ASME BOILER AND PRESSURE VESSEL CODE
AN INTERNATIONAL CODE

MATERIALS

II

Part D –

Properties

2001 Edition
July 1, 2001

ASME BOILER AND
PRESSURE VESSEL
COMMITTEE
SUBCOMMITTEE
ON MATERIALS

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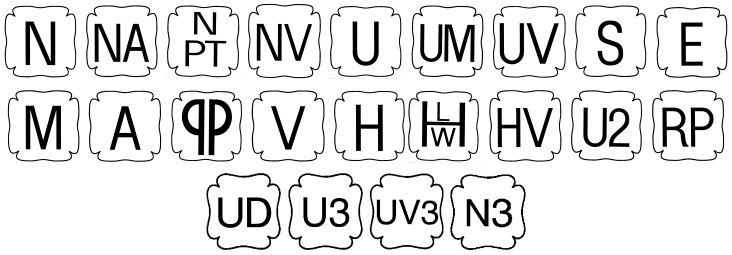
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2001 ASME
BOILER AND PRESSURE VESSEL CODE

SECTIONS

I Rules for Construction of Power Boilers
II Materials
- Part A — Ferrous Material Specifications
- Part B — Nonferrous Material Specifications
- Part C — Specifications for Welding Rods, Electrodes, and Filler Metals
- Part D — Properties

III Subsection NCA — General Requirements for Division 1 and Division 2
III Division 1
- Subsection NB — Class 1 Components
- Subsection NC — Class 2 Components
- Subsection ND — Class 3 Components
- Subsection NE — Class MC Components
- Subsection NF — Supports
- Subsection NG — Core Support Structures
- Subsection NH — Class 1 Components in Elevated Temperature Service
- Appendices

III Division 2 — Code for Concrete Reactor Vessels and Containments
III Division 3 — Containment Systems for Storage and Transport Packagings of Spent Nuclear Fuel and High Level Radioactive Material and Waste
IV Rules for Construction of Heating Boilers
V Nondestructive Examination
VI Recommended Rules for the Care and Operation of Heating Boilers
VII Recommended Guidelines for the Care of Power Boilers
VIII Rules for Construction of Pressure Vessels
- Division 1
- Division 2 — Alternative Rules
- Division 3 — Alternative Rules for Construction of High Pressure Vessels

IX Welding and Brazing Qualifications
X Fiber-Reinforced Plastic Pressure Vessels
XI Rules for Inservice Inspection of Nuclear Power Plant Components

ADDENDA

Colored-sheet Addenda, which include additions and revisions to individual Sections of the Code, are published annually and will be sent automatically to purchasers of the applicable Sections up to the publication of the 2004 Code. The 2001 Code is available only in the loose-leaf format; accordingly, the Addenda will be issued in the loose-leaf, replacement-page format.

INTERPRETATIONS

ASME issues written replies to inquiries concerning interpretation of technical aspects of the Code. The Interpretations for each individual Section will be published separately and will be included as part of the update service to that Section. They will be issued semiannually (July and December) up to the publication of the 2004 Code. Interpretations of Section III, Divisions 1 and 2, will be included with the update service to Subsection NCA.

CODE CASES

The Boiler and Pressure Vessel Committee meets regularly to consider proposed additions and revisions to the Code and to formulate Cases to clarify the intent of existing requirements or provide, when the need is urgent, rules for materials or constructions not covered by existing Code rules. Those Cases which have been adopted will appear in the appropriate 2001 Code Cases book: (1) Boilers and Pressure Vessels and (2) Nuclear Components. Supplements will be sent automatically to the purchasers of the Code Cases books up to the publication of the 2004 Code.

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CONTENTS

Foreword xi
Statements of Policy xv
Personnel xvii
Summary of Changes xxvii

Subpart 1 **Stress Tables**

Table 1A Section I; Section III, Class 2 and 3; and Section VIII, Division 1 Maximum Allowable Stress Values *S* for Ferrous Materials 2
Table 1B Section I; Section III, Class 2 and 3; and Section VIII, Division 1 Maximum Allowable Stress Values *S* for Nonferrous Materials 150
Table 2A Section III, Class 1 and Section VIII, Division 2 Design Stress Intensity Values S_m for Ferrous Materials 256
Table 2B Section III, Class 1 and Section VIII, Division 2 Design Stress Intensity Values S_m for Nonferrous Materials 354
Table 3 Section III, Class 2 and 3, and Section VIII, Divisions 1 and 2 Maximum Allowable Stress Values *S* for Bolting Materials 382
Table 4 Section III, Class 1 and Section VIII, Division 2 Design Stress Intensity Values S_m for Bolting Materials 412
Table U Tensile Strength Values S_u for Ferrous and Nonferrous Materials 420
Table U-2 Section VIII, Division 3 Tensile Strength Values S_u for Ferrous Materials 491
Table Y-1 Yield Strength Values S_y for Ferrous and Nonferrous Materials 492
Table Y-2 Factors for Limiting Permanent Strain in Nickel, High Nickel Alloys, and High Alloy Steels 637
Table Y-3 Section VIII, Division 3 Yield Strength Values S_y for Ferrous and Nonferrous Materials 638

Subpart 2 **Physical Properties Tables**

Table TE-1 Thermal Expansion for Ferrous Materials 648
Table TE-2 Thermal Expansion for Aluminum Alloys 654
Table TE-3 Thermal Expansion for Copper Alloys 655
Table TE-4 Thermal Expansion for Nickel Alloys 656
Table TE-5 Thermal Expansion for Titanium Alloys 661
Table TCD Nominal Coefficients of Thermal Conductivity (TC) and Thermal Diffusivity (TD) 662
Table TM-1 Moduli of Elasticity *E* of Ferrous Materials for Given Temperatures 671
Table TM-2 Moduli of Elasticity *E* of Aluminum and Aluminum Alloys for Given Temperatures 673
Table TM-3 Moduli of Elasticity *E* of Copper and Copper Alloys for Given Temperatures 674
Table TM-4 Moduli of Elasticity *E* of High Nickel Alloys for Given Temperatures 675
Table TM-5 Moduli of Elasticity *E* of Titanium and Zirconium for Given Temperatures 676
Table NF-1 Typical Mechanical Properties of Materials 677
Table NF-2 Typical Physical Properties of Nonferrous Materials 678

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Subpart 3	**Charts and Tables for Determining Shell Thickness of Components Under External Pressure**	
Fig. G	Geometric Chart for Components Under External or Compressive Loadings (for All Materials)	682
Fig. CS-1	Carbon or Low Alloy Steels (Specified Minimum Yield Strength 24,000 psi to, but Not Including, 30,000 psi)	684
Fig. CS-2	Carbon or Low Alloy Steels (Specified Minimum Yield Strength 30,000 psi and Over Except for Materials Within This Range Where Other Specific Charts Are Referenced) and Type 405 and Type 410 Stainless Steels	684
Fig. CS-3	Carbon Steel, Low Alloy Steels, or Steels With Properties Enhanced by Heat Treatment (Specified Minimum Yield Strength Over 38,000 psi for Materials Where Other Specific Charts Are Not Referenced)	685
Fig. CS-4	SA-537	685
Fig. CS-5	SA-508 Class 1 Grades 2 and 3; SA-508 Class 2 Grade 2; SA-533 Class 1 Grades A, B, C, and D; SA-533 Class 2 Grades A, B, C, and D; or SA-541 Grades 2 and 3	686
Fig. CS-6	SA-562 or SA-620 Carbon Steel	686
Fig. HT-1	Quenched and Tempered Low Alloy Steel, SA-517 All Grades, and SA-592 Grades A, E, and F Where $t \le 2\frac{1}{2}$ in.	687
Fig. HT-2	SA-508 Grade 4N, Class 2 or SA-543 Types B and C, Class 2	687
Fig. HA-1	Austenitic Steel (18Cr–8Ni, Type 304)	688
Fig. HA-2	Austenitic Steel [16Cr–12Ni–2Mo, Type 316; 18Cr–10Ni–Ti, Type 321; 18Cr–10Ni–Cb, Type 347; 25Cr–12Ni, Type 309 (Through 1100°F Only); 25Cr–20Ni, Type 310; and 17Cr, Type 430B Stainless Steel (Through 700°F Only)]	688
Fig. HA-3	Austenitic Steel (18Cr–8Ni–0.035 Maximum Carbon, Type 304L)	689
Fig. HA-4	Austenitic Steel (18Cr–8Ni–Mo–0.035 Maximum Carbon, Types 316L and 317L)	689
Fig. HA-5	Cr–Ni–Mo Alloy S31500	690
Fig. HA-6	21Cr–11Ni–N Alloy S30815	690
Fig. HA-7	SA-564 Type 630 H1150	691
Fig. CI-1	Cast Iron	691
Fig. CD-1	Cast Ductile Iron With a Specified Minimum Yield Strength of 40,000 psi	692
Fig. NFA-1	Aluminum Alloy 3003 in O and H112 Tempers	692
Fig. NFA-2	Aluminum Alloy 3003 in H14 Temper	693
Fig. NFA-3	Aluminum Alloy 3004 in O and H112 Tempers	694
Fig. NFA-4	Aluminum Alloy 3004 in H34 Temper	695
Fig. NFA-5	Aluminum Alloy 5154 in O and H112 Tempers	696
Fig. NFA-6	Aluminum Bronze Alloy C61400	696
Fig. NFA-7	Aluminum Alloy 1060 in O Temper	697
Fig. NFA-8	Aluminum Alloy 5052 in O and H112 Tempers	697
Fig. NFA-9	Aluminum Alloy 5086 in O and H112 Tempers	698
Fig. NFA-10	Aluminum Alloy 5456 in O Temper	698
Fig. NFA-11	Aluminum Alloy 5083 in O and H112 Tempers	699
Fig. NFA-12	Welded Aluminum Alloy 6061-T6, -T651, -T6510, and -T6511 When Welded With 5356 or 5556 Filler Metal, All Thicknesses; 4043 or 5554 Filler Metal, Thickness $\le \frac{3}{8}$ in.	699
Fig. NFA-13	Welded Aluminum Alloy 6061-T4, -T451, -T4510, and -T4511 When Welded With 4043, 5554, 5356, or 5556 Filler Metal, All Thicknesses; and of Welded Aluminum Alloy 6061-T6, -T651, -T6510, and -T6511 When Welded With 4043 or 5554 Filler Metal, Thickness $> \frac{3}{8}$ in.	700
Fig. NFA-14	Aluminum Alloy 5454 in O and H112 Tempers	700
Fig. NFC-1	Annealed Copper, Type DHP	701
Fig. NFC-2	Copper–Silicon Alloys A and C	701

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Fig. NFC-3	Annealed 90–10 Copper–Nickel Alloy	702
Fig. NFC-4	Annealed 70–30 Copper–Nickel Alloy	702
Fig. NFC-5	Welded Copper–Iron Alloy Tube C19400 (SB-543 Welded)	703
Fig. NFC-6	SB-75 and SB-111 Light Drawn Seamless Copper Tubes, Alloys C10200, C12000, C12200, and C14200	703
Fig. NFN-1	Low Carbon Nickel N02201	704
Fig. NFN-2	Nickel N02202	704
Fig. NFN-3	Annealed Nickel–Copper Alloy N04400	705
Fig. NFN-4	Annealed Nickel–Chromium–Iron Alloy N06600	705
Fig. NFN-5	Nickel–Molybdenum Alloy N10001	706
Fig. NFN-6	Nickel–Molybdenum–Chromium–Iron Alloy N10003	706
Fig. NFN-7	Nickel–Iron–Chromium–Molybdenum–Copper Alloy	707
Fig. NFN-8	Nickel–Iron–Chromium Alloy N08800 (Annealed)	707
Fig. NFN-9	Nickel–Iron–Chromium Alloy N08810 (Annealed)	708
Fig. NFN-10	Low Carbon Nickel–Molybdenum–Chromium Alloy N10276	708
Fig. NFN-11	Solution Treated Nickel–Chromium–Iron–Molybdenum–Copper Alloys N06007 and N06975	709
Fig. NFN-12	Wrought Chromium–Nickel–Iron–Molybdenum–Copper–Columbium Stabilized Alloy N08020 and Iron–Nickel–Chromium–Molybdenum Alloy N08367, SB-462, SB-463, SB-464, SB-468, and SB-473	709
Fig. NFN-13	Nickel–Iron–Chromium–Silicon Alloy N08330	710
Fig. NFN-14	Nickel–Chromium–Molybdenum Alloy N06455	710
Fig. NFN-15	Nickel–Molybdenum Alloy N06002	711
Fig. NFN-16	Nickel–Molybdenum Alloy N10665	711
Fig. NFN-17	Annealed Nickel–Chromium–Molybdenum–Columbium Alloy N06625 (SB-443, SB-444, and SB-446 in Alloy 625)	712
Fig. NFN-18	Nickel–Molybdenum–Chromium–Iron–Copper Alloy N06985 Whose Thickness is $\frac{3}{4}$ in. and Under Having a Minimum Yield Strength of 35 ksi	712
Fig. NFN-19	Nickel–Molybdenum–Chromium–Iron–Copper Alloy N06985 Whose Thickness is Greater Than $\frac{3}{4}$ in. Having a Minimum Yield Strength of 30 ksi	713
Fig. NFN-20	Work-Hardened Nickel	713
Fig. NFN-21	Nickel–Chromium–Iron Alloys N06600 and N06690, SB-163 (Specified Minimum Yield Strength 40,000 psi)	714
Fig. NFN-22	Solution Annealed Ni–Cr–Mo–Cb Alloy, Grade 2 N06625	714
Fig. NFN-23	Nickel–Iron–Chromium Alloy 800 (Cold Worked)	715
Fig. NFN-24	Nickel Alloy N06230	715
Fig. NFT-1	Unalloyed Titanium, Grade 3	716
Fig. NFT-2	Unalloyed Titanium, Grade 2	716
Fig. NFT-3	Titanium, Grade 1	717
Fig. NFZ-1	Zirconium Alloy 702	718
Fig. NFZ-2	Zirconium Alloy 705 (R60705)	719
Table G	Tabular Values for Fig. G	721
Table CS-1	Tabular Values for Fig. CS-1	723
Table CS-2	Tabular Values for Fig. CS-2	723
Table CS-3	Tabular Values for Fig. CS-3	724
Table CS-4	Tabular Values for Fig. CS-4	724
Table CS-5	Tabular Values for Fig. CS-5	725
Table CS-6	Tabular Values for Fig. CS-6	725
Table HT-1	Tabular Values for Fig. HT-1	726
Table HT-2	Tabular Values for Fig. HT-2	726
Table HA-1	Tabular Values for Fig. HA-1	727
Table HA-2	Tabular Values for Fig. HA-2	727
Table HA-3	Tabular Values for Fig. HA-3	728

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Table HA-4	Tabular Values for Fig. HA-4	728
Table HA-5	Tabular Values for Fig. HA-5	729
Table HA-6	Tabular Values for Fig. HA-6	729
Table HA-7	Tabular Values for Fig. HA-7	730
Table CI-1	Tabular Values for Fig. CI-1	730
Table CD-1	Tabular Values for Fig. CD-1	731
Table NFA-1	Tabular Values for Fig. NFA-1	731
Table NFA-2	Tabular Values for Fig. NFA-2	732
Table NFA-3	Tabular Values for Fig. NFA-3	732
Table NFA-4	Tabular Values for Fig. NFA-4	733
Table NFA-5	Tabular Values for Fig. NFA-5	733
Table NFA-6	Tabular Values for Fig. NFA-6	734
Table NFA-7	Tabular Values for Fig. NFA-7	734
Table NFA-8	Tabular Values for Fig. NFA-8	735
Table NFA-9	Tabular Values for Fig. NFA-9	735
Table NFA-10	Tabular Values for Fig. NFA-10	735
Table NFA-11	Tabular Values for Fig. NFA-11	736
Table NFA-12	Tabular Values for Fig. NFA-12	737
Table NFA-13	Tabular Values for Fig. NFA-13	737
Table NFA-14	Tabular Values for Fig. NFA-14	738
Table NFC-1	Tabular Values for Fig. NFC-1	738
Table NFC-2	Tabular Values for Fig. NFC-2	738
Table NFC-3	Tabular Values for Fig. NFC-3	739
Table NFC-4	Tabular Values for Fig. NFC-4	739
Table NFC-5	Tabular Values for Fig. NFC-5	740
Table NFC-6	Tabular Values for Fig. NFC-6	740
Table NFN-1	Tabular Values for Fig. NFN-1	740
Table NFN-2	Tabular Values for Fig. NFN-2	740
Table NFN-3	Tabular Values for Fig. NFN-3	741
Table NFN-4	Tabular Values for Fig. NFN-4	742
Table NFN-5	Tabular Values for Fig. NFN-5	742
Table NFN-6	Tabular Values for Fig. NFN-6	743
Table NFN-7	Tabular Values for Fig. NFN-7	743
Table NFN-8	Tabular Values for Fig. NFN-8	744
Table NFN-9	Tabular Values for Fig. NFN-9	744
Table NFN-10	Tabular Values for Fig. NFN-10	745
Table NFN-11	Tabular Values for Fig. NFN-11	745
Table NFN-12	Tabular Values for Fig. NFN-12	746
Table NFN-13	Tabular Values for Fig. NFN-13	746
Table NFN-14	Tabular Values for Fig. NFN-14	747
Table NFN-15	Tabular Values for Fig. NFN-15	748
Table NFN-16	Tabular Values for Fig. NFN-16	749
Table NFN-17	Tabular Values for Fig. NFN-17	750
Table NFN-18	Tabular Values for Fig. NFN-18	751
Table NFN-19	Tabular Values for Fig. NFN-19	752
Table NFN-20	Tabular Values for Fig. NFN-20	753
Table NFN-22	Tabular Values for Fig. NFN-22	753
Table NFN-23	Tabular Values for Fig. NFN-23	754
Table NFN-24	Tabular Values for Fig. NFN-24	754
Table NFT-1	Tabular Values for Fig. NFT-1	755
Table NFT-2	Tabular Values for Fig. NFT-2	755
Table NFT-3	Tabular Values for Fig. NFT-3	756

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Table NFZ-1 Tabular Values for Fig. NFZ-1 757
Table NFZ-2 Tabular Values for Fig. NFZ-2 758

Appendices

1 Basis for Establishing Stress Values in Tables 1A and 1B. 762
2 Basis for Establishing Design Stress Intensity Values for Tables 2A, 2B, 3, and 4 764
3 Basis for Establishing External Pressure Charts 767
4 Preparation of Technical Inquiries to the Boiler and Pressure Vessel Committee. 773
5 Guideline on the Approval of New Materials Under the ASME Boiler and Pressure Vessel Code 774
6 Metallurgical Phenomena 777
7 Guidelines on Multiple Marking of Materials. 783
8 Applying Linear Interpolation to the Section II, Part D Tables to Determine the Metric Values. 785
SI Units 786

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FOREWORD

The American Society of Mechanical Engineers set up a committee in 1911 for the purpose of formulating standard rules for the construction of steam boilers and other pressure vessels. This committee is now called the Boiler and Pressure Vessel Committee.

The Committee's function is to establish rules of safety governing the design, fabrication, and inspection during construction of boilers and pressure vessels, and to interpret these rules when questions arise regarding their intent. In formulating the rules, the Committee considers the needs of users, manufacturers, and inspectors of pressure vessels. The objective of the rules is to afford reasonably certain protection of life and property and to provide a margin for deterioration in service so as to give a reasonably long, safe period of usefulness. Advancements in design and material and the evidence of experience have been recognized.

This Code contains mandatory requirements, specific prohibitions, and nonmandatory guidance for construction[1] 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 designers 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 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 they are responsible for the application of these programs to their design.

The Code does not fully address tolerances. When dimensions, sizes, or other parameters are not specified with tolerances, the values of these parameters are considered nominal and allowable tolerances or local variances may be considered acceptable when based on engineering judgment and standard practices as determined by the designer.

The Boiler and Pressure Vessel Committee deals with the care and inspection of boilers and pressure vessels in service only to the extent of providing suggested rules of good practice as an aid to owners and their inspectors.

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 Boiler and Pressure Vessel Committee meets regularly to consider revisions of the rules, new rules as dictated by technological development, Code Cases, and requests for interpretations. Only the Boiler and Pressure Vessel Committee has the authority to provide official interpretations of this Code. Requests for revisions, new rules, Code Cases, or interpretations shall be addressed to the Secretary in writing and shall give full particulars in order to receive consideration and action (see Mandatory Appendix covering preparation of technical inquiries). Proposed revisions to the Code resulting from inquiries will be presented to the Main Committee for appropriate action. The action of the Main Committee becomes effective only after confirmation by letter 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 and published in *Mechanical Engineering* to invite comments from all interested persons. After the allotted time for public review and final approval by ASME, revisions are published annually in Addenda to the Code.

[1] *Construction*, as used in this Foreword, is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and pressure relief.

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Code Cases may be used in the construction of components to be stamped with the ASME Code symbol beginning with the date of their approval by ASME.

After Code revisions are approved by ASME, they may be used beginning with the date of issuance shown on the Addenda. Revisions, except for revisions to material specifications in Section II, Parts A and B, become mandatory 6 months after such date of issuance, except for boilers or pressure vessels contracted for prior to the end of the 6 month period. Revisions to material specifications are originated by the American Society for Testing and Materials (ASTM), and other recognized national or international organizations and are usually adopted by ASME. However, those revisions may or may not have any effect on the suitability of material, produced to earlier editions of specifications, for use in ASME construction. ASME material specifications approved for use in each construction Code are listed in the Appendices of Section II, Parts A and B. These Appendices list, for each specification, the latest edition adopted by ASME, and earlier and later editions considered by ASME to be identical for ASME construction.

Manufacturers and users of components are cautioned against making use of revisions and Cases that are less restrictive than former requirements without having assurance that they have been accepted by the proper authorities in the jurisdiction where the component is to be installed.

Each state and municipality in the United States and each province in Canada that adopts or accepts one or more Sections of the Boiler and Pressure Vessel Code is invited to appoint a representative to act on the Conference Committee to the Boiler and Pressure Vessel Committee. Since the members of the Conference Committee are in active contact with the administration and enforcement of the rules, the requirements for inspection in this Code correspond with those in effect in their respective jurisdictions. The required qualifications for an Authorized Inspector under these rules may be obtained from the administrative authority of any state, municipality, or province which has adopted these rules.

The Boiler and Pressure Vessel Committee in the formulation of its rules and in the establishment of maximum design and operating pressures considers materials, construction, methods of fabrication, inspection, and safety devices. Permission may be granted to regulatory bodies and organizations publishing safety standards to use a complete Section of the Code by reference. If usage of a Section, such as Section IX, involves exceptions, omissions, or changes in provisions, the intent of the Code might not be attained.

Where a state or other regulatory body, in the printing of any Section of the Boiler and Pressure Vessel Code, makes additions or omissions, it is recommended that such changes be clearly indicated.

The National Board of Boiler and Pressure Vessel Inspectors is composed of chief inspectors of states and municipalities in the United States and of provinces in Canada that have adopted the Boiler and Pressure Vessel Code. This Board, since its organization in 1919, has functioned to uniformly administer and enforce the rules of the Boiler and Pressure Vessel Code. The cooperation of that organization with the Boiler and Pressure Vessel Committee has been extremely helpful.

The Code 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. Laws or regulations issued by municipality, state, provincial, federal, or other enforcement or regulatory bodies having jurisdiction at the location of an installation establish the mandatory applicability of the Code rules, in whole or in part, within their jurisdiction. Those laws or regulations may require the use of this Code for vessels or components not considered to be within its Scope or may establish additions or deletions in that Scope. Accordingly, inquiries regarding such laws or regulations are to be directed to the issuing enforcement or regulatory body.

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 ASME Boiler and Pressure Vessel Committee. ASME is to be notified should questions arise concerning improper use of an ASME Code symbol.

The specifications for materials given in Section II are identical with or similar to those of the Specifications published by ASTM, AWS, and other recognized national or international organizations. When reference is made in an ASME material specification to a non-ASME specification for which a companion ASME specification exists, the reference shall be interpreted as applying to the ASME material specification. Not all materials included in the material specifications in Section II have been adopted for Code use. Usage is limited to those materials and grades adopted by at least one of the other Sections of the Code for application under rules of that Section. All materials allowed by these various Sections and used for construction within the scope of their rules shall be furnished in accordance with material specifications contained in

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Section II or referenced in Appendices A of Section II, Parts A and B except where otherwise provided in Code Cases or in the applicable Section of the Code. Materials covered by these specifications are acceptable for use in items covered by the Code Sections only to the degree indicated in the applicable Section. Materials for Code use should preferably be ordered, produced, and documented on this basis; Appendix A to Section II, Part A and Appendix A to Section II, Part B list editions of ASME and year dates of specifications that meet ASME requirements and that may be used in Code construction. Material produced to an acceptable specification with requirements different from the requirements of the corresponding specifications listed in Appendix A of Part A or Part B may also be used in accordance with the above, provided the material manufacturer or vessel manufacturer certifies with evidence acceptable to the Authorized Inspector that the corresponding requirements of specifications listed in Appendix A of Part A or Part B have been met. Material produced to an acceptable material specification is not limited as to country of origin.

When required by context in this Section, the singular shall be interpreted as the plural, and vice-versa; and the feminine, masculine, or neuter gender shall be treated as such other gender as appropriate.

Publication of the SI (Metric) Edition of the ASME Boiler and Pressure Vessel Code was discontinued with the 1986 Edition. Effective October 1, 1986, the SI Edition was withdrawn as an ASME Boiler and Pressure Vessel Code document.

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