ASME BPVC.SSC.XI.II.V.IX-2023

Summary of Significant Changes in the

2023 ASME Boiler and Pressure Vessel Code

Section XI
Section II
Section V
Section IX

ASME
SETTING THE STANDARD

ASME BPVC.SSC.XI.II.V.IX-2023

Summary of Significant Changes in the 2023 ASME Boiler and Pressure Vessel Code

Sections XI, II, V, and IX

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FOREWORD

This book is a companion to the 2023 ASME Boiler and Pressure Vessel Code (BPVC). It explains only significant changes to Code requirements that will be published in the 2023 Edition. It covers the following ASME BPVC Sections:

- Section XI, Divisions 1 and 2
- Section II, Parts A, B, C, and D
- Section V
- Section IX

For each of the above Sections, an Introduction describes the historical background, scope of coverage, and commercial application of that Section. The list of changes follows the Introduction. The "Explanation" for each change provides the reason for the action and the value to the Code user. The sequence of the changes follows the order of the Code requirements.

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- Daniel Miro-Quesada, *S&C Project Engineer*, Section XI
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ASME Press's *Online Companion Guide to the ASME Boiler and Pressure Vessel Codes: Criteria and Commentary on Select Aspects of the Boiler & Pressure Vessel and Piping Codes* (January 2020) provided source material for the Introduction preceding each list of changes. The complete Guide is available in the ASME Digital Collection at https://asmedigitalcollection.asme.org/ebooks/pages/onlinecompanionguide.

ASME gratefully acknowledges the members of the following volunteer committees, who are responsible for development of the ASME Boiler and Pressure Vessel Code Sections noted in this book:
- BPV Committee on Nuclear Inservice Inspection (XI)
- BPV Committee on Materials (II)
- BPV Committee on Nondestructive Examination (V)
- BPV Committee on Welding, Brazing, and Fusing (IX)

SECTION XI

Introduction

DIVISION 1

Section XI, Division 1 of the ASME Boiler and Pressure Vessel Code (BPVC) provides requirements for examination, testing, and inspection of components and systems, and repair/replacement activities in light-water cooled nuclear power plants [e.g., pressurized water reactors (PWRs) and boiling water reactors (BWRs)]. The applicability of Section XI is limited to dealing with degradation detected by periodic inservice inspection, and to repair, replacement, and modification activities performed for any reason. Section XI is not applicable to flaws identified at times other than during periodic inservice inspection or repair/replacement activities. Application of Section XI begins when the requirements of the Construction Code have been satisfied. At such time, an item will have passed a specified preservice inspection to serve as a baseline for future inservice inspections. The item will be subject to inservice inspection again after a specified period, which includes specified nondestructive examination. Degradation of the item is evaluated against the flaw acceptance criteria of Section XI to determine if continued operation is acceptable or if repair/replacement activities are necessary to make the item in compliance with the Construction Code again.

Division 1 is divided into Subsections that provide graduated criteria for different Code classes of components, including steel vessels, piping, pumps, valves, and concrete structures. It is the responsibility of the Owner to categorize the Code class of the component and apply the respective Subsection as follows:

- Subsection IWA: General requirements (applicable to all classes of components and supports)
- Subsection IWB: Class 1 components
- Subsection IWC: Class 2 components
- Subsection IWD: Class 3 components
- Subsection IWE: Class MC and CC components
- Subsection IWF: Class 1, 2, 3, and MC component supports
- Subsection IWG: Core Internal structures (in the course of preparation)
- Subsection IWL: Class CC concrete components

Section XI assigns duties to an Authorized Nuclear Inservice Inspector to verify that the responsibilities of the Owner and the mandatory requirements of Section XI are met.

The first publication of Section XI was the 1970 Edition, Rules for Inservice Inspection of Nuclear Reactor Coolant Systems, which only covered rules for inservice inspection of the primary pressure boundary system of nuclear power plants. Section XI was later expanded to contain three Divisions as well as Mandatory and Nonmandatory Appendices. Division 1 provides requirements specifically for light-water cooled nuclear power plants. The former Division 2 covered gas-cooled reactors but was discontinued in 1995. A rewrite of Division 2 was later initiated to provide requirements for the next generation of high-temperature, modular, gas-cooled reactors. Division 2 was published as its own book for the 2019 Edition and is applicable to any reactor design. The former Division 3 covered requirements for liquid-metal-cooled plants but was deleted because it was not widely used by the industry. Section XI previously had testing requirements for pumps, valves, and snubbers in Subsections IWP and IWV, but those were removed in the 1998 Edition (with 2000 Addenda). These requirements are now in ASME OM, Operation and Maintenance of Nuclear Power Plants, and the U.S. Nuclear Regulatory Commission (NRC) references ASME OM for these requirements. Owner responsibilities are identified in IWA-1400 and further detailed elsewhere in Section XI.

Section XI is a voluntary consensus standard that becomes mandatory once it is imposed by law, such as by the applicable regulatory agency depending on the country. The NRC requires the use of certain voluntary consensus standards through incorporation by reference in 10 CFR 50.55a, which is periodically updated to include the latest editions of Section XI. The NRC identifies provisions by which use of Section XI is limited in 10 CFR 50.55a(b)(2). The use of Section XI

Code Cases is accepted for use with specified conditions as listed in NRC Regulatory Guide 1.147. Section XI Code Cases deemed not to be acceptable for use on a generic basis are listed in NRC Regulatory Guide 1.193. The NRC amended its regulations to incorporate by reference the 2019 Editions of Section III, Division 1 and Section XI, Division 1 and the 2020 Edition of ASME OM on October 27, 2022.

DIVISION 2

Section XI, Division 2, of the ASME Boiler and Pressure Vessel Code (BPVC) provides requirements for protecting pressure integrity of structures, systems, and components (SSCs) that affect reliability. Like Division 1, application of Division 2 begins when the requirements of the Construction Code have been satisfied. However, Division 2 is a technology-neutral standard that may be applied to any reactor design, including advanced reactor design. Division 2 uses the reliability and integrity management (RIM) methodology to establish criteria for inservice inspection of reactors; these criteria may be established by deterministic or probabilistic methods. While Division 1 has graduated criteria depending on the Code class of the SSC, Division 2 includes any SSC that is deemed risk-significant in the scope of its RIM program. RIM uses monitoring and nondestructive examination (MANDE) criteria for detection of degradation mechanisms that may result in failure of an SSC. The RIM Expert Panel (RIMEP) and Monitoring and NDE Expert Panel (MANDEEP) are responsible for determining and assigning MANDE.

After Division 2 was removed from Section XI in 1995, a rewrite of Division 2 was initiated to provide risk-informed inspection requirements for the next generation of high-temperature, modular, gas-cooled reactors. This rewrite was accelerated by the need to develop an inservice inspection program for a pebble bed modular reactor (PBMR) being designed for licensing and construction in South Africa. The South African project was later terminated in 2010, but the rewrite of Division 2 proceeded. Small modular integrated, pressurized water reactors (SMR/IPWR) became a focus of design and licensing efforts in 2011. The Joint Committee on Nuclear Risk Management (JCNRM) was formed and developed ASME/ANS RA-S-1.4-2013, Probabilistic Risk Assessment Standard for Advanced Non-LWR Nuclear Power Plants. In response to these developments, Section XI made efforts to address SMR/IPWR designs in Division 2 and worked with JCNRM to reclassify “non-LWR” as “technology neutral,” making the standard applicable to new SMR/IPWR designs. In 2019, Division 2 was published as its own book, replacing the 2017 Edition of Section XI, Division 2, Rules for Inspection and Testing of Components of Gas-Cooled Plants.

In contrast to the prescriptive requirements of Division 1, Division 2 provides a process for developing an inservice inspection program. The NRC endorsed, with conditions, the 2019 Edition of Section XI, Division 2 for non-LWR applications via NRC Regulatory Guide 1.246. The RIM process has also been pursued outside of the United States, particularly in Japan where there is an ASME/JSME Joint Working Group on RIM Processes and System Based Code.

Division 1

Location: Cover and Title Page
Subject: Nuclear Reactor Facility
Explanation: The title of Section XI has been revised to "Rules for Inservice Inspection of Nuclear Reactor Facility Components." This revision replaces "power plant" with "reactor facility" because the term "nuclear reactor facility" applies to a wide range of reactor applications, such as nuclear power plants, isotope production reactors, mobile microreactors, propulsive microreactors, research and test reactors, and fusion reactor facilities. The subtitle of Section XI, Division 1 has not been changed.

Location: IWA-1320
Subject: Class 2 and Class 3 Exemption Criteria for Systems in Support of Residual Heat Removal, Emergency Core Cooling, and Containment Heat Removal
Explanation: Paragraph IWA-1320(a)(2) has been revised to require the portions of Class 3 systems that penetrate the containment and are classified as Class 2 solely for the containment boundary function meet the Class 3 requirements of Subsections IWD and IWF. This revision ensures that Class 2 and Class 3 portions of systems in support of residual heat removal, emergency core cooling, and containment heat removal are consistently examined.

Location: IWA-4150
Subject: Repair/Replacement Program and Plan
Explanation: Paragraph IWA-4150 has been revised to clarify that the repair/replacement plan may be a single document or a set of documents used to implement the applicable Article IWA-4000 requirements for each repair/replacement activity. Since the development of repair/replacement plans is administrative in nature, this revision provides the Owner an opportunity to reduce administrative burdens while not affecting the technical aspects of repair/replacement activities.

Location: IWA-4320, IWA-4321, and IWA-4322
Subject: Mechanical Piping Joints
Explanation: Paragraphs IWA-4321 and IWA-4322 have been deleted to remove requirements for Class 1, Class 2, and Class 3 mechanical joints that may differ from a plant's original Construction Code or Owner's Requirements. This change allows an Owner to use the provisions of IWA-4200 and IWA-4400 to adopt later Construction Codes or Section III when they determine such adoption to be beneficial. IWA-4320 has been revised to maintain a few requirements from the deleted IWA-4321 for threaded joints, expanded joints, and sleeve-coupled and other patented piping joints.

Location: IWA-4540
Subject: Pressure Testing of Class 2 and Class 3 Welds
Explanation: An exemption for Class 2 and Class 3 welds has been added to IWA-4540(d). If the Class 2 or Class 3 welds have undergone volumetric or surface examination per the Construction Code and Owner's Requirements, a pressure test of the welds is not required following the repair/replacement activity.

Location: IWA-4671 and IWA-4681
Subject: SA-302 Grade B Restriction
Explanation: Paragraphs IWA-4671 and IWA-4681 have been revised to eliminate the restriction on temper bead welding of SA-302 Grade B material.

Location: IWA-4673 and IWA-4683
Subject: 48-hr Hold Before Nondestructive Examination
Explanation: Paragraphs IWA-4673 and IWA-4683 have been revised to eliminate the 48-hr hold time before nondestructive examination of welds made with austenitic filler metals.

Location: IWA-5120
Subject: Pressure Test Exemption for Pneumatic Components and Systems
Explanation: The pressure test exemption in IWA-5120(e) for pneumatic components and systems periodically tested for leakage has been expanded. The 2021 Edition allows the exemption only if pneumatic components and systems are tested in accordance with programs required by plant Technical Specifications. The 2023 Edition extends the exemption to pneumatic components and systems tested as required by the regulatory authority having jurisdiction at the plant site. This revision gives Owners an avenue to take credit for component tests that are performed for reasons other than to meet Technical Specification requirements.

Location: IWA-5213 and IWB-5221
Subject: Test Condition Requirement for Visual, VT-2 Examinations
Explanation: Paragraph IWA-5213(b)(1) has been revised to clarify that the initial holding time for Class 1 system leakage tests does not need to be restarted if the pressure drops below the required test pressure. Instead, the hold time shall be extended by the amount of time the required test pressure was not met. This revision allows pressure to dip below 100% rated reactor power during the 4-hr hold time (as required for IWA-4540 examinations) for the Class 1 system leakage test. Paragraph IWB-5221(b) has also been revised to clarify that normal fluctuations in pressure in accordance with plant operating procedures are allowed during the performance of the VT-2 visual examination.

Location: IWA-6310
Subject: Radiograph Retention
Explanation: Paragraph IWA-6310 has been redesignated as IWA-6310(a), and IWA-6310(b) has been added to clarify that an Owner is not in violation of the Code if a record maintained per IWA-6310 deteriorates. The new paragraph addresses the fact that radiographs will deteriorate over time and will not be readable for a component's lifetime.

Location: IWA-6330, IWB-3112, and IWC-3112
Subject: Construction Code and Owner's Requirements
Explanation: References to Section III, Subsection NCA, NCA-4134.17 have been deleted from IWA-6330, IWB-3112(a)(1), and IWC-3112(a)(1). These references have been removed so that Section XI would not impose requirements that may exceed those required by the plant's original Construction Code and Owner's Requirements, unless there is a structural integrity concern that requires correction. In addition, the references in IWB-3112(a)(1) and IWC-3112(a)(1) to Section III acceptance criteria have been replaced by a reference to the Construction Code and Owner's Requirements.

Location: IWA-6340
Subject: Inservice Inspection Records
Explanation: Paragraph IWA-6340(j)(2), which required maintenance of tendon wire and strand sample test results, has been deleted.

Location: IWB-2200
Subject: Preservice Examination Requirements for Pressure-Retaining Bolting
Explanation: Paragraph IWB-2200 has been revised to add an exemption for preservice examination requirements associated with Examination Categories B-G-1 and B-G-2 bolting of Examination Categories B-L-2 and B-M-2 components. This revision allows use of the Construction Code visual examination of pressure-retaining bolting in lieu of the visual, VT-1, preservice examination required by Section XI.

Location: IWB-2200 and IWC-2200
Subject: Crediting Construction Code Surface Examinations for Section XI Preservice Inspection
Explanation: Paragraphs IWB-2200(b) and IWC-2200(b) have been revised to indicate the following:

(a) The Construction Code examinations may be credited for Section XI preservice examination credit.

(b) The Construction Code examinations may be performed by personnel qualified in accordance with Section XI or the Construction Code, which may be different than Section III.

Location: IWB-2200 and IWC-2200
Subject: Preservice Examination
Explanation: Paragraphs IWB-2200 and IWC-2200 have been revised to reference IWB-3514.8 and IWC-3514.6, respectively, for welds susceptible to primary-water stress corrosion cracking or intergranular stress corrosion cracking. Welds that are placed into service and contain internal-diameter connected flaws are required to be subsequently examined to determine if cracking has initiated.

Location: IWB-2200, IWC-2200, and IWD-2200
Subject: Preservice Examination
Explanation: Paragraphs IWB-2200, IWC-2200, and IWD-2200 have been revised to clarify that preservice examinations are required throughout the life of the plant following a repair/replacement activity.

Location: Tables IWB-2500-1 (B-K) and IWC-2500-1 (C-C)
Subject: Examination Requirements for Class 1 and Class 2 Piping
Explanation: Tables IWB-2500-1 (B-K) and IWC-2500-1 (C-C) have been revised to require surface examination of Class 1 and Class 2 piping integral attachment welds only if accompanying support deformation is identified.

Location: Figure IWB-2500-7(d)
Subject: Nozzles Fabricated From Weld Buildups
Explanation: The title of Figure IWB-2500-7(d) has been revised to clarify that the configuration is applicable to nozzles fabricated from weld buildups.

Location: Figure IWB-3600-1 and Nonmandatory Appendix C, C-2200
Subject: Characterization of Flaws in Clad Piping
Explanation: Figure IWB-3600-1, Note (1) has been revised to clarify that the flaw characterization rules for clad components shall be used for transformation of a subsurface flaw to a surface flaw. Additionally, C-2200(d) has been revised to clarify that for subcritical flaw growth analysis of clad piping, the rules of C-2200(d) shall be used in lieu of the flaw transformation rules of IWA-3300.

Location: IWB-5222
Subject: Boundary for Category B-P Pressure Tests at Boiling Water Reactor Plants
Explanation: Paragraph IWB-5222(a) has been revised to permit closure of valves within the Class 1 boundary as necessary to achieve or maintain system pressure during the Class 1 leakage test. This revision addresses the issue of valve alignments for Boiling Water Reactor plants during the Class 1 system leakage test.

Location: Table IWD-2500-1 (D-A), Notes (2)(e), (6), and (7)
Subject: Inspection Requirements
Explanation: Table IWD-2500-1 (D-A) has been revised to clarify the inspection requirements of welded attachments in systems the Owner has determined are subject to corrosion. The new Note (2)(e) adds a condition that requires examination of welded attachments that are in an environment or area where the Owner has determined the attachment weld is subject to outside surface corrosion. Note (6) has been revised to clarify that for multiple vessels of similar design, function, and service, one welded attachment of only one of the multiple vessels shall be selected for examination. For a single vessel, one welded attachment shall be selected for examination. Note (7), which applies to welded attachments of piping, pumps, and valves, has been revised to reference Note (2) to define the 10% sample of welded attachments that shall be selected for examination.

Location: IWE-1220
Subject: Components Exempted From Examination
Explanation: Paragraph IWE-1220(d) has been revised to clarify the examination exemption requirements for Class 1 and Class 2 piping, pumps, and valves that are part of the containment system or that penetrate or are attached to the containment vessel. These components shall be examined in accordance with the requirements of IWA-1320(a)(1) or IWA-1320(a)(2), as applicable.

Location: IWE-1232
Subject: Inaccessible Surface Areas
Explanation: Paragraph IWE-1232 has been revised to clarify that insulation does not need to be removed from containment surfaces solely to perform examinations required by Category E-A. However, insulation shall be removed to perform examinations required by Category E-C if the insulated surfaces are subject to conditions defined in IWE-1241.

Location: IWE-2430
Subject: Additional Examinations
Explanation: The scope of IWE-2430(a) has been expanded to include Examination Categories E-C and E-G. IWE-2430(a) has also been revised to clarify that additional examinations are required only if 100% of the items in an Examination Category have not already been examined during a refueling outage.

Location: Table IWE-2500-1 (E-A), Note (1)(b)
Subject: Containment Surfaces
Explanation: The phrase "minor permanent attachments" have been deleted from Table IWE-2500-1 (E-A), Note (1)(b). The revision makes the note consistent with Section III, Subsection NE, NE-4435, and Section III, Division 2, CC-4543.

Location: IWE-3122.3
Subject: Corrective Measures
Explanation: Paragraph IWE-3122.3(b) has been revised to clarify that items on which corrective measures have been performed are required to be examined during the next scheduled examination in accordance with Examination Category E-A.

Location: IWE-3122.3
Subject: Successive Examinations
Explanation: Paragraph IWE-3122.3(b) has been revised to eliminate the requirement for performing successive examinations in accordance with IWE-2420(b), IWE-2420(c), and IWE-2420(d) if corrective measures have been performed during the current outage and the affected areas are reexamined during the next inspection period in accordance with Table IWE-2500-1 (E-A).

Location: IWE-3511
Subject: General Visual Examination of Surface Areas
Explanation: The title of IWE-3511 has been revised to clarify that IWE-3511 includes all Category E-A, Item E1.11, Note (1)(d) items.

Location: IWE-3512
Subject: General Visual Examination of Caulking, Flashing, and Sealants
Explanation: The title of IWE-3512 has been revised to clarify that IWE-3512 applies only to caulking, flashing, and sealants.

Location: IWL-2330
Subject: Responsible Engineer
Explanation: Paragraph IWL-2330 has been revised to address the use of the term "Registered Professional Engineer." In addition, the requirements for the Responsible Engineer have been revised to apply to plants outside the United States and Canada.

Location: IWL-2523.2 and IWL-3221.2
Subject: Elimination of Requirements for Tendon Wire or Strand Tests
Explanation: Requirements for tendon wire or strand tests have been deleted from IWL-2523.2. Acceptance standards for tendon wire or strand tests have been deleted from IWL-3221.2.

Location: IWL-3221.1
Subject: Tendon Force and Elongation
Explanation: Paragraph IWL-3221.1(c) has been revised to clarify that measurements from all previous examinations are required to be included as part of the acceptance criteria when the prestressing forces for each type of tendon indicate a prestress loss. This revision more accurately predicts future tendon prestress loss. A provision has also been added to allow Owners to exclude tendon installation force measurements from long-term trending after completing three examinations in accordance with Table IWL-2500-1 (L-B), Item L2.10.

Location: IWL-5220
Subject: Test Pressure for Concrete Components
Explanation: The test pressure requirements for concrete components in IWL-5220 have been revised to be identical to the test pressure specified in IWE-5223.1. This revision facilitates performing a single test that meets the requirements of both IWL-5220 and IWE-5223.1.

Location: Mandatory Appendix I, Supplement 1
Subject: Calibration Block Material and Thickness
Explanation: Mandatory Appendix, Supplement 1 has been revised to allow use of calibration blocks fabricated from material having chemical analysis, tensile strength, and metallurgical structure similar to the material to be examined. This revision provides flexibility if calibration blocks of the same material specification, product form, and heat treatment condition as the material to be examined are unavailable.

Location: Mandatory Appendix VIII, Supplements 2, 4, 5, 8, 10, 11, 14, and 15
Subject: Specimen Identification
Explanation: Mandatory Appendix VIII, Supplements 2, 4, 5, 8, 10, 11, 14, and 15 have been revised to delete the requirement that "specimen identification" and "identification" be obscured or concealed to maintain a blind test. This revision addresses the fact that the Performance Demonstration Administrator is sometimes unable to obscure the specimen identifications due to the uniqueness of the specimens.

Location: Mandatory Appendix VIII, Supplement 11
Subject: Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds
Explanation: Mandatory Appendix VIII, Supplement 11 has been revised as follows:

(a) A Scope section and requirements for procedure qualification have been added to align Supplement 11 with other Mandatory Appendix VIII supplements.

(b) Descriptions of the preservice and inservice inspection (PSI and ISI) portions of the qualification testing have been added. Requirements for the use of service- and fabrication-induced flaws and grading units in those inspections have been clarified.

(c) Planar-flaw type and placement direction and grading-unit criteria have been clarified.

(d) Descriptions of qualification of examination procedures that specify an examination volume greater than 25% of the original base material have been added.

(e) Rules for administering PSI and ISI tests separately have been added.

(f) Criteria for maintaining security of the sample specimens have been added.

Location: Tables A-3630-9 through A-3630-16 and Tables A-3650-9 through A-3650-16
Subject: Stress Intensity Factors for Inside Surface Flaws With Depths Greater Than One-Half the Flaw Length
Explanation: Tables A-3630-9 through A-3630-16 (for circumferential inside surface flaws) and Tables A-3650-9 through A-3650-16 (for axial inside surface flaws) have been added to provide stress intensity factor coefficients (G values) for inside surface flaws with depths greater than one-half the flaw length.

Location: Figures C-2200-1 and C-2400-3 and Tables C-5310-1 through C-5310-5
Subject: Determination of the Length of a Circumferential Flaw
Explanation: Nonmandatory Appendix C has been revised to show how to determine the length of a circumferential flaw using flaw angle, θ, instead of flaw length, l. Figures C-2200-1 and C-2400-3 have been revised to show the total flaw angle. In Tables C-5310-1 through C-5310-5, flaw length has been replaced by flaw angle, and the table notes related to flaw length have been deleted.

Location: Nonmandatory Appendix G, G-2215
Subject: Low-Temperature Overpressure Protection Systems
Explanation: Paragraph G-2215 has been revised to clarify that low-temperature overpressure protection systems are required to limit the maximum pressure in the vessel to 100% of the pressure determined to satisfy eq. (1) in G-2215 under isothermal (steady-state) conditions.

Location: Nonmandatory Appendix W, Articles W-1000 and W-6000
Subject: Mechanical Clamping Devices for Class 2 and Class 3 Piping Pressure Boundary
Explanation: The following limitations have been deleted from W-1000(d):

(a) the limitation on the use of mechanical clamps on Class 1 piping. Class 1 piping is already excluded by the title of Nonmandatory Appendix W.

(b) the limitations on the use of mechanical clamping devices on portions of piping that form part of the containment boundary, on high-energy piping larger than NPS 2, and on moderate-energy piping larger than NPS 6.

Paragraph W-1000(d) now limits mechanical clamping devices on containment piping to one clamp per containment.

Requirements for monitoring mechanical clamps on containment piping have been added to Article W-6000.

Division 2

NOTE: The following abbreviations are used in the explanations of changes to Section XI, Division 2: MANDE = Monitoring and NDE; MANDEEP = Monitoring and NDE Expert Panel; NDE = nondestructive examination; RIM = Reliability and Integrity Management; RIMEP = RIM Expert Panel.

Location: Section XI, Division 2
Subject: Nuclear Reactor Facility
Explanation: The title of Section XI has been revised to "Rules for Inservice Inspection of Nuclear Reactor Facility Components." This revision replaces "power plant" with "reactor facility" because the term "nuclear reactor facility" applies to a wide range of reactor applications, such as nuclear power plants, isotope production reactors, mobile microreactors, propulsive microreactors, research and test reactors, and fusion reactor facilities.

Section XI, Division 2 includes the following related changes:

(a) The Division 2 subtitle has been revised to "Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Reactor Facilities."

(b) The term "nuclear power plant" has been replaced by "nuclear reactor facility" throughout Division 2.

(c) A definition of "nuclear reactor facility" has been added to RIM-7.

Location: RIM-1.2
Subject: Use of the Same Editions for Section XI, Divisions 1 and 2
Explanation: Paragraph RIM-1.2 has been revised to require that, where Section XI, Division 2 references Section XI, Division 1, the user shall refer to Division 1 of the same edition as Division 2.

Location: RIM-2.7.3
Subject: Preservice Inspection
Explanation: Paragraph RIM-2.7.3 has been revised to include any MANDE methods approved by the MANDEEP for creating a preservice baseline.

Location: RIM-4.2.4
Subject: Volumetric and Surface Examination
Explanation: Paragraph RIM-4.2.4 has been revised to clarify when nondestructive volumetric and surface examinations may be used in lieu of leakage testing after a repair/replacement activity.

Location: Mandatory Appendix IV, IV-1.3.2.2
Subject: NDE Level III Requirements
Explanation: Paragraph IV-1.3.2.2(d) has been revised to clarify the number of NDE Level IIIs required on the MANDEEP and the certification requirements for an NDE Level III.

Location: Mandatory Appendix VI, VI-1.1
Subject: Responsibilities and Qualifications of RIMEP
Explanation: Paragraph VI-1.1(g) has been revised to be consistent with IV-1.3.2.2. The MANDEEP Chair selected in accordance with Mandatory Appendix IV, IV-1.3.2.2(b) is required to be a member of the RIMEP.

Location: Mandatory Appendix VII, VII-1.3.1.1 and VII-3.3.1.1
Subject: Owner's Requirements
Explanation: Paragraphs VII-1.3.1.1 and VII-3.3.1.1 have been revised to add the Owner's Requirements to the required NDE acceptance standards. This revision makes the Section XI, Division 2 consistent with Section XI, Division 1.

Location: Mandatory Appendix VII, VII-1.4.9.1 and VII-3.4.9.1
Subject: Visual Examination, VT-2
Explanation: The phrase "prior to continued service" has been deleted from VII-1.4.9.1 and VII-3.4.9.1. The revision makes the paragraphs consistent with Section XI, Division 1, IWB-3522.1. This revision removes a requirement to take a system out of service to perform an evaluation to resolve a relevant condition and then return the system to continued service.

SECTION II

Introduction

Section II, Materials, is a "service section" of the ASME Boiler and Pressure Vessel Code (BPVC). This Section provides specifications for ferrous and nonferrous materials, and for welding rods, electrodes, and filler metals. It also provides material properties, including allowable, design, tensile, and yield stress values; physical properties; and external pressure charts and tables. Section II is divided into four parts, as follows:

- Part A — Ferrous Material Specifications
- Part B — Nonferrous Material Specifications
- Part C — Specifications for Welding Rods, Electrodes, and Filler Metals
- Part D — Properties

(a) Parts A and B contain material specifications published by ASTM International, Inc., and other national and international developers. These specifications have been modified as necessary for use in ASME BPVC construction. These specifications are designated with an "S" added to the beginning of the other organization's specification designation (e.g., ASTM A105 becomes ASME SA-105). These specifications contain requirements for chemical and mechanical properties, heat treatment, manufacture, heat and product analyses, and methods of testing. Note that all materials contained within a specification adopted by ASME and included in Parts A and B are not necessarily permitted for use in ASME BPVC construction. This Summary of Significant Changes describes only significant specification changes affecting materials permitted by the ASME BPVC. It does not include specification changes affecting materials not permitted by the ASME BPVC.

(b) Part C contains material specifications, most of which are identical to corresponding specifications published by the American Welding Society (AWS) and other recognized national or international organizations. All adopted specifications are either reproduced in Part C, where permission to do so has been obtained from the originating organization, or so referenced and information about how to obtain them from the originating organization is provided. The ASME BPV Committee on Welding, Brazing, and Fusing (Section IX) reviews all material specifications submitted to it and, if the Committee feels a specification needs to be adapted for ASME BPVC purposes, they revise it accordingly. However, ASME, AWS, and other originating organizations communicate regularly in an effort to maintain identical specifications.

(c) Part D primarily comprises tables providing stress and property data for materials permitted for use in ASME BPVC construction. These tables contain allowable stresses; design stress intensities; mechanical properties, including tensile strength and yield strength; and physical properties, including thermal expansion, thermal conductivity and diffusivity, moduli of elasticity, and Poisson's ratio. In addition to these tables, Part D provides charts and tables for determining shell thickness of components under external pressure.

Part A

Location: Statement of Policy on the Use of ASME Material Specifications, and Mandatory Appendix II
Subject: Use of ASME Material Specifications
Explanation: A new statement of policy on the use of ASME material specifications has been added to clarify terminology used in the body of the specifications. Mandatory Appendix II has been retitled "The Framework of ASME Material Specifications" and completely rewritten.

Location: SA-29/SA-29M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A29/A29M-20 has been adopted as the revised ASME SA-29/SA-29M. The SA-29/SA-29M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) In Table 2, the carbon content for 5160 has been revised.

(b) The maximum Cb, V, Cb + V verbiage has been deleted, and the maximums for Cb, V, and Cb + V in regards to grain-refining usage have been removed.

Location: SA-53/SA-53M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A53/A53M-20 has been adopted as the revised ASME SA-53/SA-53M. The SA-53/SA-53M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Distinctions for types and other manufacturing processes have been removed from Table 2.

(b) The flattening test requirements for seamless pipe formerly in para. 9.2 have been moved to Supplementary Requirement S1.

(c) ASTM Practice E273 has been added to para. 9.1.1 for nondestructive test of electric-resistance-welded pipe.

(d) Paragraph 9.1.1 has been revised to require the use of full-volumetric nondestructive examination on Type E pipe produced on a hot-stretch reducing mill.

(e) Paragraph 17.2 has been revised to remove allowance to take tension test specimen from the skelp as well as other considerations related to full-size tension test specimens.

Location: SA-105/SA-105M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A105/A105M-21 has been adopted as the revised ASME SA-105/SA-105M. The SA-105/SA-105M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) In Table 2, para. 8.3.4, and Supplementary Requirement S1, the hardness limit has been increased from 187 to 197 HBW.

(b) Paragraph 7.4 has been revised to clarify hardness testing requirements.

(c) Paragraph 12.2.4 has been revised to clarify the number of hardness results required to be reported.

(d) Paragraph 12.2.3 has been revised on chemistry reporting.

(e) In Table 1, the allowable manganese content has been increased from 1.35% to 1.65%.

(f) Paragraph 6.2 has been revised on heat treatment.

(g) Multiple quenching has been reinstated as a heat treatment option in para. 6.2.1.

(h) Paragraph 8.2 has been revised to clarify test specimen location.

(i) Paragraph 8.3.2 has been revised to address testing requirements for different size forgings in the same heat-treatment charge, to clarify the location for removal of test specimens, and to move mandatory Note 2 into the text.

(j) Section 11 on appearance, surface protection, and corrosion protection has been added.

(k) Sections 13 and 14 on certification and marking have been revised.

Location: SA-182/SA-182M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A182/A182M-21 has been adopted as the revised ASME SA-182/SA-182M. The SA-182/SA-182M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Material Grades F115 UNS K91060, F317LNCb UNS S31740, and F347LNCuB UNS S34752 have been added to Tables 1, 2, 3, and 4.

(b) In Table 3, the mechanical properties for F53 ≤2 in. (≤50 mm) have been split into two classes.

(c) In Table 2, footnote O, the formula for UNS S32760 has been modified to % Cr + 3.3 × %(Mo + ½ W) + 16 × % N = 41 min.

(d) In Table 2, Notes J and K, nitrogen has been added to the formula that determines titanium content for Grades F321 and F321H.

(e) A511/A511M hollow bar has been added as a starting material alternative to forged or rolled bar in para. 1.2, section 2, paras. 6.4.2 and 6.4.3 on cylindrical shaped products, and para. 7.6 on heat treatment.

(f) Paragraphs 13.1, 13.2, and 13.3 have been revised to clarify the time of examination for required nondestructive examination of hollow forgings of Grade F 91 Types 1 and 2, and Grades F 92, F 115, F 122, and F 911.

(g) Predominantly ferrous materials, Grades F700 UNS N08700, FNIC UNS N08800, FNIC10 UNS N08810, FNIC11 UNS N08811, F1925 UNS N08925, and F1925N UNS N08926, coming from ASTM B366/B366M have been added to Tables 1 through 4 and para. 15.1.2 for repair welding.

Location: SA-193/SA-193M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A193/A193M-20 has been adopted as the revised ASME SA-193/SA-193M. The SA-193/SA-193M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) In Table 1, the carbon, manganese, and chromium limits for Grade B7, B7M have been changed; tantalum has been removed for Grades B8C, B8CA, B8R, and B8RA; and the nitrogen maximum for UNS S31254 has been raised to 0.25.

(b) Alloy UNS S34752 has been added to Tables 1 through 3.

(c) Grades B8ML4CuNa, B8ML4CuNa, and UNS S31730 have been added in Tables 1, 2, 3, and 5.

(d) Table 3 has been revised to correct the maximum size range for B16.

(e) Grade B8MLNCuB has been added to para. 6.2.3 and Table 5.

(f) Paragraph 9.1.1 has been revised to allow for machined specimen testing for bolting greater than 1.500 in. in diameter.

Location: SA-194/SA-194M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A194/A194M-22 has been adopted as the revised ASME SA-194/SA-194M. The SA-194/SA-194M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) The title of the specification has been revised to include “Stainless Steel.”

(b) Paragraph 8.1.3.1 has been revised to permit use of electromagnetic hardness testing.

(c) Grade 7 nuts have been identified as a suitable substitute for Grade 4 nuts.

(d) The nitrogen maximum for UNS S31254 has been raised to 0.25 from 0.22.

(e) Chemistry has been harmonized with specifications ASTM A29/A29M and ASTM A276 as applicable in Table 1.

(f) UNS S31730, Grades 8ML4CuN and 8ML4CuNA, have been added to paras. 6.5 and 6.6 and Tables 1, 2, and 7.

(g) Grade 4 has been removed throughout.

(h) References to metric sizes smaller than M12 and to ISO 4033 have been removed throughout.

(i) Grades 8CLNCuBA and 8CLNCuB have been added to paras. 6.5 and 6.6 and Tables 1, 2, and 7.

(j) Grade 43 has been added to sections 3, 8, and 12; para. 6.4; and Tables 1, 2, 3, 4, and 7.

Location: SA-213/SA-213M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A213/A213M-22 has been adopted as the revised ASME SA-213/SA-213M. The SA-213/SA-213M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) The nitrogen content for UNS S31254 has been revised from 0.18–0.22 to 0.18–0.25.

(b) The carbon maximum for UNS S31002 has been revised from 0.02 to 0.015.

(c) Grades T128 (UNS K91421) and T921 (UNS K91201) have been added to para. 9.1.2 and Tables 1, 3, 4, and 5.

(d) UNS S31043, UNS S31740, and UNS S34752 have been added to Tables 2, 3, and 4.

Location: SA-266/SA-266M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A266/A266M-21 has been adopted as the revised ASME SA-266/SA-266M. The SA-266/SA-266M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) In para. 8.1.1.1, the description of the test depth for hollow forgings has been reworded from "midway between the center and outer surfaces of the wall" to "midwall."

(b) An alternative test depth has been added for forgings heat treated as a solid and then subsequently bored.

Location: SA-276/SA-276M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A276/A276M-17 has been adopted as the revised and redesignated ASME SA-276/SA-276M. The SA-276 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) UNS N08020, UNS N08367, UNS N08800, UNS N08810, UNS N08811, UNS N0925, UNS N08926, UNS N08904 (904L), UNS S20162, UNS S31266, UNS S31727, UNS S31730, UNS S32053, UNS S32101, UNS S31010, UNS S32202, UNS S32506, UNS S32654, UNS S32750, UNS S34565, UNS S40976, and UNS 40976 have been added to Tables 1 and 2.

(b) The tensile strength for UNS S32205 has been increased from 90 ksi to 95 ksi (620 MPa to 655 MPa).

(c) A 0.03 carbon minimum has been added to UNS S41000.

(d) The nitrogen maximum for UNS S31254 has been raised from 0.22 to 0.25.

Location: SA-283/SA-283M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A283/A283M-13 has been adopted as the revised ASME SA-283/SA-283M. The SA-283/SA-283M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Grades A and B have been deleted due to lack of use.

(b) Paragraph 4.2 has been added.

(c) The title of para. 6 has been revised from "Tensile Properties" to "Mechanical Properties."

(d) Paragraph 6.1 has been added, and the previous para. 6.1 redesignated as 6.1.1.

(e) In Table 1, the requirements for phosphorus have been changed from 0.035% to 0.030%, and the requirements for sulfur from 0.040% to 0.030%.

(f) Supplementary Requirement S97 has been deleted.

Location: SA-320/SA-320M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A320/A320M-22 has been adopted as the revised ASME SA-320/SA-320M. The SA-320/SA-320M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) The minimum reduction area for Class 2 Grades B8, B8C, B8P, B8F, and B8T, sizes over $^{3}/_{4}$ to 1, has been revised from 30% to 35%.

(b) The nickel limits for Grades B8LN, B8LNA, B8MLN, and B8MLNA have been changed.

(c) The titanium limits for Grades B8T and B8TA have been changed.

(d) The carbon and nickel limits for Grades B8P and B8PA have been changed.

(e) Paragraph 5.1.2 has been added and subsequent paragraphs redesignated.

Location: SA-350/SA-350M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A350/A350M-18 has been adopted as the revised ASME SA-350/SA-350M. The SA-350/SA-350M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) In Table 1, footnote C has been removed from copper grades LF3 and LF5.

(b) In Table 1, Grades LF1 and LF2 have been revised to allow higher columbium by agreement.

(c) Paragraph 5.4.2.1(3) has been added to allow intermediate heat treatment in the quenching and tempering process, at the option of the manufacturer.

(d) Paragraph 5.4.2 has been revised to add normalizing prior to the quenched and tempered (Q&T) heat treatment, at the option of the manufacturer.

(e) Paragraphs 7.1.3.2(1) through 7.1.3.2(3) and Figures 2 through 4 have been added to specify impact test specimen locations in separately forged test blanks for forgings that are not Q&T and in forgings that are Q&T or are quenched and precipitation hardened.

Location: SA-351/SA-351M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A351/A351M-18e1 has been adopted as the revised ASME SA-351/SA-351M. The SA-351/SA-351M listing in Table II-200-1 has been revised accordingly. This specification has been revised in its entirety, and the title of the specification has also been revised.

Location: SA-358/SA-358M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A358/A358M-19 has been adopted as the revised ASME SA-358/SA-358M. The SA-358/SA-358M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) UNS S31655 has been added to Table 1.
(b) Alloy heat treatment has been added to Table 2.
(c) UNS S34752 has been added to paras. 7.2 and 7.3.

Location: SA-370/SA-370M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A370/A370M-21 has been adopted as the revised and redesignated ASME SA-370/SA-370M. The SA-370 listing in Table II-200-1 has been revised accordingly. This specification has been revised in its entirety.

Location: SA-372/SA-372M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A372/A372M-20e1 has been adopted as the revised ASME SA-372/SA-372M. The SA-372/SA-372M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) In Table 1, phosphorus and sulfur values have been updated to 0.015% and 0.010% maximum, respectively, for all grades.
(b) Normalized, liquid quenched, and tempered have been added as heat treatment options for several grades and classes in paras. 4.3.1 and 4.3.2.
(c) Grades N and P have been added to paras. 4.3.2 and 4.3.3.1 and Tables 1 through 4.
(d) Class 90 for Grade J has been added to paras. 4.3.2 and 4.3.3.1 and Tables 2 through 4.
(e) Grade R has been added to paras. 4.3.2 and 4.3.3.1 and Tables 1 through 4.
(f) Paragraph 4.1 has been revised to add Grades N, P, and J Class 110 mandatory vacuum treating.
(g) Paragraph 5.4 has been added, pointing the purchaser to S24 of ASTM A788 if temper embrittlement is of concern (J factor).
(h) Paragraph 6.4.1.1 has been revised to clarify that the test depth requirement does not apply for bending properties.
(i) Paragraph 6.3.2 has been revised to permit all applicable ASTM E290 bend test methods, not just Arrangement C.

Location: SA-376/SA-376M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A376/A376M-19 has been adopted as the revised ASME SA-376/SA-376M. The SA-376/SA-376M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Grade TP347LN (UNS S34751) has been added to para. 5.2.3 and Tables 1 and 2.
(b) UNS S31266 has been added to para. 5.2.6 and Tables 1 and 2.
(c) Section 11 has been revised as follows:
(1) Paragraph 11.1 has been revised to add more detail to testing definitions.
(2) In para. 11.2, the number of required tension tests has been revised.
(3) Paragraph 11.3 has been revised to distinguish the flattening test requirements for batch furnaces with recording pyrometers from the requirements for batch furnaces without recording pyrometers.

Location: SA-403/SA-403M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A403/A403M-19a has been adopted as the revised ASME SA-403/SA-403M. The SA-403/SA-403M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Type 310H has been added back into the specification.
(b) In Table 2, the nickel minimum for UNS S38815 has been revised from 13.00 to 15.00.
(c) The interchangeable use of the terms “niobium” and “columbium” has been addressed in Table 2 and section 7.

(d) In paras. 6.2 and 6.4 and Supplementary Requirement S2, "stabilization" has been revised to "a stabilizing treatment" and the option for resolution anneal has been eliminated.
(e) Paragraph 10.7 has been added to reinstate passivation as part of surface preparation.
(f) Supplementary Requirement S3 has been added for ASME BPVC Section III construction.

Location: SA-409/SA-409 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A409/A409M-14(R19) has been adopted as the revised ASME SA-409/SA-409M. The SA-409/SA-409M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following change: Supplementary Requirement S7 has been added for ASME BPVC Section III and Section VIII, Division 1 construction.

Location: SA-414/SA-414M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A414/A414M-14(R19) has been adopted as the revised ASME SA-414/SA-414M. The SA-414/SA-414M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) Testing requirements have been revised.
(b) Grade H has been added.

Location: SA-423/SA-423M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A423/A423M-19 has been adopted as the revised ASME SA-423/SA-423M. The SA-423/SA-423M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following change: Grade 3 has been added to Tables 1 and 3.

Location: SA-439/SA-439 and Mandatory Appendix II, Table II-200-1
Subject: Added Specification
Explanation: ASTM A439/A439M-18 has been adopted as ASME SA-439/SA-439M. SA-439/SA-439M has been added to Table II-200-1.

Location: SA-450/SA-450 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A450/A450M-21 has been adopted as the revised ASME SA-450/SA-450M. The SA-450/SA-450M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) Paragraph 12.1 has been added.
(b) Paragraph 27.1 has been revised to make providing a material test report mandatory.
(c) ASTM test method A1058 has been incorporated throughout.

Location: SA-453/SA-453M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A453/A453M-17 has been adopted as the revised ASME SA-453/SA-453M. The SA-453/SA-453M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following change: separate strength requirements for Class 660 D bolting materials >$2^{1}/_{2}$ in. (>63.5 mm) in diameter have been added to Table 5.

Location: SA-479/SA-479M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A479/A479M-21 has been adopted as the revised ASME SA-479/SA-479M. The SA-479/SA-479M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following change: UNS S34752 has been added to Tables 1 and 2.

Location: SA-484/SA-484M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A484/A484M-21 has been adopted as the revised ASME SA-484/SA-484M. The SA-484/SA-484M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) UNS S34752 has been added to Table 2.
(b) Paragraph 6.2.1 has been added to address rules for checking tolerance limits for ratios.

(c) Paragraphs 7.2.3 and 8.1.4 have been revised.
(d) Section 17 on certification has been rewritten, and paras. 17.1.1, 17.2, and 17.4 have been added.

Location: SA-487/SA-487M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A487/A487M-21 has been adopted as the revised ASME SA-487/SA-487M. The SA-487/SA-487M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following change: Grade 17 has been added to Tables 1 through 4.

Location: SA-508/SA-508M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A508/A508M-18 has been adopted as the revised ASME SA-508/SA-508M. The SA-508/SA-508M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) In Table 1, the maximum aluminum content for Grades 1, 1a, 2, and 3 has been changed from 0.025% to 0.030%.
(b) Paragraph 7.1.2.1 has been revised to allow individual forgings that were not made in multiples and that weigh less than 1,000 lb to be qualified on a per-heat per-lot basis.

Location: SA-530/SA-530M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A530/A530M-18 has been adopted as the revised ASME SA-530/SA-530M. The SA-530/SA-530M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) Material test reports are now required.
(b) Paragraph 5.2 has been revised in its entirety.
(c) ASTM A1058 has been added to section 7.
(d) Section 20 has been revised so that test specimens must be removed from the "as-heat treated" finished pipe.

Location: SA-557/SA-557M and Mandatory Appendix II, Table II-200-1
Subject: Deleted Specification
Explanation: ASME SA-557/SA-557M has been deleted and Table II-200-1 updated accordingly.

Location: SA-572/SA-572M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A572/A572M-21e1 has been adopted as the revised ASME SA-572/SA-572M. The SA-572/SA-572M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) In Table 1, the maximum thickness or size of plates and bars has been increased from 2 in. to 2½ in. (50 mm to 64 mm) for Grade 55, from 1¼ in. to 2½ in. (32 mm to 64 mm) for Grade 60, and from 1¼ in. to 2 in. (32 mm to 50 mm) for Grade 65.
(b) In Table 2, diameter, thickness, and distance between parallel faces, plates, and bars have been revised to increase maximum thickness to 2½ in. (64 mm) for Grades 55 and 60, and to 2 in. (50 mm) for Grade 65.

Location: SA-691/SA-691M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A691/A691M-19 has been adopted as the revised ASME SA-691/SA-691M. The SA-691/SA-691M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) In Table 1, columbium has been replaced with niobium.
(b) Supplementary Requirement S13 has been added for ASME BPVC Section III construction.

Location: SA-727/SA-727M and Table II-200-1
Subject: Revised Specification
Explanation: ASTM A727/A727M-14(R19) has been adopted as the revised ASME SA-727/SA-727M. The SA-727/SA-727M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) References to A370 have been replaced with A961/A961M.
(b) Section 12 on surface finish, appearance, and corrosion protection has been added.
(c) The language in Section 15 has been simplified.

Location: SA-731/SA-731M and Mandatory Appendix II, Table II-200-1
Subject: Deleted Specification
Explanation: ASME SA-731/SA-731M has been deleted and Table II-200-1 updated accordingly.

Location: SA-751/SA-751M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A751/A751M-21 has been adopted as the revised and redesignated ASME SA-751/SA-751M. The SA-751 listing in Table II-200-1 has been revised accordingly. This specification has been revised in its entirety.

Location: SA-813/SA-813M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A813/A813M-14(R19) has been adopted as the revised and redesignated ASME SA-813/SA-813M. The SA-813/SA-813M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) UNS S31727 and UNS S32053 have been added to Tables 2 and 3 and their heat treatment requirements added in new para. 4.2.4.

(b) Types 201 and 201LN have been added to Tables 2 and 3.

(c) UNS S31266 has been added to Table 2 (and Note J) and Table 3.

Location: SA-814/SA-814M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A814/A814M-15(R19) has been adopted as the revised ASME SA-814/SA-814M. The SA-814/SA-814M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) SI units have been added to Table 1.

(b) ASME B31.3 has been added to section 2.

(c) UNS S31727 and UNS S32053 have been added to Tables 2 and 3 and their heat treatment requirements added in new para. 4.2.4.

(d) Types 201 and 201LN have been added to Tables 2 and 3.

Location: SA-836/SA-836M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A836/A836M-14(R20) has been adopted as the revised ASME SA-836/SA-836M. The SA-836/SA-836M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Section 10 on surface finish, appearance, and corrosion protection has been added.

(b) Language in sections 13 and 14 has been simplified.

Location: SA-941/SA-941M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A941/A941M-22a has been adopted as the revised and redesignated ASME SA-941/SA-941M. The SA-941 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Definitions of “controlling cross section thickness (Tc)” and “wrought product” have been added.

(b) Definitions of “fine grain practice” and “patenting” have been revised.

(c) In section 3, discussion has been added to “nonferrous material” and discussion of “stabilized stainless steel” has been revised.

Location: SA-960/SA-960M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A960/A960M-20 has been adopted as the revised ASME SA-960/SA-960M. The SA-960/SA-960M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) ASTM A1058 has been added to the references.

(b) Paragraph 4.1.6 has been added to indicate that ordering information should include the chosen testing track from the options in ASTM A1058.

(c) Paragraph 9.1 has been revised to reference ASTM A1058 if the M suffix (SI Units) standard is specified.

(d) Paragraphs 9.4.1 and 9.4.2 have been revised to allow test methods per ASTM A1058 if SI units are specified.

Location: SA-962/SA-962M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A962/A962M-22 has been adopted as the revised ASME SA-962/SA-962M. The SA-962/SA-962M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) References to ASME B18.2.2, ASME B18.2.6, ASME B18.2.4.6M, ASME B18.2.6, ASME B18.31.2, and ISO 4762 have been added.

(b) Dimensional references have been added to section 13.

(c) Requirements for carburization have been added to section 14.

(d) Test requirements have been added to para. 15.2.

(e) Retest and rework requirements have been updated in section 16.

Location: SA-965/SA-965M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A965/A965M-21a has been adopted as the revised ASME SA-965/ SA-965M. The SA-965/SA-965M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) Paragraph 6.3 has been revised to remove FXM-19 with a 1,950°F anneal.

(b) Grades UNS N08020, UNS N08367, UNS N08904, UNS N08700, UNS N08800, UNS N08810, UNS N08811, UNS N08925, and UNS N08926 have been added. Tables 1 and 2 and Sections 6, 9, and 10 have been revised to include the new grades.

Location: SA-995/SA-996M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM A995/A995M-20 has been adopted as the revised and redesignated ASME SA-995/ SA-995M. The SA-995 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes in Table 1:

(a) Additional heat-treat options have been added for Grade 6A to allow for a drop in temperature before the rapid cool.

(b) The composition formula for CD3MWCuN has been updated to include W.

Location: SA-1058 and Mandatory Appendix II, Table II-200-1
Subject: Added Specification
Explanation: ASTM A1058-19 has been adopted as ASME SA-1058. SA-1058 has been added to Table II-200-1.

Location: Non-ASTM Specifications SA-CSA-G40.21, SA/EN 10025-2, SA/IS 2062, and SA/JIS G3118
Subject: Marking Requirements
Explanation: Marking requirements have been added to the cover pages of SA-CSA-G40.21, SA/EN 10025-2, SA/IS 2062, and SA/JIS G3118.

Location: Mandatory Appendix II, Table II-200-1
Subject: Lowered Maximum Carbon Content for SA-266/SA-266M
Explanation: For SA-266/SA-266M, the earliest other acceptable ASTM edition has been changed from 1987 to 1999 because the maximum carbon content for Grade 3 was changed in the 1999 edition.

Part B

Location: Use of ASME Material Specifications, and Mandatory Appendix II
Subject: Use of ASME Material Specifications
Explanation: A new statement on the Use of ASME Material Specifications has been added. Mandatory Appendix II has been retitled "The Framework of ASME Material Specifications" and completely rewritten.

Location: SB-167 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B167-18 has been adopted as the revised ASME SB-167. The SB-167 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes: UNS N06696, UNS N06674, UNS N06235, and UNS N06699 have been added.

Location: SB-168 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B168-19 has been adopted as the revised ASME SB-168. The SB-168 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes: UNS N06696, UNS N06674, UNS N06235, and UNS N06699 have been added.

Location: SB-211/SB-211M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B211/B211M-19 has been adopted as the revised and redesignated ASME SB-211/SB-211M. The SB-211 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) ASTM has combined specifications B211 and B211M.
(b) ASTM B985 and ASTM E3061 have been added to section 2 and ASTM E34 has been deleted.
(c) The phrase "(US Customary)" has been added to the title of Table 2 and "(Metric SI)" to the title of Table 3.
(d) The unnumbered table in section 14 that referred to specific ANSI H35.2 [H35.2M] tolerance tables has been deleted, and section 14 has been revised to point the reader to ANSI H35.2 [H35.2M].

Location: SB-625 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B625-17 has been adopted as the revised ASME SB-625. The SB-625 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes: UNS N08034, UNS N08354, and UNS N08830 have been added, and UNS N08904 has been deleted.

Location: SB-649 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B649-17 has been adopted as the revised ASME SB-649. The SB-649 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) UNS N08034, UNS N08354, and UNS N08936 have been added, and UNS N08904 has been deleted.
(b) Table 2 has been deleted, and para. 6.2.1 has been revised to refer users to ASTM B880 for tolerance limits.

Location: SB-677 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B677-21 has been adopted as the revised ASME SB-677. The SB-677 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:

(a) The title of SB-677 has changed: alloy descriptors have replaced the UNS numbers.
(b) UNS N08354 has been added, and UNS N08904 has been deleted.
(c) Table 3 has been deleted and text revised to refer users to ASTM B829.
(d) Sections 9 through 18 and Appendix X1 have been replaced with Section 4, which mandates conformance to B829 for a number of topics.
(e) Ordering information in section 5 has been changed from mandatory requirements to guidance.
(f) Section 8 has been revised to require that nondestructive tests be done in accordance with B829.

Location: SB-729 and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B729-20 has been adopted as the revised ASME SB-729. The SB-729 listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes:
(a) The title of SB-729 has changed: alloy descriptors have replaced the UNS numbers.
(b) Ordering information in section 4 has been changed from mandatory requirements to guidance.
(c) The maximum hydrostatic pressure values have been removed, and the text revised to refer users to the hydrostatic pressure equation found in B829.
(d) Furnishing the certification and test report has been made mandatory.

Location: SB-752/SB-752M and Mandatory Appendix II, Table II-200-1
Subject: Revised Specification
Explanation: ASTM B752/B752M-22 has been adopted as the revised ASME SB-752/SB-752M. The SB-752/SB-752M listing in Table II-200-1 has been revised accordingly. The revised specification includes the following changes: UNS numbers have been added to the Zr casting grades.

Location: SB/EN 1706 and Mandatory Appendix II, Table II-200-1
Subject: Updated Specification and Tables
Explanation: ASME SB/EN1706 has been updated to reference the 2020 edition of EN1706. Corresponding changes have been made to the Section II, Part D tables.

Part C

Location: SFA-5.5/SFA-5.5M
Subject: Revised Specification
Explanation: AWS A5.5/A5.5M:2022 has been adopted as the revised ASME SFA-5.5/SFA-5.5M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The revised specification includes the following changes:

(a) Text has been added to require that the level of boron in weld metal be reported if boron is intentionally added or known to be present at levels greater than 0.0010%.

(b) The following filler metal classifications have been added: E9016-B9A, E8016-B23A, E9016-B92A, E9015-B115, E9016-C1, E7016-C6, E8016-C7, E10016-NM3, E9016-NM4, E10016-NM5, E11016-NM6, E11016-NM7, E11018-NM8, E(X)XX45-G, E10016-Mn2, and E10018-Mn2.

(c) Paragraph 3.2 has been revised to allow an electrode to be classified with both a "-G" chemical composition designator and a defined chemical composition designator. This change is intended to ease the transition from "-G" classification to a defined composition classification and to prevent burdensome requalification for long-entrenched products with "-G" classifications.

Location: SFA-5.9/SFA-5.9M
Subject: Revised Specification
Explanation: AWS A5.9/A5.9M:2022 has been adopted as the revised ASME SFA-5.9/SFA-5.9M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The revised specification includes classifications from ISO 14343 that were identified by AWS A5 to be well-vetted and used in industry. Those alloys classified in ISO 14343 that could not meet the vetting and industry-use criteria have been omitted from the specification.

Location: SFA-5.10/SFA-5.10M
Subject: Revised Specification
Explanation: AWS A5.10/A5.10M:2021 has been adopted as the revised ASME SFA-5.10/SFA-5.10M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The following weld strength requirements have been added to the specification:

(a) A standardized test joint and standardized welding procedures have been established.
(b) The requirement to determine all-weld-metal strength and elongation has been added for all classifications.
(c) Minimum tensile strength requirements have been established for the most common alloys.

Location: SFA-5.13/SFA-5.13M
Subject: Revised Specification
Explanation: AWS A5.13/A5.13:2021 has been adopted as the revised ASME SFA-5.13/SFA-5.13M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The specification has been updated to conform to current AWS practices and to maintain ANSI approval; however, there have been no substantive changes.

Location: SFA-5.16/SFA-5.16M
Subject: Revised Specification
Explanation: AWS A5.16/A5.16:2023 has been adopted as the revised ASME SFA-5.16/SFA-5.16M. The specification has been updated to conform to current AWS A5 wording. The only substantive change is to allow classification of unlisted composition as ERTi-G, as do other A5 filler metal specifications.

Location: SFA-5.18/SFA-5.18M
Subject: Revised Specification
Explanation: AWS A5.18/A5.18:2021 has been adopted as the revised ASME SFA-5.18/SFA-5.18M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The revised specification includes the following changes:

(a) An optional supplemental designator has been added to indicate conformance of an S-6 electrode to ASME BPVC, Section IX, A-No. 1.

(b) An optional supplemental designator has been added to indicate that the electrode meets the requirements for classification across a range of shielding gases.

Location: SFA-5.20/SFA-5.20M
Subject: Revised Specification
Explanation: AWS A5.20/A5.20:2021 has been adopted as the revised ASME SFA-5.20/SFA-5.20M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The revised specification includes the addition of an optional supplemental designator to indicate that the electrode meets the requirements for classification across a range of shielding gases.

Location: SFA-5.23/SFA-5.23M
Subject: Revised Specification
Explanation: AWS A5.23/A5.23M:2021 has been adopted as the revised ASME SFA-5.23/SFA-5.23M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The revised specification includes the following changes:

(a) New designators have been added for low Mn + Ni B91 weld deposit.

(b) New classifications, EB115 and B115, have been added for an electrode and corresponding weld deposit with 10.5% Cr and 0.5% Mo modified with niobium and vanadium.

(c) A new classification, Mn2, has been added for an austenitic high manganese (nominal 19% Mn) weld deposit.

Location: SFA-5.24/SFA-5.24M
Subject: Revised Specification
Explanation: AWS A5.24/A5.24M:2023 has been adopted as the revised ASME SFA-5.24/SFA-5.24M. The specification has been updated to conform to current AWS A5 wording. The only substantive change is the change of reference standard for chemical composition testing.

Location: SFA-5.28/SFA-5.28M
Subject: Revised Specification
Explanation: AWS A5.28/A5.28M:2022 has been adopted as the revised ASME SFA-5.28/SFA-5.28M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The revised specification includes the following changes:

(a) Optional supplemental designators have been added to indicate ranges of shielding gases for which an electrode meets the requirements for classification.

(b) The maximum manganese limit for the E80C-Ni1 classification has been raised to 1.75%.

(c) New classifications ER90S-B115 (ER62S-B115) and E90C-K14 (E62C-K14) have been added.

(e) Text has been added to allow an electrode to be classified with both a "-G" chemical composition designator and a defined chemical composition designator. This change is intended to ease the transition from "-G" classification to a defined composition classification and to prevent burdensome requalification for long-entrenched products with "-G" classifications.

Location: SFA-5.29/SFA-5.29M
Subject: Revised Specification
Explanation: AWS A5.29/A5.29M:2022 has been adopted as the revised ASME SFA-5.29/SFA-5.29M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The only substantive change is the inclusion of an optional supplemental designator to indicate ranges of shielding gases for which an electrode meets the requirements for classification.

Location: SFA-5.30/SFA-5.30M
Subject: Revised Specification
Explanation: AWS A5.30/A5.30M:2022 has been adopted as the revised ASME SFA-5.30/SFA-5.30M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The revised specification includes the following changes:

(a) A method has been added to allow consumable inserts to be made from a solid wire classified to another A5 solid wire specification (e.g., A5.18, A5.9, A5.14).

(b) The general classification "G" has been added to classify compositions not covered in another A5 specification. Consumable inserts classified by either of these provisions will not be listed in Section IX, Table QW-432 and thus will require separate welding qualifications.

Location: SFA-5.31/SFA-5.31M
Subject: Revised Specification
Explanation: AWS A5.31/A5.31M:2022 has been adopted as the revised ASME SFA-5.31/SFA-5.31M. This action has been taken to keep Section II, Part C current with the latest AWS specification. The specification has been revised to clarify test methods and to bring the wording up to date with other AWS A5 specifications. It is not anticipated that any of these revisions would require changes in classification, use, or properties of a brazing flux.

Location: SFA-5.32/SFA-5.32M
Subject: Revised Specification
Explanation: AWS A5.32/A5.32:2021 has been adopted as the revised ASME SFA-5.32/SFA-5.32M. This action has been taken to keep Section II, Part C current with the latest AWS specification.

Part D
Customary and Metric

Location: Tables 1A, 2A, and 5A
Subject: Lowered Maximum Carbon Content
Explanation: The following notes have been deleted for SA-266 Grade 3: Note W8 in Table 1A, Note W1 in Table 2A, and Note W1 in Table 5A.

Location: Table 1A
Subject: Incorporation of Code Case 2577
Explanation: Type/grade 316L is now permitted for Section VIII, Division 1 applications, and allowable stress values have been added above 1,000°F (500°C). Note T12 has been applied to the revised lines.

Location: Tables 1A, U, and Y-1
Subject: SA-240 S43932 for Section VIII, Division 1 Applications
Explanation: Allowable stress values for 18Cr–Ti SA-240 S43932 have been added to Table 1A for Section VIII, Division 1 applications. Additionally, the values for this material have been added to Tables U and Y-1.

Location: Tables 1A, U, and Y-1
Subject: Incorporation of Code Case 2903
Explanation: SA-240 S31655 has been added to Tables 1A, U, and Y-1.

Location: Tables 1A, 2A, 5A, U, and Y-1
Subject: Remove SA-283 Grades A and B
Explanation: Due to the adoption of ASTM A283/A283M-13, SA-283 grades A and B have been removed from Tables 1A, 2A, 5A, U, and Y-1.

Location: Tables 1A, U, and Y-1
Subject: Incorporation of Code Case 2591
Explanation: New lines for SA-213 S31002 and SA-312 S31002 have been added to Tables 1A, U, and Y-1 U.

Location: Tables 1A, U, Y-1, TE-1, TCD, and TM-1
Subject: Incorporation of Code Case 2586-1
Explanation: New lines for SA-789 S32707 and SA-790 S32707 have been added to Tables 1A, U, and Y-1. In addition, 27Cr–7.5Ni–4.5Mo–Co–N has been added to Note 2 of Table TE-1, Note 11 of Table TCD, and Note 8 of Table TM-1.

Location: Table 1B
Subject: Specification Reference Update for N08904 Bar and Seamless Tube
Explanation: Alloy N08904, formerly considered a nickel-base alloy, was reclassified by ASTM as a stainless steel alloy and has been incorporated in the respective stainless specifications. Table 1B has been revised to update the specification references to SA-479 for N08904 bar and to SA-213 for N08904 seamless tube.

Location: Table 1B
Subject: Application of SB-366 Fittings to Section III, Class 2 and Class 3 Construction
Explanation: Table 1B has been revised to allow use of fittings manufactured to SB-366 alloys N02201, N04400, N06002, N06022, N06030, N06600, N06625, N08020, N08367, N08800, N08825, N10276, and N10665 for Section III construction.

Location: Table 1B
Subject: UNS N06025
Explanation: Several lines for time-dependent values for UNS N06025 have been revised in Table 1B.

Location: Table 1B
Subject: Addition of Section XII Applicability
Explanation: Section XII applicability temperatures for SB-75 C12000 and C12200, SB-359 and SB-466 C70600 and C70620, and SB-148 C95800 and C95820 have been added to Table 1B.

Location: Table 1B
Subject: High Stress Lines
Explanation: High stress lines have been added to Table 1B for SB-111 and SB-395 C19200 and for SB-543 C19400 WO61. Stress values for SB-543 C19400 WO61 and WC55 temper lines were also revised.

Location: Table 1B
Subject: High Stress Lines
Explanation: Stress values for SB-111, SB-359, SB-395, and SB-466 C71000 in Table 1B have been revised, and new high stress lines have been added.

Location: Table 1B
Subject: High Stress Lines
Explanation: High stress lines have been added to Table 1B for C68700.

Location: Tables 1B and 3
Subject: New and Revised Stress Lines
Explanation: High stress lines have been added for SB-283 C64200 in Table 1B. In addition, stress lines have been revised for SB-283 C64200 in Table 1B and for SB-150 C64200 in Table 3.

Location: Tables 1B, 2B, and 5B
Subject: Addition of Stress Lines
Explanation: High stress lines have been added to Table 1B for SB-98 C65100, C65500, and C66100 and to Tables 2B and 5B for SB-98 C65100, C65500, and C66100. In addition, SB-96 C65500 lines have been revised in Tables 2B and 5B.

Location: Tables 1B, 2B, U, and Y-1
Subject: C72200, C71500 HR 50, C71520 HR50, and C68700
Explanation: Values have been added to Tables 1B, U, and Y-1 for C72200, C71500 HR 50, C71520 HR50, and C68700. Some values in Tables 1B and 2B have also been revised.

Location: Tables 1B and 6B
Subject: SB-75 O50 Temper Lines
Explanation: Stress lines for SB-75 O50 temper have been added to Table 1B for C10200 and to Table 6B for C10200, C12000, and C12200. Additionally, Applicability columns for these SB-75 alloys have been revised in Table 1B.

Location: Tables 1B, 6B, U, and Y-1
Subject: SB-283 C37700 Stress Values
Explanation: Several lines for SB-283 C37700 have been revised in Tables 1B, 6B, U, and Y-1.

Location: Tables 1B, U, and Y-1
Subject: UNS R60705
Explanation: Tensile and yield strength values for 95.5Zr + 2.5Nb UNS R60705 (both 70/55 and 80/55) have been added to Tables U and Y-1. Several allowable stress values in Table 1B for this material have also been revised.

Location: Tables 1B, U, and Y-1
Subject: Incorporation of Code Case 2923
Explanation: 52Ni–22Cr–13Co–9Mo (UNS N06617) welded tube lines have been added to Tables 1B, U, and Y-1 for Section I and Section VIII, Division 1 use.

Location: Tables 1B, U, and Y-1
Subject: Incorporation of Code Case 2633
Explanation: The following changes have been made:
(a) The maximum allowable stress values from Code Case 2633 have been added to Tables 1B, U, and Y-1.
(b) In Table 1B, for all R60705 zirconium alloy product forms, Note W2 has been deleted and grade NFZ-2 has been changed to NFZ-1.

Location: Table 2A
Subject: 17Cr–4Ni–4Cu H1100
Explanation: Applicability and maximum use temperature limits for Section VIII, Division 2, Class 1 have been revised for 17Cr–4Ni–4Cu H1100 in Table 2A.

Location: Tables 2A and 2B
Subject: Addition of Materials for Section VIII Use
Explanation: Numerous lines have been added to Tables 2A and 2B for materials for Section VIII use. These materials were previously included in Tables 5A and 5B only.

Location: Tables 2B and 5B
Subject: Type/Grade Column
Explanation: A Type/Grade column has been added to Tables 2B and 5B and titanium grade designations have been added in these tables.

Location: Table 3
Subject: Size and Stress Line Correction
Explanation: The thickness range has been corrected for SA-540 B23 H43400 and K24064. Additionally, stress lines have been revised for SB-335 N10001.

Location: Table 5A
Subject: SA-537 Stress Values
Explanation: Several lines in Table 5A have been revised to modify the maximum allowable stress values for SA-537.

Location: Table 5A (Metric Only)
Subject: Modification to Allowable Stress Values
Explanation: Allowable stress values in Table 5A for SA-487 Gr 8 Class A, SA-508 Gr 22 Class 3, and SA-541 Gr 22 Class 4 at 450°C have been changed from 197 to 162.

Location: Table 6A
Subject: Incorporation of Code Cases 2687-1 and 2849
Explanation: Allowable stress values for UNS S31635 Grade TP316Ti for SA-213 tubing and SA-312 seamless and welded pipe have been added to Table 6A.

Location: Table U (Metric Only)
Subject: Missing Values
Explanation: Values for SB-283 and SB-150 C64200 have been added to metric Table U.

Location: Tables U and Y-1
Subject: Aluminum Alloy AlSi7Mg SB/EN 1706 AC42000
Explanation: Yield and tensile strength values for aluminum alloy AlSi7Mg SB/EN 1706 AC42000 have been incorporated into Tables U and Y-1 from Section IV, Code Case 2483.

Location: Tables U and Y-1
Subject: Addition for S31635
Explanation: Values for S31635 tube (SA-213) and pipe (SA-312) have been added to Tables U and Y-1. Additionally, revisions have been made to plate (SA-240) values in Table U.

Location: Tables U and Y-1 (Metric Only)
Subject: Addition of Line Entries for Nine Specifications
Explanation: Values have been added to metric Tables U and Y-1 for the following:
17.5Cr–17.5Ni–5.3Si SA-240 S30601
18Cr–15Ni–4Si SA-182 S30600
18Cr–15Ni–4Si SA-240 S30600
18Cr–15Ni–4Si SA-312 S30600
18Cr–15Ni–4Si SA-479 S30600
18Cr–20Ni–5.5Si SA-213 S32615
18Cr–20Ni–5.5Si SA-240 S32615
18Cr–20Ni–5.5Si SA-312 S32615
18Cr–20Ni–5.5Si SA-479 S32615

Location: Table Y-1
Subject: SA-736 Grade A Class 1 and Class 2
Explanation: Lines for SA-736 Grade A Class 1 and Class 2 have been removed from Table Y-1.

Location: Table TM-3
Subject: Copper Alloys
Explanation: Lines for C19200, C37700, C46500, C62300, C72200, and C96200 with modulus values have been added to Table TM-3.

Location: Nonmandatory Appendix A, A702.1.6
Subject: Hydrogen Environment Embrittlement of Cold-Worked Stainless Steels
Explanation: Paragraph A-702.1.6 on hydrogen environment embrittlement of cold-worked stainless steels t low temperatures has been added to Nonmandatory Appendix A.

SECTION V

Introduction

Section V of the ASME Boiler and Pressure Vessel Code (BPVC) contains requirements and methods for nondestructive examination (NDE), which are referenced and required by other ASME BPVC Sections or other referencing documents. These NDE methods are intended to detect surface and internal imperfections in materials, welds, fabricated parts, and components. They include requirements for radiographic examination, ultrasonic examination for welds and materials, liquid penetrant examination, magnetic particle examination, eddy current examination, visual examination, leak testing, acoustic emission examination, alternating current field measurement, and magnetic flux leakage. Article 1, Mandatory Appendix II covers supplemental personnel qualification requirements for NDE Certification to be included in the employer's written practice for NDE personnel certification when the employer uses computed radiography, digital radiography, phased array ultrasonics, ultrasonic time-of-flight diffraction, and ultrasonic full matrix capture.

Section V is divided into two Subsections that include both Mandatory and Nonmandatory Appendices. Subsection A describes the methods of NDE to be used when referenced by other Code Sections or referencing documents. Subsection B includes ASME/ASTM standards covering various NDE methods. These standards are not mandatory unless specifically referenced in whole or in part by Subsection A or as indicated in other Code Sections or referencing documents.