ASME BPVC.SSC.VIII.XII.II.V.IX.XIII-2023

Summary of Significant Changes in the

2023 ASME Boiler and Pressure Vessel Code

Section VIII
Section XII
Section II
Section V
Section IX
Section XIII

ASME
SETTING THE STANDARD

ASME BPVC.SSC.VIII.XII.II.V.IX.XIII-2023

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Sections VIII, XII, II, V, IX, and XIII

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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 VIII, Divisions 1, 2, and 3
- Section XII
- Section II, Parts A, B, C, and D
- Section V
- Section IX
- Section XIII

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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- Steven J. Rossi, *S&C Project Engineering Manager*, Section VIII, Divisions 1 and 2
- Abena Dinizulu, *S&C Engineer*, Section VIII, Division 3
- Jihoon Oh, *S&C Project Engineering Advisor*, Section XII
- Colleen E. Rodrigues, *S&C Project Engineering Manager*, Section II, Parts A, B, and D; and Section XIII
- Ray Rahaman, *S&C Project Engineer*, Section II, Part C; and Section IX
- Carlton R. Ramcharran, *S&C Project Engineering Manager*, Section V

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 Pressure Vessels (VIII)
- BPV Committee on Transport Tanks (XII)
- BPV Committee on Materials (II)
- BPV Committee on Nondestructive Examination (V)
- BPV Committee on Welding, Brazing, and Fusing (IX)
- BPV Committee on Overpressure Protection (XIII)

SECTION VIII

Introduction

1 DIVISION 1

Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code (BPVC) provides requirements for the construction of new pressure vessels. The ASME BPVC is a safety code written to cover a wide range of industrial and commercial pressure vessel applications. For example, Section VIII, Division 1 applies to small compressed-air receivers that are sold commercially to the public as well as to very large pressure vessels needed by the petrochemical and refining industry. Thus, it is necessary that the user of the ASME BPVC be knowledgeable and experienced in the principles of pressure vessel engineering to ensure that the selected requirements and details are appropriate for the specific service conditions that a pressure vessel is expected to experience. The ASME BPVC is implemented either by contract or by compliance with laws and regulations in those jurisdictions that require its use. Numerous U.S. states, cities, and municipalities and several Canadian provinces require the ASME BPVC for the construction of pressure vessels installed within their jurisdictions.

Within Section VIII, Division 1, pressure vessels are containers of pressure, either internal or external. This pressure may be obtained from an external source or by the application of heat from a direct or indirect source, or from any combination of those sources. Section VIII, Division 1 contains mandatory requirements, specific restrictions, and nonmandatory guidance for pressure vessel materials, design, fabrication, examination, inspection, testing, overpressure protection, and product certification. The requirements of Section VIII, Division 1 were formulated based on design principles and construction practices applicable to vessels designed for pressures up to 3,000 psi (20 MPa).

Section VIII, Division 1 is divided into Subsections, Mandatory Appendices, and Nonmandatory Appendices. Subsection A consists of Part UG, covering the general requirements applicable to all pressure vessels. Subsection B covers requirements for the various methods used in the fabrication of pressure vessels. It consists of Parts UW, UF, and UB dealing with welded, forged, and brazed methods, respectively. Subsection C covers requirements for the several classes of materials used in pressure vessel construction. The Mandatory Appendices address specific subjects not covered elsewhere in this Division, and their requirements are mandatory when the subject covered applies to the construction. The Nonmandatory Appendices provide information and suggested good practices.

1.1 Pressure Vessels Included in the Scope of Section VIII, Division 1

(a) Regarding the geometry of pressure-containing parts, the scope includes the following:

(1) for connections to the vessel, such as external piping, other pressure vessels, and mechanical devices such as pumps, mixers, or compressors

(-a) the welding end connection for the first circumferential joint for welded connections

(-b) the first threaded joint for screwed connections

(-c) the face of the first flange for bolted, flanged connections

(-d) the first sealing surface for proprietary connections or fittings

(2) the design, fabrication, testing, and material requirements for nonpressure parts that are welded directly to either the internal or external pressure-retaining surface of a pressure vessel

(3) pressure-retaining covers for vessel openings, such as manhole or handhole covers

(4) the first sealing surface for proprietary fittings or components for which specific rules are not provided by this Division, such as gages

(b) Regarding steam-generating vessels, the scope includes the following:

(1) unfired steam boilers, which may be constructed in accordance with the rules of either Section I or Section VIII, Division 1

(2) evaporators or heat exchangers

(3) vessels in which steam is generated by heat resulting from the operation of a processing system containing several pressure vessels, such as those used in the manufacture of chemical and petroleum products

(4) vessels in which steam is generated but not withdrawn for external use

(c) Pressure vessels or parts that are subject to direct firing from the combustion of fuel (solid, liquid, or gaseous) but are not within the scope of Sections I, III, or IV may be constructed in accordance with the rules of Section VIII, Division 1.

(d) Gas-fired jacketed steam kettles with jacket operating pressures not exceeding 50 psi (345 kPa) may be constructed in accordance with the rules of Section VIII, Division 1.

1.2 Exemptions From the Scope of Section VIII, Division 1

The following classes of vessels are exempt from the scope of Section VIII, Division 1:

(a) those within the scope of other ASME BPVC Sections

(b) fired process tubular heaters

(c) pressure containers that are integral parts or components of rotating or reciprocating mechanical devices, where the primary design considerations, stresses, or both are derived from the functional requirements of the device

(d) structures whose primary function is the transport of fluids from one location to another within a system of which it is an integral part, that is, a piping system

(e) piping components, such as pipe, flanges, bolting, gaskets, valves, expansion joints, and fittings, and the pressure-containing parts of other components, such as strainers and devices that serve such purposes as mixing, separating, snubbing, distributing, and metering or controlling flow, provided that pressure-containing parts of such components are generally recognized as piping components or accessories

(f) vessels for containing water under pressure, including those containing air the compression of which serves only as a cushion, when none of the following limitations are exceeded:

(1) a design pressure of 300 psi (2 MPa)

(2) design temperature of 210°F (99°C)

(g) hot water supply storage tanks heated by steam or any other indirect means when none of the following limitations is exceeded:

(1) a heat input of 200,000 Btu/hr (58.6 kW)

(2) a water temperature of 210°F (99°C)

(3) a nominal water-containing capacity of 120 gal (450 L)

(h) vessels not exceeding the design pressure at the top of the vessel, with no limitation on size

(i) vessels having an internal or external pressure not exceeding 15 psi (100 kPa)

(j) combination units having an internal or external pressure in each chamber not exceeding 15 psi (100 kPa) and differential pressure on the common elements not exceeding 15 psi (100 kPa)

(k) vessels having an inside diameter, width, height, or cross section diagonal not exceeding 6 in. (152 mm), with no limitation on length of vessel or pressure

(l) pressure vessels for human occupancy

Nevertheless, any pressure vessel that complies with all the applicable requirements of Section VIII, Division 1 may be certified by the Manufacturer and stamped with the Certification Mark with the U Designator.

2 DIVISION 2

Section VIII, Division 2 of the ASME BPVC provides alternative requirements for the construction of new pressure vessels. Section VIII, Division 2 pressure vessels are containers of pressure, either internal or external. This pressure may be obtained from an external source or by the application of heat from a direct or indirect source, or from any combination of those sources. Section VIII, Division 2 contains mandatory requirements, specific restrictions, and nonmandatory guidance for pressure vessel materials, design, fabrication, examination, inspection, testing, overpressure protection, and product certification. The requirements of Section VIII, Division 2 do not specify a limitation on pressure but are not all-inclusive for all types of construction. Vessels intended for use at very high pressures may need to meet additional design and construction requirements to operate safely at such temperatures and to be stamped with the Certification Mark. As an alternative to this Division, Section VIII, Division 3 may be considered for the construction of vessels intended for operating pressures exceeding 70 MPa (10,000 psi).

Section VIII, Division 2 is divided into Parts, Normative Annexes, and Informative Annexes. Part 1 provides general requirements and the scope of this Division. Part 2 covers the responsibilities of the user and Manufacturer, and the duties of the Inspector. Part 3 covers materials requirements, including permissible materials of construction, applicable material specifications and special requirements, physical properties, allowable stresses, and design fatigue curves. Part 4

provides design-by-rule requirements for the design of vessels and components using rules. Part 5 provides design-by-analysis requirements for the design of vessels and components using analytical methods. Part 6 provides requirements governing the fabrication of vessels and parts. Part 7 provides requirements governing the examination and inspection of vessels and parts. Part 8 provides pressure-testing requirements. Part 9 provides rules for pressure relief devices. Mandatory and nonmandatory requirements are provided in Normative and Informative Annexes, respectively, to the specific Part under consideration. The Normative Annexes address mandatory requirements for specific types of construction. Informative Annexes provide information and suggested good practices.

2.1 Pressure Vessels Included in the Scope of Section VIII, Division 2

(a) The rules of this Division may be used for the construction of the following pressure vessels. These vessels shall be designated as either a Class 1 or Class 2 vessel in conformance with the User's Design Specification.

(1) vessels to be installed at a fixed (stationary) location for a specific service where operation and maintenance control is retained during the useful life of the vessel by the user and is in conformance with the User's Design Specification.

(2) pressure vessels installed in ocean-going ships, barges, and other floating craft or used for motor-vehicle or rail freight. For these applications, it is necessary that prior written agreement with the jurisdictional authority be established covering operation and maintenance control for a specific service. This operation and maintenance control must be retained during the useful life of the pressure vessel by the user in conformance with the User's Design Specification. Such a pressure vessel as described above may be constructed and stamped within the scope of this Division, provided it meets all other requirements as specified with the following additional provisions:

(-a) Loading conditions imposed by movement of the pressure vessel during operation and by relocation of the pressure vessel between work sites or due to loading and discharge, as applicable, shall be considered in the design.

(-b) The User's Design Specification shall include the agreements that define those aspects of operation and maintenance control unique to the particular pressure vessel.

(3) pressure vessels or parts subject to direct firing from the combustion of fuel (solid, liquid, or gaseous) that are not within the scope of Section I, Section III, or Section IV. Unfired steam boilers shall be constructed in accordance with the rules of Section I or Section VIII, Division 1.

(b) The following pressure vessels in which steam is generated shall be constructed in accordance with the rules of Section VIII, Division 1 or this Division:

(1) vessels known as evaporators or heat exchangers

(2) vessels in which steam is generated by heat resulting from operation of a processing system containing several pressure vessels, such as those used in the manufacture of chemical and petroleum products

(3) vessels in which steam is generated but not withdrawn for external use

2.2 Exemptions From the Scope of Section VIII, Division 2

The following classes of vessels are exempt from the scope of Section VIII, Division 2:

(a) vessels within the scope of other ASME BPVC Sections.

(b) fired process tubular heaters as defined in API RP560.

(c) pressure containers that are integral parts or components of rotating or reciprocating mechanical devices, such as pumps, compressors, turbines, generators, engines, and hydraulic or pneumatic cylinders, where the primary design considerations, stresses, or both are derived from the functional requirements of the device.

(d) structures consisting of piping components, such as pipe, flanges, bolting, gaskets, valves, expansion joints, and fittings, whose primary function is the transport of fluids from one location to another within a system of which it is an integral part, that is, a piping system. This includes the piping system between a pressure relief device and the vessel it protects.

(e) pressure-containing parts of components, such as strainers and devices, that serve such purposes as mixing, separating, snubbing, distributing, and metering or controlling flow, provided that pressure-containing parts of such components are generally recognized as piping components or accessories.

(f) vessels for containing water under pressure, including those containing air the compression of which serves only as a cushion, when none of the following limitations are exceeded:

(1) a design pressure of 2.07 MPa (300 psi)

(2) a design temperature of 99°C (210°F)

(g) a hot water supply storage tank heated by steam or any other indirect means when none of the following limitations is exceeded:

(1) a heat input of 58.6 kW (200,000 Btu/hr)

(2) a water temperature of 99°C (210°F)

(3) a nominal water-containing capacity of 454 L (120 gal)

(h) vessels having an internal or external design pressure not exceeding 103 kPa (15 psi) with no limitation on size. For multichambered vessels, the design pressure on the common elements shall not exceed 103 kPa (15 psi).

(i) vessels having an inside diameter, width, height, or cross section diagonal not exceeding 6 in. (150 mm), with no limitation on length of vessel or pressure.

(j) pressure vessels for human occupancy.

Nevertheless, any pressure vessel that complies with all the applicable requirements of Section VIII, Division 2 may be certified by the Manufacturer and stamped with the Certification Mark with the U2 Designator.

3 DIVISION 3

Section VIII, Division 3 of the ASME BPVC provides requirements for the construction of new pressure vessels for use at pressures generally above 10,000 psi (70 MPa). Within Section VIII, Division 3, pressure vessels are containers of pressure, either internal or external. This pressure may be obtained from an external source or by the application of heat from a direct or indirect source, a process reaction, or any combination of those sources and methods. The design of the vessel is based on the requirement of having an adequate design margin against relevant failure modes under the stated conditions. The fulfillment of this requirement shall be demonstrated by calculations based on tensile strength, yield strength, fracture toughness, fatigue crack growth constants, fatigue strength, mill undertolerance on material thickness, and corrosion and erosion allowances.

Section VIII, Division 3 contains mandatory requirements, specific restrictions, and nonmandatory guidance for pressure vessel materials, design, fabrication, examination, inspection, testing, overpressure protection, and product certification. Although Section VIII, Division 3 was formulated based on design principles and construction practices applicable to vessels designed for high pressures, it does not establish maximum pressure limits for either Section VIII, Division 1 or Division 2, nor minimum pressure limits for Section VIII, Division 3.

Section VIII, Division 3 is divided into Parts, Mandatory Appendices, and Nonmandatory Appendices. Part KG covers the general requirements applicable to all pressure vessels. Part KM covers the material requirements for pressure vessel construction. Part KD covers the design requirements for different design methods and construction types. Part KF covers the requirements for fabrication of pressure vessels. Part KOP covers the requirements for pressure relief devices used on pressure vessels. Part KE covers the requirements for examination procedures, repair of defects, and related acceptance criteria. Part KT covers testing requirements. Part KS covers the marking and stamping of pressure vessels and the associated reports and records. The Mandatory Appendices address specific subjects not covered elsewhere in this Division, and their requirements are mandatory when the subject covered applies to the construction of the vessel. The Nonmandatory Appendices provide information and suggested good practices.

3.1 Exemptions From the Scope of Section VIII, Division 3

The following classes of pressure-containing equipment are not within the scope of Section VIII, Division 3:

(a) those within the scopes of other ASME BPVC Sections.

(b) fired process tubular heaters.

(c) pressure-containing equipment that is an integral part or component of a rotating or reciprocating mechanical device where the primary design considerations, stresses, or both are derived from the functional requirements of the device. Such devices include

(1) pumps

(2) compressors

(3) turbines

(4) generators

(5) engines

(6) hydraulic or pneumatic cylinders

(d) structures whose primary function is the transport of fluids from one location to another within a system of which they are integral parts, that is, a piping system.

Nevertheless, any pressure vessel that complies with all the applicable requirements of Section VIII, Division 3, may be certified by the Manufacturer and stamped with the Certification Mark along with the U3 Designator.

Division 1

Location: Section VIII, Division 1
Subject: PRT Designator
Explanation: In UG-116, UG-117, UHT-115, ULW-90, UIG-116, and UIG-120; Figures UG-116 and UG-118; and Forms U-2 and U-2A, the "PRT" Designator has been replaced by the "PRT VIII-1" Designator. ASME CA-1–2020 added ASME BPVC Section–specific Certification designators for parts. The roman numeral beneath "PRT" indicates the ASME BPVC Section that a part is designed and built to comply with.

Location: U-2 and Nonmandatory Appendix NN
Subject: Guidance When Ordering Parts
Explanation: Paragraph U-2(j) has been added to provide guidance to a Manufacturer of a complete vessel who is ordering parts requiring a Partial Data Report. Nonmandatory Appendix NN has been updated to reflect the relationship of a Manufacturer of an entire vessel to a Manufacturer of a part.

Location: UG-11
Subject: Prefabricated or Preformed Pressure Parts Furnished Without a Certification Mark
Explanation: In UG-11(e), the word "welding" has been revised to "joining" to clarify that welding is no longer the only way to permanently join material when constructing a pressure vessel.

Location: UG-84
Subject: Qualification of Welding Procedures for Toughness Applications
Explanation: Paragraph UG-84 has been revised to simplify the rules for qualifying Welding Procedure Specifications when toughness testing is required. This revision eliminates the need to take subsize specimens when the test coupon is a multiprocess test coupon.

Location: UG-84
Subject: Impact Test Requirements for Diffusion Welding
Explanation: Paragraph UG-84(d)(3) has been added to clarify the impact test requirements for diffusion welding. The toughness requirement applies only to the base metal required by the rules in Subsection C.

Location: Figure UG-84.1
Subject: Charpy Impact Test Requirements
Explanation: Figure UG-84.1 has been revised to provide Charpy V-notch energy acceptance for materials having yield strengths greater than 65 ksi up to 80 ksi.

Location: UG-99 and UG-100
Subject: Minimum Pressure Test Temperature
Explanation: Paragraphs UG-99(h) and UG-100(c) have been revised to provide guidance to the user on determining the minimum pressure test temperature.

Location: UG-101
Subject: Transfer of Proof Test Reports
Explanation: Paragraph UG-101(a)(5) has been added to allow, under certain conditions, the sharing of proof testing reports between Manufacturers owned by the same entity.

Location: UG-101
Subject: Calculating the Maximum Allowable Working Pressure by Proof Test
Explanation: Paragraph UG-101(m)(2) has been revised to provide an alternative method of determining the average actual tensile strength of test specimens at room temperature, $S_{\mu avg}$.

Location: UG-119
Subject: Marking Nameplates
Explanation: Paragraph UG-119(c) has been revised to allow the marking of nameplates by laser annealing. Requirements of Code Case 2959 have been included in this revision, along with alternative means of applying the Certification Mark through mechanical etching and laser annealing.

Location: UG-151
Subject: User Responsibility for Overpressure Protection
Explanation: Paragraph UG-151(e) has been added to provide guidance on overpressure requirements for a vessel marked with multiple maximum allowable working pressures.

Location: UW-20
Subject: Consolidation of Tube-to-Tubesheet Joint Strength Rules
Explanation: The tube-to-tubesheet joint strength rules previously in Nonmandatory Appendix A have been made mandatory and moved to UW-20. Nonmandatory Appendix A has been deleted.

Location: UW-28
Subject: Qualification of Welding Procedures
Explanation: Paragraph UW-28(d) has been revised to permit the use of Section IX, QG-106.4 rules for simultaneous qualification of welding procedures.

Location: UW-55 and Mandatory Appendix 42
Subject: Diffusion Welding Examination
Explanation: The rules in Mandatory Appendix 42 have been moved to new paragraph UW-55. Mandatory Appendix 42 has been deleted.

Location: Table UCS-23
Subject: Adoption of SA/IS 2062 Grade E250
Explanation: SA/IS 2062 Grade E250, subqualities A, BR, B0, and C, and a new Note (1) have been added to Table UCS-23. This material has been added for use in Section VIII, Division 1 pressure vessel construction.

Location: UCS-6; Table UCS-23; and Mandatory Appendix 19, 19-3
Subject: Withdrawal of SA-283 Grades A and B
Explanation: SA-283 Grades A and B have been removed from Table UCS-23 and from UCS-6 and 19-3. ASTM International has adopted a new edition of ASTM A283 that has deleted Grades A and B. ASME has adopted the revised specification and has deleted the stress lines for these grades from Section II, Part D.

Location: Table UCS-23 and Table UHA-23
Subject: Withdrawal of SA-557 and SA-731
Explanation: SA-557 and SA-731 have been deleted from Tables UCS-23 and UHA-23 to make the materials in Section VIII, Division 1 consistent with the materials in Section II, Part D.

Location: Tables UCS-56-2, UCS-56-3, and UCS-56-4
Subject: Exemptions to Postweld Heat Treatment
Explanation: The General Notes in Tables UCS-56-2, UCS-56-3, and UCS-56-4 have been revised to add wrought and forged materials to the materials exempted from postweld heat treatment. This exemption does not include cast or plate materials and applies only to butt welds. The exemption does not apply to nozzle connections through the shell nor to weldolet or socket-style welds.

Location: Tables UCS-56-3 and UCS-56-4
Subject: Exemptions to Postweld Heat Treatment
Explanation: The current exemption for postweld heat treatment does not permit non-pressure-retaining fillets, studs, or heat-absorbing fins welded to fittings or forgings. This revision to the General Notes in Tables UCS-56-3 and UCS-56-4 adds wrought and forged materials to the exempted materials where this practice is permitted. This exemption does not include cast or plate materials.

Location: Table UCS-56.1
Subject: Alternative Postweld Heat Treatment Requirements
Explanation: Table UCS-56.1 has been revised to show that postweld heat treatment at a temperature less than or equal to 50°F (28°C) below the minimum specified temperature still requires a 2-hr minimum hold time.

Location: UCS-66
Subject: Fine-Grain Practice for Standard Flanges
Explanation: Paragraph UCS-66(c)(1) has been revised to address fine-grain practice for standard flanges.

Location: UCS-85
Subject: Heat Treatment of Test Specimens
Explanation: Paragraph UCS-85 has been revised to clarify the intent of the required material testing rules. It has been widely understood that all heat treatments applied to materials before a normalizing or austenitizing heat treatment would not need to be represented in the test specimens required by UCS-85. This revision clarifies this intent in UCS-85(i). Any heat treatments at lower temperatures applied beforehand do not need to be represented within the test specimens required by UCS-85.

Location: Table UNF-23.3
Subject: Adoption of UNS N08354
Explanation: Austenitic alloy UNS N08354 has been added to Table UNF-23.3 under specifications SB-673 and SB-674. These grades are used in Section VIII, Division 1 welded construction. These revisions partially incorporate the content of Code Case 2585-1.

Location: Table UNF-23.3
Subject: Adoption of UNS N06617
Explanation: Alloy UNS N06617 has been added to Table UNF-23.3 under specification SB-626. This grade is used in Section VIII, Division 1 welded construction. This revision incorporates the content of Code Case 2923.

Location: Table UNF-23.5
Subject: Adoption of UNS R61702 and R61705
Explanation: Zirconium alloys UNS R61702 and R61705 have been added to Table UNF-23.5 under specifications SB-752, Grades 702C and 705C. These grades are used in Section VIII, Division 1 construction. This revision incorporates the content of Code Case 2633.

Location: Table UNF-23.5
Subject: Withdrawal of SB-523 R60705
Explanation: Zirconium alloy UNS R60705 under specification SB-523 has been deleted from Table UNF-23.5. With the adoption of ASTM B523/B523M-18 in Section II, Part D, UNS R60705 was removed from the specification, so the parallel revision was required in Section VIII, Division 1.

Location: Table UHA-23
Subject: Adoption of UNS N08904
Explanation: High alloy steel UNS N08904 has been added to Table UHA-23 under specification SA-249. This grade is used in Section VIII, Division 1 welded construction.

Location: Table UHA-23
Subject: Adoption of UNS S31002
Explanation: Steel alloy UNS S31002 has been added to Table UHA-23 under specifications SA-213 and SA-312. These grades are used in Section VIII, Division 1 welded construction. This revision incorporates the content of Code Case 2591.

Location: Table UHA-23
Subject: Adoption of UNS S32707
Explanation: Steel alloy UNS S32707 has been added to Table UHA-23 under specifications SA-789 and SA-790. These grades are used in Section VIII, Division 1 welded construction. This revision incorporates the content of Code Case 2586-1.

Location: Table UHA-23
Subject: Adoption of UNS S43932
Explanation: Steel alloy UNS S43932 has been added to Table UHA-23 under specifications SA-240. This grade is used in Section VIII, Division 1 welded construction. This revision incorporates the content of Code Case 2788.

Location: UCL-27
Subject: Low-Temperature Design for Applied Linings and Base Material With Corrosion-Resistant Integral Cladding
Explanation: Paragraph UCL-27 has been revised to establish impact test exemption temperature rules for the following:

(a) applied corrosion-resistant linings used in accordance with UCL-23(a)
(b) corrosion-resistant integral cladding used in accordance with UCL-23(b) or UCL-23(c)

Location: Tables UHT-56 and UHT-82
Subject: Postweld Heat Treatment Requirements for Materials
Explanation: Table UHT-56 has been revised and paragraph UHT-82(k) has been added to waive, under certain conditions, the postweld heat treatment requirements of SA-353 and SA-553 Type I materials at thicknesses over 50 mm (2 in.)

Location: Part UHX
Subject: Shell-and-Tube Heat Exchanger Rules
Explanation: Part UHX has been revised for consistency between the heat exchanger types. The shell and channel coefficients have been revised to be based on the mean diameter instead of the inside diameter, which is consistent with ASME PTB-7.

Location: Part UHX
Subject: Concentric Conical Sections Welded to Tubesheets
Explanation: Part UHX has been revised to add rules for conical channel sections integral with tubesheets. New channel coefficients for cones have also been added to the calculation procedures and nomenclature.

Location: Part UHX
Subject: Shell-and-Tube Heat Exchanger Rules
Explanation: Part UHX has been revised to cross-reference Section VIII, Division 2 for requirements. Figures UHX-11.5.2-1 and UHX-11.5.2-2 have been moved to Mandatory Appendix 41. Consistent with the philosophy of maintaining one set of common rules in Division 2, removal of the technical requirements from Part UHX will ensure identical requirements for all heat exchangers. The requirements in Part UHX that were common to Divisions 1 and 2 have been replaced by cross-references to Division 2, Part 4, 4.18, as appropriate. Administrative and fabrication requirements remain in Part UHX to ensure consistency with the Division 1 approach.

Location: Mandatory Appendix 5
Subject: Expansion Joints
Explanation: Paragraph 5-3(f) has been revised to permit calculation of general membrane stress using the finite element method, in lieu of the equations in UG-27, for straight flanges of flexible shell expansion joint.

Location: Mandatory Appendix 20, 20-2
Subject: Hubs Machined From Plate
Explanation: Paragraph 20-2 has been revised to reference “the material specification” rather than “the SA material specification” for tensile and yield requirements. In addition, the reduction-of-area requirement for test specimens in hub machined from plate has been revised to specify that it is “for carbon and low alloy steels.” This revision clarifies the testing requirements, allowing use of both SA and SB material for hub made from plate.

Location: Mandatory Appendix 26
Subject: Shell-and-Tube Heat Exchanger Rules
Explanation: Mandatory Appendix 26 has been revised to cross-reference Section VIII, Division 2 for requirements and associated references. Consistent with the philosophy of maintaining one set of common rules in Division 2, removal of the technical requirements from this Appendix will ensure identical requirements for all heat exchangers. The requirements in this Appendix that were common to Divisions 1 and 2 have been replaced by references to Division 2, Part 4, 4.19, as appropriate. Administrative and fabrication requirements remain in the Appendix to ensure consistency with the Division 1 approach.

Location: Mandatory Appendix 31, Table 31-1
Subject: Rules for Welding and Heat Treatment of Cr–Mo Steels
Explanation: SA-387 Grade 22 Class 2 and other relevant Cr–Mo steels have been added to Table 31-1.

Location: Mandatory Appendix 44, 44-5
Subject: Shell Rings
Explanation: Paragraph 44-5(i) has been added to allow the use of two support rings along with welding and material requirements in a vessel shell.

Location: Mandatory Appendix 45, 45-6
Subject: Plate Heat Exchanger Calculations
Explanation: Paragraph 45-6 has been revised to incorporate closed-form calculation methods that can be used to design simple plate heat exchangers.

Location: Mandatory Appendix 47
Subject: Plate Heat Exchanger Calculations
Explanation: Mandatory Appendix 47 has been revised to clarify that the person or persons in responsible charge can be subcontracted. Small companies may not have the expertise to comply with the requirements in 47-2. This revision permits subcontracted companies to fulfill these requirements.

Division 2

Location: Part 2
Subject: PRT Designator
Explanation: In 2.3 and 2-C.1; Forms A-2, 2-F.1, 2-F.3, and 2-F.4; and Figure 2-F.1, the "PRT" designator has been replaced by the "PRT VIII-2" Designator. ASME CA-1–2020 added ASME BPVC Section–specific Certification designators for parts. The roman numeral beneath "PRT" indicates the ASME BPVC Section that a part is designed and built to comply with.

Location: Part 2
Subject: Certifying Engineers
Explanation: Paragraphs 2.2, 2.3.3, 2-A.2, and 2-B.2 have been revised to remove the requirement that a Certifying Engineer certify the User's Design Specification and the Manufacturer's Design Report for Class 2 design-by-rule applications. This revision harmonizes the design certification requirements of Section VIII, Divisions 1 and Division 2 and eliminates conflicts with international engineering registration requirements for a majority of applications.

Location: 2-F.5
Subject: Application of Markings
Explanation: Paragraph 2-F.5 has been revised to specify that the nameplate may be welded to a bracket that can be welded to the skirt or other permanent attachment.

Location: 3.3.6
Subject: Low-Temperature Design for Applied Linings and Base Material With Corrosion-Resistant Integral Cladding
Explanation: Paragraph 3.3.6.6 has been added to establish low-temperature operation rules for vessels with applied linings or cladding.

Location: 3.11.2.4
Subject: Fine-Grain Practice for Standard Flanges
Explanation: Paragraph 3.11.2.4(a) has been revised to address fine-grain practice for standard flanges.

Location: 3.11.6.1
Subject: Impact Test Requirements for Bolting
Explanation: Paragraph 3.11.6.1(b) has been revised to permit use of bolting material at a minimum design metal temperature colder than the temperatures permitted by Tables 3.4 and 3.5. The revision applies only to impact testing performed in accordance with 3.11.2.1(b) or 3.11.4.1(b).

Location: 3.11.8.2
Subject: Qualification of Welding Procedures for Toughness Applications
Explanation: Paragraph 3.11.8.2 has been revised to simplify the rules for qualifying Welding Procedure Specifications when toughness testing is required. This revision eliminates the need to take subsize specimens when the test coupon is a multiprocess test coupon.

Location: Table 3.1
Subject: Rules for Welding and Heat Treatment of Cr–Mo Steels
Explanation: SA-387 Grade 22 Class 2 and other relevant Cr–Mo steels have been added to Table 3.1. Note (1) has been added to address those steels listed for use on Class 2 vessels only.

Location: Annex 3-A, Table 3-A.1
Subject: Withdrawal of SA-283 Grade B
Explanation: SA-283 Grade B has been removed from Table 3-A.1. ASTM International has adopted a new edition of ASTM A283 that has deleted Grade B. ASME has adopted the revised specification and has deleted the stress lines for Grade B from Section II, Part D.

Location: Annex 3-A, Table 3-A.5
Subject: Adoption of UNS C70620 and UNS C71520
Explanation: Copper alloys UNS C70620 and UNS C71520 have been added to Table 3-A.5 under specifications SB-111, SB-171, and SB-395.

Location: 4.2.5.7, 4.2.5.8, Tables 4.2.1 and 7.2, and Figure 4.2.1
Subject: Tube-to-Tubesheet Welds
Explanation: Paragraph 4.2.5.7, Category F Locations, has been added to assign a common joint category to tube-to-tubesheet welds. The paragraph formerly designated as 4.2.5.7 has been redesignated as 4.2.5.8; the paragraph formerly designated as 4.2.5.8 has been deleted; and Category F has been added to Table 4.2.1, Figure 4.2.1, and Table 7.2.

Location: 4.18
Subject: Shell-and-Tube Heat Exchanger Rules
Explanation: Paragraph 4.18 has been revised for consistency between the heat exchanger types. The shell and channel coefficients have been revised to be based on the mean diameter instead of the inside diameter, which is consistent with ASME PTB-7.

Location: 4.18
Subject: Concentric Conical Sections Welded to Tubesheets
Explanation: Paragraph 4.18 has been revised to add rules for conical channel sections integral with tubesheets. New channel coefficients for cones have been added to the calculation procedures and nomenclature. The existing channel coefficients and channel stress calculations have been revised for integral conical channels. A new illustration and new notes have been added to Figure 4.18.5.

Location: 5.4 and Table 5.8
Subject: Protection Against Failure From Buckling
Explanation: Paragraph 5.4 has been rewritten, and a new table of load cases, Table 5.8, has been added. Former Tables 5.8 through 5.13 have been redesignated as Tables 5.9 through 5.14, respectively.

Location: 5.5.2.4 and Table 5.10
Subject: Fatigue Analysis Screening, Method B
Explanation: Paragraph 5.5.2.4 and Table 5.10 have been revised to describe a quick and simple method, Method B, for screening components in cyclic service. Method B replaces a full fatigue analysis. Method B uses five different sources of alternating stress to evaluate fatigue. Each source of alternating stress is evaluated separately. The revision of paragraph 5.5.2.4 has two main goals: to revise each formulation so that the different sources of alternating stress can be combined into a fatigue damage factor; and to show explicitly all penalty factors in the equations, facilitating the removal of the C factors. Explicitly showing the penalty factors in each formulation allows the user to take advantage of fatigue-resistant designs while penalizing non-fatigue-resistant designs.

Location: 6.2.2.2
Subject: Qualification of Welding Procedures
Explanation: Paragraph 6.2.2.2 has been revised to permit the use of Section IX, QG-106.4 rules for simultaneous qualification of welding procedures.

Location: Tables 6.9, 6.10, and 6.11
Subject: Postweld Heat Treatment Requirements
Explanation: The "PWHT Requirements" column of Tables 6.9, 6.10, and 6.11 has been revised to add wrought and forged materials to the materials exempted from postweld heat treatment. This exemption does not include cast or plate materials and applies only to butt welds. This exemption does not apply to nozzle connections through the shell nor to weldolet or socket-style welds.

Location: Tables 6.10 and 6.11
Subject: Postweld Heat Treatment Requirements
Explanation: The current exemption for postweld heat treatment (PWHT) does not permit non-pressure-retaining fillets, studs, or heat-absorbing fins welded to fittings or forgings. This revision to the "PWHT Requirements" column in Tables 6.10 and 6.11 has added wrought and forged materials to the exempted materials where this practice is permitted. This exemption does not include cast or plate materials.

Location: Table 6.16
Subject: Alternative Postweld Heat Treatment Requirements
Explanation: Table 6.16 has been revised to show that postweld heat treatment at a temperature less than or equal to 30°C (50°F) below the minimum specified temperature still requires a 2-hr minimum hold time.

Location: 8.1.4
Subject: Valves in the Pressure Gage Line
Explanation: Paragraph 8.1.4 has been revised to prohibit valves from being installed in the pressure gage line during the pressure test.

Location: 8.2.4
Subject: Minimum Pressure Test Temperature
Explanation: Paragraph 8.2.4(a) has been revised to provide guidance to the user on determining the minimum pressure test temperature.

Division 3

Location: KG-105
Subject: Direct-Fired Vessels
Explanation: Paragraph KG-105 has been deleted. The paragraph had implied that, by the rules of KG-120, certain direct-fired vessels are not to be constructed and stamped in accordance with Division 3. In the 2021 Edition, KG-121 was updated to impose the limit that vessels that can be made in accordance with other parts of the ASME BPVC cannot be made in accordance with Division 3. Thus, KG-105 has been deleted to eliminate redundancy.

Location: Article KG-3 and KD-740
Subject: Responsibilities and Duties
Explanation: Article KG-3 and KD-740 have been revised to provide relief to Manufacturers seeking to use a single User's Design Specification for the production of vessel designs intended to be acceptable in multiple jurisdiction. Such vessels include composite-reinforced pressure vessels, attenuators, and other vessels built for stock by a Manufacturer.

Location: KM-234.1
Subject: Charpy V-Notch Impact Test Requirements
Explanation: Paragraph KM-234.1(b) has been added to require that the Charpy V-notch impact tests for impulsively loaded vessels be carried out at 108°F (60°C) below the minimum design metal temperature unless otherwise justified by the designer. The former KM-234.1(b) has been redesignated as KM-234.1(c) and revised to lower the minimum design metal temperature for all materials that are not fully austenitic stainless steels.

Location: KM-251
Subject: Charpy V-Notch Impact Testing
Explanation: Paragraph KM-251 has been revised to reference the impact values specified in KM-234.2. This revision relieves the designer of having to provide test information to use upper-shelf correlations for high strength, low alloy steels.

Location: KM-270
Subject: Notch Tensile Testing Procedure and Acceptance Criterion
Explanation: Paragraph KM-270 has been revised to include a notch tensile strength test and the calculation of the notch strength ratio.

Location: Tables KM-400-1 and KM-400-1M
Subject: Carbon and Low Alloy Steel
Explanation: Table KM-400-1 and KM-400-1M have been revised as follows:
(a) Note (16) has been revised and added to ASME SA-372 Grade J Class 110 forgings and SA-231 and SA-232 wire materials.
(b) ASME SA-574 Grades 4137 and 4340 have been added for fasteners servicing a maximum design temperature of 550°F.

Location: KM-620
Subject: Elastic–Plastic Stress–Strain Curve Model
Explanation: Equation (KM-620.1) has been revised so that the curve is linear up to the proportional limit.

Location: Article KD-2 and Nonmandatory Appendix G, G-300
Subject: Basic Design Requirements and Design Rules for Clamp Connections
Explanation: Article KD-2 has been revised to clarify the Part KD requirements that need not be followed if Nonmandatory Appendix G is used, and the loads that shall be used in the design of clamped connections if Nonmandatory Appendix G is not used. In G-300, the equation for A_5 has been revised and the reference to "Section C–C" of Figure G-100.3 has been corrected to "Section A–A."

Location: KD-231.3
Subject: Elastic–Plastic Assessment Procedure
Explanation: Step 3 in KD-231.3 has been revised to clarify the constitutive material response that should be assigned when an assembly consisting of multiple components is assessed.

Location: KD-322 and Figures KD-320.1, KD-320.1M, KD-320.2, and KD-320.2M
Subject: Interpolation Between Design Fatigue Curves of Different Strength Levels
Explanation: Paragraph KD-322 has been revised to clarify the logarithmic interpolation between tabular values for individual design curves in Figures KD-320.1, KD-320.1M, KD-320.2, and KD-320.2M. In addition, the revision allows for linear interpolation for an intermediate ultimate tensile strength. Also, the logarithmic interpolation example in Table KD-320.1M, Note (c) has been revised.

Location: Equation (KD-322.3)
Subject: Definition of ΔS_n
Explanation: The definition of ΔS_n has been revised to "the primary-plus-secondary ($P_L + P_b + Q$) stress intensity range."

Location: KD-430
Subject: Calculation of Crack Growth Rates
Explanation: The minimum range of stress intensification factors, ΔK_{th}, for carbon and low alloy steels with yield strengths, S_y, less than or equal to 90 ksi (620 MPa) has been revised.

Location: Article KD-6 and Mandatory Appendix 9
Subject: Design Requirements for Closures, Integral Heads, Threaded Fasteners, and Seals
Explanation: The linear elastics rules for connections formerly in Article KD-6 have been moved to Mandatory Appendix 9. This revision consolidates the rules for linear elastic analysis of threaded fasteners and other threaded components.

Location: KD-1022 through KD-1024
Subject: Special Requirements for Vessels in Hydrogen Service
Explanation: Paragraphs KD-1022(b) and KD-1023(b) have been deleted. Paragraph KD-1024 has been added to provide guidance on when data obtained in KD-1022 or KD-1023 may be used for vessels manufactured from other materials.

Location: KS-100
Subject: Required Marking for Vessels
Explanation: "Partially heat treated" (PHT) has been added to KS-100 as a construction type that may be added to a vessel's nameplate.

SECTION XII

Introduction

Section XII of the ASME Boiler and Pressure Vessel Code (BPVC) provides requirements for the construction and continued service of pressure vessels for the transportation of dangerous goods via highway, rail, air, or water. *Construction* is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and overpressure protection. *Continued service* is an all-inclusive term referring to inspection, testing, repair, alteration, and recertification of a transport tank that has been in service. The term *pressure vessel* refers to the pressure boundary defined by the geometric scope of Section XII and includes, but is not limited to, the shell, heads, and openings. The term *tank* refers to the pressure vessel, appurtenances, and additional components that are covered by the Section XII Modal Appendices.

The general requirements given in Part TG apply to all vessels within the scope of Section XII. In addition, all the applicable requirements of the Modal Appendices, which address unique service conditions of the vessel, shall be met.

Section XII is divided into Parts, Modal Appendices, Mandatory Appendices, and Nonmandatory Appendices. There are ten Parts, which cover general requirements; material and design; welded construction; fabrication; nondestructive examination; testing; pressure relief devices; stamping and certification; Manufacturer's Data Reports and other records; and requirements for continued service, repair, and alterations. The Modal Appendices contain mandatory rules for vessels used in specific transport modes and unique service applications. The Modal Appendices take precedence over the requirements of other Parts of Section XII. The Mandatory Appendices contain specific requirements that are not covered elsewhere in Section XII. The Nonmandatory Appendices provide information and suggested good practices. Each Nonmandatory Appendix should be used in its entirety.

1 PRESSURE VESSELS INCLUDED IN THE SCOPE OF SECTION XII

(a) The geometric scope of Section XII includes, as a minimum, the pressure-containing parts of pressure vessels up to and including the following:

(1) the first threaded joint for threaded connections.

(2) the face of the first flange for flanged connections.

(3) the first sealing surface for proprietary connections or fittings for which rules are not provided in Section XII.

(4) the welding end connection for the first circumferential joint for welded connections to attached piping, valves, instruments, etc.

(5) the welding pad for attachment of any external nonpressure attachments such as shipping frames and handling points. Parts welded to these pads need not comply with (b).

(6) pressure-retaining permanent covers and closures, including seals, bolting, and other mechanical retainers at openings.

(b) Where nonpressure parts are directly welded to the pressure-retaining surface of a pressure vessel, the scope of Section XII includes material, design, fabrication, and testing requirements established for nonpressure attachments.

(c) The items that transform a pressure vessel into a tank are within the scope of Section XII. These items are addressed in the applicable Modal Appendix.

(d) The scope of Section XII covers pressure vessels that meet the following physical criteria:

(1) Their internal pressures are in the range of full vacuum to 207 bar (3,000 psig).

(2) Their operating temperature range from −269°C to 343°C (−452°F to 650°F).

(3) The thicknesses of shells and heads does not to exceed 38 mm (1½ in.).

2 EXEMPTIONS FROM THE SCOPE OF SECTION XII

The following classes of pressure-containing equipment are not within the scope of Section XII:

(a) items within the scope of other Sections of ASME BPVC

(b) pressure-containing equipment that is an integral part or component of a rotating or reciprocating mechanical device mounted in a common setting with the vessel, where the primary design considerations and/or design stresses are derived from the functional requirements of the device

(c) piping, valves, and other components beyond the geometric scope described above for the loading, transport, and unloading of the vessel contents

Nevertheless, any pressure vessel that meets all applicable requirements of Section XII may be stamped with the Certification Mark with T Designator. Vessels manufactured and stamped under this Section are not precluded from using parts stamped to Section VIII, Division 1, as long as all requirements of Section XII, except those for marking and reporting, are met.

Significant Changes

Location: TG-110.2
Subject: Physical Scope of the Pressure Vessel
Explanation: In TG-110.2(a), the upper limit for internal pressure has been lowered from 207 bar (3,000 psig) to 138 bar (2,000 psig) to align with the upper limit in Modal Appendix 4.

Location: TG-120.1
Subject: Physical Scope of the Pressure Vessel
Explanation: Paragraph TG-120.1(d) has been added to clarify that tube trailer cylinders and multiple-element gas containers are not covered by Section XII.

Location: TD-320
Subject: Quick-Actuating Devices
Explanation: Paragraph TD-320 has been added to address quick-actuating devices. The requirements are based on those in Section VIII, Division 1, UG-35.2 and Nonmandatory Appendix FF.

Location: TOP-170
Subject: Pressure Relief Device and the Vapor Space of the Vessel
Explanation: Paragraph TOP-170(a) has been revised to specify that the pressure relief device shall communicate with the vapor space of the vessel. Also, the requirement for 450 L (120 gal) has been removed because it is no longer applicable.

Location: Model Appendix 1, Article 2, 1-2.1
Subject: Category 406 Pressure Relief Valves
Explanation: Paragraph 1-2.1(c) has been revised to correct the minimum set pressure to 110% of maximum allowable working pressure or 0.23 bar (3.3 psi), whichever is greater. Paragraph 1-2.1(d) has been revised to remove a redundant requirement and to require a normal vent per 49 CFR rules.

Location: TS-110 and TS-200; Nonmandatory Appendix C, Forms T-2A, T-2B, and T-2C; and Nonmandatory Appendix D
Subject: PRT Certification Designator
Explanation: Throughout Section XII, the "PRT" Certification Designator has been revised to "XII PRT" to match the Designator shown in ASME CA-1–2020, Table 1.1-1.

Location: Nonmandatory Appendix E, E-6
Subject: Threaded Fittings and Brazing
Explanation: In E-6(o), the required minimum melting point of brazing material has been revised from 525°C (977°F) to 538°C (1,000°F). Paragraph E-6(p) has been added to require that pipe joints be threaded, welded, or flanged.

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.