

Attachment ASME-5 – B&PVC Application

**ASME Boiler and Pressure Vessel Code Application**

**RECORD OF REVISIONS**

<b>Rev</b>	<b>Date</b>	<b>Description</b>	<b>POC</b>	<b>RM</b>
0	11/09/18	Initial issue.	Ari Ben Swartz, <i>ES-EPD</i>	Larry Goen, <i>ES-DO</i>

**Contact the Standards POC for upkeep, interpretation, and variance issues.**

<b>Chapter 17</b>	<a href="#">Pressure Safety POC and Committee</a>
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This document is online at <http://engstandards.lanl.gov>

This attachment contains paraphrased code and regulation scope summaries with discussion of how these mandates shall be applied at LANL. They are based on the 2015 edition of the code.

Note: The B&PVC is a mandate for new construction only; repairs and alterations are governed by the NBIC (NB-23, which may reference ASME B&PVC); see Section ASME Attachment ASME-2.

<p><b>ASME Boiler and Pressure Vessel Code (BPVC)</b></p> <p>ASME’s BPVC document establishes rules of safety relating only to pressure integrity—governing the design, fabrication, and inspection of boilers and pressure vessels, and nuclear power plant components during construction. The objective of the rules is to provide a margin for deterioration in service. The Code Cases clarify the existing requirements or provide, when the need is urgent, rules for materials or constructions not covered by existing BPVC rules.</p>	<p>international organizations.</p>
<p><b>ASME BPVC.I, Section I—Rules for Construction of Power Boilers</b></p> <p>This section provides requirements for all methods of construction of power, electric, and miniature boilers; high temperature water boilers, heat recovery steam generators, and certain fired pressure vessels to be used in stationary service; and power boilers used in locomotive, portable, and traction service. Rules pertaining to use of the V, A, M, PP, S and E ASME Product Certification Marks are also included. The rules are applicable to boilers in which steam or other vapor is generated at pressures exceeding 15 psig, and high temperature water boilers intended for operation at pressures exceeding 160 psig and/or temperatures exceeding 250 degree F. Super heaters, economizers, and other pressure parts connected directly to the boiler without intervening valves are considered as part of the scope of Section I.</p>	<p><b>ASME BPVC.II.A, Section II—Materials, Part A—Ferrous Material Specifications (SA–451 to end)</b></p> <p>This section is a “service section” to the other BPVC sections providing material specifications for ferrous materials adequate for safety in the field of pressure equipment. These specifications contain requirements for chemical and mechanical properties, heat treatment, manufacture, heat and product analyses, and methods of testing. They are designated by SA numbers and are identical with or similar to those of specifications published by ASTM and other recognized national or international organizations</p>
<p><b>ASME BPVC.II.A, Section II—Materials, Part A—Ferrous Material Specifications (beginning to SA–450)</b></p> <p>This section is a “service section” to the other BPVC sections, providing material specifications for ferrous materials adequate for safety in the field of pressure equipment. These specifications contain requirements for chemical and mechanical properties, heat treatment, manufacture, heat and product analyses, and methods of testing. They are designated by SA numbers and are identical with or similar to those of specifications published by ASTM International and other recognized national or</p>	<p><b>ASME BPVC.II.B, Section II—Materials, Part B—Nonferrous Material Specifications</b></p> <p>This section is a “service section” to the other BPVC sections, providing material specifications for ferrous materials adequate for safety in the field of pressure equipment. These specifications contain requirements for chemical and mechanical properties, heat treatment, manufacture, heat and product analyses, and methods of testing. They are designated by SB numbers and are identical with or similar to those of specifications published by ASTM and other recognized national or international organizations.</p>
<p><b>ASME BPVC.II.C, Section II—Materials, Part C—Specification for Welding Rods, Electrodes, and Filler Metals</b></p> <p>This section is a “service section” to the other BPVC sections providing material specifications for the manufacture, acceptability, chemical composition, mechanical usability, surfacing, testing requirements and procedures, operating characteristics, and intended uses for welding rods, electrodes and filler metals. These specifications are designated by SFA numbers and are derived from AWS specifications.</p>	<p><b>ASME BPVC.II.C, Section II—Materials, Part C—Specification for Welding Rods, Electrodes, and Filler Metals</b></p> <p>This section is a “service section” to the other BPVC sections providing material specifications for the manufacture, acceptability, chemical composition, mechanical usability, surfacing, testing requirements and procedures, operating characteristics, and intended uses for welding rods, electrodes and filler metals. These specifications are designated by SFA numbers and are derived from AWS specifications.</p>

<p><b>ASME BPVC.II.D.C, Section II—Materials, Part D—Properties (Customary)</b></p> <p>This section is a “service section” for reference by the BPVC construction sections providing tables of material properties including allowable, design, tensile and yield stress values, physical properties and external pressure charts and tables. Part D facilitates ready identification of materials to specific Sections of the BPVC. Part D contains appendices which contain criteria for establishing allowable stress, the bases for establishing external pressure charts, and information required for approval of new materials.</p>	<p>for nondestructive examination which are referenced and required by other BPVC sections. It also includes manufacturer’s examination responsibilities, duties of authorized inspectors and requirements for qualification of personnel, inspection and examination. Examination methods are intended to detect surface and internal discontinuities in materials, welds, and fabricated parts and components. A glossary of related terms is included.</p>
<p><b>ASME BPVC.II.D.M, Section II—Materials, Part —Properties (Metric)</b></p> <p>Same as “Customary” above, but metric.</p>	<p><b>ASME BPVC.VI, Section VI, Recommended Rules for the Care and Operation of Heating Boilers</b></p> <p>This section covers general descriptions, terminology, and operation guidelines applicable to steel and cast iron boilers limited to the operating ranges of Section IV Heating Boilers. It includes guidelines for associated controls and automatic fuel burning equipment. Illustrations show typical examples of available equipment. Also included is a glossary of terms commonly associated with boilers, controls, and fuel-burning equipment.</p>
<p><b>ASME BPVC.III.A, Section III— Rules for Construction of Nuclear Facility Components, Appendices.</b></p> <p>LANL does not apply this section because there are no known systems that are within the scope of the code.</p>	<p><b>ASME BPVC.VII, Section VII, Recommended Guidelines for the Care of Power Boilers</b></p> <p>The purpose of these recommended guidelines is to promote safety in the use of power boilers. The term “power boiler” in this section includes stationary, portable, and traction type boilers, but does not include locomotive and high temperature water boilers, nuclear power plant boilers, heating boilers, pressure vessels, or marine boilers. This section provides such guidelines to assist those directly responsible for operating, maintaining, and inspecting power boilers. Emphasis has been placed on industrial type boilers because of their extensive use. Guidelines are also provided for operation of auxiliary equipment and appliances that affect the safe and reliable operation of power boilers.</p>
<p><b>ASME BPVC.IV, Section IV, Rules for Construction of Heating Boilers</b></p> <p>This section provides requirements for design, fabrication, installation and inspection of steam heating, hot water heating, hot water supply boilers, and potable water heaters intended for low pressure service that are directly fired by oil, gas, electricity, coal or other solid or liquid fuels. It contains appendices which cover approval of new material, methods of checking safety valve and safety relief valve capacity, examples of methods of checking safety valve and safety relief valve capacity, examples of methods of calculation and computation, definitions relating to boiler design and welding, and quality control systems. Rules pertaining to use of the H, HV, and HLW ASME Product Certification Marks are also included.</p>	<p><b>ASME BPVC.VIII.1, Section VIII—Rules for Construction of Pressure Vessels, Division 1</b></p> <p>This division provides requirements applicable to the design, fabrication, inspection, testing, and certification of pressure vessels operating at either internal or external pressures exceeding 15 psig. Such pressure vessels may be fired or</p>
<p><b>ASME BPVC.V, Section V, Nondestructive Examination</b></p> <p>This section contains requirements and methods</p>	

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unfired. Specific requirements apply to several classes of material used in pressure vessel construction, and also to fabrication methods such as welding, forging and brazing. It contains mandatory and non-mandatory appendices detailing supplementary design criteria, nondestructive examination and inspection acceptance standards. Rules pertaining to the use of the U, UM and UV ASME Product Certification Marks are also included.

**ASME BPVC.VIII.2, Section VIII—Rules for Construction of Pressure Vessels, Division 2, Alternative Rules**

This division provides requirements applicable to the design, fabrication, inspection, testing, and certification of pressure vessels operating at either internal or external pressures exceeding 15 psig. Such vessels may be fired or unfired. This pressure may be obtained from an external source or by the application of heat from a direct or indirect source, or any combination thereof. These rules provide an alternative to the minimum requirements for pressure vessels under Division 1 rules. In comparison the Division 1, Division 2 requirements on materials, design, and nondestructive examination are more rigorous; however, higher design stress intensify values are permitted. Division 2 rules cover only vessels to be installed in a fixed location for a specific service where operation and maintenance control is retained during the useful life of the vessel by the user who prepares or causes to be prepared the design specifications. These rules may also apply to human occupancy pressure vessels typically in the diving industry. Rules pertaining to the use of the U2 and UV ASME Product Certification Marks are also included.

**ASME BPVC.VIII.3, Section VIII—Rules for Construction of Pressure Vessels, Division 3, Alternative Rules for Construction of High Pressure Vessels**

This division provides requirements applicable to the design, fabrication, inspection, testing, and certification of pressure vessels operating at either internal or external pressures generally above 10,000 psi. Such vessels may be fired or unfired. This pressure may be obtained from an external source, a process reaction, by the

application of heat from a direct or indirect source, or any combination thereof. Division 3 rules cover vessels intended for a specific service and installed in a fixed location or relocated from work site to work site between pressurizations. The operation and maintenance control is retained during the useful life of the vessel by the user who prepares or causes to be prepared the design specifications. Division 3 does not establish maximum pressure limits for either Section VIII, Divisions 1 or 2, nor minimum pressure limits for this Division. Rules pertaining to the use of the UV3 ASME Product Certification Marks are also included.

**ASME BPVC.IX, Section IX— Welding, Brazing and Fusing Qualifications, Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators**

This section contains rules relating to the qualification of welding, brazing, and fusing procedures as required by other BPVC Sections for component manufacture. It also covers rules relating to the qualification and requalification of welders, brazers, and welding, brazing and fusing machine operators in order that they may perform welding, brazing, or plastic fusing as required by other BPVC Sections in the manufacture of components. Welding, brazing, and fusing data cover essential and nonessential variables specific to the joining process used.

**ASME BPVC.X, Section X, Fiber-Reinforced Plastic Pressure Vessels**

This section provides requirements for construction of an FRP pressure vessel in conformance with a manufacturer's design report. It includes production, processing, fabrication, inspection and testing methods required for the vessel. Section X includes three Classes of vessel design; Class I and Class III—qualification through the destructive test of a prototype and Class II—mandatory design rules and acceptance testing by nondestructive methods. These vessels are not permitted to store, handle or process lethal fluids. Vessel fabrication is limited to the following processes: bag molding, centrifugal casting and filament-winding and contact molding. General

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<p>specifications for the glass and resin materials and minimum physical properties for the composite materials are given.</p>	<p><b>ASME BPVC.CC.BPV, Code Cases, Boilers and Pressure Vessels</b></p>
<p><b>ASME BPVC.XI, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components.</b> LANL does not apply this code because there are no know systems that are within the scope of the code.</p>	<p>This section provides the approved actions by the BPVC Committee on alternatives intended to allow early and urgent implementation of any revised requirements for boilers and pressure vessels.</p>
<p><b>ASME BPVC.XII, Section XII, Rules for Construction and Continued Service of Transport Tanks</b></p> <p>This section covers requirements for construction and continued service of pressure vessels for the transportation of dangerous goods via highway, rail, air or water at pressures from full vacuum to 3,000 psig and volumes greater than 120 gallons. "Construction" is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and over-pressure 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. This section contains modal appendices containing requirements for vessels used in specific transport modes and service applications. Rules pertaining to the use of the T ASME Product Certification Marks are included.</p>	<p><b>ASME BPVC.CC.NC, Code Cases, Nuclear Components.</b></p> <p>LANL does not apply this code because there are no known systems that are within the scope of the code.</p>