17       | ...                 | Plate, sheet             | SB-209    | ...        | A95052                     | H32                        |
| 18       | ...                 | Plate, sheet             | SB-209    | ...        | A95052                     | H34                        |
| 19       | ...                 | Drawn smls. tube         | SB-210    | ...        | A95052                     | O                          |
| 20       | ...                 | Drawn smls. tube         | SB-210    | ...        | A95052                     | H32                        |
| 21       | ...                 | Drawn smls. tube         | SB-210    | ...        | A95052                     | H34                        |
| 22       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A95052                     | H32                        |
| 23       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A95052                     | H34                        |
| 24       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95052                     | O                          |
| 25       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | O                          |
| 26       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | O                          |
| 27       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | O                          |
| 28       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | O                          |
| 29       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | O                          |
| 30       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | H112                       |
| 31       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | H112                       |
| 32       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | H32                        |
| 33       | ...                 | Plate, sheet             | SB-209    | ...        | A95083                     | H32                        |
| 34       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95083                     | O                          |
| 35       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95083                     | H111                       |
| 36       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95083                     | H112                       |
| 37       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95083                     | O                          |
| 38       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95083                     | H111                       |
| 39       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95083                     | H112                       |
| 40       | ...                 | Die & hand forgings      | SB-247    | ...        | A95083                     | H111                       |
| 41       | ...                 | Die & hand forgings      | SB-247    | ...        | A95083                     | H112                       |
| 42       | ...                 | Die & hand forgings      | SB-247    | ...        | A95083                     | H111 wld.                  |
| 43       | ...                 | Die & hand forgings      | SB-247    | ...        | A95083                     | H112 wld.                  |
| 44       | ...                 | Plate, sheet             | SB-928    | ...        | A95083                     | H321                       |
| 45       | ...                 | Plate, sheet             | SB-928    | ...        | A95083                     | H321                       |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes        |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|--------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |              |
| 1        | ...                  | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W3       |
| 2        | 0.010-0.200          | 21    | 20                         | 17                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-2                       | T4, W4       |
| 3        | 0.010-0.200          | 21    | 22                         | 19                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-2                       | T4, W4       |
| 4        | ...                  | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3           |
| 5        | ...                  | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W3       |
| 6        | ≥1.000               | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4       |
| 7        | <1.000               | 21    | 27                         | 24                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T4, W4       |
| 8        | ≤4.000               | 21    | 14                         | 5                        | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3           |
| 9        | ≤4.000               | 21    | 14                         | ...                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W7       |
| 10       | 0.006-3.000          | 22    | 22                         | 8.5                      | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-3                       | ...          |
| 11       | 0.250-3.000          | 22    | 23                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-3                       | W3           |
| 12       | 0.017-2.000          | 22    | 28                         | 21                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-3                       | W3           |
| 13       | 0.009-1.000          | 22    | 32                         | 25                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-4                       | W3           |
| 14       | 0.006-3.000          | 22    | 25                         | 9.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-8                       | ...          |
| 15       | 0.250-0.499          | 22    | 28                         | 16                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-8                       | W3           |
| 16       | 0.500-3.000          | 22    | 25                         | 9.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-8                       | W3           |
| 17       | 0.017-2.000          | 22    | 31                         | 23                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-3                       | W3           |
| 18       | 0.009-1.000          | 22    | 34                         | 26                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-4                       | W3           |
| 19       | 0.010-0.450          | 22    | 25                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFA-8                       | ...          |
| 20       | 0.010-0.450          | 22    | 31                         | 23                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-8                       | W4           |
| 21       | 0.010-0.450          | 22    | 34                         | 26                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-8                       | W4           |
| 22       | 0.010-0.200          | 22    | 31                         | 23                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-8                       | W4           |
| 23       | 0.010-0.200          | 22    | 34                         | 26                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-8                       | W4           |
| 24       | ...                  | 22    | 25                         | 10                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-8                       | ...          |
| 25       | 0.051-1.500          | 25    | 40                         | 18                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19     |
| 26       | 1.501-3.000          | 25    | 39                         | 17                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19     |
| 27       | 3.001-5.000          | 25    | 38                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19     |
| 28       | 5.001-7.000          | 25    | 37                         | 15                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19     |
| 29       | 7.001-8.000          | 25    | 36                         | 14                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19     |
| 30       | 0.250-1.500          | 25    | 40                         | 18                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 31       | 1.501-3.000          | 25    | 39                         | 17                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 32       | 0.125-1.500          | 25    | 44                         | 31                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 33       | 1.501-3.000          | 25    | 41                         | 29                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 34       | ≤5.000               | 25    | 39                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19     |
| 35       | ≤5.000               | 25    | 40                         | 24                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 36       | ≤5.000               | 25    | 39                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 37       | ...                  | 25    | 39                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19     |
| 38       | ...                  | 25    | 40                         | 24                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 39       | ...                  | 25    | 39                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 40       | ≤4.000               | 25    | 39                         | 20                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W4 |
| 41       | ≤4.000               | 25    | 39                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W4 |
| 42       | ≤4.000               | 25    | 38                         | ...                      | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W7 |
| 43       | ≤4.000               | 25    | 38                         | ...                      | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W7 |
| 44       | 0.125-1.500          | 25    | 44                         | 31                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 45       | 1.501-3.000          | 25    | 41                         | 29                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 3.3                                                                                                      | 3.3  | 3.3 | 3.2 | 2.4 | 1.8 | 1.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 5.7                                                                                                      | 5.7  | 5.7 | 5.5 | 4.3 | 3.0 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 6.3                                                                                                      | 6.3  | 6.3 | 6.1 | 4.3 | 3.0 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 3.3                                                                                                      | 3.3  | 3.3 | 3.2 | 2.4 | 1.8 | 1.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 3.3                                                                                                      | 3.3  | 3.3 | 3.2 | 2.4 | 1.8 | 1.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 3.3                                                                                                      | 3.3  | 3.3 | 3.2 | 2.4 | 1.8 | 1.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 7.7                                                                                                      | 7.7  | 7.4 | 6.9 | 5.4 | 3.5 | 2.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 3.3                                                                                                      | 3.3  | 3.3 | 3.2 | 2.4 | 1.8 | 1.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 3.3                                                                                                      | 3.3  | 3.3 | 3.2 | 2.4 | 1.8 | 1.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 5.7                                                                                                      | 5.7  | 5.7 | 5.5 | 5.0 | 3.8 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 6.0                                                                                                      | 6.0  | 6.0 | 6.0 | 5.1 | 3.8 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 8.0                                                                                                      | 8.0  | 8.0 | 8.0 | 5.8 | 3.8 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 9.1                                                                                                      | 9.1  | 9.1 | 9.1 | 5.8 | 3.8 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 6.3                                                                                                      | 6.3  | 6.3 | 6.3 | 5.6 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 8.0                                                                                                      | 8.0  | 8.0 | 8.0 | 6.2 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 6.3                                                                                                      | 6.3  | 6.3 | 6.3 | 6.0 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 8.9                                                                                                      | 8.9  | 8.9 | 8.9 | 6.2 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 9.7                                                                                                      | 9.7  | 9.7 | 9.7 | 6.2 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 6.7                                                                                                      | 6.7  | 6.7 | 6.7 | 5.6 | 4.1 | 2.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 8.9                                                                                                      | 8.9  | 8.9 | 8.9 | 6.1 | 4.1 | 2.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 9.7                                                                                                      | 9.7  | 9.7 | 9.7 | 6.1 | 4.1 | 2.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 8.9                                                                                                      | 8.9  | 8.9 | 8.9 | 6.2 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 9.7                                                                                                      | 9.7  | 9.7 | 9.7 | 6.2 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 6.7                                                                                                      | 6.7  | 6.7 | 6.7 | 5.6 | 4.1 | 2.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 11.4                                                                                                     | 11.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 11.1                                                                                                     | 11.1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 10.0                                                                                                     | 10.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 9.3                                                                                                      | 9.3  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 11.4                                                                                                     | 11.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 11.1                                                                                                     | 11.1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 12.6                                                                                                     | 12.6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 11.7                                                                                                     | 11.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 11.4                                                                                                     | 11.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 11.4                                                                                                     | 11.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 11.1                                                                                                     | 11.1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 10.7                                                                                                     | 10.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 12.6                                                                                                     | 12.6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 11.7                                                                                                     | 11.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy Desig./UNS No. | Class/Condition/ Temper |
|----------|---------------------|--------------------------|-----------|------------|----------------------|-------------------------|
| 1        | ...                 | Plate, sheet             | SB-209    | ...        | A95086               | O                       |
| 2        | ...                 | Plate, sheet             | SB-209    | ...        | A95086               | H112                    |
| 3        | ...                 | Plate, sheet             | SB-209    | ...        | A95086               | H112                    |
| 4        | ...                 | Plate, sheet             | SB-209    | ...        | A95086               | H112                    |
| 5        | ...                 | Plate, sheet             | SB-209    | ...        | A95086               | H112                    |
| 6        | ...                 | Plate, sheet             | SB-209    | ...        | A95086               | H32                     |
| 7        | ...                 | Plate, sheet             | SB-209    | ...        | A95086               | H34                     |
| 8        | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95086               | H112                    |
| 9        | ...                 | Smls. extr. tube         | SB-241    | ...        | A95086               | O                       |
| 10       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95086               | H111                    |
| 11       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95086               | H112                    |
| 12       | ...                 | Plate, sheet             | SB-928    | ...        | A95086               | H116                    |
| 13       | ...                 | Plate, sheet             | SB-209    | ...        | A95154               | O                       |
| 14       | ...                 | Plate, sheet             | SB-209    | ...        | A95154               | H112                    |
| 15       | ...                 | Plate, sheet             | SB-209    | ...        | A95154               | H112                    |
| 16       | ...                 | Plate, sheet             | SB-209    | ...        | A95154               | H32                     |
| 17       | ...                 | Plate, sheet             | SB-209    | ...        | A95154               | H34                     |
| 18       | ...                 | Drawn smls. tube         | SB-210    | ...        | A95154               | O                       |
| 19       | ...                 | Drawn smls. tube         | SB-210    | ...        | A95154               | H34                     |
| 20       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95154               | O                       |
| 21       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95154               | H112                    |
| 22       | ...                 | Plate, sheet             | SB-209    | ...        | A95254               | O                       |
| 23       | ...                 | Plate, sheet             | SB-209    | ...        | A95254               | H112                    |
| 24       | ...                 | Plate, sheet             | SB-209    | ...        | A95254               | H112                    |
| 25       | ...                 | Plate, sheet             | SB-209    | ...        | A95254               | H32                     |
| 26       | ...                 | Plate, sheet             | SB-209    | ...        | A95254               | H34                     |
| 27       | ...                 | Plate, sheet             | SB-209    | ...        | A95454               | O                       |
| 28       | ...                 | Plate, sheet             | SB-209    | ...        | A95454               | H112                    |
| 29       | ...                 | Plate, sheet             | SB-209    | ...        | A95454               | H112                    |
| 30       | ...                 | Plate, sheet             | SB-209    | ...        | A95454               | H32                     |
| 31       | ...                 | Plate, sheet             | SB-209    | ...        | A95454               | H34                     |
| 32       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95454               | O                       |
| 33       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95454               | H111                    |
| 34       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95454               | H112                    |
| 35       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A95454               | H32                     |
| 36       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A95454               | H34                     |
| 37       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95454               | O                       |
| 38       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95454               | H111                    |
| 39       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95454               | H112                    |
| 40       | ...                 | Plate, sheet             | SB-209    | ...        | A95456               | O                       |
| 41       | ...                 | Plate, sheet             | SB-209    | ...        | A95456               | O                       |
| 42       | ...                 | Plate, sheet             | SB-209    | ...        | A95456               | O                       |
| 43       | ...                 | Plate, sheet             | SB-209    | ...        | A95456               | O                       |
| 44       | ...                 | Plate, sheet             | SB-209    | ...        | A95456               | O                       |
| 45       | ...                 | Plate, sheet             | SB-209    | ...        | A95456               | H112                    |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes        |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|--------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |              |
| 1        | 0.020-2.000          | 25    | 35                         | 14                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19     |
| 2        | 0.188-0.499          | 25    | 36                         | 18                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19, W3 |
| 3        | 0.500-1.000          | 25    | 35                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19, W3 |
| 4        | 1.001-2.000          | 25    | 35                         | 14                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19, W3 |
| 5        | 2.001-3.000          | 25    | 34                         | 14                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19     |
| 6        | 0.051-2.000          | 25    | 40                         | 28                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 7        | 0.051-1.000          | 25    | 44                         | 34                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 8        | ≤5.000               | 25    | 35                         | 14                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19, W4 |
| 9        | ...                  | 25    | 35                         | 14                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19     |
| 10       | ...                  | 25    | 36                         | 21                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | G18, G19, W3 |
| 11       | ...                  | 25    | 35                         | 14                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-9                       | ...          |
| 12       | 0.063-2.000          | 25    | 40                         | 28                       | NP                                                                                         | NP               | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 13       | 0.020-3.000          | 22    | 30                         | 11                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19     |
| 14       | 0.250-0.499          | 22    | 32                         | 18                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 15       | 0.500-3.000          | 22    | 30                         | 11                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19, W3 |
| 16       | 0.020-2.000          | 22    | 36                         | 26                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 17       | 0.009-1.000          | 22    | 39                         | 29                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 18       | 0.010-0.450          | 22    | 30                         | 11                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19     |
| 19       | 0.010-0.450          | 22    | 39                         | 29                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19, W3 |
| 20       | ...                  | 22    | 30                         | 11                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19     |
| 21       | ...                  | 22    | 30                         | 11                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19, W3 |
| 22       | 0.051-3.000          | 22    | 30                         | 11                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19     |
| 23       | 0.250-0.499          | 22    | 32                         | 18                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 24       | 0.500-3.000          | 22    | 30                         | 11                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-5                       | G18, G19, W3 |
| 25       | 0.051-2.000          | 22    | 36                         | 26                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 26       | 0.051-1.000          | 22    | 39                         | 29                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-11                      | G18, G19, W3 |
| 27       | 0.020-3.000          | 22    | 31                         | 12                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2           |
| 28       | 0.250-0.499          | 22    | 32                         | 18                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 29       | 0.500-3.000          | 22    | 31                         | 12                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 30       | 0.020-2.000          | 22    | 36                         | 26                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 31       | 0.020-1.000          | 22    | 39                         | 29                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 32       | ≤5.000               | 22    | 31                         | 12                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2           |
| 33       | ≤5.000               | 22    | 33                         | 19                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 34       | ≤5.000               | 22    | 31                         | 12                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 35       | 0.010-0.200          | 22    | 36                         | 26                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4       |
| 36       | 0.010-0.200          | 22    | 39                         | 29                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W4       |
| 37       | ...                  | 22    | 31                         | 12                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2           |
| 38       | ...                  | 22    | 33                         | 19                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 39       | ...                  | 22    | 31                         | 12                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-6                       | T2, W3       |
| 40       | 0.051-1.500          | 25    | 42                         | 19                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19     |
| 41       | 1.501-3.000          | 25    | 41                         | 18                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19     |
| 42       | 3.001-5.000          | 25    | 40                         | 17                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19     |
| 43       | 5.001-7.000          | 25    | 39                         | 16                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19     |
| 44       | 7.001-8.000          | 25    | 38                         | 15                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19     |
| 45       | 0.250-1.500          | 25    | 42                         | 19                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 9.3                                                                                                      | 9.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 10.3                                                                                                     | 10.3 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 10.0                                                                                                     | 10.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 9.3                                                                                                      | 9.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 9.3                                                                                                      | 9.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 11.4                                                                                                     | 11.4 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 12.6                                                                                                     | 12.6 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 9.3                                                                                                      | 9.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 9.3                                                                                                      | 9.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 10.3                                                                                                     | 10.3 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 9.3                                                                                                      | 9.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 11.4                                                                                                     | 11.4 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 7.3                                                                                                      | 7.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 9.1                                                                                                      | 9.1  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 7.3                                                                                                      | 7.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 10.3                                                                                                     | 10.3 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 11.1                                                                                                     | 11.1 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 7.3                                                                                                      | 7.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 11.1                                                                                                     | 11.1 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 7.3                                                                                                      | 7.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 7.3                                                                                                      | 7.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 7.3                                                                                                      | 7.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 9.1                                                                                                      | 9.1  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 7.3                                                                                                      | 7.3  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 10.3                                                                                                     | 10.3 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 11.1                                                                                                     | 11.1 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 9.1                                                                                                      | 9.1  | 9.1  | 9.1  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 11.1                                                                                                     | 11.1 | 11.1 | 10.8 | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 9.4                                                                                                      | 9.4  | 9.4  | 9.4  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 11.1                                                                                                     | 11.1 | 11.1 | 10.8 | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 9.4                                                                                                      | 9.4  | 9.4  | 9.4  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 5.5 | 4.1 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 12.0                                                                                                     | 12.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 11.3                                                                                                     | 11.3 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 10.7                                                                                                     | 10.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 10.0                                                                                                     | 10.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 12.0                                                                                                     | 12.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| No.  | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|--------------------------|-----------|------------|----------------------------|----------------------------|
| 1        | ...                 | Plate, sheet             | SB-209    | ...        | A95456                     | H112                       |
| 2        | ...                 | Plate, sheet             | SB-209    | ...        | A95456                     | H32                        |
| 3        | ...                 | Plate, sheet             | SB-209    | ...        | A95456                     | H32                        |
| 4        | ...                 | Plate, sheet             | SB-209    | ...        | A95456                     | H32                        |
| 5        | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95456                     | O                          |
| 6        | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95456                     | H111                       |
| 7        | ...                 | Bar, rod, shapes         | SB-221    | ...        | A95456                     | H112                       |
| 8        | ...                 | Smls. extr. tube         | SB-241    | ...        | A95456                     | O                          |
| 9        | ...                 | Smls. extr. tube         | SB-241    | ...        | A95456                     | H111                       |
| 10       | ...                 | Smls. extr. tube         | SB-241    | ...        | A95456                     | H112                       |
| 11       | ...                 | Plate, sheet             | SB-928    | ...        | A95456                     | H321                       |
| 12       | ...                 | Plate, sheet             | SB-928    | ...        | A95456                     | H321                       |
| 13       | ...                 | Plate, sheet             | SB-928    | ...        | A95456                     | H321                       |
| 14       | ...                 | Plate, sheet             | SB-209    | ...        | A95652                     | O                          |
| 15       | ...                 | Plate, sheet             | SB-209    | ...        | A95652                     | H112                       |
| 16       | ...                 | Plate, sheet             | SB-209    | ...        | A95652                     | H112                       |
| 17       | ...                 | Plate, sheet             | SB-209    | ...        | A95652                     | H32                        |
| 18       | ...                 | Plate, sheet             | SB-209    | ...        | A95652                     | H34                        |
| 19       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T4                         |
| 20       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T451                       |
| 21       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T6                         |
| 22       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T651                       |
| 23       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T651                       |
| 24       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T4 wld.                    |
| 25       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T451 wld.                  |
| 26       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T6 wld.                    |
| 27       | ...                 | Plate, sheet             | SB-209    | ...        | A96061                     | T651 wld.                  |
| 28       | ...                 | Drawn smls. tube         | SB-210    | ...        | A96061                     | T4                         |
| 29       | ...                 | Drawn smls. tube         | SB-210    | ...        | A96061                     | T6                         |
| 30       | ...                 | Drawn smls. tube         | SB-210    | ...        | A96061                     | T4 wld.                    |
| 31       | ...                 | Drawn smls. tube         | SB-210    | ...        | A96061                     | T6 wld.                    |
| 32       | ...                 | Bar, rod, wire           | SB-211    | ...        | A96061                     | T6                         |
| 33       | ...                 | Bar, rod, wire           | SB-211    | ...        | A96061                     | T651                       |
| 34       | ...                 | Bar, rod, wire           | SB-211    | ...        | A96061                     | T6 wld.                    |
| 35       | ...                 | Bar, rod, wire           | SB-211    | ...        | A96061                     | T651 wld.                  |
| 36       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96061                     | T4                         |
| 37       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96061                     | T6                         |
| 38       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96061                     | T4 wld.                    |
| 39       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96061                     | T6 wld.                    |
| 40       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A96061                     | T4                         |
| 41       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A96061                     | T6                         |
| 42       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A96061                     | T4 wld.                    |
| 43       | ...                 | Cond. & heat exch. tubes | SB-234    | ...        | A96061                     | T6 wld.                    |
| 44       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96061                     | T4                         |
| 45       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96061                     | T6                         |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes                |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|----------------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                      |
| 1        | 1.501-3.000          | 25    | 41                         | 18                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 2        | 0.188-0.499          | 25    | 46                         | 33                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 3        | 0.500-1.500          | 25    | 44                         | 31                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 4        | 1.501-3.000          | 25    | 41                         | 29                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 5        | ≤5.000               | 25    | 41                         | 19                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19             |
| 6        | ≤5.000               | 25    | 42                         | 26                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 7        | ≤5.000               | 25    | 41                         | 19                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 8        | ...                  | 25    | 41                         | 19                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19             |
| 9        | ...                  | 25    | 42                         | 26                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 10       | ...                  | 25    | 41                         | 19                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 11       | 0.188-0.499          | 25    | 46                         | 33                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 12       | 0.500-1.500          | 25    | 44                         | 31                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 13       | 1.501-3.000          | 25    | 41                         | 29                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFA-10                      | G18, G19, W3         |
| 14       | 0.051-3.000          | 22    | 25                         | 9.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-8                       | T2                   |
| 15       | 0.250-0.499          | 22    | 28                         | 16                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-8                       | T1, W3               |
| 16       | 0.500-3.000          | 22    | 25                         | 9.5                      | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFA-8                       | T2, W3               |
| 17       | 0.051-2.000          | 22    | 31                         | 23                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-3                       | T1, W3               |
| 18       | 0.051-1.000          | 22    | 34                         | 26                       | NP                                                                                         | 200 (Cl. 3 only) | 400    | 400 | NFA-4                       | T1, W3               |
| 19       | 0.006-0.249          | 23    | 30                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | G24, T3, W4          |
| 20       | 0.250-3.000          | 23    | 30                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | G24, T3, W4          |
| 21       | 0.006-0.249          | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, T3, W4          |
| 22       | 0.250-4.000          | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G24, T3, W4, W9      |
| 23       | 4.001-6.000          | 23    | 40                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G24, T3, W4, W9      |
| 24       | 0.006-0.249          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | G24, T3, W7          |
| 25       | 0.250-3.000          | 23    | 24                         | ...                      | NP                                                                                         | NP               | 400    | 400 | NFA-13                      | G24, T3, W7          |
| 26       | 0.006-0.249          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, T3, W7          |
| 27       | 0.250-6.000          | 23    | 24                         | ...                      | NP                                                                                         | NP               | 400    | 400 | NFA-12,13                   | G24, T3, W7, W9      |
| 28       | 0.025-0.500          | 23    | 30                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | T3, W4               |
| 29       | 0.025-0.500          | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W4, W9           |
| 30       | 0.025-0.500          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | T3, W7               |
| 31       | 0.025-0.500          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W7, W9           |
| 32       | 0.125-0.249          | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G24, T3, W4          |
| 33       | 0.250-8.000          | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G24, T3, W4, W9      |
| 34       | 0.125-0.249          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | G13, G24, T3, W7     |
| 35       | 0.250-8.000          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G13, G24, T3, W7, W9 |
| 36       | ...                  | 23    | 26                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | G24, T3, W4          |
| 37       | ...                  | 23    | 38                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G24, T3, W4, W9      |
| 38       | ...                  | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | G24, T3, W7          |
| 39       | ...                  | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G13, G24, T3, W7, W9 |
| 40       | 0.025-0.200          | 23    | 30                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | T3, W4               |
| 41       | 0.025-0.200          | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | T3, W4               |
| 42       | 0.025-0.200          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | T3, W7               |
| 43       | 0.025-0.200          | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12                      | T3, W7               |
| 44       | ...                  | 23    | 26                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | G24, T3, W4          |
| 45       | ...                  | 23    | 38                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G24, T3, W4, W9      |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 13.1                                                                                                     | 13.1 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 12.6                                                                                                     | 12.6 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 12.0                                                                                                     | 12.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 12.0                                                                                                     | 12.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 13.1                                                                                                     | 13.1 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 12.6                                                                                                     | 12.6 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 11.7                                                                                                     | 11.7 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 6.3                                                                                                      | 6.3  | 6.3  | 6.3  | 6.1 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 8.0                                                                                                      | 8.0  | 8.0  | 7.5  | 6.1 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 6.3                                                                                                      | 6.3  | 6.3  | 6.3  | 6.1 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 8.9                                                                                                      | 8.9  | 8.9  | 7.5  | 6.1 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 9.7                                                                                                      | 9.7  | 9.7  | 7.5  | 6.1 | 4.1 | 2.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 8.6                                                                                                      | 8.6  | 8.6  | 8.5  | 6.9 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 8.6                                                                                                      | 8.6  | 8.6  | 8.5  | 6.9 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 8.4 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 8.4 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 11.4                                                                                                     | 11.4 | 11.4 | 11.1 | 8.2 | 6.3 | 4.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 8.6                                                                                                      | 8.6  | 8.6  | 8.5  | 6.9 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 8.4 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 8.4 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 8.4 | 6.4 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 7.4                                                                                                      | 7.4  | 7.4  | 7.4  | 6.0 | 5.8 | 4.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 7.9 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 8.6                                                                                                      | 8.6  | 8.6  | 8.5  | 6.9 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 8.4 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5 | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 7.4                                                                                                      | 7.4  | 7.4  | 7.4  | 6.0 | 5.8 | 4.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 7.9 | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|--------------------------|-----------|------------|----------------------------|----------------------------|
| 1        | ...                 | Smls. extr. tube         | SB-241    | ...        | A96061                     | T4 wld.                    |
| 2        | ...                 | Smls. extr. tube         | SB-241    | ...        | A96061                     | T6 wld.                    |
| 3        | ...                 | Smls. pipe               | SB-241    | ...        | A96061                     | T6 drawn                   |
| 4        | ...                 | Smls. pipe               | SB-241    | ...        | A96061                     | T6                         |
| 5        | ...                 | Smls. pipe               | SB-241    | ...        | A96061                     | T6 wld.                    |
| 6        | ...                 | Die forgings             | SB-247    | ...        | A96061                     | T6                         |
| 7        | ...                 | Hand forgings            | SB-247    | ...        | A96061                     | T6                         |
| 8        | ...                 | Hand forgings            | SB-247    | ...        | A96061                     | T6                         |
| 9        | ...                 | Die & hand forgings      | SB-247    | ...        | A96061                     | T6 wld.                    |
| 10       | ...                 | Shapes                   | SB-308    | ...        | A96061                     | T6                         |
| 11       | ...                 | Shapes                   | SB-308    | ...        | A96061                     | T6 wld.                    |
| 12       | ...                 | Drawn smls. tube         | SB-210    | ...        | A96063                     | T6                         |
| 13       | ...                 | Drawn smls. tube         | SB-210    | ...        | A96063                     | T6 wld.                    |
| 14       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96063                     | T1                         |
| 15       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96063                     | T1                         |
| 16       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96063                     | T5                         |
| 17       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96063                     | T5                         |
| 18       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96063                     | T6                         |
| 19       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96063                     | T5 wld.                    |
| 20       | ...                 | Bar, rod, shapes         | SB-221    | ...        | A96063                     | T6 wld.                    |
| 21       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96063                     | T1                         |
| 22       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96063                     | T1                         |
| 23       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96063                     | T5                         |
| 24       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96063                     | T5                         |
| 25       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96063                     | T6                         |
| 26       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96063                     | T5 wld.                    |
| 27       | ...                 | Smls. extr. tube         | SB-241    | ...        | A96063                     | T6 wld.                    |
| 28       | ...                 | Smls. pipe               | SB-241    | ...        | A96063                     | T6                         |
| 29       | ...                 | Smls. pipe               | SB-241    | ...        | A96063                     | T6 wld.                    |
| 30       | ...                 | Bar, rod                 | SB-187    | ...        | C10200                     | O60                        |
| 31       | ...                 | Bar, rod                 | SB-187    | ...        | C10200                     | O60                        |
| 32       | ...                 | Smls. tube               | SB-75     | ...        | C10200                     | O50, O60                   |
| 33       | ...                 | Smls. tube               | SB-75     | ...        | C10200                     | O50, O60                   |
| 34       | ...                 | Smls. pipe               | SB-42     | ...        | C10200                     | O61                        |
| 35       | ...                 | Smls. pipe               | SB-42     | ...        | C10200                     | O61                        |
| (25) 36  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10200                     | H00                        |
| (25) 37  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10200                     | H01                        |
| (25) 38  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10200                     | H02                        |
| (25) 39  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10200                     | H03                        |
| (25) 40  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10200                     | H04                        |
| (25) 41  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10200                     | M20, O25                   |
| (25) 42  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10200                     | M20, O25                   |
| 43       | ...                 | Smls. pipe               | SB-42     | ...        | C10200                     | H55                        |
| 44       | ...                 | Smls. tube               | SB-75     | ...        | C10200                     | H55                        |
| 45       | ...                 | Smls. cond. tube         | SB-111    | ...        | C10200                     | H55                        |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes           |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|-----------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                 |
| 1        | ...                  | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-13                      | G24, T3, W7     |
| 2        | ...                  | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G24, T3, W7, W9 |
| 3        | <1.000               | 23    | 42                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W4, W9      |
| 4        | ≥1.000               | 23    | 38                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W4, W9      |
| 5        | ...                  | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W7, W9      |
| 6        | ≤4.000               | 23    | 38                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W4, W9      |
| 7        | ≤4.000               | 23    | 37                         | 33                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W4, W9      |
| 8        | 4.001-8.000          | 23    | 35                         | 32                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W4, W9      |
| 9        | ≤8.000               | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W7, W9      |
| 10       | ...                  | 23    | 38                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | T3, W4, W9      |
| 11       | ...                  | 23    | 24                         | ...                      | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-12,13                   | G13, T3, W7, W9 |
| 12       | 0.025-0.500          | 23    | 33                         | 28                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 13       | 0.025-0.500          | 23    | 17                         | 8                        | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W7          |
| 14       | ≤0.500               | 23    | 17                         | 9                        | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 15       | 0.501-1.000          | 23    | 16                         | 8                        | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 16       | ≤0.500               | 23    | 22                         | 16                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 17       | 0.501-1.000          | 23    | 21                         | 15                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 18       | ≤1.000               | 23    | 30                         | 25                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 19       | ≤1.000               | 23    | 17                         | 8                        | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W7          |
| 20       | ≤1.000               | 23    | 17                         | 8                        | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W7          |
| 21       | ≤0.500               | 23    | 17                         | 9                        | NP                                                                                         | 350 (Cl. 3 only) | NP     | NP  | NFA-1                       | T3, W4          |
| 22       | 0.501-1.000          | 23    | 16                         | 8                        | NP                                                                                         | 350 (Cl. 3 only) | NP     | NP  | NFA-1                       | T3, W4          |
| 23       | ≤0.500               | 23    | 22                         | 16                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 24       | 0.501-1.000          | 23    | 21                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 25       | ≤1.000               | 23    | 30                         | 25                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 26       | ≤1.000               | 23    | 17                         | 8                        | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W7          |
| 27       | ≤1.000               | 23    | 17                         | 8                        | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W7          |
| 28       | ≤1.000               | 23    | 30                         | 25                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W4          |
| 29       | ≤1.000               | 23    | 17                         | 8                        | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFA-1                       | T3, W7          |
| 30       | All                  | 31    | 28                         | 8                        | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | T3              |
| 31       | All                  | 31    | 28                         | 8                        | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G5, T3          |
| 32       | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G1, T3          |
| 33       | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G1, G5, T3      |
| 34       | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, T3          |
| 35       | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, G5, T3      |
| 36       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G33, T3, W3     |
| 37       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G33, T3, W3     |
| 38       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G33, T3, W3     |
| 39       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G33, T3, W3     |
| 40       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G33, T3, W3     |
| 41       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | T3              |
| 42       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 250 (Cl. 3 only) | 400    | 400 | NFC-1                       | G5, T2          |
| 43       | 2 < NPS ≤ 12         | 31    | 36                         | 30                       | 400                                                                                        | 400              | 400    | 400 | NFC-6                       | G1, G9, W3      |
| 44       | All                  | 31    | 36                         | 30                       | 400                                                                                        | 400 (Cl. 3 only) | 400    | 400 | NFC-6                       | G1, G9, W3      |
| 45       | ...                  | 31    | 36                         | 30                       | NP                                                                                         | 400              | 400    | 400 | NFC-6                       | G9, W3          |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5  | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5  | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 12.0                                                                                                     | 12.0 | 12.0 | 11.7 | 8.4  | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 7.9  | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5  | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 7.9  | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 10.6                                                                                                     | 10.6 | 10.6 | 10.5 | 7.7  | 6.3 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 10.0                                                                                                     | 10.0 | 10.0 | 9.9  | 7.4  | 6.1 | 4.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.5  | 4.6 | 3.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 7.2  | 5.6 | 4.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 6.9                                                                                                      | 6.9  | 6.9  | 6.8  | 5.0  | 4.2 | 3.2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 9.4                                                                                                      | 9.4  | 9.4  | 8.3  | 5.5  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 3.9  | 3.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 4.2  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 4.6                                                                                                      | 4.6  | 4.6  | 4.6  | 4.0  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 6.3                                                                                                      | 6.3  | 6.1  | 5.8  | 4.6  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 6.0                                                                                                      | 6.0  | 5.9  | 5.6  | 4.3  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 8.6                                                                                                      | 8.6  | 8.6  | 7.5  | 5.0  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 3.9  | 3.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 3.9  | 3.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 4.2  | 3.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 4.6                                                                                                      | 4.6  | 4.6  | 4.6  | 4.0  | 3.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 6.3                                                                                                      | 6.3  | 6.1  | 5.8  | 4.6  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 6.0                                                                                                      | 6.0  | 5.9  | 5.6  | 4.4  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 8.6                                                                                                      | 8.6  | 8.6  | 7.5  | 5.0  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 3.9  | 3.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 3.9  | 3.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 8.6                                                                                                      | 8.6  | 8.6  | 7.5  | 5.0  | 3.4 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 4.9                                                                                                      | 4.9  | 4.9  | 4.9  | 3.9  | 3.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 5.3                                                                                                      | 4.7  | 4.7  | 4.7  | 4.7  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 5.3                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | 6.3  | 4.4 | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7 | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7 | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7 | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy Design./UNS No. | Class/Condition/ Temper |
|----------|---------------------|--------------------------|-----------|------------|-----------------------|-------------------------|
| 1        | ...                 | Smls. U-bend tube        | SB-395    | ...        | C10200                | H55                     |
| 2        | ...                 | Smls. pipe               | SB-42     | ...        | C10200                | H80                     |
| 3        | ...                 | Smls. tube               | SB-75     | ...        | C10200                | H80                     |
| 4        | ...                 | Smls. cond. tube         | SB-111    | ...        | C10200                | H80                     |
| (25) 5   | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10400                | H00                     |
| (25) 6   | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10400                | H01                     |
| (25) 7   | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10400                | H02                     |
| (25) 8   | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10400                | H03                     |
| (25) 9   | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10400                | H04                     |
| (25) 10  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10400                | M20, 025                |
| (25) 11  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10400                | M20, 025                |
| (25) 12  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10500                | H00                     |
| (25) 13  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10500                | H01                     |
| (25) 14  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10500                | H02                     |
| (25) 15  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10500                | H03                     |
| (25) 16  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10500                | H04                     |
| (25) 17  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10500                | M20, 025                |
| (25) 18  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10500                | M20, 025                |
| (25) 19  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10700                | H00                     |
| (25) 20  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10700                | H01                     |
| (25) 21  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10700                | H02                     |
| (25) 22  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10700                | H03                     |
| (25) 23  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10700                | H04                     |
| (25) 24  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10700                | M20, 025                |
| (25) 25  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C10700                | M20, 025                |
| 26       | ...                 | Bar                      | SB-187    | ...        | C11000                | H04                     |
| 27       | ...                 | Bar, rod                 | SB-187    | ...        | C11000                | O60                     |
| 28       | ...                 | Bar, rod                 | SB-187    | ...        | C11000                | O60                     |
| 29       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C11000                | H00                     |
| 30       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C11000                | H01                     |
| 31       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C11000                | H02                     |
| 32       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C11000                | H03                     |
| 33       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C11000                | H04                     |
| 34       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C11000                | M20, 025                |
| 35       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C11000                | M20, 025                |
| 36       | ...                 | Smls. tube               | SB-75     | ...        | C12000                | O50, O60                |
| 37       | ...                 | Smls. tube               | SB-75     | ...        | C12000                | O50, O60                |
| 38       | ...                 | Smls. pipe               | SB-42     | ...        | C12000                | O61                     |
| 39       | ...                 | Smls. pipe               | SB-42     | ...        | C12000                | O61                     |
| 40       | ...                 | Smls. pipe               | SB-42     | ...        | C12000                | H55                     |
| 41       | ...                 | Smls. tube               | SB-75     | ...        | C12000                | H55                     |
| 42       | ...                 | Smls. cond. tube         | SB-111    | ...        | C12000                | H55                     |
| 43       | ...                 | Smls. U-bend tube        | SB-395    | ...        | C12000                | H55                     |
| 44       | ...                 | Smls. pipe               | SB-42     | ...        | C12000                | H80                     |
| 45       | ...                 | Smls. tube               | SB-75     | ...        | C12000                | H80                     |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in.              | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes              |
|----------|-----------------------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|--------------------|
|          |                                   |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                    |
| 1        | ...                               | 31    | 36                         | 30                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFC-6                       | G9, W3             |
| 2        | $\frac{1}{8} < \text{NPS} \leq 2$ | 31    | 45                         | 40                       | 400                                                                                        | 300              | 400    | 400 | NFC-6                       | G1, G6, G9, T4, W3 |
| 3        | <4                                | 31    | 45                         | 40                       | 400                                                                                        | 350              | 400    | 400 | NFC-6                       | G1, G6, G9, T4, W3 |
| 4        | ...                               | 31    | 45                         | 40                       | NP                                                                                         | 300              | 400    | 400 | NFC-6                       | G6, G9, T4, W3     |
| 5        | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 6        | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 7        | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 8        | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 9        | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 10       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | T3                 |
| 11       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 250              | 400    | 400 | NFC-1                       | G5, T2             |
| 12       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 13       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 14       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 15       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 16       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 17       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | T3                 |
| 18       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 250              | 400    | 400 | NFC-1                       | G5, T2             |
| 19       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 20       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 21       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 22       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 23       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 24       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | T3                 |
| 25       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | 250              | 400    | 400 | NFC-1                       | G5, T2             |
| 26       | All                               | 31    | 28                         | 8                        | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3            |
| 27       | All                               | 31    | 28                         | 8                        | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | T3                 |
| 28       | All                               | 31    | 28                         | 8                        | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G5, T3             |
| 29       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | NP               | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 30       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | NP               | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 31       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | NP               | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 32       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | NP               | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 33       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | NP               | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 34       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | NP               | 400    | 400 | NFC-1                       | T3                 |
| 35       | ...                               | 31    | 30                         | 10                       | NP                                                                                         | NP               | 400    | 400 | NFC-1                       | G5, T2             |
| 36       | All                               | 31    | 30                         | 9                        | 400                                                                                        | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G1, T3             |
| 37       | All                               | 31    | 30                         | 9                        | 400                                                                                        | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G1, G5, T3         |
| 38       | All                               | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, T3             |
| 39       | All                               | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, G5, T3         |
| 40       | $2 < \text{NPS} \leq 12$          | 31    | 36                         | 30                       | 400                                                                                        | 400              | 400    | 400 | NFC-6                       | G1, G9, W3         |
| 41       | All                               | 31    | 36                         | 30                       | 400                                                                                        | 400 (Cl. 3 only) | 400    | 400 | NFC-6                       | G1, G9, W3         |
| 42       | ...                               | 31    | 36                         | 30                       | NP                                                                                         | 400              | 400    | 400 | NFC-6                       | G9, W3             |
| 43       | ...                               | 31    | 36                         | 30                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFC-6                       | G9, W3             |
| 44       | $\frac{1}{8} < \text{NPS} \leq 2$ | 31    | 45                         | 40                       | 400                                                                                        | 300              | 400    | 400 | NFC-6                       | G1, G6, G9, T4, W3 |
| 45       | <4                                | 31    | 45                         | 40                       | 400                                                                                        | 350 (Cl. 3 only) | 400    | 400 | NFC-6                       | G1, G6, G9, T4, W3 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | 6.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | 6.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | 6.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 5.3                                                                                                      | 4.7  | 4.7  | 4.7  | 4.7  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 5.3                                                                                                      | 4.7  | 4.7  | 4.7  | 4.7  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 5.3                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | 6.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|--------------------------|-----------|------------|----------------------------|----------------------------|
| 1        | ...                 | Smls. cond. tube         | SB-111    | ...        | C12000                     | H80                        |
| (25) 2   | ...                 | Smls. pipe               | SB-42     | ...        | C12200                     | O61                        |
| (25) 3   | ...                 | Smls. pipe               | SB-42     | ...        | C12200                     | O61                        |
| 4        | ...                 | Smls. tube               | SB-75     | ...        | C12200                     | O50                        |
| 5        | ...                 | Smls. tube               | SB-75     | ...        | C12200                     | O50                        |
| 6        | ...                 | Smls. tube               | SB-75     | ...        | C12200                     | O60                        |
| 7        | ...                 | Smls. tube               | SB-75     | ...        | C12200                     | O60                        |
| (25) 8   | ...                 | Finned tube              | SB-359    | ...        | C12200                     | O61                        |
| (25) 9   | ...                 | Finned tube              | SB-359    | ...        | C12200                     | O61                        |
| (25) 10  | ...                 | Wld. cond. tube          | SB-543    | ...        | C12200                     | W061                       |
| (25) 11  | ...                 | Wld. cond. tube          | SB-543    | ...        | C12200                     | W061                       |
| (25) 12  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12200                     | H00                        |
| (25) 13  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12200                     | H01                        |
| (25) 14  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12200                     | H02                        |
| (25) 15  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12200                     | H03                        |
| (25) 16  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12200                     | H04                        |
| (25) 17  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12200                     | M20, O25                   |
| (25) 18  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12200                     | M20, O25                   |
| 19       | ...                 | Wld. cond. tube          | SB-543    | ...        | C12200                     | WC55                       |
| 20       | ...                 | Smls. pipe               | SB-42     | ...        | C12200                     | H55                        |
| 21       | ...                 | Smls. tube               | SB-75     | ...        | C12200                     | H55                        |
| 22       | ...                 | Smls. cond. tube         | SB-111    | ...        | C12200                     | H55                        |
| (25) 23  | ...                 | Finned tube              | SB-359    | ...        | C12200                     | H55                        |
| 24       | ...                 | Smls. U-bend tube        | SB-395    | ...        | C12200                     | H55                        |
| 25       | ...                 | Smls. pipe               | SB-42     | ...        | C12200                     | H80                        |
| 26       | ...                 | Smls. cond. tube         | SB-75     | ...        | C12200                     | H80                        |
| 27       | ...                 | Smls. tube               | SB-111    | ...        | C12200                     | H80                        |
| (25) 28  | ...                 | Finned tube              | SB-359    | ...        | C12200                     | H80                        |
| 29       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12300                     | H00                        |
| 30       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12300                     | H01                        |
| 31       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12300                     | H02                        |
| 32       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12300                     | H03                        |
| 33       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12300                     | H04                        |
| 34       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12300                     | M20, O25                   |
| 35       | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C12300                     | M20, O25                   |
| (25) 36  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C14200                     | M20, O25                   |
| (25) 37  | ...                 | Plate, sheet, strip, bar | SB-152    | ...        | C14200                     | M20, O25                   |
| 38       | ...                 | Smls. cond. tube         | SB-111    | ...        | C14200                     | H55                        |
| 39       | ...                 | Smls. U-bend tube        | SB-395    | ...        | C14200                     | H55                        |
| 40       | ...                 | Smls. cond. tube         | SB-111    | ...        | C14200                     | H80                        |
| 41       | ...                 | Smls. cond. tube         | SB-111    | ...        | C19200                     | O61                        |
| 42       | ...                 | Smls. cond. tube         | SB-111    | ...        | C19200                     | O61                        |
| 43       | ...                 | Smls. U-bend tube        | SB-395    | ...        | C19200                     | O61                        |
| 44       | ...                 | Smls. U-bend tube        | SB-395    | ...        | C19200                     | O61                        |
| 45       | ...                 | Wld. cond. tube          | SB-543    | ...        | C19400                     | W061                       |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes              |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|--------------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                    |
| 1        | ...                  | 31    | 45                         | 40                       | NP                                                                                         | 300              | 400    | 400 | NFC-6                       | G6, G9, T4, W3     |
| 2        | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, T3             |
| 3        | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, G5, T3         |
| 4        | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-7                       | G1, T3             |
| 5        | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-7                       | G1, G5, T3         |
| 6        | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, T3             |
| 7        | All                  | 31    | 30                         | 9                        | 400                                                                                        | 300              | 400    | 400 | NFC-1                       | G1, G5, T3         |
| 8        | ...                  | 31    | 30                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | NP  | NFC-1                       | T3                 |
| 9        | ...                  | 31    | 30                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | NP  | NFC-1                       | G5, T3             |
| 10       | ...                  | 31    | 30                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G14, T3, W11       |
| 11       | ...                  | 31    | 30                         | 9                        | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G5, G14, T3, W11   |
| 12       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 13       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 14       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 15       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 16       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 17       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | T3                 |
| 18       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 250              | 400    | 400 | NFC-1                       | G5, T2             |
| 19       | ...                  | 31    | 32                         | 15                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-1                       | G14, T4, W10       |
| 20       | 2 < NPS ≤ 12         | 31    | 36                         | 30                       | 400                                                                                        | 400              | 400    | 400 | NFC-6                       | G1, G9, W3         |
| 21       | All                  | 31    | 36                         | 30                       | 400                                                                                        | 400 (Cl. 3 only) | 400    | 400 | NFC-6                       | G1, G9, W3         |
| 22       | ...                  | 31    | 36                         | 30                       | NP                                                                                         | 400              | 400    | 400 | NFC-6                       | G9, W3             |
| 23       | ...                  | 31    | 36                         | 30                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | NP  | NFC-6                       | G9, W3             |
| 24       | ...                  | 31    | 36                         | 30                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFC-6                       | G9, W3             |
| 25       | 1/8 < NPS ≤ 2        | 31    | 45                         | 40                       | 400                                                                                        | 300              | 400    | 400 | NFC-6                       | G1, G6, G9, T4, W3 |
| 26       | <4                   | 31    | 45                         | 40                       | 400                                                                                        | 350 (Cl. 3 only) | 400    | 400 | NFC-6                       | G1, G6, G9, T4, W3 |
| 27       | ...                  | 31    | 45                         | 40                       | NP                                                                                         | 300              | 400    | 400 | NFC-6                       | G6, G9, T4, W3     |
| 28       | ...                  | 31    | 45                         | 40                       | NP                                                                                         | NP               | 400    | NP  | NFC-6                       | G6, G9, T4, W3     |
| 29       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 30       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 31       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 32       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 33       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | G33, T3, W3        |
| 34       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300              | 400    | 400 | NFC-1                       | T3                 |
| 35       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 250              | 400    | 400 | NFC-1                       | G5, T2             |
| 36       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 300 (Cl. 3 only) | NP     | NP  | NFC-1                       | ...                |
| 37       | ...                  | 31    | 30                         | 10                       | NP                                                                                         | 250 (Cl. 3 only) | NP     | NP  | NFC-1                       | G5                 |
| 38       | ...                  | 31    | 36                         | 30                       | NP                                                                                         | 400              | 400    | 400 | NFC-6                       | G9, W3             |
| 39       | ...                  | 31    | 36                         | 30                       | NP                                                                                         | 400 (Cl. 3 only) | 400    | 400 | NFC-6                       | G9, W3             |
| 40       | ...                  | 31    | 45                         | 40                       | NP                                                                                         | 300              | 400    | 400 | NFC-6                       | G6, G9, T4, W3     |
| 41       | ...                  | 31    | 38                         | 12                       | NP                                                                                         | NP               | 300    | 300 | NFC-1                       | ...                |
| 42       | ...                  | 31    | 38                         | 12                       | NP                                                                                         | NP               | 300    | 300 | NFC-1                       | G5, T2             |
| 43       | ...                  | 31    | 38                         | 12                       | NP                                                                                         | NP               | 300    | 300 | NFC-1                       | ...                |
| 44       | ...                  | 31    | 38                         | 12                       | NP                                                                                         | NP               | 300    | 300 | NFC-1                       | G5, T2             |
| 45       | ...                  | 31    | 45                         | 15                       | NP                                                                                         | NP               | 400    | 400 | NFC-5                       | G14, T4, W11       |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 6.0                                                                                                      | 5.3  | 5.3  | 5.3  | 5.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 6.0                                                                                                      | 6.0  | 6.0  | 6.0  | 6.0  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 5.1                                                                                                      | 4.5  | 4.5  | 4.5  | 4.5  | 3.8  | 2.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 5.1                                                                                                      | 5.1  | 5.1  | 5.1  | 5.1  | 3.8  | 2.5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | 6.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 7.8                                                                                                      | 7.8  | 7.8  | 7.8  | 7.5  | 7.3  | 2.6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | 6.3  | 4.4  | 3.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 6.7                                                                                                      | 5.9  | 5.9  | 5.9  | 5.8  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 6.7                                                                                                      | 6.7  | 6.7  | 6.7  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 10.3                                                                                                     | 10.3 | 10.3 | 10.3 | 10.0 | 9.7  | 9.4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 12.9                                                                                                     | 12.9 | 12.9 | 12.9 | 12.5 | 11.8 | 4.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 8.0                                                                                                      | 7.1  | 6.7  | 6.4  | 6.2  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 6.3  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 8.0                                                                                                      | 7.1  | 6.7  | 6.4  | 6.2  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 6.3  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 8.5                                                                                                      | 8.4  | 8.3  | 8.1  | 7.8  | 7.6  | 6.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form         | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|----------------------|-----------|------------|----------------------------|----------------------------|
| 1        | ...                 | Wld. cond. tube      | SB-543    | ...        | C19400                     | W061                       |
| 2        | ...                 | Wld. cond. tube      | SB-543    | ...        | C19400                     | WC55                       |
| (25) 3   | ...                 | Smls. pipe           | SB-43     | ...        | C23000                     | O61                        |
| (25) 4   | ...                 | Smls. pipe           | SB-43     | ...        | C23000                     | H58                        |
| 5        | ...                 | Smls. cond. tube     | SB-111    | ...        | C23000                     | O61                        |
| (25) 6   | ...                 | Smls. tube           | SB-135    | ...        | C23000                     | O50                        |
| (25) 7   | ...                 | Smls. red brass tube | SB-135    | ...        | C23000                     | O60                        |
| 8        | ...                 | Smls. tube           | SB-395    | ...        | C23000                     | O61                        |
| 9        | ...                 | Wld. cond. tube      | SB-543    | ...        | C23000                     | W061                       |
| 10       | ...                 | Wld. cond. tube      | SB-543    | ...        | C23000                     | WC55                       |
| 11       | ...                 | Smls. tube           | SB-111    | ...        | C28000                     | O61                        |
| 12       | ...                 | Plate                | SB-171    | ...        | C36500                     | M10, M20                   |
| 13       | ...                 | Plate                | SB-171    | ...        | C36500                     | O20, O25                   |
| 14       | ...                 | Plate                | SB-171    | ...        | C36500                     | M10, M20                   |
| 15       | ...                 | Plate                | SB-171    | ...        | C36500                     | O20, O25                   |
| (25) 16  | ...                 | Plate, sheet         | SB-171    | ...        | C36500                     | M10, M20                   |
| (25) 17  | ...                 | Plate, sheet         | SB-171    | ...        | C36500                     | O20, O25                   |
| (25) 18  | ...                 | Forgings             | SB-283    | ...        | C37700                     | M10, O20                   |
| (25) 19  | ...                 | Forgings             | SB-283    | ...        | C37700                     | M10, O20                   |
| (25) 20  | ...                 | Forgings             | SB-283    | ...        | C37700                     | M10, O20                   |
| (25) 21  | ...                 | Forgings             | SB-283    | ...        | C37700                     | M10, O20                   |
| (25) 22  | ...                 | Smls. cond. tube     | SB-111    | ...        | C44300                     | O61                        |
| (25) 23  | ...                 | Plate, sheet         | SB-171    | ...        | C44300                     | M10, M20                   |
| (25) 24  | ...                 | Plate, sheet         | SB-171    | ...        | C44300                     | O20, O25                   |
| (25) 25  | ...                 | Finned tube          | SB-359    | ...        | C44300                     | O61                        |
| 26       | ...                 | Smls. U-bend tube    | SB-395    | ...        | C44300                     | O61                        |
| 27       | ...                 | Wld. cond. tube      | SB-543    | ...        | C44300                     | W061                       |
| (25) 28  | ...                 | Smls. cond. tube     | SB-111    | ...        | C44400                     | O61                        |
| (25) 29  | ...                 | Plate, sheet         | SB-171    | ...        | C44400                     | M10, M20                   |
| (25) 30  | ...                 | Plate, sheet         | SB-171    | ...        | C44400                     | O20, O25                   |
| (25) 31  | ...                 | Finned tube          | SB-359    | ...        | C44400                     | O61                        |
| 32       | ...                 | Smls. U-bend tube    | SB-395    | ...        | C44400                     | O61                        |
| 33       | ...                 | Wld. cond. tube      | SB-543    | ...        | C44400                     | W061                       |
| (25) 34  | ...                 | Smls. cond. tube     | SB-111    | ...        | C44500                     | O61                        |
| (25) 35  | ...                 | Plate, sheet         | SB-171    | ...        | C44500                     | M10, M20                   |
| (25) 36  | ...                 | Plate, sheet         | SB-171    | ...        | C44500                     | O20, O25                   |
| (25) 37  | ...                 | Finned tube          | SB-359    | ...        | C44500                     | O61                        |
| 38       | ...                 | Smls. U-bend tube    | SB-395    | ...        | C44500                     | O61                        |
| 39       | ...                 | Wld. cond. tube      | SB-543    | ...        | C44500                     | W061                       |
| 40       | ...                 | Plate                | SB-171    | ...        | C46400                     | M10, M20                   |
| 41       | ...                 | Plate                | SB-171    | ...        | C46400                     | O20, O25                   |
| (25) 42  | ...                 | Plate, sheet         | SB-171    | ...        | C46400                     | M10, M20                   |
| (25) 43  | ...                 | Plate, sheet         | SB-171    | ...        | C46400                     | O20, O25                   |
| 44       | ...                 | Plate                | SB-171    | ...        | C46500                     | M10, M20                   |
| 45       | ...                 | Plate                | SB-171    | ...        | C46500                     | O20, O25                   |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
 (\*See Maximum Temperature Limits for Restrictions on Class)

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes             |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|-------------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                   |
| 1        | ...                  | 31    | 45                         | 15                       | NP                                                                                         | NP               | 400    | 400 | NFC-5                       | G5, G14, T3, W11  |
| 2        | ...                  | 31    | 45                         | 22                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-5                       | G14, T3, W10      |
| 3        | ...                  | 32    | 40                         | 12                       | 450                                                                                        | 300 (Cl. 3 only) | 450    | 450 | NFC-1                       | T3                |
| 4        | ...                  | 32    | 44                         | 18                       | 450                                                                                        | 300 (Cl. 3 only) | 450    | 450 | NFC-1                       | G33, T3, W3       |
| 5        | ...                  | 32    | 40                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-1                       | T3                |
| 6        | ...                  | 32    | 40                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | NP     | NP  | NFC-1                       | ...               |
| 7        | ...                  | 32    | 40                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-1                       | T3                |
| 8        | ...                  | 32    | 40                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-1                       | T3                |
| 9        | ...                  | 32    | 40                         | 12                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-1                       | G14, T3, W11      |
| 10       | ...                  | 32    | 42                         | 20                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-2                       | G14, G33, T3, W10 |
| 11       | ...                  | 32    | 50                         | 20                       | 400                                                                                        | 350 (Cl. 3 only) | 400    | 400 | NFC-3                       | G1, G6, T3        |
| 12       | $3.5 < t \leq 5$     | 32    | 40                         | 12                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFC-2                       | G7, T4            |
| 13       | $3.5 < t \leq 5$     | 32    | 40                         | 12                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFC-2                       | G7, T4            |
| 14       | $2 < t \leq 3.5$     | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFC-2                       | T4                |
| 15       | $2 < t \leq 3.5$     | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFC-2                       | T4                |
| 16       | $\leq 2$             | 32    | 50                         | 20                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |
| 17       | $\leq 2$             | 32    | 50                         | 20                       | NP                                                                                         | 350 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |
| 18       | $> 1\frac{1}{2}$     | ...   | 46                         | 15                       | NP                                                                                         | NP               | 400    | 400 | NFC-2                       | G17, T2, W14      |
| 19       | $> 1\frac{1}{2}$     | ...   | 46                         | 15                       | NP                                                                                         | NP               | 400    | 400 | NFC-2                       | G5, G17, T1, W14  |
| 20       | $\leq 1\frac{1}{2}$  | ...   | 50                         | 18                       | NP                                                                                         | NP               | 400    | 400 | NFC-2                       | G17, T1, W14      |
| 21       | $\leq 1\frac{1}{2}$  | ...   | 50                         | 18                       | NP                                                                                         | NP               | 400    | 400 | NFC-2                       | G5, G17, T1, W14  |
| 22       | ...                  | 32    | 45                         | 15                       | 450                                                                                        | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | G6, T4            |
| 23       | $\leq 4$             | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 24       | $\leq 4$             | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 25       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | NP  | NFC-2                       | G6, T4            |
| 26       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 27       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | NP               | 450    | 450 | NFC-2                       | G7, G14, T4, W11  |
| 28       | ...                  | 32    | 45                         | 15                       | 450                                                                                        | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | G6, T4            |
| 29       | $\leq 4$             | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 30       | $\leq 4$             | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 31       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | NP  | NFC-2                       | G6, T4            |
| 32       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 33       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | NP               | 450    | 450 | NFC-2                       | G7, G14, T4, W11  |
| 34       | ...                  | 32    | 45                         | 15                       | 450                                                                                        | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | G6, T4            |
| 35       | $\leq 4$             | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 36       | $\leq 4$             | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 37       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | NP  | NFC-2                       | G6, T4            |
| 38       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | 350 (Cl. 3 only) | 450    | 450 | NFC-2                       | T4                |
| 39       | ...                  | 32    | 45                         | 15                       | NP                                                                                         | NP               | 450    | 450 | NFC-2                       | G7, G14, T4, W11  |
| 40       | $3 < t \leq 5$       | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |
| 41       | $3 < t \leq 5$       | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |
| 42       | $\leq 3$             | 32    | 50                         | 20                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |
| 43       | $\leq 3$             | 32    | 50                         | 20                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |
| 44       | $3 < t \leq 5$       | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |
| 45       | $3 < t \leq 5$       | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3                |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 7.7  | 6.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 10.9                                                                                                     | 10.9 | 10.9 | 10.6 | 10.1 | 7.7  | 6.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 3        | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 7.0  | 5.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 7.0  | 5.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 7.0  | 5.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 7.0  | 5.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 7.0  | 5.0 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 6.8                                                                                                      | 6.8  | 6.8  | 6.8  | 6.8  | 6.0  | 4.3 | 1.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 6.8                                                                                                      | 6.8  | 6.8  | 6.8  | 6.8  | 6.0  | 4.3 | 1.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 10.8 | 5.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 8.0  | 5.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 8.0  | 5.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 10.8 | 5.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 10.8 | 5.3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 10.0                                                                                                     | 8.3  | 8.3  | 8.3  | 5.3  | 3.1  | 1.8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 19       | 10.0                                                                                                     | 10.0 | 10.0 | 8.6  | 5.3  | 3.1  | 1.8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 20       | 12.0                                                                                                     | 10.0 | 10.0 | 8.6  | 5.3  | 3.1  | 1.8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 21       | 12.0                                                                                                     | 12.0 | 12.0 | 8.6  | 5.3  | 3.1  | 1.8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 22       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 23       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 24       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 25       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 26       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 27       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 4.5 | 1.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 28       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 29       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 30       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 31       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 32       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 33       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 4.5 | 1.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 34       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 35       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 36       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 37       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 38       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.3 | 2.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 39       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 4.5 | 1.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 40       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 6.4  | 2.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 41       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 6.4  | 2.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 42       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 6.4  | 2.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 43       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 6.4  | 2.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 44       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 6.4  | 2.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 6.4  | 2.7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form             | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|--------------------------|-----------|------------|----------------------------|----------------------------|
| (25) 1   | ...                 | Plate, sheet             | SB-171    | ...        | C46500                     | M10, M20                   |
| (25) 2   | ...                 | Plate, sheet             | SB-171    | ...        | C46500                     | O20, O25                   |
| 3        | ...                 | Smls. cond. tube         | SB-111    | ...        | C60800                     | O61                        |
| 4        | ...                 | Smls. cond. tube         | SB-111    | ...        | C60800                     | O61                        |
| (25) 5   | ...                 | Smls. U-bend tube        | SB-395    | ...        | C60800                     | O61                        |
| (25) 6   | ...                 | Smls. U-bend tube        | SB-395    | ...        | C60800                     | O61                        |
| (25) 7   | ...                 | Plate                    | SB-171    | ...        | C61400                     | M10, M20, O20, O25         |
| (25) 8   | ...                 | ...                      | ...       | ...        | ...                        | ...                        |
| (25) 9   | ...                 | Plate, sheet, bar        | SB-169    | ...        | C61400                     | M20, O25, O60              |
| (25) 10  | ...                 | Plate                    | SB-171    | ...        | C61400                     | M10, M20, O20, O25         |
| (25) 11  | ...                 | ...                      | ...       | ...        | ...                        | ...                        |
| (25) 12  | ...                 | Plate, sheet, bar        | SB-169    | ...        | C61400                     | M20, O25, O60              |
| (25) 13  | ...                 | Plate, sheet, bar        | SB-169    | ...        | C61400                     | M20, O25, O60              |
| (25) 14  | ...                 | Plate                    | SB-171    | ...        | C63000                     | M10, M20, O20, O25         |
| (25) 15  | ...                 | ...                      | ...       | ...        | ...                        | ...                        |
| (25) 16  | ...                 | Plate                    | SB-171    | ...        | C63000                     | M10, M20, O20, O25         |
| (25) 17  | ...                 | ...                      | ...       | ...        | ...                        | ...                        |
| (25) 18  | ...                 | Plate                    | SB-171    | ...        | C63000                     | M10, M20, O20, O25         |
| (25) 19  | ...                 | ...                      | ...       | ...        | ...                        | ...                        |
| (25) 20  | ...                 | Forgings                 | SB-283    | ...        | C64200                     | M10, O20                   |
| (25) 21  | ...                 | Forgings                 | SB-283    | ...        | C64200                     | M10, O20                   |
| (25) 22  | ...                 | Forgings                 | SB-283    | ...        | C64200                     | M10, O20                   |
| (25) 23  | ...                 | Forgings                 | SB-283    | ...        | C64200                     | M10, O20                   |
| 24       | ...                 | Bar, rod                 | SB-98     | ...        | C65100                     | O60                        |
| 25       | ...                 | Bar, rod                 | SB-98     | ...        | C65100                     | O60                        |
| 26       | ...                 | Bar, rod                 | SB-98     | ...        | C65100                     | H02                        |
| 27       | ...                 | Bar, rod                 | SB-98     | ...        | C65100                     | H02                        |
| (25) 28  | ...                 | Smls. pipe & tube        | SB-315    | ...        | C65500                     | O30, O61                   |
| (25) 29  | ...                 | Smls. pipe & tube        | SB-315    | ...        | C65500                     | O30, O61                   |
| (25) 30  | ...                 | Plate, sheet, strip, bar | SB-96     | ...        | C65500                     | O61                        |
| (25) 31  | ...                 | Plate, sheet, strip, bar | SB-96     | ...        | C65500                     | O61                        |
| 32       | ...                 | Bar, rod                 | SB-98     | ...        | C65500                     | O60                        |
| 33       | ...                 | Bar, rod                 | SB-98     | ...        | C65500                     | O60                        |
| 34       | ...                 | Bar, rod                 | SB-98     | ...        | C65500                     | H02                        |
| 35       | ...                 | Bar, rod                 | SB-98     | ...        | C66100                     | O60                        |
| 36       | ...                 | Bar, rod                 | SB-98     | ...        | C66100                     | O60                        |
| 37       | ...                 | Bar, rod                 | SB-98     | ...        | C66100                     | H02                        |
| 38       | ...                 | Smls. cond. tube         | SB-111    | ...        | C68700                     | O61                        |
| 39       | ...                 | Smls. cond. tube         | SB-111    | ...        | C68700                     | O61                        |
| 40       | ...                 | Smls. U-bend tube        | SB-395    | ...        | C68700                     | O61                        |
| 41       | ...                 | Smls. U-bend tube        | SB-395    | ...        | C68700                     | O61                        |
| 42       | ...                 | Wld. cond. tube          | SB-543    | ...        | C68700                     | W061                       |
| 43       | ...                 | Wld. cond. tube          | SB-543    | ...        | C68700                     | W061                       |
| 44       | ...                 | Smls. cond. tube         | SB-111    | ...        | C70400                     | O61                        |
| 45       | ...                 | Wld. tube                | SB-543    | ...        | C70400                     | W061                       |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes            |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|------------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                  |
| 1        | ≤3                   | 32    | 50                         | 20                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3               |
| 2        | ≤3                   | 32    | 50                         | 20                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | T3               |
| 3        | ...                  | 35    | 50                         | 19                       | NP                                                                                         | 300 (Cl. 3 only) | 500    | 500 | NFC-2                       | G6, T3           |
| 4        | ...                  | 35    | 50                         | 19                       | NP                                                                                         | 300 (Cl. 3 only) | 500    | 500 | NFC-2                       | G5, G6, T3       |
| 5        | ...                  | 35    | 50                         | 19                       | NP                                                                                         | 300 (Cl. 3 only) | 500    | 500 | NFC-2                       | G6, T3           |
| 6        | ...                  | 35    | 50                         | 19                       | NP                                                                                         | 300 (Cl. 3 only) | 500    | 500 | NFC-2                       | G5, G6, T3       |
| 7        | 2 < t ≤ 5            | 35    | 65                         | 28                       | NP                                                                                         | 500 (Cl. 3 only) | 500    | 500 | NFC-8                       | ...              |
| 8        | ...                  | ...   | ...                        | ...                      | ...                                                                                        | ...              | ...    | ... | ...                         | ...              |
| 9        | 2 < t ≤ 5            | 35    | 65                         | 28                       | NP                                                                                         | 500 (Cl. 3 only) | 500    | 500 | NFC-8                       | ...              |
| 10       | ≤2                   | 35    | 70                         | 30                       | NP                                                                                         | 500 (Cl. 3 only) | 500    | 500 | NFC-8                       | ...              |
| 11       | ...                  | ...   | ...                        | ...                      | ...                                                                                        | ...              | ...    | ... | ...                         | ...              |
| 12       | 1/2 < t ≤ 2          | 35    | 70                         | 30                       | NP                                                                                         | 500 (Cl. 3 only) | 500    | 500 | NFC-8                       | ...              |
| 13       | ≤1/2                 | 35    | 72                         | 32                       | NP                                                                                         | 450 (Cl. 3 only) | 500    | 500 | NFC-8                       | ...              |
| 14       | 3.5 < t ≤ 5          | 35    | 80                         | 30                       | NP                                                                                         | 500 (Cl. 3 only) | 700    | 650 | NFC-8                       | T6               |
| 15       | ...                  | ...   | ...                        | ...                      | ...                                                                                        | ...              | ...    | ... | ...                         | ...              |
| 16       | 2 < t ≤ 3.5          | 35    | 85                         | 33                       | NP                                                                                         | 500 (Cl. 3 only) | 700    | 650 | NFC-8                       | T6               |
| 17       | ...                  | ...   | ...                        | ...                      | ...                                                                                        | ...              | ...    | ... | ...                         | ...              |
| 18       | ≤2                   | 35    | 90                         | 36                       | NP                                                                                         | 500 (Cl. 3 only) | 700    | 650 | NFC-8                       | T6               |
| 19       | ...                  | ...   | ...                        | ...                      | ...                                                                                        | ...              | ...    | ... | ...                         | ...              |
| 20       | >1 1/2               | ...   | 68                         | 23                       | NP                                                                                         | NP               | 500    | 500 | NFC-3                       | G10, T4, W14     |
| 21       | >1 1/2               | ...   | 68                         | 23                       | NP                                                                                         | NP               | 500    | 500 | NFC-3                       | G5, G10, T4, W14 |
| 22       | ≤1 1/2               | ...   | 70                         | 25                       | NP                                                                                         | NP               | 500    | 500 | NFC-3                       | G10, T4, W14     |
| 23       | ≤1 1/2               | ...   | 70                         | 25                       | NP                                                                                         | NP               | 500    | 500 | NFC-3                       | G5, G10, T4, W14 |
| 24       | All                  | 33    | 40                         | 12                       | NP                                                                                         | 300              | 350    | 350 | NFC-1                       | G17              |
| 25       | All                  | 33    | 40                         | 12                       | NP                                                                                         | 300              | 350    | 350 | NFC-1                       | G5, G17          |
| 26       | ≤2                   | 33    | 55                         | 20                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G17, W3          |
| 27       | ≤2                   | 33    | 55                         | 20                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G5, G17, W3      |
| 28       | ...                  | 33    | 50                         | 15                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | G17, T4          |
| 29       | ...                  | 33    | 50                         | 15                       | NP                                                                                         | 300 (Cl. 3 only) | 400    | 400 | NFC-2                       | G5, G17, T4      |
| 30       | ≤2                   | 33    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 350    | 350 | NFC-2                       | G17, T3          |
| 31       | ≤2                   | 33    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 350    | 350 | NFC-2                       | G5, G17, T3      |
| 32       | All                  | 33    | 52                         | 15                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G17              |
| 33       | All                  | 33    | 52                         | 15                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G5, G17          |
| 34       | ≤2                   | 33    | 70                         | 38                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G17, W3          |
| 35       | All                  | 33    | 52                         | 15                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G17              |
| 36       | All                  | 33    | 52                         | 15                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G5, G17          |
| 37       | ≤2                   | 33    | 70                         | 38                       | NP                                                                                         | 300              | 350    | 350 | NFC-2                       | G17, W3          |
| 38       | ...                  | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-2                       | T3               |
| 39       | ...                  | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-2                       | G5, T3           |
| 40       | ...                  | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-2                       | T3               |
| 41       | ...                  | 32    | 50                         | 18                       | NP                                                                                         | 300 (Cl. 3 only) | 450    | 450 | NFC-2                       | G5, T3           |
| 42       | ...                  | 32    | 50                         | 18                       | NP                                                                                         | NP               | 450    | 450 | NFC-2                       | G14, T3, W11     |
| 43       | ...                  | 32    | 50                         | 18                       | NP                                                                                         | NP               | 450    | 450 | NFC-2                       | G5, G14, T3, W11 |
| 44       | ...                  | 34    | 38                         | 12                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFC-2                       | ...              |
| 45       | ...                  | 34    | 38                         | 12                       | NP                                                                                         | NP               | 150    | 150 | NFC-2                       | G14, W11         |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500  | 550  | 600  | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 6.4  | 2.7  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 2        | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 6.4  | 2.7  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 3        | 12.7                                                                                                     | 12.2 | 12.2 | 12.2 | 12.0 | 10.0 | 6.0  | 4.0  | 2.0  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 4        | 12.7                                                                                                     | 12.7 | 12.7 | 12.7 | 12.7 | 10.0 | 6.0  | 4.0  | 2.0  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 5        | 12.7                                                                                                     | 12.2 | 12.2 | 12.2 | 12.0 | 10.0 | 6.0  | 4.0  | 2.0  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 6        | 12.7                                                                                                     | 12.7 | 12.7 | 12.7 | 12.7 | 10.0 | 6.0  | 4.0  | 2.0  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 7        | 18.6                                                                                                     | 18.6 | 18.5 | 18.3 | 18.2 | 18.1 | 17.9 | 17.5 | 17.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 9        | 18.6                                                                                                     | 18.6 | 18.5 | 18.3 | 18.2 | 18.1 | 17.9 | 17.5 | 17.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 10       | 20.0                                                                                                     | 19.9 | 19.8 | 19.7 | 19.5 | 19.4 | 19.2 | 18.9 | 18.3 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 12       | 20.0                                                                                                     | 19.9 | 19.8 | 19.7 | 19.5 | 19.4 | 19.2 | 18.9 | 18.3 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 13       | 20.6                                                                                                     | 20.6 | 20.6 | 20.6 | 20.6 | 20.6 | 20.2 | 19.4 | 18.8 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 14       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 19.9 | 19.7 | 16.0 | 12.0 | 8.6 | 6.0 | ... | ... | ... | ... | ... |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 16       | 22.0                                                                                                     | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 21.9 | 21.7 | 16.0 | 12.0 | 8.6 | 6.0 | ... | ... | ... | ... | ... |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 18       | 24.0                                                                                                     | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 23.9 | 23.6 | 16.0 | 12.0 | 8.6 | 6.0 | ... | ... | ... | ... | ... |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 20       | 15.3                                                                                                     | 14.4 | 14.2 | 14.1 | 14.1 | 14.1 | 11.0 | 7.5  | 5.2  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 21       | 15.3                                                                                                     | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 11.0 | 7.5  | 5.2  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 22       | 16.7                                                                                                     | 16.7 | 15.6 | 15.4 | 15.4 | 15.4 | 11.0 | 7.5  | 5.2  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 23       | 16.7                                                                                                     | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 11.0 | 7.5  | 5.2  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 24       | 8.0                                                                                                      | 7.9  | 7.9  | 7.8  | 7.8  | 7.7  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 25       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 8.0  | 8.0  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 26       | 13.3                                                                                                     | 13.3 | 13.2 | 12.9 | 12.5 | 12.0 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 27       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 28       | 10.0                                                                                                     | 10.0 | 9.9  | 9.9  | 9.9  | 9.8  | 6.8  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 29       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 6.8  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 30       | 12.0                                                                                                     | 12.0 | 11.9 | 11.9 | 11.9 | 10.7 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 31       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 10.7 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 32       | 10.0                                                                                                     | 10.0 | 9.9  | 9.9  | 9.9  | 9.8  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 33       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 34       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 35       | 10.0                                                                                                     | 10.0 | 9.9  | 9.9  | 9.9  | 9.8  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 36       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 37       | 20.0                                                                                                     | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 38       | 12.0                                                                                                     | 11.9 | 11.8 | 11.7 | 11.6 | 6.5  | 3.3  | 1.8  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 39       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 6.5  | 3.3  | 1.8  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 40       | 12.0                                                                                                     | 11.9 | 11.8 | 11.7 | 11.6 | 6.5  | 3.3  | 1.8  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 41       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 6.5  | 3.3  | 1.8  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 42       | 10.2                                                                                                     | 10.1 | 10.0 | 9.9  | 9.9  | 5.5  | 2.7  | 1.4  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 43       | 10.2                                                                                                     | 10.2 | 10.2 | 10.2 | 10.2 | 5.5  | 2.7  | 1.4  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 44       | 8.0                                                                                                      | 8.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |
| 45       | 6.8                                                                                                      | 6.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |      |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form      | Spec. No. | Type/Grade | Alloy<br>Design./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|-------------------|-----------|------------|-----------------------------|----------------------------|
| 1        | ...                 | Smls. cond. tube  | SB-111    | ...        | C70400                      | H55                        |
| 2        | ...                 | Smls. pipe & tube | SB-466    | ...        | C70600                      | O60                        |
| 3        | ...                 | Smls. pipe & tube | SB-466    | ...        | C70600                      | O60                        |
| 4        | ...                 | Wld. pipe         | SB-467    | ...        | C70600                      | W061                       |
| 5        | ...                 | Wld. pipe         | SB-467    | ...        | C70600                      | W061                       |
| 6        | ...                 | Bar, rod          | SB-151    | ...        | C70600                      | O60                        |
| 7        | ...                 | Bar, rod          | SB-151    | ...        | C70600                      | O60                        |
| 8        | ...                 | Plate             | SB-171    | ...        | C70600                      | M10, M20                   |
| 9        | ...                 | Plate             | SB-171    | ...        | C70600                      | M10, M20                   |
| 10       | ...                 | Plate, sheet      | SB-171    | ...        | C70600                      | M10, M20                   |
| 11       | ...                 | Plate, sheet      | SB-171    | ...        | C70600                      | M10, M20                   |
| 12       | ...                 | Plate             | SB-171    | ...        | C70600                      | M10, M20                   |
| 13       | ...                 | Plate             | SB-171    | ...        | C70600                      | M10, M20                   |
| 14       | ...                 | Plate             | SB-171    | ...        | C70600                      | O20, O25                   |
| 15       | ...                 | Plate             | SB-171    | ...        | C70600                      | O20, O25                   |
| 16       | ...                 | Plate, sheet      | SB-171    | ...        | C70600                      | O20, O25                   |
| 17       | ...                 | Plate, sheet      | SB-171    | ...        | C70600                      | O20, O25                   |
| 18       | ...                 | Plate             | SB-171    | ...        | C70600                      | O20, O25                   |
| 19       | ...                 | Plate             | SB-171    | ...        | C70600                      | O20, O25                   |
| 20       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70600                      | O61                        |
| 21       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70600                      | O61                        |
| 22       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70600                      | O61                        |
| 23       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70600                      | O61                        |
| 24       | ...                 | Finned tube       | SB-359    | ...        | C70600                      | O61                        |
| 25       | ...                 | Finned tube       | SB-359    | ...        | C70600                      | O61                        |
| 26       | ...                 | Smls. U-bend tube | SB-395    | ...        | C70600                      | O61                        |
| 27       | ...                 | Smls. U-bend tube | SB-395    | ...        | C70600                      | O61                        |
| 28       | ...                 | Wld. pipe         | SB-467    | ...        | C70600                      | W061                       |
| 29       | ...                 | Wld. pipe         | SB-467    | ...        | C70600                      | W061                       |
| 30       | ...                 | Wld. tube         | SB-543    | ...        | C70600                      | W061                       |
| 31       | ...                 | Wld. tube         | SB-543    | ...        | C70600                      | W061                       |
| 32       | ...                 | Finned wld. tube  | SB-956    | ...        | C70600                      | W061                       |
| 33       | ...                 | Finned wld. tube  | SB-956    | ...        | C70600                      | W061                       |
| 34       | ...                 | Wld. pipe         | SB-467    | ...        | C70600                      | WM50                       |
| 35       | ...                 | Smls. tube        | SB-111    | ...        | C70600                      | H55                        |
| 36       | ...                 | Smls. pipe & tube | SB-466    | ...        | C70600                      | H55                        |
| 37       | ...                 | Wld. tube         | SB-543    | ...        | C70600                      | WC55                       |
| 38       | ...                 | Finned wld. tube  | SB-956    | ...        | C70600                      | WC55                       |
| 39       | ...                 | Wld. pipe         | SB-467    | ...        | C70600                      | Wld. fr. cold rld. strip   |
| 40       | ...                 | Smls. pipe & tube | SB-466    | ...        | C70620                      | O60                        |
| 41       | ...                 | Smls. pipe & tube | SB-466    | ...        | C70620                      | O60                        |
| 42       | ...                 | Wld. pipe         | SB-467    | ...        | C70620                      | W061                       |
| 43       | ...                 | Wld. pipe         | SB-467    | ...        | C70620                      | W061                       |
| 44       | ...                 | Bar, rod          | SB-151    | ...        | C70620                      | O60                        |
| 45       | ...                 | Bar, rod          | SB-151    | ...        | C70620                      | O60                        |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in.           | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes                  |
|----------|--------------------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|------------------------|
|          |                                |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                        |
| 1        | ...                            | 34    | 40                         | 30                       | NP                                                                                         | 150 (Cl. 3 only) | 150    | 150 | NFC-2                       | G7, W3                 |
| 2        | ...                            | 34    | 38                         | 13                       | NP                                                                                         | 400              | 600    | 600 | NFC-3                       | T6                     |
| 3        | ...                            | 34    | 38                         | 13                       | NP                                                                                         | 400              | 600    | 600 | NFC-3                       | G5, T5                 |
| 4        | >4 <sup>1</sup> / <sub>2</sub> | 34    | 38                         | 13                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G34, T6, W11      |
| 5        | >4 <sup>1</sup> / <sub>2</sub> | 34    | 38                         | 13                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, G14, G34, T5, W11  |
| 6        | All                            | 34    | 38                         | 15                       | NP                                                                                         | 200              | NP     | NP  | NFC-3                       | ...                    |
| 7        | All                            | 34    | 38                         | 15                       | NP                                                                                         | 200              | NP     | NP  | NFC-3                       | G5                     |
| 8        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | ...                    |
| 9        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | G5                     |
| 10       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | ...                    |
| 11       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | G5                     |
| 12       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | T5                     |
| 13       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G5, T5                 |
| 14       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | ...                    |
| 15       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | G5                     |
| 16       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | ...                    |
| 17       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | G5                     |
| 18       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | T5                     |
| 19       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G5, T5                 |
| 20       | ...                            | 34    | 40                         | 15                       | 600                                                                                        | 400              | NP     | NP  | NFC-3                       | G1, T5                 |
| 21       | ...                            | 34    | 40                         | 15                       | 600                                                                                        | 400              | NP     | NP  | NFC-3                       | G1, G5, T5             |
| 22       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | T5                     |
| 23       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, T5                 |
| 24       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G1, T5                 |
| 25       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G1, G5, T5             |
| 26       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | T5                     |
| 27       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, T5                 |
| 28       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 29       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, G14, G34, T5, W11  |
| 30       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 31       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, G14, G34, T5, W11  |
| 32       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | NP  | NFC-3                       | G14, G34, T5, W11      |
| 33       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | NP  | NFC-3                       | G5, G14, G34, T5, W11  |
| 34       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 45                         | 30                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 35       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G33, T5, W3            |
| 36       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G33, T5, W3            |
| 37       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G33, G34, T5, W10 |
| 38       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | NP               | 600    | NP  | NFC-3                       | G14, G33, G34, T5, W10 |
| 39       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 54                         | 45                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 40       | ...                            | 34    | 38                         | 13                       | NP                                                                                         | 400              | 600    | 600 | NFC-3                       | T6                     |
| 41       | ...                            | 34    | 38                         | 13                       | NP                                                                                         | 400              | 600    | 600 | NFC-3                       | G5, T5                 |
| 42       | >4 <sup>1</sup> / <sub>2</sub> | 34    | 38                         | 13                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G34, T6, W11      |
| 43       | >4 <sup>1</sup> / <sub>2</sub> | 34    | 38                         | 13                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, G14, G34, T5, W11  |
| 44       | All                            | 34    | 38                         | 15                       | NP                                                                                         | 200              | NP     | NP  | NFC-3                       | ...                    |
| 45       | All                            | 34    | 38                         | 15                       | NP                                                                                         | 200              | NP     | NP  | NFC-3                       | G5                     |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500 | 550 | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 11.4                                                                                                     | 11.4 | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 2        | 8.7                                                                                                      | 8.4  | 8.2  | 8.0  | 7.8  | 7.7  | 7.5  | 7.4  | 7.3 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 3        | 8.7                                                                                                      | 8.7  | 8.7  | 8.7  | 8.7  | 8.7  | 8.7  | 8.7  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 4        | 7.4                                                                                                      | 7.2  | 7.0  | 6.8  | 6.7  | 6.5  | 6.4  | 6.3  | 6.2 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 5        | 7.4                                                                                                      | 7.4  | 7.4  | 7.4  | 7.4  | 7.4  | 7.4  | 7.4  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 6        | 10.0                                                                                                     | 9.7  | 9.5  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 10.0                                                                                                     | 10.0 | 10.0 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 8        | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 9        | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 11       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 13       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 14       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 16       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 17       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 18       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 19       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 20       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 21       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 22       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 23       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 24       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 25       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 26       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 27       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 28       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 29       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 30       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 31       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 32       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 33       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 34       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 35       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 36       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 37       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 38       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 39       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 40       | 8.7                                                                                                      | 8.4  | 8.2  | 8.0  | 7.8  | 7.7  | 7.5  | 7.4  | 7.3 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 41       | 8.7                                                                                                      | 8.7  | 8.7  | 8.7  | 8.7  | 8.7  | 8.7  | 8.7  | 8.0 | 7.0 | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 42       | 7.4                                                                                                      | 7.2  | 7.0  | 6.8  | 6.7  | 6.5  | 6.4  | 6.3  | 6.2 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 43       | 7.4                                                                                                      | 7.4  | 7.4  | 7.4  | 7.4  | 7.4  | 7.4  | 7.4  | 6.3 | 5.7 | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 44       | 10.0                                                                                                     | 9.7  | 9.5  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 45       | 10.0                                                                                                     | 10.0 | 10.0 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| No.  | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9    | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45   | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form      | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|-------------------|-----------|------------|----------------------------|----------------------------|
| 1        | ...                 | Forgings          | SB-283    | ...        | C70620                     | M10                        |
| 2        | ...                 | Forgings          | SB-283    | ...        | C70620                     | M10                        |
| 3        | ...                 | Plate             | SB-171    | ...        | C70620                     | M10, M20                   |
| 4        | ...                 | Plate             | SB-171    | ...        | C70620                     | M10, M20                   |
| 5        | ...                 | Plate, sheet      | SB-171    | ...        | C70620                     | M10, M20                   |
| 6        | ...                 | Plate, sheet      | SB-171    | ...        | C70620                     | M10, M20                   |
| 7        | ...                 | Plate             | SB-171    | ...        | C70620                     | M10, M20                   |
| 8        | ...                 | Plate             | SB-171    | ...        | C70620                     | M10, M20                   |
| 9        | ...                 | Forgings          | SB-283    | ...        | C70620                     | O20                        |
| 10       | ...                 | Forgings          | SB-283    | ...        | C70620                     | O20                        |
| 11       | ...                 | Plate             | SB-171    | ...        | C70620                     | O20, O25                   |
| 12       | ...                 | Plate             | SB-171    | ...        | C70620                     | O20, O25                   |
| 13       | ...                 | Plate, sheet      | SB-171    | ...        | C70620                     | O20, O25                   |
| 14       | ...                 | Plate, sheet      | SB-171    | ...        | C70620                     | O20, O25                   |
| 15       | ...                 | Plate             | SB-171    | ...        | C70620                     | O20, O25                   |
| 16       | ...                 | Plate             | SB-171    | ...        | C70620                     | O20, O25                   |
| 17       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70620                     | O61                        |
| 18       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70620                     | O61                        |
| 19       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70620                     | O61                        |
| 20       | ...                 | Smls. cond. tube  | SB-111    | ...        | C70620                     | O61                        |
| 21       | ...                 | Finned tube       | SB-359    | ...        | C70620                     | O61                        |
| 22       | ...                 | Finned tube       | SB-359    | ...        | C70620                     | O61                        |
| 23       | ...                 | Smls. U-bend tube | SB-395    | ...        | C70620                     | O61                        |
| 24       | ...                 | Smls. U-bend tube | SB-395    | ...        | C70620                     | O61                        |
| 25       | ...                 | Wld. pipe         | SB-467    | ...        | C70620                     | W061                       |
| 26       | ...                 | Wld. pipe         | SB-467    | ...        | C70620                     | W061                       |
| 27       | ...                 | Wld. tube         | SB-543    | ...        | C70620                     | W061                       |
| 28       | ...                 | Wld. tube         | SB-543    | ...        | C70620                     | W061                       |
| 29       | ...                 | Finned wld. tube  | SB-956    | ...        | C70620                     | W061                       |
| 30       | ...                 | Finned wld. tube  | SB-956    | ...        | C70620                     | W061                       |
| 31       | ...                 | Forgings          | SB-283    | ...        | C70620                     | M10                        |
| 32       | ...                 | Forgings          | SB-283    | ...        | C70620                     | M10                        |
| 33       | ...                 | Wld. pipe         | SB-467    | ...        | C70620                     | WM50                       |
| 34       | ...                 | Smls. tube        | SB-111    | ...        | C70620                     | H55                        |
| 35       | ...                 | Smls. pipe & tube | SB-466    | ...        | C70620                     | H55                        |
| 36       | ...                 | Wld. tube         | SB-543    | ...        | C70620                     | WC55                       |
| 37       | ...                 | Finned wld. tube  | SB-956    | ...        | C70620                     | WC55                       |
| 38       | ...                 | Wld. pipe         | SB-467    | ...        | C70620                     | Wld. fr. cold rld. strip   |
| 39       | ...                 | Smls. tube        | SB-466    | ...        | C71000                     | O60                        |
| 40       | ...                 | Smls. tube        | SB-466    | ...        | C71000                     | O60                        |
| 41       | ...                 | Smls. cond. tube  | SB-111    | ...        | C71000                     | O61                        |
| 42       | ...                 | Smls. cond. tube  | SB-111    | ...        | C71000                     | O61                        |
| 43       | ...                 | Finned tube       | SB-359    | ...        | C71000                     | O61                        |
| 44       | ...                 | Finned tube       | SB-359    | ...        | C71000                     | O61                        |
| 45       | ...                 | Smls. tube        | SB-395    | ...        | C71000                     | O61                        |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in.           | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes                  |
|----------|--------------------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|------------------------|
|          |                                |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                        |
| 1        | >6                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | T5                     |
| 2        | >6                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G5, T5                 |
| 3        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | ...                    |
| 4        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | G5                     |
| 5        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | ...                    |
| 6        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | G5                     |
| 7        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | T5                     |
| 8        | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G5, T5                 |
| 9        | ...                            | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | T5                     |
| 10       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G5, T5                 |
| 11       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | ...                    |
| 12       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 400              | NP     | NP  | NFC-3                       | G5                     |
| 13       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | ...                    |
| 14       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | NP     | NP  | NFC-3                       | G5                     |
| 15       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | T5                     |
| 16       | ≤5                             | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G5, T5                 |
| 17       | ...                            | 34    | 40                         | 15                       | 600                                                                                        | 400              | NP     | NP  | NFC-3                       | G1, T5                 |
| 18       | ...                            | 34    | 40                         | 15                       | 600                                                                                        | 400              | NP     | NP  | NFC-3                       | G1, G5, T5             |
| 19       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | T5                     |
| 20       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, T5                 |
| 21       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G1, T5                 |
| 22       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G1, G5, T5             |
| 23       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | T5                     |
| 24       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, T5                 |
| 25       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 26       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, G14, G34, T5, W11  |
| 27       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 28       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G5, G14, G34, T5, W11  |
| 29       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | NP  | NFC-3                       | G14, G34, T5, W11      |
| 30       | ...                            | 34    | 40                         | 15                       | NP                                                                                         | NP               | 600    | NP  | NFC-3                       | G5, G14, G34, T5, W11  |
| 31       | ≤6                             | 34    | 45                         | 18                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G34, T5                |
| 32       | ≤6                             | 34    | 45                         | 18                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G5, G34, T5            |
| 33       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 45                         | 30                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 34       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G33, T5, W3            |
| 35       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G33, T5, W3            |
| 36       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | 450 (Cl. 3 only) | 600    | 600 | NFC-3                       | G14, G33, G34, T5, W10 |
| 37       | ...                            | 34    | 45                         | 35                       | NP                                                                                         | NP               | 600    | NP  | NFC-3                       | G14, G33, G34, T5, W10 |
| 38       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 54                         | 45                       | NP                                                                                         | NP               | 600    | 600 | NFC-3                       | G14, G34, T5, W11      |
| 39       | ...                            | 34    | 45                         | 16                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-3                       | T7                     |
| 40       | ...                            | 34    | 45                         | 16                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-3                       | G5, T7                 |
| 41       | ...                            | 34    | 45                         | 16                       | 700                                                                                        | 700 (Cl. 3 only) | 700    | 650 | NFC-3                       | T7                     |
| 42       | ...                            | 34    | 45                         | 16                       | 700                                                                                        | 700 (Cl. 3 only) | 700    | 650 | NFC-3                       | G5, T7                 |
| 43       | ...                            | 34    | 45                         | 16                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | NP  | NFC-3                       | T7                     |
| 44       | ...                            | 34    | 45                         | 16                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | NP  | NFC-3                       | G5, T7                 |
| 45       | ...                            | 34    | 45                         | 16                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-3                       | T7                     |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500  | 550  | 600 | 650 | 700 | 750 | 800 | 850 | 900 | 950 |
| 1        | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 2        | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 3        | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 4        | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 5        | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 6        | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 7        | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 8        | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 9        | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 10       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 11       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 12       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 13       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 14       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | ...  | ...  | ... | ... | ... | ... | ... | ... | ... | ... |
| 15       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 16       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 17       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 18       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 19       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 20       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 21       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 22       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 23       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 24       | 10.0                                                                                                     | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 25       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 26       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 27       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 28       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 29       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 30       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 31       | 12.0                                                                                                     | 11.7 | 11.4 | 11.1 | 10.9 | 10.6 | 10.4 | 10.2 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 32       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 11.8 | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 33       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 34       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 35       | 10.0                                                                                                     | 9.7  | 9.5  | 9.3  | 9.0  | 8.8  | 8.7  | 8.5  | 8.0  | 7.0  | 6.0 | ... | ... | ... | ... | ... | ... | ... |
| 36       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 37       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 38       | 8.5                                                                                                      | 8.3  | 8.1  | 7.9  | 7.7  | 7.5  | 7.4  | 7.2  | 6.3  | 5.7  | 4.3 | ... | ... | ... | ... | ... | ... | ... |
| 39       | 10.7                                                                                                     | 10.4 | 10.2 | 10.0 | 9.7  | 9.4  | 9.2  | 8.9  | 8.7  | 8.5  | 8.4 | 7.7 | 7.0 | ... | ... | ... | ... | ... |
| 40       | 10.7                                                                                                     | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 8.4 | 7.7 | 7.0 | ... | ... | ... | ... | ... |
| 41       | 10.7                                                                                                     | 10.4 | 10.2 | 10.0 | 9.7  | 9.4  | 9.2  | 8.9  | 8.7  | 8.5  | 8.4 | 7.7 | 7.0 | ... | ... | ... | ... | ... |
| 42       | 10.7                                                                                                     | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 8.4 | 7.7 | 7.0 | ... | ... | ... | ... | ... |
| 43       | 10.7                                                                                                     | 10.4 | 10.2 | 10.0 | 9.7  | 9.4  | 9.2  | 8.9  | 8.7  | 8.5  | 8.4 | 7.7 | 7.0 | ... | ... | ... | ... | ... |
| 44       | 10.7                                                                                                     | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 8.4 | 7.7 | 7.0 | ... | ... | ... | ... | ... |
| 45       | 10.7                                                                                                     | 10.4 | 10.2 | 10.0 | 9.7  | 9.4  | 9.2  | 8.9  | 8.7  | 8.5  | 8.4 | 7.7 | 7.0 | ... | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form           | Spec. No. | Type/Grade | Alloy<br>Design./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|------------------------|-----------|------------|-----------------------------|----------------------------|
| 1        | ...                 | Smls. tube             | SB-395    | ...        | C71000                      | O61                        |
| 2        | ...                 | Wld. pipe              | SB-467    | ...        | C71500                      | W061                       |
| 3        | ...                 | Wld. pipe              | SB-467    | ...        | C71500                      | W061                       |
| 4        | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | M10, M20                   |
| 5        | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | M10, M20                   |
| 6        | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | O20, O25                   |
| 7        | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | O20, O25                   |
| 8        | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | M10, M20                   |
| 9        | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | M10, M20                   |
| 10       | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | O20, O25                   |
| 11       | ...                 | Plate, sheet           | SB-171    | ...        | C71500                      | O20, O25                   |
| 12       | ...                 | Wld. pipe              | SB-467    | ...        | C71500                      | W061                       |
| 13       | ...                 | Wld. pipe              | SB-467    | ...        | C71500                      | W061                       |
| 14       | ...                 | Smls. pipe & tube      | SB-466    | ...        | C71500                      | O60                        |
| 15       | ...                 | Smls. pipe & tube      | SB-466    | ...        | C71500                      | O60                        |
| 16       | ...                 | Smls. cond. tube       | SB-111    | ...        | C71500                      | O61                        |
| 17       | ...                 | Smls. cond. tube       | SB-111    | ...        | C71500                      | O61                        |
| 18       | ...                 | Finned tube            | SB-359    | ...        | C71500                      | O61                        |
| 19       | ...                 | Finned tube            | SB-359    | ...        | C71500                      | O61                        |
| 20       | ...                 | Smls. U-bend tube      | SB-395    | ...        | C71500                      | O61                        |
| 21       | ...                 | Smls. U-bend tube      | SB-395    | ...        | C71500                      | O61                        |
| 22       | ...                 | Wld. cond. tube        | SB-543    | ...        | C71500                      | W061                       |
| 23       | ...                 | Wld. cond. tube        | SB-543    | ...        | C71500                      | W061                       |
| 24       | ...                 | Finned wld. cond. tube | SB-956    | ...        | C71500                      | W061                       |
| 25       | ...                 | Finned wld. cond. tube | SB-956    | ...        | C71500                      | W061                       |
| 26       | ...                 | Smls. cond. tube       | SB-111    | ...        | C71500                      | HR50                       |
| 27       | ...                 | Smls. U-bend tube      | SB-395    | ...        | C71500                      | HR50                       |
| 28       | ...                 | Wld. pipe              | SB-467    | ...        | C71520                      | W061                       |
| 29       | ...                 | Wld. pipe              | SB-467    | ...        | C71520                      | W061                       |
| 30       | ...                 | Forgings               | SB-283    | ...        | C71520                      | M10                        |
| 31       | ...                 | Forgings               | SB-283    | ...        | C71520                      | M10                        |
| 32       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | M10, M20                   |
| 33       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | M10, M20                   |
| 34       | ...                 | Forgings               | SB-283    | ...        | C71520                      | O20                        |
| 35       | ...                 | Forgings               | SB-283    | ...        | C71520                      | O20                        |
| 36       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | O20, O25                   |
| 37       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | O20, O25                   |
| 38       | ...                 | Forgings               | SB-283    | ...        | C71520                      | M10                        |
| 39       | ...                 | Forgings               | SB-283    | ...        | C71520                      | M10                        |
| 40       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | M10, M20                   |
| 41       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | M10, M20                   |
| 42       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | O20, O25                   |
| 43       | ...                 | Plate, sheet           | SB-171    | ...        | C71520                      | O20, O25                   |
| 44       | ...                 | Wld. pipe              | SB-467    | ...        | C71520                      | W061                       |
| 45       | ...                 | Wld. pipe              | SB-467    | ...        | C71520                      | W061                       |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in.           | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes        |
|----------|--------------------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|--------------|
|          |                                |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |              |
| 1        | ...                            | 34    | 45                         | 16                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-3                       | G5, T7       |
| 2        | >4 <sup>1</sup> / <sub>2</sub> | 34    | 45                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-3                       | G14, W11     |
| 3        | >4 <sup>1</sup> / <sub>2</sub> | 34    | 45                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-3                       | G5, G14, W11 |
| 4        | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 5        | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 6        | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 7        | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 8        | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 9        | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 10       | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 11       | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 12       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 50                         | 20                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-4                       | G14          |
| 13       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 50                         | 20                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-4                       | G5, G14      |
| 14       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 15       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 16       | ...                            | 34    | 52                         | 18                       | 700                                                                                        | 700              | 700    | 650 | NFC-4                       | G1           |
| 17       | ...                            | 34    | 52                         | 18                       | 700                                                                                        | 700              | 700    | 650 | NFC-4                       | G1, G5       |
| 18       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | NP  | NFC-4                       | G1           |
| 19       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | NP  | NFC-4                       | G1, G5       |
| 20       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-4                       | ...          |
| 21       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-4                       | G5           |
| 22       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFC-4                       | G14, W11     |
| 23       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFC-4                       | G5, G14, W11 |
| 24       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | NP               | 600    | NP  | NFC-4                       | G14, W11     |
| 25       | ...                            | 34    | 52                         | 18                       | NP                                                                                         | NP               | 600    | NP  | NFC-4                       | G5, G14, W11 |
| 26       | ...                            | 34    | 72                         | 50                       | NP                                                                                         | 700              | 800    | 650 | NFC-4                       | T9, W3       |
| 27       | ...                            | 34    | 72                         | 50                       | NP                                                                                         | 700              | 800    | 650 | NFC-8                       | T9, W3       |
| 28       | >4 <sup>1</sup> / <sub>2</sub> | 34    | 45                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-3                       | G14, W11     |
| 29       | >4 <sup>1</sup> / <sub>2</sub> | 34    | 45                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-3                       | G5, G14, W11 |
| 30       | >6                             | 34    | 45                         | 18                       | NP                                                                                         | NP               | 700    | 650 | NFC-4                       | ...          |
| 31       | >6                             | 34    | 45                         | 18                       | NP                                                                                         | NP               | 700    | 650 | NFC-4                       | G5           |
| 32       | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 33       | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 34       | ...                            | 34    | 45                         | 18                       | NP                                                                                         | NP               | 700    | 650 | NFC-4                       | ...          |
| 35       | ...                            | 34    | 45                         | 18                       | NP                                                                                         | NP               | 700    | 650 | NFC-4                       | G5           |
| 36       | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 37       | 2.5 < t ≤ 5                    | 34    | 45                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 38       | ≤6                             | 34    | 50                         | 20                       | NP                                                                                         | NP               | 700    | 650 | NFC-4                       | ...          |
| 39       | ≤6                             | 34    | 50                         | 20                       | NP                                                                                         | NP               | 700    | 650 | NFC-4                       | G5           |
| 40       | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 41       | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 42       | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...          |
| 43       | ≤2.5                           | 34    | 50                         | 20                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5           |
| 44       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 50                         | 20                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-4                       | G14          |
| 45       | ≤4 <sup>1</sup> / <sub>2</sub> | 34    | 50                         | 20                       | NP                                                                                         | 600 (Cl. 3 only) | NP     | NP  | NFC-4                       | G5, G14      |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800 | 850 | 900 | 950 |
| 1        | 10.7                                                                                                     | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 10.7 | 8.4  | 7.7  | 7.0  | ...  | ... | ... | ... | ... |
| 2        | 8.5                                                                                                      | 8.2  | 8.0  | 7.8  | 7.6  | 7.5  | 7.3  | 7.2  | 7.0  | 6.9  | 6.8  | ...  | ...  | ...  | ... | ... | ... | ... |
| 3        | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | ...  | ...  | ...  | ... | ... | ... | ... |
| 4        | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 5        | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 6        | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 7        | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 8        | 13.3                                                                                                     | 12.9 | 12.6 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 | 10.7 | 10.6 | 10.4 | ...  | ... | ... | ... | ... |
| 9        | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | ...  | ... | ... | ... | ... |
| 10       | 13.3                                                                                                     | 12.9 | 12.6 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 | 10.7 | 10.6 | 10.4 | ...  | ... | ... | ... | ... |
| 11       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | ...  | ... | ... | ... | ... |
| 12       | 11.3                                                                                                     | 10.9 | 10.7 | 10.4 | 10.2 | 10.0 | 9.7  | 9.6  | 9.4  | 9.2  | 9.1  | ...  | ...  | ...  | ... | ... | ... | ... |
| 13       | 11.3                                                                                                     | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | ...  | ...  | ...  | ... | ... | ... | ... |
| 14       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 15       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 16       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 17       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 18       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 19       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 20       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 21       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 22       | 10.2                                                                                                     | 9.8  | 9.6  | 9.4  | 9.2  | 9.0  | 8.8  | 8.6  | 8.4  | 8.3  | 8.2  | ...  | ...  | ...  | ... | ... | ... | ... |
| 23       | 10.2                                                                                                     | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | ...  | ...  | ...  | ... | ... | ... | ... |
| 24       | 10.2                                                                                                     | 9.8  | 9.6  | 9.4  | 9.2  | 9.0  | 8.8  | 8.6  | 8.4  | 8.3  | 8.2  | ...  | ...  | ...  | ... | ... | ... | ... |
| 25       | 10.2                                                                                                     | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | ...  | ...  | ...  | ... | ... | ... | ... |
| 26       | 20.6                                                                                                     | 20.6 | 20.6 | 20.6 | 20.6 | 20.3 | 20.0 | 19.7 | 19.4 | 19.2 | 18.9 | 18.7 | 18.4 | 18.0 | 8.5 | ... | ... | ... |
| 27       | 20.6                                                                                                     | 20.6 | 20.6 | 20.6 | 20.6 | 20.3 | 20.0 | 19.7 | 19.4 | 19.2 | 18.9 | 18.7 | 18.4 | 18.0 | 8.5 | ... | ... | ... |
| 28       | 8.5                                                                                                      | 8.2  | 8.0  | 7.8  | 7.6  | 7.5  | 7.3  | 7.2  | 7.0  | 6.9  | 6.8  | ...  | ...  | ...  | ... | ... | ... | ... |
| 29       | 8.5                                                                                                      | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | 8.5  | ...  | ...  | ...  | ... | ... | ... | ... |
| 30       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 31       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 32       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 33       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 34       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 35       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 36       | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 37       | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 38       | 13.3                                                                                                     | 12.9 | 12.6 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 | 10.7 | 10.6 | 10.4 | ...  | ... | ... | ... | ... |
| 39       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | ...  | ... | ... | ... | ... |
| 40       | 13.3                                                                                                     | 12.9 | 12.6 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 | 10.7 | 10.6 | 10.4 | ...  | ... | ... | ... | ... |
| 41       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | ...  | ... | ... | ... | ... |
| 42       | 13.3                                                                                                     | 12.9 | 12.6 | 12.3 | 12.0 | 11.7 | 11.5 | 11.2 | 11.0 | 10.8 | 10.7 | 10.6 | 10.4 | ...  | ... | ... | ... | ... |
| 43       | 13.3                                                                                                     | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | 13.3 | ...  | ... | ... | ... | ... |
| 44       | 11.3                                                                                                     | 10.9 | 10.7 | 10.4 | 10.2 | 10.0 | 9.7  | 9.6  | 9.4  | 9.2  | 9.1  | ...  | ...  | ...  | ... | ... | ... | ... |
| 45       | 11.3                                                                                                     | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | 11.3 | ...  | ...  | ...  | ... | ... | ... | ... |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form           | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|------------------------|-----------|------------|----------------------------|----------------------------|
| 1        | ...                 | Smls. pipe & tube      | SB-466    | ...        | C71520                     | O60                        |
| 2        | ...                 | Smls. pipe & tube      | SB-466    | ...        | C71520                     | O60                        |
| 3        | ...                 | Smls. cond. tube       | SB-111    | ...        | C71520                     | O61                        |
| 4        | ...                 | Smls. cond. tube       | SB-111    | ...        | C71520                     | O61                        |
| 5        | ...                 | Finned tube            | SB-359    | ...        | C71520                     | O61                        |
| 6        | ...                 | Finned tube            | SB-359    | ...        | C71520                     | O61                        |
| 7        | ...                 | Smls. U-bend tube      | SB-395    | ...        | C71520                     | O61                        |
| 8        | ...                 | Smls. U-bend tube      | SB-395    | ...        | C71520                     | O61                        |
| 9        | ...                 | Wld. cond. tube        | SB-543    | ...        | C71520                     | W061                       |
| 10       | ...                 | Wld. cond. tube        | SB-543    | ...        | C71520                     | W061                       |
| 11       | ...                 | Finned wld. cond. tube | SB-956    | ...        | C71520                     | W061                       |
| 12       | ...                 | Finned wld. cond. tube | SB-956    | ...        | C71520                     | W061                       |
| 13       | ...                 | Smls. cond. tube       | SB-111    | ...        | C71520                     | HR50                       |
| 14       | ...                 | Smls. U-bend tube      | SB-395    | ...        | C71520                     | HR50                       |
| 15       | ...                 | Smls. cond. tube       | SB-111    | ...        | C72200                     | O61                        |
| (25) 16  | ...                 | Castings               | SB-62     | ...        | C83600                     | M01                        |
| (25) 17  | ...                 | Castings               | SB-62     | ...        | C83600                     | M01                        |
| (25) 18  | ...                 | Castings               | SB-61     | ...        | C92200                     | M01                        |
| (25) 19  | ...                 | Castings               | SB-61     | ...        | C92200                     | M01                        |
| (25) 20  | ...                 | Castings               | SB-584    | ...        | C92200                     | M01                        |
| (25) 21  | ...                 | Castings               | SB-584    | ...        | C92200                     | M01                        |
| 22       | ...                 | Castings               | SB-584    | ...        | C93700                     | M01                        |
| 23       | ...                 | Castings               | SB-584    | ...        | C93700                     | M01                        |
| 24       | ...                 | Castings               | SB-148    | ...        | C95200                     | M01                        |
| 25       | ...                 | Castings               | SB-271    | ...        | C95200                     | M02                        |
| 26       | ...                 | Castings               | SB-505    | ...        | C95200                     | M07                        |
| 27       | ...                 | Castings               | SB-148    | ...        | C95400                     | M01                        |
| 28       | ...                 | Castings               | SB-271    | ...        | C95400                     | M02                        |
| 29       | ...                 | Castings               | SB-148    | ...        | C95800                     | M01                        |
| 30       | ...                 | Castings               | SB-148    | ...        | C95820                     | M01                        |
| (25) 31  | ...                 | Castings               | SB-369    | ...        | C96200                     | M01                        |
| 32       | ...                 | Castings               | SB-584    | ...        | C97600                     | M01                        |
| 33       | ...                 | Castings               | SB-584    | ...        | C97600                     | M01                        |
| 34       | 99Ni                | Smls. pipe & tube      | SB-161    | ...        | N02200                     | Annealed                   |
| 35       | 99Ni                | Smls. & wld. fittings  | SB-366    | ...        | N02200                     | Annealed                   |
| 36       | 99Ni                | Bar, rod               | SB-160    | ...        | N02200                     | Annealed                   |
| 37       | 99Ni                | Smls. pipe & tube      | SB-161    | ...        | N02200                     | Annealed                   |
| 38       | 99Ni                | Plate, sheet, strip    | SB-162    | ...        | N02200                     | Annealed                   |
| 39       | 99Ni                | Smls. tube             | SB-163    | ...        | N02200                     | Annealed                   |
| 40       | 99Ni                | Plate, sheet, strip    | SB-162    | ...        | N02200                     | As rolled                  |
| 41       | 99Ni                | Bar, rod               | SB-160    | ...        | N02200                     | Hot rolled                 |
| 42       | 99Ni                | Smls. pipe & tube      | SB-161    | ...        | N02200                     | Stress rel.                |
| 43       | 99Ni                | Smls. tube             | SB-163    | ...        | N02200                     | Stress rel.                |
| 44       | 99Ni-Low C          | Smls. pipe & tube      | SB-161    | ...        | N02201                     | Annealed                   |
| 45       | 99Ni-Low C          | Smls. & wld. fittings  | SB-366    | ...        | N02201                     | Annealed                   |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes                 |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|-----------------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                       |
| 1        | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | ...                   |
| 2        | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 700              | 700    | 650 | NFC-4                       | G5                    |
| 3        | ...                  | 34    | 52                         | 18                       | 700                                                                                        | 700              | 700    | 650 | NFC-4                       | G1                    |
| 4        | ...                  | 34    | 52                         | 18                       | 700                                                                                        | 700              | 700    | 650 | NFC-4                       | G1, G5                |
| 5        | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | NP  | NFC-4                       | G1                    |
| 6        | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | NP  | NFC-4                       | G1, G5                |
| 7        | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-4                       | ...                   |
| 8        | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 700 (Cl. 3 only) | 700    | 650 | NFC-4                       | G5                    |
| 9        | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFC-4                       | G14, W11              |
| 10       | ...                  | 34    | 52                         | 18                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFC-4                       | G5, G14, W11          |
| 11       | ...                  | 34    | 52                         | 18                       | NP                                                                                         | NP               | 600    | NP  | NFC-4                       | G14, W11              |
| 12       | ...                  | 34    | 52                         | 18                       | NP                                                                                         | NP               | 600    | NP  | NFC-4                       | G5, G14, W11          |
| 13       | ...                  | 34    | 72                         | 50                       | NP                                                                                         | 700              | 800    | 650 | NFC-4                       | T9, W3                |
| 14       | ...                  | 34    | 72                         | 50                       | NP                                                                                         | 700              | 800    | 650 | NFC-8                       | T9, W3                |
| 15       | ...                  | 34    | 45                         | 16                       | NP                                                                                         | NP               | 150    | 150 | NFC-3                       | ...                   |
| 16       | ...                  | ...   | 30                         | 14                       | 450                                                                                        | 450 (Cl. 3 only) | 450    | 450 | NFC-1                       | G3, G15, W14          |
| 17       | ...                  | ...   | 30                         | 14                       | 450                                                                                        | 450 (Cl. 3 only) | 450    | 450 | NFC-1                       | G3, G5, G15, T19, W14 |
| 18       | ...                  | ...   | 34                         | 16                       | 550                                                                                        | 500 (Cl. 3 only) | 550    | 550 | NFC-1                       | G3, G15, T5, W14      |
| 19       | ...                  | ...   | 34                         | 16                       | 550                                                                                        | 500 (Cl. 3 only) | 550    | 550 | NFC-1                       | G3, G5, G15, T5, W14  |
| 20       | ...                  | ...   | 34                         | 16                       | NP                                                                                         | 500 (Cl. 3 only) | 550    | 550 | NFC-1                       | G15, T5               |
| 21       | ...                  | ...   | 34                         | 16                       | NP                                                                                         | 500 (Cl. 3 only) | 550    | 550 | NFC-1                       | G5, G15, T5           |
| 22       | ...                  | ...   | 30                         | 12                       | NP                                                                                         | 400 (SPT)        | 400    | 400 | NFC-1                       | G15, W8               |
| 23       | ...                  | ...   | 30                         | 12                       | NP                                                                                         | 400 (SPT)        | 400    | 400 | NFC-1                       | G5, G15, W8           |
| 24       | ...                  | 35    | 65                         | 25                       | 550                                                                                        | 500 (Cl. 3 only) | 600    | 600 | NFC-4                       | G15, T6               |
| 25       | ...                  | 35    | 65                         | 25                       | NP                                                                                         | 500 (Cl. 3 only) | 600    | 600 | NFC-4                       | G15, T6               |
| 26       | ...                  | 35    | 68                         | 26                       | NP                                                                                         | 500 (Cl. 3 only) | NP     | NP  | NFC-4                       | G15                   |
| 27       | ...                  | 35    | 75                         | 30                       | 550                                                                                        | 400 (Cl. 3 only) | 600    | 600 | NFC-4                       | G15, T19              |
| 28       | ...                  | 35    | 75                         | 30                       | NP                                                                                         | 400 (Cl. 3 only) | NP     | NP  | NFC-4                       | G15                   |
| 29       | ...                  | 35    | 85                         | 35                       | NP                                                                                         | 400 (Cl. 3 only) | NP     | 400 | NFC-4                       | G15                   |
| 30       | ...                  | 35    | 94                         | 39                       | NP                                                                                         | NP               | 400    | 400 | NFC-4                       | G15                   |
| 31       | ...                  | 34    | 45                         | 25                       | NP                                                                                         | 200 (Cl. 3 only) | NP     | NP  | NFC-3                       | G15                   |
| 32       | ...                  | ...   | 40                         | 17                       | NP                                                                                         | NP               | 300    | 300 | NFC-1                       | G15, W8               |
| 33       | ...                  | ...   | 40                         | 17                       | NP                                                                                         | NP               | 300    | 300 | NFC-1                       | G5, G15, W8           |
| 34       | >5 O.D.              | 41    | 55                         | 12                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-2                       | ...                   |
| 35       | ...                  | 41    | 55                         | 12                       | NP                                                                                         | NP               | 600    | 600 | NFN-2                       | W12                   |
| 36       | ...                  | 41    | 55                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-2                       | ...                   |
| 37       | ≤5 O.D.              | 41    | 55                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-2                       | ...                   |
| 38       | ...                  | 41    | 55                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-2                       | ...                   |
| 39       | ...                  | 41    | 55                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-2                       | ...                   |
| 40       | ...                  | 41    | 55                         | 20                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-2                       | G20                   |
| 41       | ...                  | 41    | 60                         | 15                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-2                       | ...                   |
| 42       | ...                  | 41    | 65                         | 40                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-25                      | G29                   |
| 43       | ...                  | 41    | 65                         | 40                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-25                      | G29                   |
| 44       | >5 O.D.              | 41    | 50                         | 10                       | NP                                                                                         | 800 (Cl. 3 only) | 1200   | 650 | NFN-1                       | T10                   |
| 45       | ...                  | 41    | 50                         | 10                       | 800 (Cl. 3 only)                                                                           | NP               | 1150   | 650 | NFN-1                       | T10, W5, W12          |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |     |     |     |     |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800 | 850 | 900 | 950 |
| 1        | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 2        | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 3        | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 4        | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 5        | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 6        | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 7        | 12.0                                                                                                     | 11.6 | 11.3 | 11.0 | 10.8 | 10.5 | 10.3 | 10.1 | 9.9  | 9.8  | 9.6  | 9.5  | 9.4  | ...  | ... | ... | ... | ... |
| 8        | 12.0                                                                                                     | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | ...  | ... | ... | ... | ... |
| 9        | 10.2                                                                                                     | 9.8  | 9.6  | 9.4  | 9.2  | 9.0  | 8.8  | 8.6  | 8.4  | 8.3  | 8.2  | ...  | ...  | ...  | ... | ... | ... | ... |
| 10       | 10.2                                                                                                     | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | ...  | ...  | ...  | ... | ... | ... | ... |
| 11       | 10.2                                                                                                     | 9.8  | 9.6  | 9.4  | 9.2  | 9.0  | 8.8  | 8.6  | 8.4  | 8.3  | 8.2  | ...  | ...  | ...  | ... | ... | ... | ... |
| 12       | 10.2                                                                                                     | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | ...  | ...  | ...  | ... | ... | ... | ... |
| 13       | 20.6                                                                                                     | 20.6 | 20.6 | 20.6 | 20.6 | 20.3 | 20.0 | 19.7 | 19.4 | 19.2 | 18.9 | 18.7 | 18.4 | 18.0 | 8.5 | ... | ... | ... |
| 14       | 20.6                                                                                                     | 20.6 | 20.6 | 20.6 | 20.6 | 20.3 | 20.0 | 19.7 | 19.4 | 19.2 | 18.9 | 18.7 | 18.4 | 18.0 | 8.5 | ... | ... | ... |
| 15       | 10.7                                                                                                     | 10.4 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 16       | 8.6                                                                                                      | 8.6  | 8.4  | 8.1  | 7.8  | 7.6  | 7.3  | 7.0  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 17       | 8.6                                                                                                      | 8.6  | 8.6  | 8.5  | 8.4  | 8.2  | 8.1  | 7.5  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 18       | 9.7                                                                                                      | 9.7  | 9.6  | 9.2  | 9.0  | 8.9  | 8.8  | 8.7  | 7.4  | 5.0  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 19       | 9.7                                                                                                      | 9.7  | 9.7  | 9.7  | 9.7  | 9.7  | 9.5  | 9.1  | 7.4  | 5.0  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 20       | 9.7                                                                                                      | 9.7  | 9.6  | 9.2  | 9.0  | 8.9  | 8.8  | 8.7  | 7.4  | 5.0  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 21       | 9.7                                                                                                      | 9.7  | 9.7  | 9.7  | 9.7  | 9.7  | 9.5  | 9.1  | 7.4  | 5.0  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 22       | 8.0                                                                                                      | 7.4  | 7.1  | 7.0  | 6.8  | 6.7  | 6.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 23       | 8.0                                                                                                      | 8.0  | 8.0  | 8.0  | 7.9  | 7.7  | 7.4  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 24       | 16.7                                                                                                     | 15.7 | 15.2 | 14.8 | 14.5 | 14.3 | 14.2 | 14.2 | 14.2 | 11.7 | 7.4  | ...  | ...  | ...  | ... | ... | ... | ... |
| 25       | 16.7                                                                                                     | 15.7 | 15.2 | 14.8 | 14.5 | 14.3 | 14.2 | 14.2 | 14.2 | 11.7 | 7.4  | ...  | ...  | ...  | ... | ... | ... | ... |
| 26       | 17.3                                                                                                     | 16.3 | 15.8 | 15.4 | 15.1 | 14.9 | 14.8 | 14.7 | 14.7 | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 27       | 20.0                                                                                                     | 19.6 | 19.5 | 19.4 | 19.3 | 19.3 | 19.3 | 16.0 | 13.9 | 11.0 | 8.5  | ...  | ...  | ...  | ... | ... | ... | ... |
| 28       | 20.0                                                                                                     | 19.6 | 19.5 | 19.4 | 19.3 | 19.3 | 19.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 29       | 23.3                                                                                                     | 23.0 | 22.9 | 22.8 | 22.7 | 22.4 | 21.9 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 30       | 26.0                                                                                                     | 25.6 | 25.5 | 25.4 | 25.3 | 24.8 | 24.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 31       | 12.9                                                                                                     | 12.9 | 12.8 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 32       | 11.3                                                                                                     | 10.2 | 9.6  | 9.1  | 8.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 33       | 11.3                                                                                                     | 11.3 | 11.3 | 11.1 | 11.0 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ... | ... | ... | ... |
| 34       | 8.0                                                                                                      | ...  | 8.0  | ...  | 8.0  | ...  | 8.0  | ...  | 8.0  | ...  | 8.0  | ...  | ...  | ...  | ... | ... | ... | ... |
| 35       | 8.0                                                                                                      | ...  | 8.0  | ...  | 8.0  | ...  | 8.0  | ...  | 8.0  | ...  | 8.0  | ...  | ...  | ...  | ... | ... | ... | ... |
| 36       | 10.0                                                                                                     | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | ...  | ...  | ... | ... | ... | ... |
| 37       | 10.0                                                                                                     | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | ...  | ...  | ... | ... | ... | ... |
| 38       | 10.0                                                                                                     | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | ...  | ...  | ... | ... | ... | ... |
| 39       | 10.0                                                                                                     | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | ...  | ...  | ... | ... | ... | ... |
| 40       | 13.3                                                                                                     | ...  | 13.3 | ...  | 13.3 | ...  | 13.3 | ...  | 12.6 | ...  | 11.5 | ...  | ...  | ...  | ... | ... | ... | ... |
| 41       | 10.0                                                                                                     | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | 10.0 | ...  | ...  | ...  | ... | ... | ... | ... |
| 42       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | ...  | 18.6 | ...  | 18.3 | ...  | 17.7 | ...  | ...  | ...  | ... | ... | ... | ... |
| 43       | 18.6                                                                                                     | ...  | 18.6 | ...  | 18.6 | ...  | 18.6 | ...  | 18.3 | ...  | 17.7 | ...  | ...  | ...  | ... | ... | ... | ... |
| 44       | 6.7                                                                                                      | ...  | 6.4  | ...  | 6.3  | ...  | 6.2  | ...  | 6.2  | ...  | 6.2  | 6.2  | 6.2  | 6.1  | 6.0 | 5.8 | 4.5 | 3.7 |
| 45       | 6.7                                                                                                      | ...  | 6.4  | ...  | 6.3  | ...  | 6.2  | ...  | 6.2  | ...  | 6.2  | 6.2  | 6.2  | 6.1  | 6.0 | 5.8 | 4.5 | 3.7 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | (25) |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 3.0                                                                                                      | 2.4  | 2.0  | 1.5  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 3.0                                                                                                      | 2.4  | 2.0  | 1.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form                | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|---------------------|-----------------------------|-----------|------------|----------------------------|----------------------------|
| 1        | 99Ni-Low C          | Bar, rod                    | SB-160    | ...        | N02201                     | Hot rolled/ann.            |
| 2        | 99Ni-Low C          | Smls. pipe & tube           | SB-161    | ...        | N02201                     | Annealed                   |
| 3        | 99Ni-Low C          | Smls. tube                  | SB-163    | ...        | N02201                     | Annealed                   |
| 4        | 99Ni-Low C          | Plate, sheet, strip         | SB-162    | ...        | N02201                     | Hot rolled/ann.            |
| 5        | 99Ni-Low C          | Smls. pipe & tube           | SB-161    | ...        | N02201                     | Stress rel.                |
| 6        | 99Ni-Low C          | Smls. pipe & tube           | SB-163    | ...        | N02201                     | Stress rel.                |
| 7        | 67Ni-30Cu           | Bar, rod                    | SB-164    | ...        | N04400                     | HW or CW ann.              |
| 8        | 67Ni-30Cu           | Smls. pipe & tube           | SB-165    | ...        | N04400                     | Annealed                   |
| 9        | 67Ni-30Cu           | Forgings                    | SB-564    | ...        | N04400                     | Annealed                   |
| 10       | 67Ni-30Cu           | Plate                       | SB-127    | ...        | N04400                     | Annealed                   |
| 11       | 67Ni-30Cu           | Smls. tube                  | SB-163    | ...        | N04400                     | Annealed                   |
| 12       | 67Ni-30Cu           | Smls. pipe & tube           | SB-165    | ...        | N04400                     | Annealed                   |
| 13       | 67Ni-30Cu           | Smls. & wld. fittings       | SB-366    | ...        | N04400                     | Annealed                   |
| 14       | 67Ni-30Cu           | Hexagons, rings, discs      | SB-164    | ...        | N04400                     | Hot worked                 |
| 15       | 67Ni-30Cu           | Plate                       | SB-127    | ...        | N04400                     | As rolled                  |
| 16       | 67Ni-30Cu           | Rounds, squares, rectangles | SB-164    | ...        | N04400                     | Hot worked                 |
| 17       | 67Ni-30Cu           | Rounds, squares, rectangles | SB-164    | ...        | N04400                     | Hot worked                 |
| 18       | 67Ni-30Cu           | Hexagon                     | SB-164    | ...        | N04400                     | Hot worked                 |
| 19       | 67Ni-30Cu           | Smls. tube                  | SB-163    | ...        | N04400                     | Stress rel.                |
| 20       | 67Ni-30Cu           | Smls. pipe & tube           | SB-165    | ...        | N04400                     | Stress rel.                |
| 21       | 67Ni-30Cu-S         | Bar                         | SB-164    | ...        | N04405                     | Annealed                   |
| 22       | 67Ni-30Cu-S         | Bar                         | SB-164    | ...        | N04405                     | Hot worked                 |
| 23       | 47Ni-22Cr-9Mo-18Fe  | Plate, sheet, strip         | SB-435    | ...        | N06002                     | Annealed                   |
| 24       | 47Ni-22Cr-9Mo-18Fe  | Plate, sheet, strip         | SB-435    | ...        | N06002                     | Annealed                   |
| 25       | 47Ni-22Cr-9Mo-18Fe  | Rod                         | SB-572    | ...        | N06002                     | Annealed                   |
| 26       | 47Ni-22Cr-9Mo-18Fe  | Rod                         | SB-572    | ...        | N06002                     | Annealed                   |
| 27       | 47Ni-22Cr-9Mo-18Fe  | Smls. & wld. fittings       | SB-366    | ...        | N06002                     | Annealed                   |
| 28       | 47Ni-22Cr-9Mo-18Fe  | Wld. pipe                   | SB-619    | ...        | N06002                     | Solution ann.              |
| 29       | 47Ni-22Cr-9Mo-18Fe  | Wld. pipe                   | SB-619    | ...        | N06002                     | Solution ann.              |
| 30       | 47Ni-22Cr-9Mo-18Fe  | Smls. pipe & tube           | SB-622    | ...        | N06002                     | Solution ann.              |
| 31       | 47Ni-22Cr-9Mo-18Fe  | Smls. pipe & tube           | SB-622    | ...        | N06002                     | Solution ann.              |
| 32       | 47Ni-22Cr-9Mo-18Fe  | Wld. tube                   | SB-626    | ...        | N06002                     | Solution ann.              |
| 33       | 47Ni-22Cr-9Mo-18Fe  | Wld. tube                   | SB-626    | ...        | N06002                     | Solution ann.              |
| 34       | 47Ni-22Cr-19Fe-6Mo  | Rod                         | SB-581    | ...        | N06007                     | Solution ann.              |
| 35       | 47Ni-22Cr-19Fe-6Mo  | Rod                         | SB-581    | ...        | N06007                     | Solution ann.              |
| 36       | 47Ni-22Cr-19Fe-6Mo  | Plate, sheet, strip         | SB-582    | ...        | N06007                     | Solution ann.              |
| 37       | 47Ni-22Cr-19Fe-6Mo  | Plate, sheet, strip         | SB-582    | ...        | N06007                     | Solution ann.              |
| 38       | 47Ni-22Cr-19Fe-6Mo  | Smls. & wld. fittings       | SB-366    | ...        | N06007                     | Annealed                   |
| 39       | 47Ni-22Cr-19Fe-6Mo  | Rod                         | SB-581    | ...        | N06007                     | Solution ann.              |
| 40       | 47Ni-22Cr-19Fe-6Mo  | Rod                         | SB-581    | ...        | N06007                     | Solution ann.              |
| 41       | 47Ni-22Cr-19Fe-6Mo  | Plate, sheet, strip         | SB-582    | ...        | N06007                     | Solution ann.              |
| 42       | 47Ni-22Cr-19Fe-6Mo  | Plate, sheet, strip         | SB-582    | ...        | N06007                     | Solution ann.              |
| 43       | 47Ni-22Cr-19Fe-6Mo  | Wld. pipe                   | SB-619    | ...        | N06007                     | Solution ann.              |
| 44       | 47Ni-22Cr-19Fe-6Mo  | Wld. pipe                   | SB-619    | ...        | N06007                     | Solution ann.              |
| 45       | 47Ni-22Cr-19Fe-6Mo  | Smls. pipe & tube           | SB-622    | ...        | N06007                     | Solution ann.              |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in.      | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes                |
|----------|---------------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|----------------------|
|          |                           |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                      |
| 1        | ...                       | 41    | 50                         | 10                       | NP                                                                                         | 800 (Cl. 3 only) | 1200   | 650 | NFN-1                       | T10                  |
| 2        | ≤5 O.D.                   | 41    | 50                         | 12                       | NP                                                                                         | 800 (Cl. 3 only) | 1200   | 650 | NFN-1                       | T9                   |
| 3        | ...                       | 41    | 50                         | 12                       | NP                                                                                         | 800 (Cl. 3 only) | 1200   | 650 | NFN-1                       | T9                   |
| 4        | ...                       | 41    | 50                         | 12                       | NP                                                                                         | 800 (Cl. 3 only) | 1200   | 650 | NFN-1                       | T9                   |
| 5        | ...                       | 41    | 60                         | 30                       | NP                                                                                         | 600 (Cl. 3 only) | 600    | 600 | NFN-1                       | ...                  |
| 6        | ...                       | 41    | 60                         | 30                       | NP                                                                                         | 800 (Cl. 3 only) | 900    | 650 | NFN-1                       | ...                  |
| 7        | All                       | 42    | 70                         | 25                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 8        | >5 O.D.                   | 42    | 70                         | 25                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 9        | ...                       | 42    | 70                         | 25                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 10       | ...                       | 42    | 70                         | 28                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 11       | ≤3                        | 42    | 70                         | 28                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 12       | ≤5 O.D.                   | 42    | 70                         | 28                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 13       | ...                       | 42    | 70                         | 28                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10, W5, W12         |
| 14       | $2\frac{1}{8} < t \leq 4$ | 42    | 75                         | 30                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T9                   |
| 15       | ...                       | 42    | 75                         | 40                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | G12, G20, T9         |
| 16       | $12 < t \leq 14$          | 42    | 75                         | 40                       | NP                                                                                         | NP               | 900    | 650 | NFN-3                       | T9                   |
| 17       | ≤12                       | 42    | 80                         | 40                       | NP                                                                                         | 800 (Cl. 3 only) | 900    | 650 | NFN-3                       | T9                   |
| 18       | ≤2 $\frac{1}{8}$          | 42    | 80                         | 40                       | NP                                                                                         | 800 (Cl. 3 only) | 900    | 650 | NFN-3                       | T9                   |
| 19       | ...                       | 42    | 85                         | 55                       | NP                                                                                         | 800              | 800    | 650 | NFN-3                       | G11, T8              |
| 20       | ...                       | 42    | 85                         | 55                       | NP                                                                                         | 800              | 500    | 500 | NFN-3                       | G5, G21, T8          |
| 21       | ...                       | 42    | 70                         | 25                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 22       | ...                       | 42    | 75                         | 35                       | NP                                                                                         | 800              | 900    | 650 | NFN-3                       | T10                  |
| 23       | ...                       | 43    | 95                         | 35                       | NP                                                                                         | 800              | 1650   | 650 | NFN-15                      | G4, G5, T15          |
| 24       | ...                       | 43    | 95                         | 35                       | NP                                                                                         | NP               | 1650   | 650 | NFN-15                      | G4, T16              |
| 25       | ...                       | 43    | 95                         | 35                       | NP                                                                                         | 800              | 1650   | 650 | NFN-15                      | G4, G5, G13, T15     |
| 26       | ...                       | 43    | 95                         | 35                       | NP                                                                                         | NP               | 1650   | 650 | NFN-15                      | G4, G13, T16         |
| 27       | ...                       | 43    | 100                        | 40                       | NP                                                                                         | 800              | 1650   | 650 | NFN-15                      | G4, G5, T15, W5, W12 |
| 28       | ...                       | 43    | 100                        | 40                       | NP                                                                                         | 800              | 1650   | 650 | NFN-15                      | G4, G5, G14, T14, W5 |
| 29       | ...                       | 43    | 100                        | 40                       | NP                                                                                         | NP               | 1650   | 650 | NFN-15                      | G4, G14, T16         |
| 30       | ...                       | 43    | 100                        | 40                       | NP                                                                                         | 800              | 1650   | 650 | NFN-15                      | G4, G5, T14          |
| 31       | ...                       | 43    | 100                        | 40                       | NP                                                                                         | NP               | 1650   | 650 | NFN-15                      | G4, T16              |
| 32       | ...                       | 43    | 100                        | 40                       | NP                                                                                         | 800              | 1650   | 650 | NFN-15                      | G4, G5, G14, T14, W5 |
| 33       | ...                       | 43    | 100                        | 40                       | NP                                                                                         | NP               | 1650   | 650 | NFN-15                      | G4, G14, T16         |
| 34       | > $\frac{3}{4}$           | 45    | 85                         | 30                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | ...                  |
| 35       | > $\frac{3}{4}$           | 45    | 85                         | 30                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | G5                   |
| 36       | > $\frac{3}{4}$           | 45    | 85                         | 30                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | ...                  |
| 37       | > $\frac{3}{4}$           | 45    | 85                         | 30                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | G5                   |
| 38       | ...                       | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | G5, W12              |
| 39       | ≤ $\frac{3}{4}$           | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | ...                  |
| 40       | ≤ $\frac{3}{4}$           | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | G5                   |
| 41       | ≤ $\frac{3}{4}$           | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | ...                  |
| 42       | ≤ $\frac{3}{4}$           | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | G5                   |
| 43       | ...                       | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | G14                  |
| 44       | ...                       | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | G5, G14              |
| 45       | ...                       | 45    | 90                         | 35                       | NP                                                                                         | NP               | 1000   | 650 | NFN-11                      | ...                  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 350 | 400  | 450 | 500  | 550 | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  |
| 1        | 6.7                                                                                                      | ... | 6.4  | ... | 6.3  | ... | 6.2  | ... | 6.2  | ... | 6.2  | 6.2  | 6.2  | 6.1  | 6.0  | 5.8  | 4.5  | 3.7  |
| 2        | 8.0                                                                                                      | ... | 7.7  | ... | 7.5  | ... | 7.5  | ... | 7.5  | ... | 7.5  | 7.5  | 7.4  | 7.4  | 7.2  | 5.8  | 4.5  | 3.7  |
| 3        | 8.0                                                                                                      | ... | 7.7  | ... | 7.5  | ... | 7.5  | ... | 7.5  | ... | 7.5  | 7.5  | 7.4  | 7.4  | 7.2  | 5.8  | 4.5  | 3.7  |
| 4        | 8.0                                                                                                      | ... | 7.7  | ... | 7.5  | ... | 7.5  | ... | 7.5  | ... | 7.5  | 7.5  | 7.4  | 7.4  | 7.2  | 5.8  | 4.5  | 3.7  |
| 5        | 17.1                                                                                                     | ... | 17.1 | ... | 17.0 | ... | 17.0 | ... | 16.8 | ... | 16.3 | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 17.1                                                                                                     | ... | 17.1 | ... | 17.0 | ... | 17.0 | ... | 16.8 | ... | 16.3 | 14.0 | 13.4 | 12.8 | 12.1 | 11.7 | 11.1 | ...  |
| 7        | 16.7                                                                                                     | ... | 14.6 | ... | 13.6 | ... | 13.2 | ... | 13.1 | ... | 13.1 | 13.1 | 13.0 | 12.9 | 12.7 | 11.0 | 8.0  | ...  |
| 8        | 16.7                                                                                                     | ... | 14.6 | ... | 13.6 | ... | 13.2 | ... | 13.1 | ... | 13.1 | 13.1 | 13.0 | 12.9 | 12.7 | 11.0 | 8.0  | ...  |
| 9        | 16.7                                                                                                     | ... | 14.6 | ... | 13.6 | ... | 13.2 | ... | 13.1 | ... | 13.1 | 13.1 | 13.0 | 12.9 | 12.7 | 11.0 | 8.0  | ...  |
| 10       | 18.7                                                                                                     | ... | 16.4 | ... | 15.2 | ... | 14.7 | ... | 14.7 | ... | 14.7 | 14.7 | 14.6 | 14.5 | 14.3 | 11.0 | 8.0  | ...  |
| 11       | 18.7                                                                                                     | ... | 16.4 | ... | 15.2 | ... | 14.7 | ... | 14.7 | ... | 14.7 | 14.7 | 14.6 | 14.5 | 14.3 | 11.0 | 8.0  | ...  |
| 12       | 18.7                                                                                                     | ... | 16.4 | ... | 15.2 | ... | 14.7 | ... | 14.7 | ... | 14.7 | 14.7 | 14.6 | 14.5 | 14.3 | 11.0 | 8.0  | ...  |
| 13       | 18.7                                                                                                     | ... | 16.4 | ... | 15.2 | ... | 14.7 | ... | 14.7 | ... | 14.7 | 14.7 | 14.6 | 14.5 | 14.3 | 11.0 | 8.0  | ...  |
| 14       | 20.0                                                                                                     | ... | 19.4 | ... | 18.6 | ... | 17.9 | ... | 17.6 | ... | 17.3 | 17.2 | 17.0 | 16.8 | 14.5 | 8.5  | 4.0  | ...  |
| 15       | 21.4                                                                                                     | ... | 21.4 | ... | 21.4 | ... | 21.4 | ... | 21.4 | ... | 21.4 | 21.4 | 20.7 | 18.5 | 14.5 | 8.5  | 4.0  | ...  |
| 16       | 21.4                                                                                                     | ... | 21.4 | ... | 21.4 | ... | 21.4 | ... | 21.4 | ... | 21.4 | 21.4 | 20.7 | 18.5 | 14.5 | 8.5  | 4.0  | ...  |
| 17       | 22.9                                                                                                     | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | 22.8 | 22.0 | 18.5 | 14.5 | 8.5  | 4.0  | ...  |
| 18       | 22.9                                                                                                     | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | 22.8 | 22.0 | 18.5 | 14.5 | 8.5  | 4.0  | ...  |
| 19       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 24.3 | ... | 24.3 | ... | 23.9 | 23.5 | 22.8 | 18.0 | 12.7 | ...  | ...  | ...  |
| 20       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 24.3 | ... | 24.3 | ... | 23.9 | 23.5 | 22.8 | 18.0 | 12.7 | ...  | ...  | ...  |
| 21       | 16.7                                                                                                     | ... | 14.6 | ... | 13.6 | ... | 13.2 | ... | 13.1 | ... | 13.1 | 13.1 | 13.0 | 12.9 | 12.7 | 11.0 | 8.0  | ...  |
| 22       | 21.4                                                                                                     | ... | 21.4 | ... | 21.4 | ... | 20.9 | ... | 20.5 | ... | 20.2 | 20.1 | 19.8 | 18.5 | 14.5 | 8.5  | 4.0  | ...  |
| 23       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.3 | ... | 21.2 | 20.7 | 20.3 | 20.1 | 19.9 | 19.7 | 19.6 | 19.5 |
| 24       | 23.3                                                                                                     | ... | 21.0 | ... | 19.2 | ... | 17.7 | ... | 16.5 | ... | 15.7 | 15.3 | 15.1 | 14.9 | 14.7 | 14.6 | 14.5 | 14.4 |
| 25       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.3 | ... | 21.2 | 20.7 | 20.3 | 20.1 | 19.9 | 19.7 | 19.6 | 19.5 |
| 26       | 23.3                                                                                                     | ... | 21.0 | ... | 19.2 | ... | 17.7 | ... | 16.5 | ... | 15.7 | 15.3 | 15.1 | 14.9 | 14.7 | 14.6 | 14.5 | 14.4 |
| 27       | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 25.5 | ... | 24.2 | ...  | 23.3 | ...  | 22.7 | ...  | 22.4 | ...  |
| 28       | 22.7                                                                                                     | ... | 22.7 | ... | 22.7 | ... | 22.7 | ... | 21.7 | ... | 20.5 | 20.1 | 19.8 | 19.5 | 19.3 | 19.1 | 19.0 | 18.9 |
| 29       | 22.7                                                                                                     | ... | 20.4 | ... | 18.7 | ... | 17.2 | ... | 16.1 | ... | 15.2 | 14.9 | 14.6 | 14.4 | 14.3 | 14.2 | 14.1 | 14.0 |
| 30       | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 25.5 | ... | 24.2 | 23.7 | 23.3 | 22.9 | 22.7 | 22.5 | 22.4 | 22.2 |
| 31       | 26.7                                                                                                     | ... | 24.0 | ... | 22.0 | ... | 20.3 | ... | 18.9 | ... | 17.9 | 17.5 | 17.2 | 17.0 | 16.8 | 16.7 | 16.6 | 16.5 |
| 32       | 22.7                                                                                                     | ... | 22.7 | ... | 22.7 | ... | 22.7 | ... | 21.7 | ... | 20.5 | 20.1 | 19.8 | 19.5 | 19.3 | 19.1 | 19.0 | 18.9 |
| 33       | 22.7                                                                                                     | ... | 20.4 | ... | 18.7 | ... | 17.2 | ... | 16.1 | ... | 15.2 | 14.9 | 14.6 | 14.4 | 14.3 | 14.2 | 14.1 | 14.0 |
| 34       | 20.0                                                                                                     | ... | 18.0 | ... | 16.7 | ... | 15.7 | ... | 14.9 | ... | 14.4 | 14.2 | 14.1 | 14.0 | 13.9 | 13.8 | 13.7 | 13.6 |
| 35       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 19.5 | 19.2 | 19.0 | 18.8 | 18.7 | 18.6 | 18.5 | 18.4 |
| 36       | 20.0                                                                                                     | ... | 18.0 | ... | 16.7 | ... | 15.7 | ... | 14.9 | ... | 14.4 | 14.2 | 14.1 | 14.0 | 13.9 | 13.8 | 13.7 | 13.6 |
| 37       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 19.5 | 19.2 | 19.0 | 18.8 | 18.7 | 18.6 | 18.5 | 18.4 |
| 38       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.7 | ...  | 22.2 | ...  | 21.8 | ...  | 21.6 | ...  |
| 39       | 23.3                                                                                                     | ... | 21.0 | ... | 19.5 | ... | 18.3 | ... | 17.4 | ... | 16.8 | 16.6 | 16.4 | 16.3 | 16.2 | 16.1 | 16.0 | 15.9 |
| 40       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.7 | 22.4 | 22.2 | 22.0 | 21.8 | 21.7 | 21.6 | 21.5 |
| 41       | 23.3                                                                                                     | ... | 21.0 | ... | 19.5 | ... | 18.3 | ... | 17.4 | ... | 16.8 | 16.6 | 16.4 | 16.3 | 16.2 | 16.1 | 16.0 | 15.9 |
| 42       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.7 | 22.4 | 22.2 | 22.0 | 21.8 | 21.7 | 21.6 | 21.5 |
| 43       | 19.8                                                                                                     | ... | 17.8 | ... | 16.5 | ... | 15.5 | ... | 14.8 | ... | 14.3 | 14.1 | 14.0 | 13.8 | 13.7 | 13.7 | 13.6 | 13.5 |
| 44       | 19.8                                                                                                     | ... | 19.8 | ... | 19.8 | ... | 19.8 | ... | 19.8 | ... | 19.3 | 19.1 | 18.8 | 18.7 | 18.5 | 18.4 | 18.3 | 18.3 |
| 45       | 23.3                                                                                                     | ... | 21.0 | ... | 19.5 | ... | 18.3 | ... | 17.4 | ... | 16.8 | 16.6 | 16.4 | 16.3 | 16.2 | 16.1 | 16.0 | 15.9 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | 3.0                                                                                                      | 2.4  | 2.0  | 1.5  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 3.0                                                                                                      | 2.4  | 2.0  | 1.5  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 3.0                                                                                                      | 2.4  | 2.0  | 1.5  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 3.0                                                                                                      | 2.4  | 2.0  | 1.5  | 1.2  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 19.4                                                                                                     | 19.3 | 17.5 | 14.1 | 11.3 | 9.3  | 7.7  | 6.1  | 4.8  | 3.8  | 3.0  | 2.3  | 1.7  | 1.2  | ...  | ...  | ...  |
| 24       | 14.3                                                                                                     | 14.3 | 14.2 | 14.1 | 11.3 | 9.3  | 7.7  | 6.1  | 4.8  | 3.8  | 3.0  | 2.3  | 1.7  | 1.2  | ...  | ...  | ...  |
| 25       | 19.4                                                                                                     | 19.3 | 17.5 | 14.1 | 11.3 | 9.3  | 7.7  | 6.1  | 4.8  | 3.8  | 3.0  | 2.3  | 1.7  | 1.2  | ...  | ...  | ...  |
| 26       | 14.3                                                                                                     | 14.3 | 14.2 | 14.1 | 11.3 | 9.3  | 7.7  | 6.1  | 4.8  | 3.8  | 3.0  | 2.3  | 1.7  | 1.2  | ...  | ...  | ...  |
| 27       | 22.1                                                                                                     | ...  | 17.5 | ...  | 11.3 | ...  | 7.7  | ...  | 4.8  | ...  | 3.0  | ...  | 1.7  | 1.2  | ...  | ...  | ...  |
| 28       | 18.8                                                                                                     | 18.5 | 14.9 | 12.0 | 9.6  | 7.9  | 6.5  | 5.2  | 4.1  | 3.2  | 2.6  | 2.0  | 1.4  | 1.0  | ...  | ...  | ...  |
| 29       | 13.9                                                                                                     | 13.9 | 13.8 | 12.0 | 9.6  | 7.9  | 6.5  | 5.2  | 4.1  | 3.2  | 2.6  | 2.0  | 1.4  | 1.0  | ...  | ...  | ...  |
| 30       | 22.1                                                                                                     | 21.7 | 17.5 | 14.1 | 11.3 | 9.3  | 7.7  | 6.1  | 4.8  | 3.8  | 3.0  | 2.3  | 1.7  | 1.2  | ...  | ...  | ...  |
| 31       | 16.4                                                                                                     | 16.3 | 16.2 | 14.1 | 11.3 | 9.3  | 7.7  | 6.1  | 4.8  | 3.8  | 3.0  | 2.3  | 1.7  | 1.2  | ...  | ...  | ...  |
| 32       | 18.8                                                                                                     | 18.5 | 14.9 | 12.0 | 9.6  | 7.9  | 6.5  | 5.2  | 4.1  | 3.2  | 2.6  | 2.0  | 1.4  | 1.0  | ...  | ...  | ...  |
| 33       | 13.9                                                                                                     | 13.9 | 13.8 | 12.0 | 9.6  | 7.9  | 6.5  | 5.2  | 4.1  | 3.2  | 2.6  | 2.0  | 1.4  | 1.0  | ...  | ...  | ...  |
| 34       | 13.6                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 18.3                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 13.6                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 18.3                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 21.4                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 15.8                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 21.4                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 15.8                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 21.4                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 13.5                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 18.2                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 15.8                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
 (\*See Maximum Temperature Limits for Restrictions on Class)

| Line No. | Nominal Composition   | Product Form          | Spec. No. | Type/Grade | Alloy Desig./UNS No. | Class/Condition/ Temper |
|----------|-----------------------|-----------------------|-----------|------------|----------------------|-------------------------|
| 1        | 47Ni-22Cr-19Fe-6Mo    | Smls. pipe & tube     | SB-622    | ...        | N06007               | Solution ann.           |
| 2        | 47Ni-22Cr-19Fe-6Mo    | Wld. tube             | SB-626    | ...        | N06007               | Solution ann.           |
| 3        | 47Ni-22Cr-19Fe-6Mo    | Wld. tube             | SB-626    | ...        | N06007               | Solution ann.           |
| 4        | 55Ni-21Cr-13.5Mo      | Smls. & wld. fittings | SB-366    | ...        | N06022               | Solution ann.           |
| 5        | 55Ni-21Cr-13.5Mo      | Forgings              | SB-462    | ...        | N06022               | Solution ann.           |
| 6        | 55Ni-21Cr-13.5Mo      | Forgings              | SB-462    | ...        | N06022               | Solution ann.           |
| 7        | 55Ni-21Cr-13.5Mo      | Forgings              | SB-564    | ...        | N06022               | Solution ann.           |
| 8        | 55Ni-21Cr-13.5Mo      | Forgings              | SB-564    | ...        | N06022               | Solution ann.           |
| 9        | 55Ni-21Cr-13.5Mo      | Rod                   | SB-574    | ...        | N06022               | Solution ann.           |
| 10       | 55Ni-21Cr-13.5Mo      | Rod                   | SB-574    | ...        | N06022               | Solution ann.           |
| 11       | 55Ni-21Cr-13.5Mo      | Plate, sheet, strip   | SB-575    | ...        | N06022               | Solution ann.           |
| 12       | 55Ni-21Cr-13.5Mo      | Plate, sheet, strip   | SB-575    | ...        | N06022               | Solution ann.           |
| 13       | 55Ni-21Cr-13.5Mo      | Wld. pipe             | SB-619    | ...        | N06022               | Solution ann.           |
| 14       | 55Ni-21Cr-13.5Mo      | Wld. pipe             | SB-619    | ...        | N06022               | Solution ann.           |
| 15       | 55Ni-21Cr-13.5Mo      | Smls. pipe & tube     | SB-622    | ...        | N06022               | Solution ann.           |
| 16       | 55Ni-21Cr-13.5Mo      | Smls. pipe & tube     | SB-622    | ...        | N06022               | Solution ann.           |
| 17       | 55Ni-21Cr-13.5Mo      | Wld. tube             | SB-626    | ...        | N06022               | Solution ann.           |
| 18       | 55Ni-21Cr-13.5Mo      | Wld. tube             | SB-626    | ...        | N06022               | Solution ann.           |
| 19       | 60Ni-25Cr-9.5Fe-2.1Al | Smls. tube            | SB-163    | ...        | N06025               | Annealed                |
| 20       | 60Ni-25Cr-9.5Fe-2.1Al | Smls. tube            | SB-163    | ...        | N06025               | Annealed                |
| 21       | 60Ni-25Cr-9.5Fe-2.1Al | Plate, sheet, strip   | SB-168    | ...        | N06025               | Annealed                |
| 22       | 60Ni-25Cr-9.5Fe-2.1Al | Plate, sheet, strip   | SB-168    | ...        | N06025               | Annealed                |
| 23       | 60Ni-25Cr-9.5Fe-2.1Al | Wrought fittings      | SB-366    | ...        | N06025               | Annealed                |
| 24       | 60Ni-25Cr-9.5Fe-2.1Al | Wrought fittings      | SB-366    | ...        | N06025               | Annealed                |
| 25       | 60Ni-25Cr-9.5Fe-2.1Al | Forgings              | SB-462    | ...        | N06025               | Annealed                |
| 26       | 60Ni-25Cr-9.5Fe-2.1Al | Forgings              | SB-462    | ...        | N06025               | Annealed                |
| 27       | 60Ni-25Cr-9.5Fe-2.1Al | Wld. tube             | SB-516    | ...        | N06025               | Annealed                |
| 28       | 60Ni-25Cr-9.5Fe-2.1Al | Wld. tube             | SB-516    | ...        | N06025               | Annealed                |
| 29       | 60Ni-25Cr-9.5Fe-2.1Al | Wld. pipe             | SB-517    | ...        | N06025               | Annealed                |
| 30       | 60Ni-25Cr-9.5Fe-2.1Al | Wld. pipe             | SB-517    | ...        | N06025               | Annealed                |
| 31       | 60Ni-25Cr-9.5Fe-2.1Al | Forgings              | SB-564    | ...        | N06025               | Annealed                |
| 32       | 60Ni-25Cr-9.5Fe-2.1Al | Forgings              | SB-564    | ...        | N06025               | Annealed                |
| 33       | 60Ni-25Cr-9.5Fe-2.1Al | Bar                   | SB-166    | ...        | N06025               | HW or CW ann.           |
| 34       | 60Ni-25Cr-9.5Fe-2.1Al | Bar                   | SB-166    | ...        | N06025               | HW or CW ann.           |
| 35       | 60Ni-25Cr-9.5Fe-2.1Al | Smls. pipe & tube     | SB-167    | ...        | N06025               | HW or CW ann.           |
| 36       | 60Ni-25Cr-9.5Fe-2.1Al | Smls. pipe & tube     | SB-167    | ...        | N06025               | HW or CW ann.           |
| 37       | 40Ni-29Cr-15Fe-5Mo    | Smls. & wld. fittings | SB-366    | ...        | N06030               | Solution ann.           |
| 38       | 40Ni-29Cr-15Fe-5Mo    | Forgings              | SB-462    | ...        | N06030               | Solution ann.           |
| 39       | 40Ni-29Cr-15Fe-5Mo    | Forgings              | SB-462    | ...        | N06030               | Solution ann.           |
| 40       | 40Ni-29Cr-15Fe-5Mo    | Rod                   | SB-581    | ...        | N06030               | Solution ann.           |
| 41       | 40Ni-29Cr-15Fe-5Mo    | Rod                   | SB-581    | ...        | N06030               | Solution ann.           |
| 42       | 40Ni-29Cr-15Fe-5Mo    | Plate, sheet, strip   | SB-582    | ...        | N06030               | Solution ann.           |
| 43       | 40Ni-29Cr-15Fe-5Mo    | Plate, sheet, strip   | SB-582    | ...        | N06030               | Solution ann.           |
| 44       | 40Ni-29Cr-15Fe-5Mo    | Wld. pipe             | SB-619    | ...        | N06030               | Solution ann.           |
| 45       | 40Ni-29Cr-15Fe-5Mo    | Wld. pipe             | SB-619    | ...        | N06030               | Solution ann.           |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes                           |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|-----|--------|-----|-----------------------------|---------------------------------|
|          |                      |       |                            |                          | I                                                                                          | III | VIII-1 | XII |                             |                                 |
| 1        | ...                  | 45    | 90                         | 35                       | NP                                                                                         | NP  | 1000   | 650 | NFN-11                      | G5                              |
| 2        | ...                  | 45    | 90                         | 35                       | NP                                                                                         | NP  | 1000   | 650 | NFN-11                      | G14                             |
| 3        | ...                  | 45    | 90                         | 35                       | NP                                                                                         | NP  | 1000   | 650 | NFN-11                      | G5, G14                         |
| 4        | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | 800 | 1250   | 650 | NFN-10                      | G5, G27, G28, T15, W5, W12      |
| 5        | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | NP  | NFN-10                      | G5, G27, G28, T15               |
| 6        | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | NP  | NFN-10                      | G27, G28, T15                   |
| 7        | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | 800 | 1250   | 650 | NFN-10                      | G5, G27, G28, T15               |
| 8        | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | 650 | NFN-10                      | G27, G28, T15                   |
| 9        | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | 800 | 1250   | 650 | NFN-10                      | G5, G27, G28, T15               |
| 10       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | 650 | NFN-10                      | G27, G28, T15                   |
| 11       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | 800 | 1250   | 650 | NFN-10                      | G5, G27, G28, T15               |
| 12       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | 650 | NFN-10                      | G27, G28, T15                   |
| 13       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | 800 | 1250   | 650 | NFN-10                      | G5, G14, G27, G28, T15, W6      |
| 14       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | 650 | NFN-10                      | G14, G27, G28, T15              |
| 15       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | 800 | 1250   | 650 | NFN-10                      | G5, G27, G28, T15               |
| 16       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | 650 | NFN-10                      | G27, G28, T15                   |
| 17       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | 800 | 1250   | 650 | NFN-10                      | G5, G14, G27, G28, T15, W6      |
| 18       | ...                  | 43    | 100                        | 45                       | 1250                                                                                       | NP  | 1250   | 650 | NFN-10                      | G14, G27, G28, T15              |
| 19       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G30, G31, G32, T12      |
| 20       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G30, G31, G32, T13          |
| 21       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G30, G31, G32, T12      |
| 22       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G30, G31, G32, T13          |
| 23       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G30, G31, G32, T12      |
| 24       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G30, G31, G32, T13          |
| 25       | $t \leq 4$           | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G30, G31, G32, T12      |
| 26       | $t \leq 4$           | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G30, G31, G32, T13          |
| 27       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G14, G30, G31, G32, T12 |
| 28       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G14, G30, G31, G32, T13     |
| 29       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G14, G30, G31, G32, T12 |
| 30       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G14, G30, G31, G32, T13     |
| 31       | $t \leq 4$           | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G30, G31, G32, T12      |
| 32       | $t \leq 4$           | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G30, G31, G32, T13          |
| 33       | $t \leq 4$           | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G30, G31, G32, T12      |
| 34       | $t \leq 4$           | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G30, G31, G32, T13          |
| 35       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G5, G30, G31, G32, T12      |
| 36       | ...                  | 43    | 98                         | 39                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-13                      | G4, G30, G31, G32, T13          |
| 37       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | 800 | 800    | 650 | NFN-19                      | G5, W5, W12                     |
| 38       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-19                      | G5                              |
| 39       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-19                      | ...                             |
| 40       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | 800 | 800    | 650 | NFN-19                      | G5                              |
| 41       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | NP  | 800    | 650 | NFN-19                      | ...                             |
| 42       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | 800 | 800    | 650 | NFN-19                      | G5                              |
| 43       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | NP  | 800    | 650 | NFN-19                      | ...                             |
| 44       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | 800 | 800    | 650 | NFN-19                      | G5, G14, W6                     |
| 45       | ...                  | 45    | 85                         | 35                       | NP                                                                                         | NP  | 800    | 650 | NFN-19                      | G14                             |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  |
| 1        | 23.3                                                                                                     | ...  | 23.3 | ...  | 23.3 | ...  | 23.3 | ...  | 23.3 | ...  | 22.7 | 22.4 | 22.2 | 22.0 | 21.8 | 21.7 | 21.6 | 21.5 |
| 2        | 19.8                                                                                                     | ...  | 17.8 | ...  | 16.5 | ...  | 15.5 | ...  | 14.8 | ...  | 14.3 | 14.1 | 14.0 | 13.8 | 13.7 | 13.7 | 13.6 | 13.5 |
| 3        | 19.8                                                                                                     | ...  | 19.8 | ...  | 19.8 | ...  | 19.8 | ...  | 19.8 | ...  | 19.3 | 19.1 | 18.8 | 18.7 | 18.5 | 18.4 | 18.3 | 18.3 |
| 4        | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.2 | ...  | 27.2 | ...  | 26.5 | ...  | 26.0 | 25.8 | 25.6 | 25.4 | 25.3 | 25.1 | 24.9 | 24.7 |
| 5        | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.2 | ...  | 27.2 | ...  | 26.5 | ...  | 26.0 | 25.8 | 25.6 | 25.4 | 25.3 | 25.1 | 24.9 | 24.7 |
| 6        | 28.6                                                                                                     | ...  | 26.7 | ...  | 24.6 | ...  | 22.9 | ...  | 21.5 | ...  | 20.4 | 20.0 | 19.6 | 19.3 | 19.0 | 18.8 | 18.6 | 18.5 |
| 7        | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.2 | ...  | 27.2 | ...  | 26.5 | ...  | 26.0 | 25.8 | 25.6 | 25.4 | 25.3 | 25.1 | 24.9 | 24.7 |
| 8        | 28.6                                                                                                     | ...  | 26.7 | ...  | 24.6 | ...  | 22.9 | ...  | 21.5 | ...  | 20.4 | 20.0 | 19.6 | 19.3 | 19.0 | 18.8 | 18.6 | 18.5 |
| 9        | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.2 | ...  | 27.2 | ...  | 26.5 | ...  | 26.0 | 25.8 | 25.6 | 25.4 | 25.3 | 25.1 | 24.9 | 24.7 |
| 10       | 28.6                                                                                                     | ...  | 26.7 | ...  | 24.6 | ...  | 22.9 | ...  | 21.5 | ...  | 20.4 | 20.0 | 19.6 | 19.3 | 19.0 | 18.8 | 18.6 | 18.5 |
| 11       | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.2 | ...  | 27.2 | ...  | 26.5 | ...  | 26.0 | 25.8 | 25.6 | 25.4 | 25.3 | 25.1 | 24.9 | 24.7 |
| 12       | 28.6                                                                                                     | ...  | 26.7 | ...  | 24.6 | ...  | 22.9 | ...  | 21.5 | ...  | 20.4 | 20.0 | 19.6 | 19.3 | 19.0 | 18.8 | 18.6 | 18.5 |
| 13       | 24.3                                                                                                     | ...  | 24.3 | ...  | 23.9 | ...  | 23.1 | ...  | 22.6 | ...  | 22.1 | 21.9 | 21.8 | 21.6 | 21.5 | 21.3 | 21.1 | 21.0 |
| 14       | 24.3                                                                                                     | ...  | 22.7 | ...  | 20.9 | ...  | 19.4 | ...  | 18.3 | ...  | 17.4 | 17.0 | 16.7 | 16.4 | 16.2 | 16.0 | 15.8 | 15.7 |
| 15       | 28.6                                                                                                     | ...  | 28.6 | ...  | 28.2 | ...  | 27.2 | ...  | 26.5 | ...  | 26.0 | 25.8 | 25.6 | 25.4 | 25.3 | 25.1 | 24.9 | 24.7 |
| 16       | 28.6                                                                                                     | ...  | 26.7 | ...  | 24.6 | ...  | 22.9 | ...  | 21.5 | ...  | 20.4 | 20.0 | 19.6 | 19.3 | 19.0 | 18.8 | 18.6 | 18.5 |
| 17       | 24.3                                                                                                     | ...  | 24.3 | ...  | 23.9 | ...  | 23.1 | ...  | 22.6 | ...  | 22.1 | 21.9 | 21.8 | 21.6 | 21.5 | 21.3 | 21.1 | 21.0 |
| 18       | 24.3                                                                                                     | ...  | 22.7 | ...  | 20.9 | ...  | 19.4 | ...  | 18.3 | ...  | 17.4 | 17.0 | 16.7 | 16.4 | 16.2 | 16.0 | 15.8 | 15.7 |
| 19       | 26.0                                                                                                     | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 20       | 26.0                                                                                                     | 26.0 | 25.8 | 25.4 | 24.9 | 24.3 | 23.7 | 23.1 | 22.5 | 22.0 | 21.5 | 21.1 | 20.7 | 20.4 | 20.2 | 20.0 | 19.9 | 19.8 |
| 21       | 26.0                                                                                                     | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 22       | 26.0                                                                                                     | 26.0 | 25.8 | 25.4 | 24.9 | 24.3 | 23.7 | 23.1 | 22.5 | 22.0 | 21.5 | 21.1 | 20.7 | 20.4 | 20.2 | 20.0 | 19.9 | 19.8 |
| 23       | 26.0                                                                                                     | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 24       | 26.0                                                                                                     | 26.0 | 25.8 | 25.4 | 24.9 | 24.3 | 23.7 | 23.1 | 22.5 | 22.0 | 21.5 | 21.1 | 20.7 | 20.4 | 20.2 | 20.0 | 19.9 | 19.8 |
| 25       | 26.0                                                                                                     | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 26       | 26.0                                                                                                     | 26.0 | 25.8 | 25.4 | 24.9 | 24.3 | 23.7 | 23.1 | 22.5 | 22.0 | 21.5 | 21.1 | 20.7 | 20.4 | 20.2 | 20.0 | 19.9 | 19.8 |
| 27       | 22.1                                                                                                     | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 |
| 28       | 22.1                                                                                                     | 22.1 | 21.9 | 21.6 | 21.1 | 20.3 | 20.1 | 19.6 | 19.1 | 18.7 | 18.3 | 17.9 | 17.6 | 17.4 | 17.2 | 17.0 | 16.9 | 16.8 |
| 29       | 22.1                                                                                                     | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 |
| 30       | 22.1                                                                                                     | 22.1 | 21.9 | 21.6 | 21.1 | 20.6 | 20.1 | 19.6 | 19.1 | 18.7 | 18.3 | 17.9 | 17.6 | 17.4 | 17.2 | 17.0 | 16.9 | 16.8 |
| 31       | 26.0                                                                                                     | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 32       | 26.0                                                                                                     | 26.0 | 25.8 | 25.4 | 24.9 | 24.3 | 23.7 | 23.1 | 22.5 | 22.0 | 21.5 | 21.1 | 20.7 | 20.4 | 20.2 | 20.0 | 19.9 | 19.8 |
| 33       | 26.0                                                                                                     | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 34       | 26.0                                                                                                     | 26.0 | 25.8 | 25.4 | 24.9 | 24.3 | 23.7 | 23.1 | 22.5 | 22.0 | 21.5 | 21.1 | 20.7 | 20.4 | 20.2 | 20.0 | 19.9 | 19.8 |
| 35       | 26.0                                                                                                     | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 36       | 26.0                                                                                                     | 26.0 | 25.8 | 25.4 | 24.9 | 24.3 | 23.7 | 23.1 | 22.5 | 22.0 | 21.5 | 21.1 | 20.7 | 20.4 | 20.2 | 20.0 | 19.9 | 19.8 |
| 37       | 23.3                                                                                                     | ...  | 23.3 | ...  | 23.3 | ...  | 22.5 | ...  | 21.9 | ...  | 21.3 | 20.9 | 20.5 | 20.1 | 19.7 | ...  | ...  | ...  |
| 38       | 23.3                                                                                                     | ...  | 23.3 | ...  | 23.3 | ...  | 22.5 | ...  | 21.9 | ...  | 21.3 | 20.9 | 20.5 | 20.1 | 19.7 | ...  | ...  | ...  |
| 39       | 23.3                                                                                                     | ...  | 20.0 | ...  | 18.3 | ...  | 17.2 | ...  | 16.4 | ...  | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 | ...  | ...  | ...  |
| 40       | 23.3                                                                                                     | ...  | 23.3 | ...  | 23.3 | ...  | 22.5 | ...  | 21.9 | ...  | 21.3 | 20.9 | 20.5 | 20.1 | 19.7 | ...  | ...  | ...  |
| 41       | 23.3                                                                                                     | ...  | 20.0 | ...  | 18.3 | ...  | 17.2 | ...  | 16.4 | ...  | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 | ...  | ...  | ...  |
| 42       | 23.3                                                                                                     | ...  | 23.3 | ...  | 23.3 | ...  | 22.5 | ...  | 21.9 | ...  | 21.3 | 20.9 | 20.5 | 20.1 | 19.7 | ...  | ...  | ...  |
| 43       | 23.3                                                                                                     | ...  | 20.0 | ...  | 18.3 | ...  | 17.2 | ...  | 16.4 | ...  | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 | ...  | ...  | ...  |
| 44       | 19.8                                                                                                     | ...  | 19.8 | ...  | 19.8 | ...  | 19.1 | ...  | 18.6 | ...  | 18.1 | 17.7 | 17.4 | 17.1 | 16.8 | ...  | ...  | ...  |
| 45       | 19.8                                                                                                     | ...  | 17.0 | ...  | 15.6 | ...  | 14.6 | ...  | 13.9 | ...  | 13.4 | 13.1 | 12.9 | 12.7 | 12.4 | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | 21.4                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 13.5                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 18.2                                                                                                     | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 24.4                                                                                                     | 23.0 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 24.4                                                                                                     | 23.0 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 18.3                                                                                                     | 18.2 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 24.4                                                                                                     | 23.0 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | 18.3                                                                                                     | 18.2 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | 24.4                                                                                                     | 23.0 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | 18.3                                                                                                     | 18.2 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | 24.4                                                                                                     | 23.0 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | 18.3                                                                                                     | 18.2 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | 20.7                                                                                                     | 19.6 | 14.9 | 10.8 | 8.2  | 6.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | 15.6                                                                                                     | 15.5 | 14.9 | 10.8 | 8.2  | 6.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 24.4                                                                                                     | 23.0 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 18.3                                                                                                     | 18.2 | 17.5 | 12.7 | 9.6  | 7.6  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 20.7                                                                                                     | 19.6 | 14.9 | 10.8 | 8.2  | 6.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 15.6                                                                                                     | 15.5 | 14.9 | 10.8 | 8.2  | 6.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 25.3                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 20       | 19.7                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 21       | 25.3                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 22       | 19.7                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 23       | 25.3                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 24       | 19.7                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 25       | 25.3                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 26       | 19.7                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 27       | 21.5                                                                                                     | 16.1 | 13.3 | 10.7 | 8.7  | 7.0  | 5.7  | 4.7  | 3.4  | 1.7  | 1.1  | 0.92 | 0.74 | 0.60 | 0.48 | 0.39 | 0.32 |
| 28       | 16.7                                                                                                     | 16.1 | 13.3 | 10.7 | 8.7  | 7.0  | 5.7  | 4.7  | 3.4  | 1.7  | 1.1  | 0.92 | 0.74 | 0.60 | 0.48 | 0.39 | 0.32 |
| 29       | 21.5                                                                                                     | 16.1 | 13.3 | 10.7 | 8.7  | 7.0  | 5.7  | 4.7  | 3.4  | 1.7  | 1.1  | 0.92 | 0.74 | 0.60 | 0.48 | 0.39 | 0.32 |
| 30       | 16.7                                                                                                     | 16.1 | 13.3 | 10.7 | 8.7  | 7.0  | 5.7  | 4.7  | 3.4  | 1.7  | 1.1  | 0.92 | 0.74 | 0.60 | 0.48 | 0.39 | 0.32 |
| 31       | 25.3                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 32       | 19.7                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 33       | 25.3                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 34       | 19.7                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 35       | 25.3                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 36       | 19.7                                                                                                     | 18.9 | 15.6 | 12.6 | 10.2 | 8.3  | 6.7  | 5.5  | 4.1  | 2.0  | 1.3  | 1.1  | 0.87 | 0.70 | 0.57 | 0.46 | 0.37 |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition   | Product Form          | Spec. No. | Type/Grade | Alloy Desig./UNS No. | Class/Condition/ Temper |
|----------|-----------------------|-----------------------|-----------|------------|----------------------|-------------------------|
| 1        | 40Ni-29Cr-15Fe-5Mo    | Smls. pipe & tube     | SB-622    | ...        | N06030               | Solution ann.           |
| 2        | 40Ni-29Cr-15Fe-5Mo    | Smls. pipe & tube     | SB-622    | ...        | N06030               | Solution ann.           |
| 3        | 40Ni-29Cr-15Fe-5Mo    | Wld. tube             | SB-626    | ...        | N06030               | Solution ann.           |
| 4        | 40Ni-29Cr-15Fe-5Mo    | Wld. tube             | SB-626    | ...        | N06030               | Solution ann.           |
| 5        | 58Ni-33Cr-8Mo         | Smls. & wld. fittings | SB-366    | ...        | N06035               | Solution ann.           |
| 6        | 58Ni-33Cr-8Mo         | Forgings              | SB-462    | ...        | N06035               | Solution ann.           |
| 7        | 58Ni-33Cr-8Mo         | Forgings              | SB-462    | ...        | N06035               | Solution ann.           |
| 8        | 58Ni-33Cr-8Mo         | Forgings              | SB-564    | ...        | N06035               | Solution ann.           |
| 9        | 58Ni-33Cr-8Mo         | Forgings              | SB-564    | ...        | N06035               | Solution ann.           |
| 10       | 58Ni-33Cr-8Mo         | Rod                   | SB-574    | ...        | N06035               | Solution ann.           |
| 11       | 58Ni-33Cr-8Mo         | Rod                   | SB-574    | ...        | N06035               | Solution ann.           |
| 12       | 58Ni-33Cr-8Mo         | Plate, sheet, strip   | SB-575    | ...        | N06035               | Solution ann.           |
| 13       | 58Ni-33Cr-8Mo         | Plate, sheet, strip   | SB-575    | ...        | N06035               | Solution ann.           |
| 14       | 58Ni-33Cr-8Mo         | Wld. pipe             | SB-619    | ...        | N06035               | Solution ann.           |
| 15       | 58Ni-33Cr-8Mo         | Wld. pipe             | SB-619    | ...        | N06035               | Solution ann.           |
| 16       | 58Ni-33Cr-8Mo         | Smls. pipe & tube     | SB-622    | ...        | N06035               | Solution ann.           |
| 17       | 58Ni-33Cr-8Mo         | Smls. pipe & tube     | SB-622    | ...        | N06035               | Solution ann.           |
| 18       | 58Ni-33Cr-8Mo         | Wld. tube             | SB-626    | ...        | N06035               | Solution ann.           |
| 19       | 58Ni-33Cr-8Mo         | Wld. tube             | SB-626    | ...        | N06035               | Solution ann.           |
| 20       | 46Ni-27Cr-23Fe-2.75Si | Rod                   | SB-166    | ...        | N06045               | Solution ann.           |
| 21       | 46Ni-27Cr-23Fe-2.75Si | Rod                   | SB-166    | ...        | N06045               | Solution ann.           |
| 22       | 46Ni-27Cr-23Fe-2.75Si | Smls. pipe & tube     | SB-167    | ...        | N06045               | Solution ann.           |
| 23       | 46Ni-27Cr-23Fe-2.75Si | Smls. pipe & tube     | SB-167    | ...        | N06045               | Solution ann.           |
| 24       | 46Ni-27Cr-23Fe-2.75Si | Plate, sheet, strip   | SB-168    | ...        | N06045               | Solution ann.           |
| 25       | 46Ni-27Cr-23Fe-2.75Si | Plate, sheet, strip   | SB-168    | ...        | N06045               | Solution ann.           |
| 26       | 46Ni-27Cr-23Fe-2.75Si | Smls. & wld. fittings | SB-366    | ...        | N06045               | Solution ann.           |
| 27       | 46Ni-27Cr-23Fe-2.75Si | Forged fittings       | SB-462    | ...        | N06045               | Solution ann.           |
| 28       | 46Ni-27Cr-23Fe-2.75Si | Forged fittings       | SB-462    | ...        | N06045               | Solution ann.           |
| 29       | 46Ni-27Cr-23Fe-2.75Si | Wld. tube             | SB-516    | ...        | N06045               | Solution ann.           |
| 30       | 46Ni-27Cr-23Fe-2.75Si | Wld. tube             | SB-516    | ...        | N06045               | Solution ann.           |
| 31       | 46Ni-27Cr-23Fe-2.75Si | Wld. pipe             | SB-517    | ...        | N06045               | Solution ann.           |
| 32       | 46Ni-27Cr-23Fe-2.75Si | Wld. pipe             | SB-517    | ...        | N06045               | Solution ann.           |
| 33       | 46Ni-27Cr-23Fe-2.75Si | Forgings              | SB-564    | ...        | N06045               | Solution ann.           |
| 34       | 46Ni-27Cr-23Fe-2.75Si | Forgings              | SB-564    | ...        | N06045               | Solution ann.           |
| 35       | 59Ni-23Cr-16Mo        | Fittings              | SB-366    | CR5923     | N06059               | Annealed                |
| 36       | 59Ni-23Cr-16Mo        | Fittings              | SB-366    | WP5923     | N06059               | Annealed                |
| 37       | 59Ni-23Cr-16Mo        | Wld. fittings         | SB-366    | WP5923W    | N06059               | Annealed                |
| 38       | 59Ni-23Cr-16Mo        | Fittings              | SB-366    | WP5923WX   | N06059               | Annealed                |
| 39       | 59Ni-23Cr-16Mo        | Forged fittings       | SB-462    | ...        | N06059               | Solution ann.           |
| 40       | 59Ni-23Cr-16Mo        | Forged fittings       | SB-462    | ...        | N06059               | Solution ann.           |
| 41       | 59Ni-23Cr-16Mo        | Forgings              | SB-564    | ...        | N06059               | Solution ann.           |
| 42       | 59Ni-23Cr-16Mo        | Forgings              | SB-564    | ...        | N06059               | Solution ann.           |
| 43       | 59Ni-23Cr-16Mo        | Rod                   | SB-574    | ...        | N06059               | Solution ann.           |
| 44       | 59Ni-23Cr-16Mo        | Rod                   | SB-574    | ...        | N06059               | Solution ann.           |
| 45       | 59Ni-23Cr-16Mo        | Plate, sheet, strip   | SB-575    | ...        | N06059               | Solution ann.           |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes             |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|-----|--------|-----|-----------------------------|-------------------|
|          |                      |       |                            |                          | I                                                                                          | III | VIII-1 | XII |                             |                   |
| 1        | ...                  | 45    | 85                         | 35                       | NP                                                                                         | 800 | 800    | 650 | NFN-19                      | G5                |
| 2        | ...                  | 45    | 85                         | 35                       | NP                                                                                         | NP  | 800    | 650 | NFN-19                      | ...               |
| 3        | ...                  | 45    | 85                         | 35                       | NP                                                                                         | 800 | 800    | 650 | NFN-19                      | G5, G14, W6       |
| 4        | ...                  | 45    | 85                         | 35                       | NP                                                                                         | NP  | 800    | 650 | NFN-19                      | G14               |
| 5        | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5, W12           |
| 6        | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5                |
| 7        | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | ...               |
| 8        | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5                |
| 9        | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | ...               |
| 10       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5                |
| 11       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | ...               |
| 12       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5                |
| 13       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | ...               |
| 14       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5, G14           |
| 15       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G14               |
| 16       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5                |
| 17       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | ...               |
| 18       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G5, G14           |
| 19       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 800    | NP  | NFN-27                      | G14               |
| 20       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G1, G5, T11       |
| 21       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | T11               |
| 22       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G1, G5, T11       |
| 23       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | T11               |
| 24       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G1, G5, T11       |
| 25       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | T11               |
| 26       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G5, T11, W12      |
| 27       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G5, T11           |
| 28       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | T11               |
| 29       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G5, G14, T11      |
| 30       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G14, T11          |
| 31       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G1, G5, G14, T11  |
| 32       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G14, T11          |
| 33       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | G1, G5, T11       |
| 34       | ...                  | 46    | 90                         | 35                       | 1500                                                                                       | NP  | 1500   | NP  | NFN-8                       | T11               |
| 35       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G14, G23, T16 |
| 36       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G23, T16      |
| 37       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G14, G23, T16 |
| 38       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G23, T16      |
| 39       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 1400   | 650 | NFN-14                      | G23, T16          |
| 40       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 1400   | 650 | NFN-14                      | G5, G23, T16      |
| 41       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G23, T16          |
| 42       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G23, T16      |
| 43       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G23, T16          |
| 44       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G23, T16      |
| 45       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G23, T16          |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 350 | 400  | 450 | 500  | 550 | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  |
| 1        | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 22.5 | ... | 21.9 | ... | 21.3 | 20.9 | 20.5 | 20.1 | 19.7 | ...  | ...  | ...  |
| 2        | 23.3                                                                                                     | ... | 20.0 | ... | 18.3 | ... | 17.2 | ... | 16.4 | ... | 15.8 | 15.5 | 15.2 | 14.9 | 14.6 | ...  | ...  | ...  |
| 3        | 19.8                                                                                                     | ... | 19.8 | ... | 19.8 | ... | 19.1 | ... | 18.6 | ... | 18.1 | 17.7 | 17.4 | 17.1 | 16.8 | ...  | ...  | ...  |
| 4        | 19.8                                                                                                     | ... | 17.0 | ... | 15.6 | ... | 14.6 | ... | 13.9 | ... | 13.4 | 13.1 | 12.9 | 12.7 | 12.4 | ...  | ...  | ...  |
| 5        | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 22.2 | ... | 20.5 | ... | 19.7 | 19.4 | 19.2 | 19.0 | 18.8 | ...  | ...  | ...  |
| 6        | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 22.2 | ... | 20.5 | ... | 19.7 | 19.4 | 19.2 | 19.0 | 18.8 | ...  | ...  | ...  |
| 7        | 23.3                                                                                                     | ... | 20.4 | ... | 18.2 | ... | 16.5 | ... | 15.3 | ... | 14.6 | 14.4 | 14.2 | 14.1 | 13.9 | ...  | ...  | ...  |
| 8        | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 22.2 | ... | 20.5 | ... | 19.7 | 19.4 | 19.2 | 19.0 | 18.8 | ...  | ...  | ...  |
| 9        | 23.3                                                                                                     | ... | 20.4 | ... | 18.2 | ... | 16.5 | ... | 15.3 | ... | 14.6 | 14.4 | 14.2 | 14.1 | 13.9 | ...  | ...  | ...  |
| 10       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 22.2 | ... | 20.5 | ... | 19.7 | 19.4 | 19.2 | 19.0 | 18.8 | ...  | ...  | ...  |
| 11       | 23.3                                                                                                     | ... | 20.4 | ... | 18.2 | ... | 16.5 | ... | 15.3 | ... | 14.6 | 14.4 | 14.2 | 14.1 | 13.9 | ...  | ...  | ...  |
| 12       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 22.2 | ... | 20.5 | ... | 19.7 | 19.4 | 19.2 | 19.0 | 18.8 | ...  | ...  | ...  |
| 13       | 23.3                                                                                                     | ... | 20.4 | ... | 18.2 | ... | 16.5 | ... | 15.3 | ... | 14.6 | 14.4 | 14.2 | 14.1 | 13.9 | ...  | ...  | ...  |
| 14       | 19.8                                                                                                     | ... | 19.8 | ... | 19.8 | ... | 18.9 | ... | 17.4 | ... | 16.7 | 16.5 | 16.3 | 16.2 | 16.0 | ...  | ...  | ...  |
| 15       | 19.8                                                                                                     | ... | 17.3 | ... | 15.5 | ... | 14.0 | ... | 13.0 | ... | 12.4 | 12.2 | 12.1 | 12.0 | 11.8 | ...  | ...  | ...  |
| 16       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 22.2 | ... | 20.5 | ... | 19.7 | 19.4 | 19.2 | 19.0 | 18.8 | ...  | ...  | ...  |
| 17       | 23.3                                                                                                     | ... | 20.4 | ... | 18.2 | ... | 16.5 | ... | 15.3 | ... | 14.6 | 14.4 | 14.2 | 14.1 | 13.9 | ...  | ...  | ...  |
| 18       | 19.8                                                                                                     | ... | 19.8 | ... | 19.8 | ... | 18.9 | ... | 17.4 | ... | 16.7 | 16.5 | 16.3 | 16.2 | 16.0 | ...  | ...  | ...  |
| 19       | 19.8                                                                                                     | ... | 17.3 | ... | 15.5 | ... | 14.0 | ... | 13.0 | ... | 12.4 | 12.2 | 12.1 | 12.0 | 11.8 | ...  | ...  | ...  |
| 20       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.6 | ... | 22.1 | 21.9 | 21.7 | 21.6 | 21.4 | 21.1 | 16.0 | 12.9 |
| 21       | 23.3                                                                                                     | ... | 20.9 | ... | 19.3 | ... | 18.1 | ... | 17.4 | ... | 17.0 | 16.8 | 16.8 | 16.7 | 16.6 | 16.5 | 16.0 | 12.9 |
| 22       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.6 | ... | 22.1 | 21.9 | 21.7 | 21.6 | 21.4 | 21.1 | 16.0 | 12.9 |
| 23       | 23.3                                                                                                     | ... | 20.9 | ... | 19.3 | ... | 18.1 | ... | 17.4 | ... | 17.0 | 16.8 | 16.8 | 16.7 | 16.6 | 16.5 | 16.0 | 12.9 |
| 24       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.6 | ... | 22.1 | 21.9 | 21.7 | 21.6 | 21.4 | 21.1 | 16.0 | 12.9 |
| 25       | 23.3                                                                                                     | ... | 20.9 | ... | 19.3 | ... | 18.1 | ... | 17.4 | ... | 17.0 | 16.8 | 16.8 | 16.7 | 16.6 | 16.5 | 16.0 | 12.9 |
| 26       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.6 | ... | 22.1 | 21.9 | 21.7 | 21.6 | 21.4 | 21.1 | 16.0 | 12.9 |
| 27       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.6 | ... | 22.1 | 21.9 | 21.7 | 21.6 | 21.4 | 21.1 | 16.0 | 12.9 |
| 28       | 23.3                                                                                                     | ... | 20.9 | ... | 19.3 | ... | 18.1 | ... | 17.4 | ... | 17.0 | 16.8 | 16.8 | 16.7 | 16.6 | 16.5 | 16.0 | 12.9 |
| 29       | 19.8                                                                                                     | ... | 19.8 | ... | 19.8 | ... | 19.8 | ... | 19.2 | ... | 18.8 | 18.6 | 18.4 | 18.4 | 18.2 | 17.9 | 13.6 | 11.0 |
| 30       | 19.8                                                                                                     | ... | 17.8 | ... | 16.4 | ... | 15.4 | ... | 14.8 | ... | 14.5 | 14.3 | 14.3 | 14.2 | 14.1 | 14.0 | 13.6 | 11.0 |
| 31       | 19.8                                                                                                     | ... | 19.8 | ... | 19.8 | ... | 19.8 | ... | 19.2 | ... | 18.8 | 18.6 | 18.4 | 18.4 | 18.2 | 17.9 | 13.6 | 11.0 |
| 32       | 19.8                                                                                                     | ... | 17.8 | ... | 16.4 | ... | 15.4 | ... | 14.8 | ... | 14.5 | 14.3 | 14.3 | 14.2 | 14.1 | 14.0 | 13.6 | 11.0 |
| 33       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.6 | ... | 22.1 | 21.9 | 21.7 | 21.6 | 21.4 | 21.1 | 16.0 | 12.9 |
| 34       | 23.3                                                                                                     | ... | 20.9 | ... | 19.3 | ... | 18.1 | ... | 17.4 | ... | 17.0 | 16.8 | 16.8 | 16.7 | 16.6 | 16.5 | 16.0 | 12.9 |
| 35       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 23.8 | ... | 23.0 | ... | 22.1 | 21.8 | 21.4 | 21.2 | 20.9 | 20.7 | 20.6 | 20.1 |
| 36       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 28.0 | ... | 27.0 | ... | 26.0 | 25.6 | 25.2 | 24.9 | 24.6 | 24.4 | 24.2 | 23.7 |
| 37       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 23.8 | ... | 23.0 | ... | 22.1 | 21.8 | 21.4 | 21.2 | 20.9 | 20.7 | 20.6 | 20.1 |
| 38       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 28.0 | ... | 27.0 | ... | 26.0 | 25.6 | 25.2 | 24.9 | 24.6 | 24.4 | 24.2 | 23.7 |
| 39       | 28.6                                                                                                     | ... | 26.9 | ... | 25.2 | ... | 23.8 | ... | 22.6 | ... | 21.4 | 20.8 | 20.2 | 19.6 | 19.1 | 18.5 | 18.0 | 17.5 |
| 40       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 28.0 | ... | 27.0 | ... | 26.0 | 25.6 | 25.2 | 24.9 | 24.6 | 24.4 | 24.2 | 23.7 |
| 41       | 28.6                                                                                                     | ... | 26.9 | ... | 25.2 | ... | 23.8 | ... | 22.6 | ... | 21.4 | 20.8 | 20.2 | 19.6 | 19.1 | 18.5 | 18.0 | 17.5 |
| 42       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 28.0 | ... | 27.0 | ... | 26.0 | 25.6 | 25.2 | 24.9 | 24.6 | 24.4 | 24.2 | 23.7 |
| 43       | 28.6                                                                                                     | ... | 26.9 | ... | 25.2 | ... | 23.8 | ... | 22.6 | ... | 21.4 | 20.8 | 20.2 | 19.6 | 19.1 | 18.5 | 18.0 | 17.5 |
| 44       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 28.0 | ... | 27.0 | ... | 26.0 | 25.6 | 25.2 | 24.9 | 24.6 | 24.4 | 24.2 | 23.7 |
| 45       | 28.6                                                                                                     | ... | 26.9 | ... | 25.2 | ... | 23.8 | ... | 22.6 | ... | 21.4 | 20.8 | 20.2 | 19.6 | 19.1 | 18.5 | 18.0 | 17.5 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 8.0                                                                                                      | 6.0  | 4.8  | 3.7  | 3.0  | 2.4  | 1.9  | 1.5  | 1.2  | 0.90 | 0.70 | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | 8.0                                                                                                      | 6.0  | 4.8  | 3.7  | 3.0  | 2.4  | 1.9  | 1.5  | 1.2  | 0.90 | 0.70 | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 8.0                                                                                                      | 6.0  | 4.8  | 3.7  | 3.0  | 2.4  | 1.9  | 1.5  | 1.2  | 0.90 | 0.70 | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 8.0                                                                                                      | 6.0  | 4.8  | 3.7  | 3.0  | 2.4  | 1.9  | 1.5  | 1.2  | 0.90 | 0.70 | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 9.4                                                                                                      | 7.1  | 5.6  | 4.4  | 3.5  | 2.8  | 2.2  | 1.8  | 1.4  | 1.1  | 0.85 | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 19.6                                                                                                     | 19.2 | 16.0 | 12.4 | 9.9  | 8.0  | 6.3  | 5.0  | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 23.1                                                                                                     | 22.6 | 18.8 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 19.6                                                                                                     | 19.2 | 16.0 | 12.4 | 9.9  | 8.0  | 6.3  | 5.0  | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 23.1                                                                                                     | 22.6 | 18.8 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 17.1                                                                                                     | 16.8 | 16.5 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 23.1                                                                                                     | 22.6 | 18.8 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | 17.1                                                                                                     | 16.8 | 16.5 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | 23.1                                                                                                     | 22.6 | 18.8 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | 17.1                                                                                                     | 16.8 | 16.5 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | 23.1                                                                                                     | 22.6 | 18.8 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | 17.1                                                                                                     | 16.8 | 16.5 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition  | Product Form          | Spec. No. | Type/Grade | Alloy Desig./UNS No. | Class/Condition/ Temper |
|----------|----------------------|-----------------------|-----------|------------|----------------------|-------------------------|
| 1        | 59Ni-23Cr-16Mo       | Plate, sheet, strip   | SB-575    | ...        | N06059               | Solution ann.           |
| 2        | 59Ni-23Cr-16Mo       | Wld. pipe             | SB-619    | ...        | N06059               | Solution ann.           |
| 3        | 59Ni-23Cr-16Mo       | Wld. pipe             | SB-619    | ...        | N06059               | Solution ann.           |
| 4        | 59Ni-23Cr-16Mo       | Smls. pipe & tube     | SB-622    | ...        | N06059               | Solution ann.           |
| 5        | 59Ni-23Cr-16Mo       | Smls. pipe & tube     | SB-622    | ...        | N06059               | Solution ann.           |
| 6        | 59Ni-23Cr-16Mo       | Wld. tube             | SB-626    | ...        | N06059               | Solution ann.           |
| 7        | 59Ni-23Cr-16Mo       | Wld. tube             | SB-626    | ...        | N06059               | Solution ann.           |
| 8        | 59Ni-23Cr-16Mo-1.6Cu | Smls. & wld. fittings | SB-366    | ...        | N06200               | Solution ann.           |
| 9        | 59Ni-23Cr-16Mo-1.6Cu | Forgings              | SB-462    | ...        | N06200               | Solution ann.           |
| 10       | 59Ni-23Cr-16Mo-1.6Cu | Forgings              | SB-462    | ...        | N06200               | Solution ann.           |
| 11       | 59Ni-23Cr-16Mo-1.6Cu | Forgings              | SB-564    | ...        | N06200               | Solution ann.           |
| 12       | 59Ni-23Cr-16Mo-1.6Cu | Forgings              | SB-564    | ...        | N06200               | Solution ann.           |
| 13       | 59Ni-23Cr-16Mo-1.6Cu | Rod                   | SB-574    | ...        | N06200               | Solution ann.           |
| 14       | 59Ni-23Cr-16Mo-1.6Cu | Rod                   | SB-574    | ...        | N06200               | Solution ann.           |
| 15       | 59Ni-23Cr-16Mo-1.6Cu | Plate, sheet, strip   | SB-575    | ...        | N06200               | Solution ann.           |
| 16       | 59Ni-23Cr-16Mo-1.6Cu | Plate, sheet, strip   | SB-575    | ...        | N06200               | Solution ann.           |
| 17       | 59Ni-23Cr-16Mo-1.6Cu | Wld. pipe             | SB-619    | ...        | N06200               | Solution ann.           |
| 18       | 59Ni-23Cr-16Mo-1.6Cu | Wld. pipe             | SB-619    | ...        | N06200               | Solution ann.           |
| 19       | 59Ni-23Cr-16Mo-1.6Cu | Smls. pipe & tube     | SB-622    | ...        | N06200               | Solution ann.           |
| 20       | 59Ni-23Cr-16Mo-1.6Cu | Smls. pipe & tube     | SB-622    | ...        | N06200               | Solution ann.           |
| 21       | 59Ni-23Cr-16Mo-1.6Cu | Wld. tube             | SB-626    | ...        | N06200               | Solution ann.           |
| 22       | 59Ni-23Cr-16Mo-1.6Cu | Wld. tube             | SB-626    | ...        | N06200               | Solution ann.           |
| 23       | 60Ni-19Cr-19Mo-1.8Ta | Smls. & wld. fittings | SB-366    | ...        | N06210               | Solution ann.           |
| 24       | 60Ni-19Cr-19Mo-1.8Ta | Forgings              | SB-564    | ...        | N06210               | Solution ann.           |
| 25       | 60Ni-19Cr-19Mo-1.8Ta | Forgings              | SB-564    | ...        | N06210               | Solution ann.           |
| 26       | 60Ni-19Cr-19Mo-1.8Ta | Rod                   | SB-574    | ...        | N06210               | Solution ann.           |
| 27       | 60Ni-19Cr-19Mo-1.8Ta | Rod                   | SB-574    | ...        | N06210               | Solution ann.           |
| 28       | 60Ni-19Cr-19Mo-1.8Ta | Plate, sheet, strip   | SB-575    | ...        | N06210               | Solution ann.           |
| 29       | 60Ni-19Cr-19Mo-1.8Ta | Plate, sheet, strip   | SB-575    | ...        | N06210               | Solution ann.           |
| 30       | 60Ni-19Cr-19Mo-1.8Ta | Wld. pipe             | SB-619    | ...        | N06210               | Solution ann.           |
| 31       | 60Ni-19Cr-19Mo-1.8Ta | Wld. pipe             | SB-619    | ...        | N06210               | Solution ann.           |
| 32       | 60Ni-19Cr-19Mo-1.8Ta | Smls. pipe & tube     | SB-622    | ...        | N06210               | Solution ann.           |
| 33       | 60Ni-19Cr-19Mo-1.8Ta | Smls. pipe & tube     | SB-622    | ...        | N06210               | Solution ann.           |
| 34       | 60Ni-19Cr-19Mo-1.8Ta | Wld. tube             | SB-626    | ...        | N06210               | Solution ann.           |
| 35       | 60Ni-19Cr-19Mo-1.8Ta | Wld. tube             | SB-626    | ...        | N06210               | Solution ann.           |
| 36       | 57Ni-22Cr-14W-2Mo-La | Smls. & wld. fittings | SB-366    | ...        | N06230               | Solution ann.           |
| 37       | 57Ni-22Cr-14W-2Mo-La | Plate, sheet, strip   | SB-435    | ...        | N06230               | Solution ann.           |
| 38       | 57Ni-22Cr-14W-2Mo-La | Plate, sheet, strip   | SB-435    | ...        | N06230               | Solution ann.           |
| 39       | 57Ni-22Cr-14W-2Mo-La | Forgings              | SB-564    | ...        | N06230               | Solution ann.           |
| 40       | 57Ni-22Cr-14W-2Mo-La | Forgings              | SB-564    | ...        | N06230               | Solution ann.           |
| 41       | 57Ni-22Cr-14W-2Mo-La | Bar                   | SB-572    | ...        | N06230               | Solution ann.           |
| 42       | 57Ni-22Cr-14W-2Mo-La | Bar                   | SB-572    | ...        | N06230               | Solution ann.           |
| 43       | 57Ni-22Cr-14W-2Mo-La | Wld. pipe             | SB-619    | ...        | N06230               | Solution ann.           |
| 44       | 57Ni-22Cr-14W-2Mo-La | Wld. pipe             | SB-619    | ...        | N06230               | Solution ann.           |
| 45       | 57Ni-22Cr-14W-2Mo-La | Smls. pipe & tube     | SB-622    | ...        | N06230               | Solution ann.           |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes             |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|-----|--------|-----|-----------------------------|-------------------|
|          |                      |       |                            |                          | I                                                                                          | III | VIII-1 | XII |                             |                   |
| 1        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G23, T16      |
| 2        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G14, G23, T16     |
| 3        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G14, G23, T16 |
| 4        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G23, T16          |
| 5        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G23, T16      |
| 6        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G14, G23, T16     |
| 7        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | 800 | 1400   | 650 | NFN-14                      | G5, G14, G23, T16 |
| 8        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5, W12           |
| 9        | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...               |
| 10       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                |
| 11       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...               |
| 12       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                |
| 13       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...               |
| 14       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                |
| 15       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...               |
| 16       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                |
| 17       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G14               |
| 18       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5, G14           |
| 19       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...               |
| 20       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                |
| 21       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G14               |
| 22       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5, G14           |
| 23       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | G5, W12           |
| 24       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | ...               |
| 25       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | G5                |
| 26       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | ...               |
| 27       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | G5                |
| 28       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | ...               |
| 29       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | G5                |
| 30       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | ...               |
| 31       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | G5, G14           |
| 32       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | ...               |
| 33       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | G5                |
| 34       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | ...               |
| 35       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-14                      | G5, G14           |
| 36       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, G5, T15, W12  |
| 37       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, T16           |
| 38       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, G5, T15       |
| 39       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, T16           |
| 40       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, G5, T15       |
| 41       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, T16           |
| 42       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, G5, T15       |
| 43       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, G14, T16      |
| 44       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, G5, G14, T15  |
| 45       | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP  | 1800   | 650 | NFN-24                      | G4, T16           |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
 (\*See Maximum Temperature Limits for Restrictions on Class)

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 350 | 400  | 450 | 500  | 550 | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  |
| 1        | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 28.0 | ... | 27.0 | ... | 26.0 | 25.6 | 25.2 | 24.9 | 24.6 | 24.4 | 24.2 | 23.7 |
| 2        | 24.3                                                                                                     | ... | 22.9 | ... | 21.4 | ... | 20.2 | ... | 19.2 | ... | 18.2 | 17.7 | 17.2 | 16.7 | 16.2 | 15.7 | 15.3 | 14.9 |
| 3        | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 23.8 | ... | 23.0 | ... | 22.1 | 21.8 | 21.4 | 21.2 | 20.9 | 20.7 | 20.6 | 20.1 |
| 4        | 28.6                                                                                                     | ... | 26.9 | ... | 25.2 | ... | 23.8 | ... | 22.6 | ... | 21.4 | 20.8 | 20.2 | 19.6 | 19.1 | 18.5 | 18.0 | 17.5 |
| 5        | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 28.0 | ... | 27.0 | ... | 26.0 | 25.6 | 25.2 | 24.9 | 24.6 | 24.4 | 24.2 | 23.7 |
| 6        | 24.3                                                                                                     | ... | 22.9 | ... | 21.4 | ... | 20.2 | ... | 19.2 | ... | 18.2 | 17.7 | 17.2 | 16.7 | 16.2 | 15.7 | 15.3 | 14.9 |
| 7        | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 23.8 | ... | 23.0 | ... | 22.1 | 21.8 | 21.4 | 21.2 | 20.9 | 20.7 | 20.6 | 20.1 |
| 8        | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 27.6 | ... | 26.8 | ... | 26.2 | 26.0 | 25.7 | 25.4 | 25.2 | ...  | ...  | ...  |
| 9        | 28.6                                                                                                     | ... | 26.9 | ... | 24.8 | ... | 22.9 | ... | 21.2 | ... | 19.9 | 19.4 | 19.1 | 18.8 | 18.7 | ...  | ...  | ...  |
| 10       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 27.6 | ... | 26.8 | ... | 26.2 | 26.0 | 25.7 | 25.4 | 25.2 | ...  | ...  | ...  |
| 11       | 28.6                                                                                                     | ... | 26.9 | ... | 24.8 | ... | 22.9 | ... | 21.2 | ... | 19.9 | 19.4 | 19.1 | 18.8 | 18.7 | ...  | ...  | ...  |
| 12       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 27.6 | ... | 26.8 | ... | 26.2 | 26.0 | 25.7 | 25.4 | 25.2 | ...  | ...  | ...  |
| 13       | 28.6                                                                                                     | ... | 26.9 | ... | 24.8 | ... | 22.9 | ... | 21.2 | ... | 19.9 | 19.4 | 19.1 | 18.8 | 18.7 | ...  | ...  | ...  |
| 14       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 27.6 | ... | 26.8 | ... | 26.2 | 26.0 | 25.7 | 25.4 | 25.2 | ...  | ...  | ...  |
| 15       | 28.6                                                                                                     | ... | 26.9 | ... | 24.8 | ... | 22.9 | ... | 21.2 | ... | 19.9 | 19.4 | 19.1 | 18.8 | 18.7 | ...  | ...  | ...  |
| 16       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 27.6 | ... | 26.8 | ... | 26.2 | 26.0 | 25.7 | 25.4 | 25.2 | ...  | ...  | ...  |
| 17       | 24.3                                                                                                     | ... | 22.9 | ... | 21.1 | ... | 19.4 | ... | 18.0 | ... | 16.9 | 16.5 | 16.2 | 16.0 | 15.9 | ...  | ...  | ...  |
| 18       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 23.5 | ... | 22.8 | ... | 22.3 | 22.1 | 21.9 | 21.6 | 21.4 | ...  | ...  | ...  |
| 19       | 28.6                                                                                                     | ... | 26.9 | ... | 24.8 | ... | 22.9 | ... | 21.2 | ... | 19.9 | 19.4 | 19.1 | 18.8 | 18.7 | ...  | ...  | ...  |
| 20       | 28.6                                                                                                     | ... | 28.6 | ... | 28.6 | ... | 27.6 | ... | 26.8 | ... | 26.2 | 26.0 | 25.7 | 25.4 | 25.2 | ...  | ...  | ...  |
| 21       | 24.3                                                                                                     | ... | 22.9 | ... | 21.1 | ... | 19.4 | ... | 18.0 | ... | 16.9 | 16.5 | 16.2 | 16.0 | 15.9 | ...  | ...  | ...  |
| 22       | 24.3                                                                                                     | ... | 24.3 | ... | 24.3 | ... | 23.5 | ... | 22.8 | ... | 22.3 | 22.1 | 21.9 | 21.6 | 21.4 | ...  | ...  | ...  |
| 23       | 28.6                                                                                                     | ... | 28.6 | ... | 28.5 | ... | 27.6 | ... | 26.9 | ... | 26.3 | 25.5 | 24.8 | 24.1 | 23.6 | ...  | ...  | ...  |
| 24       | 28.6                                                                                                     | ... | 26.6 | ... | 24.5 | ... | 22.6 | ... | 21.0 | ... | 19.5 | 18.9 | 18.4 | 17.9 | 17.5 | ...  | ...  | ...  |
| 25       | 28.6                                                                                                     | ... | 28.6 | ... | 28.5 | ... | 27.6 | ... | 26.9 | ... | 26.3 | 25.5 | 24.8 | 24.1 | 23.6 | ...  | ...  | ...  |
| 26       | 28.6                                                                                                     | ... | 26.6 | ... | 24.5 | ... | 22.6 | ... | 21.0 | ... | 19.5 | 18.9 | 18.4 | 17.9 | 17.5 | ...  | ...  | ...  |
| 27       | 28.6                                                                                                     | ... | 28.6 | ... | 28.5 | ... | 27.6 | ... | 26.9 | ... | 26.3 | 25.5 | 24.8 | 24.1 | 23.6 | ...  | ...  | ...  |
| 28       | 28.6                                                                                                     | ... | 26.6 | ... | 24.5 | ... | 22.6 | ... | 21.0 | ... | 19.5 | 18.9 | 18.4 | 17.9 | 17.5 | ...  | ...  | ...  |
| 29       | 28.6                                                                                                     | ... | 28.6 | ... | 28.5 | ... | 27.6 | ... | 26.9 | ... | 26.3 | 25.5 | 24.8 | 24.1 | 23.6 | ...  | ...  | ...  |
| 30       | 24.3                                                                                                     | ... | 22.6 | ... | 20.8 | ... | 19.2 | ... | 17.8 | ... | 16.6 | 16.1 | 15.6 | 15.2 | 14.8 | ...  | ...  | ...  |
| 31       | 24.3                                                                                                     | ... | 24.3 | ... | 24.2 | ... | 23.5 | ... | 22.9 | ... | 22.4 | 21.7 | 21.1 | 20.5 | 20.0 | ...  | ...  | ...  |
| 32       | 28.6                                                                                                     | ... | 26.6 | ... | 24.5 | ... | 22.6 | ... | 21.0 | ... | 19.5 | 18.9 | 18.4 | 17.9 | 17.5 | ...  | ...  | ...  |
| 33       | 28.6                                                                                                     | ... | 28.6 | ... | 28.5 | ... | 27.6 | ... | 26.9 | ... | 26.3 | 25.5 | 24.8 | 24.1 | 23.6 | ...  | ...  | ...  |
| 34       | 24.3                                                                                                     | ... | 22.6 | ... | 20.8 | ... | 19.2 | ... | 17.8 | ... | 16.6 | 16.1 | 15.6 | 15.2 | 14.8 | ...  | ...  | ...  |
| 35       | 24.3                                                                                                     | ... | 24.3 | ... | 24.2 | ... | 23.5 | ... | 22.9 | ... | 22.4 | 21.7 | 21.1 | 20.5 | 20.0 | ...  | ...  | ...  |
| 36       | 30.0                                                                                                     | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 29.4 | 29.1 | 28.7 | 28.4 | 28.2 | 28.2 | 28.2 | 28.2 |
| 37       | 30.0                                                                                                     | ... | 28.2 | ... | 26.4 | ... | 24.7 | ... | 23.1 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.9 | 20.9 | 20.9 | 20.9 |
| 38       | 30.0                                                                                                     | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 29.4 | 29.1 | 28.7 | 28.4 | 28.2 | 28.2 | 28.2 | 28.2 |
| 39       | 30.0                                                                                                     | ... | 28.2 | ... | 26.4 | ... | 24.7 | ... | 23.1 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.9 | 20.9 | 20.9 | 20.9 |
| 40       | 30.0                                                                                                     | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 29.4 | 29.1 | 28.7 | 28.4 | 28.2 | 28.2 | 28.2 | 28.2 |
| 41       | 30.0                                                                                                     | ... | 28.2 | ... | 26.4 | ... | 24.7 | ... | 23.1 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.9 | 20.9 | 20.9 | 20.9 |
| 42       | 30.0                                                                                                     | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 29.4 | 29.1 | 28.7 | 28.4 | 28.2 | 28.2 | 28.2 | 28.2 |
| 43       | 25.5                                                                                                     | ... | 24.0 | ... | 22.4 | ... | 21.0 | ... | 19.6 | ... | 18.7 | 18.3 | 18.0 | 17.9 | 17.8 | 17.8 | 17.8 | 17.8 |
| 44       | 25.5                                                                                                     | ... | 25.5 | ... | 25.5 | ... | 25.5 | ... | 25.5 | ... | 25.0 | 24.7 | 24.4 | 24.1 | 24.0 | 24.0 | 24.0 | 24.0 |
| 45       | 30.0                                                                                                     | ... | 28.2 | ... | 26.4 | ... | 24.7 | ... | 23.1 | ... | 22.0 | 21.5 | 21.2 | 21.0 | 20.9 | 20.9 | 20.9 | 20.9 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | 23.1                                                                                                     | 22.6 | 18.8 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 2        | 14.5                                                                                                     | 14.3 | 14.0 | 12.4 | 9.9  | 8.0  | 6.3  | 5.0  | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 3        | 19.6                                                                                                     | 19.2 | 16.0 | 12.4 | 9.9  | 8.0  | 6.3  | 5.0  | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 4        | 17.1                                                                                                     | 16.8 | 16.5 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | 23.1                                                                                                     | 22.6 | 18.8 | 14.6 | 11.6 | 9.4  | 7.4  | 5.9  | 4.8  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | 14.5                                                                                                     | 14.3 | 14.0 | 12.4 | 9.9  | 8.0  | 6.3  | 5.0  | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | 19.6                                                                                                     | 19.2 | 16.0 | 12.4 | 9.9  | 8.0  | 6.3  | 5.0  | 4.1  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 28.2                                                                                                     | 28.2 | 23.2 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 37       | 20.9                                                                                                     | 20.9 | 20.9 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 38       | 28.2                                                                                                     | 28.2 | 23.2 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 39       | 20.9                                                                                                     | 20.9 | 20.9 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 40       | 28.2                                                                                                     | 28.2 | 23.2 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 41       | 20.9                                                                                                     | 20.9 | 20.9 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 42       | 28.2                                                                                                     | 28.2 | 23.2 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 43       | 17.8                                                                                                     | 17.8 | 17.8 | 16.2 | 13.3 | 11.0 | 9.0  | 7.2  | 5.7  | 4.5  | 3.5  | 2.5  | 1.8  | 1.3  | 0.94 | 0.60 | 0.38 |
| 44       | 24.0                                                                                                     | 24.0 | 19.7 | 16.2 | 13.3 | 11.0 | 9.0  | 7.2  | 5.7  | 4.5  | 3.5  | 2.5  | 1.8  | 1.3  | 0.94 | 0.60 | 0.38 |
| 45       | 20.9                                                                                                     | 20.9 | 20.9 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition  | Product Form          | Spec. No. | Type/Grade | Alloy<br>Desig./UNS<br>No. | Class/Condition/<br>Temper |
|----------|----------------------|-----------------------|-----------|------------|----------------------------|----------------------------|
| 1        | 57Ni-22Cr-14W-2Mo-La | Smls. pipe & tube     | SB-622    | ...        | N06230                     | Solution ann.              |
| 2        | 57Ni-22Cr-14W-2Mo-La | Wld. tube             | SB-626    | ...        | N06230                     | Solution ann.              |
| 3        | 57Ni-22Cr-14W-2Mo-La | Wld. tube             | SB-626    | ...        | N06230                     | Solution ann.              |
| 4        | 61Ni-16Mo-16Cr       | Smls. & wld. fittings | SB-366    | ...        | N06455                     | Annealed                   |
| 5        | 61Ni-16Mo-16Cr       | Rod                   | SB-574    | ...        | N06455                     | Solution ann.              |
| 6        | 61Ni-16Mo-16Cr       | Rod                   | SB-574    | ...        | N06455                     | Solution ann.              |
| 7        | 61Ni-16Mo-16Cr       | Plate, sheet, strip   | SB-575    | ...        | N06455                     | Solution ann.              |
| 8        | 61Ni-16Mo-16Cr       | Plate, sheet, strip   | SB-575    | ...        | N06455                     | Solution ann.              |
| 9        | 61Ni-16Mo-16Cr       | Wld. pipe             | SB-619    | ...        | N06455                     | Solution ann.              |
| 10       | 61Ni-16Mo-16Cr       | Wld. pipe             | SB-619    | ...        | N06455                     | Solution ann.              |
| 11       | 61Ni-16Mo-16Cr       | Smls. pipe & tube     | SB-622    | ...        | N06455                     | Solution ann.              |
| 12       | 61Ni-16Mo-16Cr       | Smls. pipe & tube     | SB-622    | ...        | N06455                     | Solution ann.              |
| 13       | 61Ni-16Mo-16Cr       | Wld. tube             | SB-626    | ...        | N06455                     | Solution ann.              |
| 14       | 61Ni-16Mo-16Cr       | Wld. tube             | SB-626    | ...        | N06455                     | Solution ann.              |
| 15       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Hot fin./ann.              |
| 16       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Hot fin./ann.              |
| 17       | 72Ni-15Cr-8Fe        | Smls. & wld. fittings | SB-366    | ...        | N06600                     | Annealed                   |
| 18       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Cold drawn/ann.            |
| 19       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Cold drawn/ann.            |
| 20       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Hot fin./ann.              |
| 21       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Hot fin./ann.              |
| 22       | 72Ni-15Cr-8Fe        | Smls. tube            | SB-163    | ...        | N06600                     | Annealed                   |
| 23       | 72Ni-15Cr-8Fe        | Smls. tube            | SB-163    | ...        | N06600                     | Annealed                   |
| 24       | 72Ni-15Cr-8Fe        | Bar                   | SB-166    | ...        | N06600                     | Annealed                   |
| 25       | 72Ni-15Cr-8Fe        | Bar                   | SB-166    | ...        | N06600                     | Annealed                   |
| 26       | 72Ni-15Cr-8Fe        | Plate                 | SB-168    | ...        | N06600                     | Annealed                   |
| 27       | 72Ni-15Cr-8Fe        | Plate, sheet, strip   | SB-168    | ...        | N06600                     | Annealed                   |
| 28       | 72Ni-15Cr-8Fe        | Wld. tube             | SB-516    | ...        | N06600                     | Annealed                   |
| 29       | 72Ni-15Cr-8Fe        | Wld. tube             | SB-516    | ...        | N06600                     | Annealed                   |
| 30       | 72Ni-15Cr-8Fe        | Forgings              | SB-564    | ...        | N06600                     | ...                        |
| 31       | 72Ni-15Cr-8Fe        | Forgings              | SB-564    | ...        | N06600                     | Annealed                   |
| 32       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Cold drawn/ann.            |
| 33       | 72Ni-15Cr-8Fe        | Smls. pipe & tube     | SB-167    | ...        | N06600                     | Cold drawn/ann.            |
| 34       | 72Ni-15Cr-8Fe        | Wld. pipe             | SB-517    | ...        | N06600                     | Cold drawn/ann.            |
| 35       | 72Ni-15Cr-8Fe        | Wld. pipe             | SB-517    | ...        | N06600                     | Cold drawn/ann.            |
| 36       | 72Ni-15Cr-8Fe        | Bar, rod              | SB-166    | ...        | N06600                     | Hot fin.                   |
| 37       | 72Ni-15Cr-8Fe        | Bar, rod              | SB-166    | ...        | N06600                     | Hot fin.                   |
| 38       | 72Ni-15Cr-8Fe        | Plate, sheet, strip   | SB-168    | ...        | N06600                     | Hot rolled                 |
| 39       | 72Ni-15Cr-8Fe        | Plate, sheet, strip   | SB-168    | ...        | N06600                     | Hot rolled                 |
| 40       | 60Ni-23Cr-Fe         | Smls. tube            | SB-163    | ...        | N06601                     | Annealed                   |
| 41       | 60Ni-23Cr-Fe         | Smls. tube            | SB-163    | ...        | N06601                     | Annealed                   |
| 42       | 60Ni-23Cr-Fe         | Bar                   | SB-166    | ...        | N06601                     | Annealed                   |
| 43       | 60Ni-23Cr-Fe         | Bar                   | SB-166    | ...        | N06601                     | Annealed                   |
| 44       | 60Ni-23Cr-Fe         | Smls. pipe & tube     | SB-167    | ...        | N06601                     | Annealed                   |
| 45       | 60Ni-23Cr-Fe         | Smls. pipe & tube     | SB-167    | ...        | N06601                     | Annealed                   |



**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |                  |        |     | External Pressure Chart No. | Notes            |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|------------------|--------|-----|-----------------------------|------------------|
|          |                      |       |                            |                          | I                                                                                          | III              | VIII-1 | XII |                             |                  |
| 1        | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP               | 1800   | 650 | NFN-24                      | G4, G5, T15      |
| 2        | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP               | 1800   | 650 | NFN-24                      | G4, G14, T16     |
| 3        | ...                  | 43    | 110                        | 45                       | 1650                                                                                       | NP               | 1800   | 650 | NFN-24                      | G4, G5, G14, T15 |
| 4        | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G5, W12          |
| 5        | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | ...              |
| 6        | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G5               |
| 7        | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | ...              |
| 8        | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G5               |
| 9        | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G14              |
| 10       | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G5, G14          |
| 11       | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | ...              |
| 12       | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G5               |
| 13       | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G14              |
| 14       | ...                  | 43    | 100                        | 40                       | NP                                                                                         | NP               | 800    | 650 | NFN-14                      | G5, G14          |
| 15       | >5                   | 43    | 75                         | 25                       | NP                                                                                         | 800              | 1200   | 650 | NFN-4                       | T12              |
| 16       | >5                   | 43    | 75                         | 25                       | NP                                                                                         | 800              | 1200   | 650 | NFN-4                       | G5, T11          |
| 17       | ...                  | 43    | 80                         | 30                       | 800                                                                                        | NP               | 1200   | 650 | NFN-4                       | G5, T11, W5, W12 |
| 18       | >5                   | 43    | 80                         | 30                       | NP                                                                                         | 800 (Cl. 3 only) | 1200   | 650 | NFN-4                       | T12              |
| 19       | >5                   | 43    | 80                         | 30                       | NP                                                                                         | 800 (Cl. 3 only) | 1200   | 650 | NFN-4                       | G5, T11          |
| 20       | ≤5                   | 43    | 80                         | 30                       | NP                                                                                         | 800              | 1200   | 650 | NFN-4                       | G5, T11          |
| 21       | ≤5                   | 43    | 80                         | 30                       | NP                                                                                         | NP               | 1200   | 650 | NFN-4                       | T12              |
| 22       | ≤3                   | 43    | 80                         | 35                       | 1200                                                                                       | 800              | 1200   | 650 | NFN-4                       | G5, T11          |
| 23       | ≤3                   | 43    | 80                         | 35                       | 1200                                                                                       | NP               | 1200   | 650 | NFN-4                       | T11              |
| 24       | ...                  | 43    | 80                         | 35                       | 1200                                                                                       | 800              | 1200   | 650 | NFN-4                       | G5, T11          |
| 25       | ...                  | 43    | 80                         | 35                       | 1200                                                                                       | NP               | 1200   | 650 | NFN-4                       | T11              |
| 26       | ...                  | 43    | 80                         | 35                       | 1200                                                                                       | 800              | 1200   | 650 | NFN-4                       | G5, T11          |
| 27       | ...                  | 43    | 80                         | 35                       | 1200                                                                                       | NP               | 1200   | 650 | NFN-4                       | T11              |
| 28       | ...                  | 43    | 80                         | 35                       | NP                                                                                         | NP               | 1200   | 650 | NFN-4                       | G14, T11         |
| 29       | ...                  | 43    | 80                         | 35                       | NP                                                                                         | NP               | 1200   | 650 | NFN-4                       | G5, G14, T11     |
| 30       | ...                  | 43    | 80                         | 35                       | NP                                                                                         | 800              | NP     | NP  | NFN-4                       | G5               |
| 31       | ...                  | 43    | 80                         | 35                       | NP                                                                                         | NP               | 1200   | 650 | NFN-4                       | T11              |
| 32       | ≤5                   | 43    | 80                         | 35                       | 1200                                                                                       | 800 (Cl. 3 only) | 1200   | 650 | NFN-4                       | T11              |
| 33       | ≤5                   | 43    | 80                         | 35                       | 1200                                                                                       | 800              | 1200   | 650 | NFN-4                       | G5, T11          |
| 34       | ...                  | 43    | 80                         | 35                       | NP                                                                                         | NP               | 1200   | 650 | NFN-4                       | G14, T11         |
| 35       | ...                  | 43    | 80                         | 35                       | NP                                                                                         | NP               | 1200   | 650 | NFN-4                       | G5, G14, T11     |
| 36       | ...                  | 43    | 85                         | 35                       | 1200                                                                                       | 800 (Cl. 3 only) | 1200   | 650 | NFN-4                       | T13              |
| 37       | ...                  | 43    | 85                         | 35                       | 1200                                                                                       | 800 (Cl. 3 only) | 1200   | 650 | NFN-4                       | G5, T12          |
| 38       | ...                  | 43    | 85                         | 35                       | 1200                                                                                       | 800 (Cl. 3 only) | 1200   | 650 | NFN-4                       | G20, T13         |
| 39       | ...                  | 43    | 85                         | 35                       | 1200                                                                                       | 800 (Cl. 3 only) | 1200   | 650 | NFN-4                       | G5, G20, T12     |
| 40       | ≤3 O.D.              | 43    | 80                         | 30                       | 1650                                                                                       | NP               | 1650   | NP  | NFN-4                       | G4, T14          |
| 41       | ≤3 O.D.              | 43    | 80                         | 30                       | 1650                                                                                       | NP               | 1650   | NP  | NFN-4                       | G4, G5, T13      |
| 42       | ...                  | 43    | 80                         | 30                       | 1650                                                                                       | NP               | 1650   | NP  | NFN-4                       | G4, T14          |
| 43       | ...                  | 43    | 80                         | 30                       | 1650                                                                                       | NP               | 1650   | NP  | NFN-4                       | G4, G5, T13      |
| 44       | ...                  | 43    | 80                         | 30                       | 1650                                                                                       | NP               | 1650   | NP  | NFN-4                       | G4, T14          |
| 45       | ...                  | 43    | 80                         | 30                       | 1650                                                                                       | NP               | 1650   | NP  | NFN-4                       | G4, G5, T13      |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 350 | 400  | 450 | 500  | 550 | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  |
| 1        | 30.0                                                                                                     | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 30.0 | ... | 29.4 | 29.1 | 28.7 | 28.4 | 28.2 | 28.2 | 28.2 | 28.2 |
| 2        | 25.5                                                                                                     | ... | 24.0 | ... | 22.4 | ... | 21.0 | ... | 19.6 | ... | 18.7 | 18.3 | 18.0 | 17.9 | 17.8 | 17.8 | 17.8 | 17.8 |
| 3        | 25.5                                                                                                     | ... | 25.5 | ... | 25.5 | ... | 25.5 | ... | 25.5 | ... | 25.0 | 24.7 | 24.4 | 24.1 | 24.0 | 24.0 | 24.0 | 24.0 |
| 4        | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ...  | 26.5 | ...  | 25.8 | ...  | ...  | ...  |
| 5        | 26.7                                                                                                     | ... | 24.6 | ... | 23.0 | ... | 21.7 | ... | 20.8 | ... | 20.1 | 19.9 | 19.6 | 19.4 | 19.1 | ...  | ...  | ...  |
| 6        | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | 26.7 | 26.5 | 26.1 | 25.8 | ...  | ...  | ...  |
| 7        | 26.7                                                                                                     | ... | 24.6 | ... | 23.0 | ... | 21.7 | ... | 20.8 | ... | 20.1 | 19.9 | 19.6 | 19.4 | 19.1 | ...  | ...  | ...  |
| 8        | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | 26.7 | 26.5 | 26.1 | 25.8 | ...  | ...  | ...  |
| 9        | 22.7                                                                                                     | ... | 20.9 | ... | 19.5 | ... | 18.5 | ... | 17.7 | ... | 17.1 | 16.9 | 16.7 | 16.5 | 16.2 | ...  | ...  | ...  |
| 10       | 22.7                                                                                                     | ... | 22.7 | ... | 22.7 | ... | 22.7 | ... | 22.7 | ... | 22.7 | 22.7 | 22.5 | 22.2 | 21.9 | ...  | ...  | ...  |
| 11       | 26.7                                                                                                     | ... | 24.6 | ... | 23.0 | ... | 21.7 | ... | 20.8 | ... | 20.1 | 19.9 | 19.6 | 19.4 | 19.1 | ...  | ...  | ...  |
| 12       | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | 26.7 | 26.5 | 26.1 | 25.8 | ...  | ...  | ...  |
| 13       | 22.7                                                                                                     | ... | 20.9 | ... | 19.5 | ... | 18.5 | ... | 17.7 | ... | 17.1 | 16.9 | 16.7 | 16.5 | 16.2 | ...  | ...  | ...  |
| 14       | 22.7                                                                                                     | ... | 22.7 | ... | 22.7 | ... | 22.7 | ... | 22.7 | ... | 22.7 | 22.7 | 22.5 | 22.2 | 21.9 | ...  | ...  | ...  |
| 15       | 16.7                                                                                                     | ... | 15.9 | ... | 15.2 | ... | 14.6 | ... | 14.0 | ... | 13.5 | 13.3 | 13.1 | 12.9 | 12.7 | 12.5 | 12.4 | 10.6 |
| 16       | 16.7                                                                                                     | ... | 16.7 | ... | 16.7 | ... | 16.7 | ... | 16.7 | ... | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.7 | 16.0 | 10.6 |
| 17       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 16.0 | 10.6 |
| 18       | 20.0                                                                                                     | ... | 19.1 | ... | 18.3 | ... | 17.5 | ... | 16.8 | ... | 16.2 | 15.9 | 15.7 | 15.5 | 15.2 | 15.1 | 14.9 | 10.6 |
| 19       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 16.0 | 10.6 |
| 20       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 16.0 | 10.6 |
| 21       | 20.0                                                                                                     | ... | 19.1 | ... | 18.3 | ... | 17.5 | ... | 16.8 | ... | 16.2 | 15.9 | 15.7 | 15.5 | 15.2 | 15.1 | 14.9 | 10.6 |
| 22       | 22.9                                                                                                     | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.4 | 16.0 | 10.6 |
| 23       | 22.9                                                                                                     | ... | 21.3 | ... | 20.8 | ... | 20.5 | ... | 20.2 | ... | 19.9 | 19.8 | 19.6 | 19.4 | 19.1 | 18.7 | 16.0 | 10.6 |
| 24       | 22.9                                                                                                     | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.4 | 16.0 | 10.6 |
| 25       | 22.9                                                                                                     | ... | 21.3 | ... | 20.8 | ... | 20.5 | ... | 20.2 | ... | 19.9 | 19.8 | 19.6 | 19.4 | 19.1 | 18.7 | 16.0 | 10.6 |
| 26       | 22.9                                                                                                     | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.4 | 16.0 | 10.6 |
| 27       | 22.9                                                                                                     | ... | 21.3 | ... | 20.8 | ... | 20.5 | ... | 20.2 | ... | 19.9 | 19.8 | 19.6 | 19.4 | 19.1 | 18.7 | 16.0 | 10.6 |
| 28       | 19.4                                                                                                     | ... | 18.1 | ... | 17.7 | ... | 17.4 | ... | 17.2 | ... | 16.9 | 16.8 | 16.7 | 16.5 | 16.2 | 15.9 | 13.6 | 9.0  |
| 29       | 19.4                                                                                                     | ... | 19.4 | ... | 19.4 | ... | 19.4 | ... | 19.4 | ... | 19.4 | 19.4 | 19.4 | 19.4 | 19.4 | 19.0 | 13.6 | 9.0  |
| 30       | 22.9                                                                                                     | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | ...  | ...  | ...  |
| 31       | 22.9                                                                                                     | ... | 21.3 | ... | 20.8 | ... | 20.5 | ... | 20.2 | ... | 19.9 | 19.8 | 19.6 | 19.4 | 19.1 | 18.7 | 16.0 | 10.6 |
| 32       | 22.9                                                                                                     | ... | 21.3 | ... | 20.8 | ... | 20.5 | ... | 20.2 | ... | 19.9 | 19.8 | 19.6 | 19.4 | 19.1 | 18.7 | 16.0 | 10.6 |
| 33       | 22.9                                                                                                     | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | ... | 22.9 | 22.9 | 22.9 | 22.9 | 22.9 | 22.4 | 16.0 | 10.6 |
| 34       | 19.4                                                                                                     | ... | 18.1 | ... | 17.7 | ... | 17.4 | ... | 17.2 | ... | 16.9 | 16.8 | 16.7 | 16.5 | 16.2 | 15.9 | 13.6 | 9.0  |
| 35       | 19.4                                                                                                     | ... | 19.4 | ... | 19.4 | ... | 19.4 | ... | 19.4 | ... | 19.4 | 19.4 | 19.4 | 19.4 | 19.4 | 19.0 | 13.6 | 9.0  |
| 36       | 23.3                                                                                                     | ... | 22.1 | ... | 21.5 | ... | 21.3 | ... | 21.3 | ... | 21.2 | 21.1 | 21.0 | 20.8 | 20.5 | 20.1 | 19.7 | 19.3 |
| 37       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | 23.3 | 23.3 | 23.3 | 23.3 | 23.3 | 23.3 | 20.4 |
| 38       | 23.3                                                                                                     | ... | 22.1 | ... | 21.5 | ... | 21.3 | ... | 21.3 | ... | 21.2 | 21.1 | 21.0 | 20.8 | 20.5 | 20.1 | 19.7 | 19.3 |
| 39       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | 23.3 | 23.3 | 23.3 | 23.3 | 23.3 | 23.3 | 20.4 |
| 40       | 20.0                                                                                                     | ... | 17.8 | ... | 16.6 | ... | 15.5 | ... | 14.7 | ... | 14.2 | 14.0 | 13.9 | 13.8 | 13.8 | 13.8 | 13.8 | 13.7 |
| 41       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 19.9 | ... | 19.2 | 19.0 | 18.8 | 18.7 | 18.6 | 18.6 | 18.6 | 18.6 |
| 42       | 20.0                                                                                                     | ... | 17.8 | ... | 16.6 | ... | 15.5 | ... | 14.7 | ... | 14.2 | 14.0 | 13.9 | 13.8 | 13.8 | 13.8 | 13.8 | 13.7 |
| 43       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 19.9 | ... | 19.2 | 19.0 | 18.8 | 18.7 | 18.6 | 18.6 | 18.6 | 18.6 |
| 44       | 20.0                                                                                                     | ... | 17.8 | ... | 16.6 | ... | 15.5 | ... | 14.7 | ... | 14.2 | 14.0 | 13.9 | 13.8 | 13.8 | 13.8 | 13.8 | 13.7 |
| 45       | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 19.9 | ... | 19.2 | 19.0 | 18.8 | 18.7 | 18.6 | 18.6 | 18.6 | 18.6 |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | 28.2                                                                                                     | 28.2 | 23.2 | 19.0 | 15.6 | 12.9 | 10.6 | 8.5  | 6.7  | 5.3  | 4.1  | 2.9  | 2.1  | 1.5  | 1.1  | 0.70 | 0.45 |
| 2        | 17.8                                                                                                     | 17.8 | 17.8 | 16.2 | 13.3 | 11.0 | 9.0  | 7.2  | 5.7  | 4.5  | 3.5  | 2.5  | 1.8  | 1.3  | 0.94 | 0.60 | 0.38 |
| 3        | 24.0                                                                                                     | 24.0 | 19.7 | 16.2 | 13.3 | 11.0 | 9.0  | 7.2  | 5.7  | 4.5  | 3.5  | 2.5  | 1.8  | 1.3  | 0.94 | 0.60 | 0.38 |
| 4        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 5        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 6        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 7        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 8        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 9        | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 10       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 11       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 12       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 13       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 14       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 15       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 16       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 17       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 18       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 19       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 6.0                                                                                                      | 3.8  | 2.6  | 1.9  | 1.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 6.0                                                                                                      | 3.8  | 2.6  | 1.9  | 1.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | 7.0                                                                                                      | 4.5  | 3.0  | 2.2  | 2.0  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | 6.0                                                                                                      | 3.8  | 2.6  | 1.9  | 1.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | 6.0                                                                                                      | 3.8  | 2.6  | 1.9  | 1.7  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | 14.5                                                                                                     | 10.3 | 7.2  | 5.8  | 5.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | 14.5                                                                                                     | 10.3 | 7.2  | 5.8  | 5.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | 14.5                                                                                                     | 10.3 | 7.2  | 5.8  | 5.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | 14.5                                                                                                     | 10.3 | 7.2  | 5.8  | 5.5  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | 13.7                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |
| 41       | 17.6                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |
| 42       | 13.7                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |
| 43       | 17.6                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |
| 44       | 13.7                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |
| 45       | 17.6                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition | Product Form          | Spec. No. | Type/Grade | Alloy          | Class/Condition/<br>Temper |          |
|----------|---------------------|-----------------------|-----------|------------|----------------|----------------------------|----------|
|          |                     |                       |           |            | Desig./UNS No. |                            |          |
| 1        | 60Ni-23Cr-Fe        | Plate, sheet, strip   | SB-168    | ...        | N06601         | Annealed                   |          |
| 2        | 60Ni-23Cr-Fe        | Plate, sheet, strip   | SB-168    | ...        | N06601         | Annealed                   |          |
| 3        | 52Ni-22Cr-13Co-9Mo  | Bar, rod              | SB-166    | ...        | N06617         | Annealed                   |          |
| 4        | 52Ni-22Cr-13Co-9Mo  | Bar, rod              | SB-166    | ...        | N06617         | Annealed                   |          |
| 5        | 52Ni-22Cr-13Co-9Mo  | Smls. pipe & tube     | SB-167    | ...        | N06617         | Annealed                   |          |
| 6        | 52Ni-22Cr-13Co-9Mo  | Smls. pipe & tube     | SB-167    | ...        | N06617         | Annealed                   |          |
| 7        | 52Ni-22Cr-13Co-9Mo  | Wld. tube             | SB-626    | ...        | N06617         | Solution ann.              |          |
| 8        | 52Ni-22Cr-13Co-9Mo  | Wld. tube             | SB-626    | ...        | N06617         | Solution ann.              |          |
| 9        | 52Ni-22Cr-13Co-9Mo  | Plate, sheet, strip   | SB-168    | ...        | N06617         | Annealed                   |          |
| 10       | 52Ni-22Cr-13Co-9Mo  | Plate, sheet, strip   | SB-168    | ...        | N06617         | Annealed                   |          |
| 11       | 52Ni-22Cr-13Co-9Mo  | Forgings              | SB-564    | ...        | N06617         | Annealed                   |          |
| 12       | 52Ni-22Cr-13Co-9Mo  | Forgings              | SB-564    | ...        | N06617         | Annealed                   |          |
| 13       | 60Ni-22Cr-9Mo-3.5Cb | Plate, sheet, strip   | SB-443    | 2          | N06625         | Cold rolled/solution ann.  |          |
| 14       | 60Ni-22Cr-9Mo-3.5Cb | Plate, sheet          | SB-443    | 2          | N06625         | Hot rolled/solution ann.   |          |
| 15       | 60Ni-22Cr-9Mo-3.5Cb | Smls. pipe & tube     | SB-444    | 2          | N06625         | Solution ann.              |          |
| 16       | 60Ni-22Cr-9Mo-3.5Cb | Smls. pipe & tube     | SB-444    | 2          | N06625         | Solution ann.              |          |
| 17       | 60Ni-22Cr-9Mo-3.5Cb | Bar                   | SB-446    | 2          | N06625         | Solution ann.              |          |
| 18       | 60Ni-22Cr-9Mo-3.5Cb | Bar                   | SB-446    | 2          | N06625         | Solution ann.              |          |
| 19       | 60Ni-22Cr-9Mo-3.5Cb | Smls. & wld. fittings | SB-366    | ...        | N06625         | Annealed                   |          |
| 20       | 60Ni-22Cr-9Mo-3.5Cb | Bar                   | SB-446    | 1          | N06625         | Annealed                   |          |
| (25)     | 21                  | 60Ni-22Cr-9Mo-3.5Cb   | Forgings  | SB-564     | 1              | N06625                     | Annealed |
| 22       | 60Ni-22Cr-9Mo-3.5Cb | Plate                 | SB-443    | 1          | N06625         | Cold rolled/ann.           |          |
| 23       | 60Ni-22Cr-9Mo-3.5Cb | Plate, sheet          | SB-443    | 1          | N06625         | Hot rolled/ann.            |          |
| 24       | 60Ni-22Cr-9Mo-3.5Cb | Sheet, strip          | SB-443    | 1          | N06625         | Cold rolled/ann.           |          |
| 25       | 60Ni-22Cr-9Mo-3.5Cb | Smls. pipe            | SB-444    | 1          | N06625         | Annealed                   |          |
| (25)     | 26                  | 60Ni-22Cr-9Mo-3.5Cb   | Bar       | SB-446     | 1              | N06625                     | Annealed |
| 27       | 60Ni-22Cr-9Mo-3.5Cb | Forgings              | SB-564    | 1          | N06625         | Annealed                   |          |
| 28       | 60Ni-22Cr-9Mo-3.5Cb | Wld. tube             | SB-704    | ...        | N06625         | Annealed                   |          |
| 29       | 60Ni-22Cr-9Mo-3.5Cb | Wld. pipe             | SB-705    | 1          | N06625         | Annealed                   |          |
| 30       | Ni-Cr-Mo-W          | Forged fittings       | SB-462    | ...        | N06686         | Solution ann.              |          |
| 31       | Ni-Cr-Mo-W          | Forged fittings       | SB-462    | ...        | N06686         | Solution ann.              |          |
| 32       | Ni-Cr-Mo-W          | Forgings              | SB-564    | ...        | N06686         | Solution ann.              |          |
| 33       | Ni-Cr-Mo-W          | Forgings              | SB-564    | ...        | N06686         | Solution ann.              |          |
| 34       | Ni-Cr-Mo-W          | Rod                   | SB-574    | ...        | N06686         | Solution ann.              |          |
| 35       | Ni-Cr-Mo-W          | Rod                   | SB-574    | ...        | N06686         | Solution ann.              |          |
| 36       | Ni-Cr-Mo-W          | Plate, sheet, strip   | SB-575    | ...        | N06686         | Solution ann.              |          |
| 37       | Ni-Cr-Mo-W          | Plate, sheet, strip   | SB-575    | ...        | N06686         | Solution ann.              |          |
| 38       | Ni-Cr-Mo-W          | Wld. pipe             | SB-619    | ...        | N06686         | Solution ann.              |          |
| 39       | Ni-Cr-Mo-W          | Wld. pipe             | SB-619    | ...        | N06686         | Solution ann.              |          |
| 40       | Ni-Cr-Mo-W          | Smls. pipe & tube     | SB-622    | ...        | N06686         | Solution ann.              |          |
| 41       | Ni-Cr-Mo-W          | Smls. pipe & tube     | SB-622    | ...        | N06686         | Solution ann.              |          |
| 42       | Ni-Cr-Mo-W          | Wld. tube             | SB-626    | ...        | N06686         | Solution ann.              |          |
| 43       | Ni-Cr-Mo-W          | Wld. tube             | SB-626    | ...        | N06686         | Solution ann.              |          |
| 44       | 58Ni-29Cr-9Fe       | Bar, rod              | SB-166    | ...        | N06690         | Annealed                   |          |
| 45       | 58Ni-29Cr-9Fe       | Bar, rod              | SB-166    | ...        | N06690         | Annealed                   |          |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Size/ Thickness, in. | P-No. | Min. Tensile Strength, ksi | Min. Yield Strength, ksi | Applicability and Max. Temperature Limits<br>(NP = Not Permitted)<br>(SPT = Supports Only) |     |        |     | External Pressure Chart No. | Notes                 |
|----------|----------------------|-------|----------------------------|--------------------------|--------------------------------------------------------------------------------------------|-----|--------|-----|-----------------------------|-----------------------|
|          |                      |       |                            |                          | I                                                                                          | III | VIII-1 | XII |                             |                       |
| 1        | ...                  | 43    | 80                         | 30                       | 1650                                                                                       | NP  | 1650   | NP  | NFN-4                       | G4, T14               |
| 2        | ...                  | 43    | 80                         | 30                       | 1650                                                                                       | NP  | 1650   | NP  | NFN-4                       | G4, G5, T13           |
| 3        | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, T18               |
| 4        | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, G5, T17           |
| 5        | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, T18               |
| 6        | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, G5, T17           |
| 7        | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, G14, T18          |
| 8        | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, G5, G14, T17      |
| 9        | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, T18               |
| 10       | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, G5, T17           |
| 11       | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, T18               |
| 12       | ...                  | 43    | 95                         | 35                       | 1650                                                                                       | NP  | 1800   | NP  | NFN-4                       | G4, G5, T17           |
| 13       | ...                  | 43    | 100                        | 40                       | 1100                                                                                       | NP  | 1600   | 650 | NFN-22                      | G4, G5, G23, T17, W13 |
| 14       | ...                  | 43    | 100                        | 40                       | 1100                                                                                       | NP  | 1600   | 650 | NFN-22                      | G4, G23, T18, W13     |
| 15       | ...                  | 43    | 100                        | 40                       | 1100                                                                                       | NP  | 1600   | 650 | NFN-22                      | G4, G5, G23, T17, W13 |
| 16       | ...                  | 43    | 100                        | 40                       | 1100                                                                                       | NP  | 1600   | 650 | NFN-22                      | G4, G23, T18, W13     |
| 17       | ...                  | 43    | 100                        | 40                       | 1100                                                                                       | NP  | 1600   | 650 | NFN-22                      | G4, G5, G23, T17, W13 |
| 18       | ...                  | 43    | 100                        | 40                       | 1100                                                                                       | NP  | 1600   | 650 | NFN-22                      | G4, G23, T18, W13     |
| 19       | ...                  | 43    | 110                        | 50                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G23, T16, W5, W12     |
| 20       | $4 < t \leq 10$      | 43    | 110                        | 50                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G23, T16              |
| 21       | $4 < t \leq 10$      | 43    | 110                        | 50                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G23, T16              |
| 22       | $\leq 0.375$         | 43    | 110                        | 55                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G23, T16              |
| 23       | $\leq 2.75$          | 43    | 110                        | 55                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G23, T16              |
| 24       | ...                  | 43    | 120                        | 60                       | 1100                                                                                       | NP  | 1200   | 650 | NFN-17                      | G22, G23, T16         |
| 25       | ...                  | 43    | 120                        | 60                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G22, G23, T16         |
| 26       | $\leq 4$             | 43    | 120                        | 60                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G22, G23, T16         |
| 27       | $\leq 4$             | 43    | 120                        | 60                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G22, G23, T16         |
| 28       | ...                  | 43    | 120                        | 60                       | 1100                                                                                       | 800 | 1200   | 650 | NFN-17                      | G14, G22, G23, T16    |
| 29       | ...                  | 43    | 120                        | 60                       | 1100                                                                                       | NP  | 1200   | 650 | NFN-17                      | G14, G22, G23, T16    |
| 30       | $\leq 3\frac{1}{2}$  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                    |
| 31       | $\leq 3\frac{1}{2}$  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...                   |
| 32       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                    |
| 33       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...                   |
| 34       | $\leq 3\frac{1}{2}$  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                    |
| 35       | $\leq 3\frac{1}{2}$  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...                   |
| 36       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                    |
| 37       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...                   |
| 38       | $\leq 8$             | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5, G14               |
| 39       | $\leq 8$             | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G14                   |
| 40       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5                    |
| 41       | ...                  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | ...                   |
| 42       | $\leq 3\frac{1}{2}$  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G5, G14               |
| 43       | $\leq 3\frac{1}{2}$  | 43    | 100                        | 45                       | NP                                                                                         | NP  | 800    | NP  | NFN-10                      | G14                   |
| 44       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 850    | 650 | NFN-4                       | ...                   |
| 45       | ...                  | 43    | 85                         | 35                       | NP                                                                                         | NP  | 850    | 650 | NFN-4                       | G5                    |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |     |      |     |      |     |      |     |      |     |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|-----|------|-----|------|-----|------|-----|------|-----|------|------|------|------|------|------|------|------|
|          | 100                                                                                                      | 150 | 200  | 250 | 300  | 350 | 400  | 450 | 500  | 550 | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  |
| 1        | 20.0                                                                                                     | ... | 17.8 | ... | 16.6 | ... | 15.5 | ... | 14.7 | ... | 14.2 | 14.0 | 13.9 | 13.8 | 13.8 | 13.8 | 13.8 | 13.7 |
| 2        | 20.0                                                                                                     | ... | 20.0 | ... | 20.0 | ... | 20.0 | ... | 19.9 | ... | 19.2 | 19.0 | 18.8 | 18.7 | 18.6 | 18.6 | 18.6 | 18.6 |
| 3        | 23.3                                                                                                     | ... | 20.8 | ... | 19.2 | ... | 18.1 | ... | 17.2 | ... | 16.6 | 16.4 | 16.2 | 16.0 | 15.9 | 15.8 | 15.7 | 15.6 |
| 4        | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.5 | 22.1 | 21.9 | 21.7 | 21.5 | 21.3 | 21.2 | 21.0 |
| 5        | 23.3                                                                                                     | ... | 20.8 | ... | 19.2 | ... | 18.1 | ... | 17.2 | ... | 16.6 | 16.4 | 16.2 | 16.0 | 15.9 | 15.8 | 15.7 | 15.6 |
| 6        | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.5 | 22.1 | 21.9 | 21.7 | 21.5 | 21.3 | 21.2 | 21.0 |
| 7        | 19.8                                                                                                     | ... | 17.7 | ... | 16.3 | ... | 15.4 | ... | 14.6 | ... | 14.1 | 13.9 | 13.8 | 13.6 | 13.5 | 13.4 | 13.3 | 13.3 |
| 8        | 19.8                                                                                                     | ... | 19.8 | ... | 19.8 | ... | 19.8 | ... | 19.8 | ... | 19.1 | 18.8 | 18.6 | 18.4 | 18.3 | 18.1 | 18.0 | 17.9 |
| 9        | 23.3                                                                                                     | ... | 20.8 | ... | 19.2 | ... | 18.1 | ... | 17.2 | ... | 16.6 | 16.4 | 16.2 | 16.0 | 15.9 | 15.8 | 15.7 | 15.6 |
| 10       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.5 | 22.1 | 21.9 | 21.7 | 21.5 | 21.3 | 21.2 | 21.0 |
| 11       | 23.3                                                                                                     | ... | 20.8 | ... | 19.2 | ... | 18.1 | ... | 17.2 | ... | 16.6 | 16.4 | 16.2 | 16.0 | 15.9 | 15.8 | 15.7 | 15.6 |
| 12       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 22.5 | 22.1 | 21.9 | 21.7 | 21.5 | 21.3 | 21.2 | 21.0 |
| 13       | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.6 |
| 14       | 26.7                                                                                                     | ... | 24.6 | ... | 23.4 | ... | 22.4 | ... | 21.7 | ... | 21.0 | 20.8 | 20.5 | 20.3 | 20.1 | 20.0 | 19.8 | 19.7 |
| 15       | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.6 |
| 16       | 26.7                                                                                                     | ... | 24.6 | ... | 23.4 | ... | 22.4 | ... | 21.7 | ... | 21.0 | 20.8 | 20.5 | 20.3 | 20.1 | 20.0 | 19.8 | 19.7 |
| 17       | 26.7                                                                                                     | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | ... | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.6 |
| 18       | 26.7                                                                                                     | ... | 24.6 | ... | 23.4 | ... | 22.4 | ... | 21.7 | ... | 21.0 | 20.8 | 20.5 | 20.3 | 20.1 | 20.0 | 19.8 | 19.7 |
| 19       | 31.4                                                                                                     | ... | 31.4 | ... | 31.4 | ... | 30.8 | ... | 30.2 | ... | 29.7 | 29.4 | 29.1 | 28.9 | 28.6 | 28.3 | 28.0 | 27.7 |
| 20       | 31.4                                                                                                     | ... | 31.4 | ... | 31.4 | ... | 30.8 | ... | 30.2 | ... | 29.7 | 29.4 | 29.1 | 28.9 | 28.6 | 28.3 | 28.0 | 27.7 |
| 21       | 31.4                                                                                                     | ... | 31.4 | ... | 31.4 | ... | 30.8 | ... | 30.2 | ... | 29.7 | 29.4 | 29.1 | 28.9 | 28.6 | 28.3 | 28.0 | 27.7 |
| 22       | 31.4                                                                                                     | ... | 31.4 | ... | 31.4 | ... | 30.8 | ... | 30.2 | ... | 29.7 | 29.4 | 29.1 | 28.9 | 28.6 | 28.3 | 28.0 | 27.7 |
| 23       | 31.4                                                                                                     | ... | 31.4 | ... | 31.4 | ... | 30.8 | ... | 30.2 | ... | 29.7 | 29.4 | 29.1 | 28.9 | 28.6 | 28.3 | 28.0 | 27.7 |
| 24       | 34.3                                                                                                     | ... | 34.3 | ... | 34.3 | ... | 33.6 | ... | 32.9 | ... | 32.4 | 32.1 | 31.8 | 31.5 | 31.2 | 30.9 | 30.6 | 30.3 |
| 25       | 34.3                                                                                                     | ... | 34.3 | ... | 34.3 | ... | 33.6 | ... | 32.9 | ... | 32.4 | 32.1 | 31.8 | 31.5 | 31.2 | 30.9 | 30.6 | 30.3 |
| 26       | 34.3                                                                                                     | ... | 34.3 | ... | 34.3 | ... | 33.6 | ... | 32.9 | ... | 32.4 | 32.1 | 31.8 | 31.5 | 31.2 | 30.9 | 30.6 | 30.3 |
| 27       | 34.3                                                                                                     | ... | 34.3 | ... | 34.3 | ... | 33.6 | ... | 32.9 | ... | 32.4 | 32.1 | 31.8 | 31.5 | 31.2 | 30.9 | 30.6 | 30.3 |
| 28       | 29.1                                                                                                     | ... | 29.1 | ... | 29.1 | ... | 28.5 | ... | 28.0 | ... | 27.5 | 27.3 | 27.0 | 26.8 | 26.5 | 26.3 | 26.0 | 25.7 |
| 29       | 29.1                                                                                                     | ... | 29.1 | ... | 29.1 | ... | 28.5 | ... | 28.0 | ... | 27.5 | 27.3 | 27.0 | 26.8 | 26.5 | 26.3 | 26.0 | 25.7 |
| 30       | 28.6                                                                                                     | ... | 28.6 | ... | 28.2 | ... | 27.2 | ... | 26.5 | ... | 25.9 | 25.7 | 25.4 | 25.2 | 24.9 | ...  | ...  | ...  |
| 31       | 28.6                                                                                                     | ... | 24.9 | ... | 23.4 | ... | 22.5 | ... | 21.6 | ... | 20.8 | 20.4 | 20.1 | 19.9 | 19.9 | ...  | ...  | ...  |
| 32       | 28.6                                                                                                     | ... | 28.6 | ... | 28.2 | ... | 27.2 | ... | 26.5 | ... | 25.9 | 25.7 | 25.4 | 25.2 | 24.9 | ...  | ...  | ...  |
| 33       | 28.6                                                                                                     | ... | 24.9 | ... | 23.4 | ... | 22.5 | ... | 21.6 | ... | 20.8 | 20.4 | 20.1 | 19.9 | 19.9 | ...  | ...  | ...  |
| 34       | 28.6                                                                                                     | ... | 28.6 | ... | 28.2 | ... | 27.2 | ... | 26.5 | ... | 25.9 | 25.7 | 25.4 | 25.2 | 24.9 | ...  | ...  | ...  |
| 35       | 28.6                                                                                                     | ... | 24.9 | ... | 23.4 | ... | 22.5 | ... | 21.6 | ... | 20.8 | 20.4 | 20.1 | 19.9 | 19.9 | ...  | ...  | ...  |
| 36       | 28.6                                                                                                     | ... | 28.6 | ... | 28.2 | ... | 27.2 | ... | 26.5 | ... | 25.9 | 25.7 | 25.4 | 25.2 | 24.9 | ...  | ...  | ...  |
| 37       | 28.6                                                                                                     | ... | 24.9 | ... | 23.4 | ... | 22.5 | ... | 21.6 | ... | 20.8 | 20.4 | 20.1 | 19.9 | 19.9 | ...  | ...  | ...  |
| 38       | 24.3                                                                                                     | ... | 24.3 | ... | 24.0 | ... | 23.1 | ... | 22.5 | ... | 22.0 | 21.8 | 21.6 | 21.4 | 21.2 | ...  | ...  | ...  |
| 39       | 24.3                                                                                                     | ... | 21.2 | ... | 19.9 | ... | 19.1 | ... | 18.4 | ... | 17.7 | 17.3 | 17.1 | 16.9 | 16.9 | ...  | ...  | ...  |
| 40       | 28.6                                                                                                     | ... | 28.6 | ... | 28.2 | ... | 27.2 | ... | 26.5 | ... | 25.9 | 25.7 | 25.4 | 25.2 | 24.9 | ...  | ...  | ...  |
| 41       | 28.6                                                                                                     | ... | 24.9 | ... | 23.4 | ... | 22.5 | ... | 21.6 | ... | 20.8 | 20.4 | 20.1 | 19.9 | 19.9 | ...  | ...  | ...  |
| 42       | 24.3                                                                                                     | ... | 24.3 | ... | 24.0 | ... | 23.1 | ... | 22.5 | ... | 22.0 | 21.8 | 21.6 | 21.4 | 21.2 | ...  | ...  | ...  |
| 43       | 24.3                                                                                                     | ... | 21.2 | ... | 19.9 | ... | 19.1 | ... | 18.4 | ... | 17.7 | 17.3 | 17.1 | 16.9 | 16.9 | ...  | ...  | ...  |
| 44       | 23.3                                                                                                     | ... | 21.1 | ... | 19.9 | ... | 19.1 | ... | 18.6 | ... | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | ...  | ...  |
| 45       | 23.3                                                                                                     | ... | 23.3 | ... | 23.3 | ... | 23.3 | ... | 23.1 | ... | 22.9 | 22.9 | 22.8 | 22.7 | 22.6 | 22.5 | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Maximum Allowable Stress, ksi (Multiply by 1000 to Obtain psi), for Metal Temperature, °F, Not Exceeding |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|----------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|          | 1000                                                                                                     | 1050 | 1100 | 1150 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 |
| 1        | 13.7                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |
| 2        | 17.6                                                                                                     | 13.6 | 10.4 | 8.0  | 6.1  | 4.6  | 3.6  | 2.8  | 2.1  | 1.7  | 1.3  | 1.1  | 0.87 | 0.71 | ...  | ...  | ...  |
| 3        | 15.5                                                                                                     | 15.4 | 15.4 | 15.3 | 15.3 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 4        | 20.9                                                                                                     | 20.9 | 20.8 | 20.7 | 18.1 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 5        | 15.5                                                                                                     | 15.4 | 15.4 | 15.3 | 15.3 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 6        | 20.9                                                                                                     | 20.9 | 20.8 | 20.7 | 18.1 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 7        | 13.2                                                                                                     | 13.1 | 13.1 | 13.1 | 13.0 | 12.3 | 9.5  | 7.4  | 5.6  | 4.3  | 3.3  | 2.6  | 2.0  | 1.5  | 1.2  | 0.9  | 0.62 |
| 8        | 17.8                                                                                                     | 17.8 | 17.7 | 17.6 | 15.4 | 12.3 | 9.5  | 7.4  | 5.6  | 4.3  | 3.3  | 2.6  | 2.0  | 1.5  | 1.2  | 0.9  | 0.62 |
| 9        | 15.5                                                                                                     | 15.4 | 15.4 | 15.3 | 15.3 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 10       | 20.9                                                                                                     | 20.9 | 20.8 | 20.7 | 18.1 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 11       | 15.5                                                                                                     | 15.4 | 15.4 | 15.3 | 15.3 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 12       | 20.9                                                                                                     | 20.9 | 20.8 | 20.7 | 18.1 | 14.5 | 11.2 | 8.7  | 6.6  | 5.1  | 3.9  | 3.0  | 2.3  | 1.8  | 1.4  | 1.1  | 0.73 |
| 13       | 26.4                                                                                                     | 26.3 | 26.2 | 26.1 | 20.0 | 15.0 | 11.6 | 8.5  | 6.7  | 4.9  | 3.8  | 2.6  | 1.9  | ...  | ...  | ...  | ...  |
| 14       | 19.6                                                                                                     | 19.5 | 19.4 | 19.3 | 19.3 | 15.0 | 11.6 | 8.5  | 6.7  | 4.9  | 3.8  | 2.6  | 1.9  | ...  | ...  | ...  | ...  |
| 15       | 26.4                                                                                                     | 26.3 | 26.2 | 26.1 | 20.0 | 15.0 | 11.6 | 8.5  | 6.7  | 4.9  | 3.8  | 2.6  | 1.9  | ...  | ...  | ...  | ...  |
| 16       | 19.6                                                                                                     | 19.5 | 19.4 | 19.3 | 19.3 | 15.0 | 11.6 | 8.5  | 6.7  | 4.9  | 3.8  | 2.6  | 1.9  | ...  | ...  | ...  | ...  |
| 17       | 26.4                                                                                                     | 26.3 | 26.2 | 26.1 | 20.0 | 15.0 | 11.6 | 8.5  | 6.7  | 4.9  | 3.8  | 2.6  | 1.9  | ...  | ...  | ...  | ...  |
| 18       | 19.6                                                                                                     | 19.5 | 19.4 | 19.3 | 19.3 | 15.0 | 11.6 | 8.5  | 6.7  | 4.9  | 3.8  | 2.6  | 1.9  | ...  | ...  | ...  | ...  |
| 19       | 27.4                                                                                                     | 27.0 | 26.6 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 20       | 27.4                                                                                                     | 27.0 | 26.6 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 21       | 27.4                                                                                                     | 27.0 | 26.6 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 22       | 27.4                                                                                                     | 27.0 | 26.6 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 23       | 27.4                                                                                                     | 27.0 | 26.6 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 24       | 29.9                                                                                                     | 29.5 | 29.0 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 25       | 29.9                                                                                                     | 29.5 | 29.0 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 26       | 29.9                                                                                                     | 29.5 | 29.0 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 27       | 29.9                                                                                                     | 29.5 | 29.0 | 21.0 | 13.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 28       | 25.4                                                                                                     | 25.1 | 24.7 | 17.9 | 11.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 29       | 25.4                                                                                                     | 25.1 | 24.7 | 17.9 | 11.2 | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 30       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 31       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 32       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 33       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 34       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 35       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 36       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 37       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 38       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 39       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 40       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 41       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 42       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 43       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 44       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |
| 45       | ...                                                                                                      | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  | ...  |

**Table 1B (Cont'd)**  
**Section I; Section III, Division 1, Classes 2 and 3,\* Section VIII, Division 1; and Section XII**  
**Maximum Allowable Stress Values, S, for Nonferrous Materials**  
**(\*See Maximum Temperature Limits for Restrictions on Class)**

| Line No. | Nominal Composition   | Product Form          | Spec. No. | Type/Grade | Alloy Desig./UNS No. | Class/Condition/ Temper |
|----------|-----------------------|-----------------------|-----------|------------|----------------------|-------------------------|
| 1        | 58Ni-29Cr-9Fe         | Plate, sheet, strip   | SB-168    | ...        | N06690               | Annealed                |
| 2        | 58Ni-29Cr-9Fe         | Plate, sheet, strip   | SB-168    | ...        | N06690               | Annealed                |
| 3        | 58Ni-29Cr-9Fe         | Smls. pipe & tube     | SB-167    | ...        | N06690               | Cold drawn/ann.         |
| 4        | 58Ni-29Cr-9Fe         | Smls. pipe & tube     | SB-167    | ...        | N06690               | Cold drawn/ann.         |
| 5        | 49Ni-25Cr-18Fe-6Mo    | Plate, sheet, strip   | SB-582    | ...        | N06975               | Solution ann.           |
| 6        | 49Ni-25Cr-18Fe-6Mo    | Plate, sheet, strip   | SB-582    | ...        | N06975               | Solution ann.           |
| 7        | 49Ni-25Cr-18Fe-6Mo    | Wld. pipe             | SB-619    | ...        | N06975               | Solution ann.           |
| 8        | 49Ni-25Cr-18Fe-6Mo    | Wld. pipe             | SB-619    | ...        | N06975               | Solution ann.           |
| 9        | 49Ni-25Cr-18Fe-6Mo    | Smls. pipe & tube     | SB-622    | ...        | N06975               | Solution ann.           |
| 10       | 49Ni-25Cr-18Fe-6Mo    | Smls. pipe & tube     | SB-622    | ...        | N06975               | Solution ann.           |
| 11       | 49Ni-25Cr-18Fe-6Mo    | Wld. tube             | SB-626    | ...        | N06975               | Solution ann.           |
| 12       | 49Ni-25Cr-18Fe-6Mo    | Wld. tube             | SB-626    | ...        | N06975               | Solution ann.           |
| 13       | 47Ni-22Cr-20Fe-7Mo    | Rod                   | SB-581    | ...        | N06985               | Annealed                |
| 14       | 47Ni-22Cr-20Fe-7Mo    | Rod                   | SB-581    | ...        | N06985               | Annealed                |
| 15       | 47Ni-22Cr-20Fe-7Mo    | Plate, sheet, strip   | SB-582    | ...        | N06985               | Annealed                |
| 16       | 47Ni-22Cr-20Fe-7Mo    | Plate, sheet, strip   | SB-582    | ...        | N06985               | Annealed                |
| 17       | 47Ni-22Cr-20Fe-7Mo    | Smls. & wld. fittings | SB-366    | ...        | N06985               | Annealed                |
| 18       | 47Ni-22Cr-20Fe-7Mo    | Rod                   | SB-581    | ...        | N06985               | Annealed                |
| 19       | 47Ni-22Cr-20Fe-7Mo    | Rod                   | SB-581    | ...        | N06985               | Annealed                |
| 20       | 47Ni-22Cr-20Fe-7Mo    | Plate, sheet, strip   | SB-582    | ...        | N06985               | Annealed                |
| 21       | 47Ni-22Cr-20Fe-7Mo    | Plate, sheet, strip   | SB-582    | ...        | N06985               | Annealed                |
| 22       | 47Ni-22Cr-20Fe-7Mo    | Wld. pipe             | SB-619    | ...        | N06985               | Annealed                |
| 23       | 47Ni-22Cr-20Fe-7Mo    | Wld. pipe             | SB-619    | ...        | N06985               | Annealed                |
| 24       | 47Ni-22Cr-20Fe-7Mo    | Smls. pipe & tube     | SB-622    | ...        | N06985               | Annealed                |
| 25       | 47Ni-22Cr-20Fe-7Mo    | Smls. pipe & tube     | SB-622    | ...        | N06985               | Annealed                |
| 26       | 47Ni-22Cr-20Fe-7Mo    | Wld. tube             | SB-626    | ...        | N06985               | Annealed                |
| 27       | 47Ni-22Cr-20Fe-7Mo    | Wld. tube             | SB-626    | ...        | N06985               | Annealed                |
| 28       | 35Ni-35Fe-20Cr-Cb     | Forgings              | SB-462    | ...        | N08020               | Annealed                |
| 29       | 35Ni-35Fe-20Cr-Cb     | Forgings              | SB-462    | ...        | N08020               | Annealed                |
| 30       | 35Ni-35Fe-20Cr-Cb     | Plate                 | SB-463    | ...        | N08020               | Annealed                |
| 31       | 35Ni-35Fe-20Cr-Cb     | Plate                 | SB-463    | ...        | N08020               | Annealed                |
| 32       | 35Ni-35Fe-20Cr-Cb     | Bar                   | SB-473    | ...        | N08020               | Annealed                |
| 33       | 35Ni-35Fe-20Cr-Cb     | Bar                   | SB-473    | ...        | N08020               | Annealed                |
| 34       | 35Ni-35Fe-20Cr-Cb     | Smls. pipe & tube     | SB-729    | ...        | N08020               | Annealed                |
| 35       | 35Ni-35Fe-20Cr-Cb     | Smls. pipe & tube     | SB-729    | ...        | N08020               | Annealed                |
| 36       | 35Ni-35Fe-20Cr-Cb     | Wld. pipe             | SB-464    | ...        | N08020               | Wld. ann.               |
| 37       | 35Ni-35Fe-20Cr-Cb     | Wld. pipe             | SB-464    | ...        | N08020               | Wld. ann.               |
| 38       | 35Ni-35Fe-20Cr-Cb     | Wld. pipe             | SB-464    | ...        | N08020               | Wld. ann.               |
| 39       | 35Ni-35Fe-20Cr-Cb     | Wld. tube             | SB-468    | ...        | N08020               | Wld. ann.               |
| 40       | 35Ni-35Fe-20Cr-Cb     | Wld. tube             | SB-468    | ...        | N08020               | Wld. ann.               |
| 41       | 35Ni-35Fe-20Cr-Cb     | Wld. tube             | SB-468    | ...        | N08020               | Wld. ann.               |
| 42       | 35Ni-35Fe-20Cr-Cb     | Smls. & wld. fittings | SB-366    | ...        | N08020               | Annealed                |
| 43       | 37Ni-33Fe-23Cr-4Mo-Cu | Wld. pipe             | SB-464    | ...        | N08024               | Wld. ann.               |
| 44       | 37Ni-33Fe-23Cr-4Mo-Cu | Wld. pipe             | SB-464    | ...        | N08024               | Wld. ann.               |
| 45       | 37Ni-33Fe-23Cr-4Mo-Cu | Wld. tube             | SB-468    | ...        | N08024               | Wld. ann.               |