2019
Boiler and Pressure Vessel Code
AN INTERNATIONAL CODE

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ASME issued its first standard, Code for the Conduct of Trials of Steam Boilers, in 1884. This paper nurtured the effort to develop, Rules for the Construction of Stationary Boilers and for Allowable Working Pressure, the first edition of ASME's now-legendary Boiler and Pressure Vessel Code (BPVC) – issued in 1914 and published in 1915.

The BPVC has grown over the decades to include 32 books and 18,000 pages covering industrial and residential boilers as well as nuclear reactor components, transport tanks, and other forms of pressure vessels. It is kept current by nearly more than 1,600 volunteer technical experts – drawn from a balance of interests among industry, government and R&D – who operate in a fully open and transparent manner via consensus process.

The resulting "living document" remains a worldwide model for assuring the safety, reliability and operational efficiency first envisioned by ASME's founders more than a century ago.

BOILERS AND PRESSURE VESSELS

Since its first issuance in 1914, ASME's BPVC has pioneered modern standards-development, maintaining a commitment to enhance public safety and technological advancement to meet the needs of a changing world. This "International Historic Mechanical Engineering Landmark" now has been incorporated into the laws of state and local jurisdictions of the United States, all of the Canadian provinces and innumerable jurisdictions elsewhere.

The BPVC is in use in 100 countries around the world, with translations into a number of languages. The boiler and pressure-vessel sections of the BPVC have long been considered essential within such industries as electric power-generation, petrochemical, and transportation, among others.

NUCLEAR

ASME has played a vital role in supporting the nuclear industry since its inception, when ASME, standards and conformity assessment programs, originally developed for fossil fuel-fired plants, were applied to nuclear power-plant construction. The nuclear sections of the BPVC reflect the best-practices of industry, while contributing to more than a half-century of safety for the general public.

Visit **go.asme.org/BPVC**

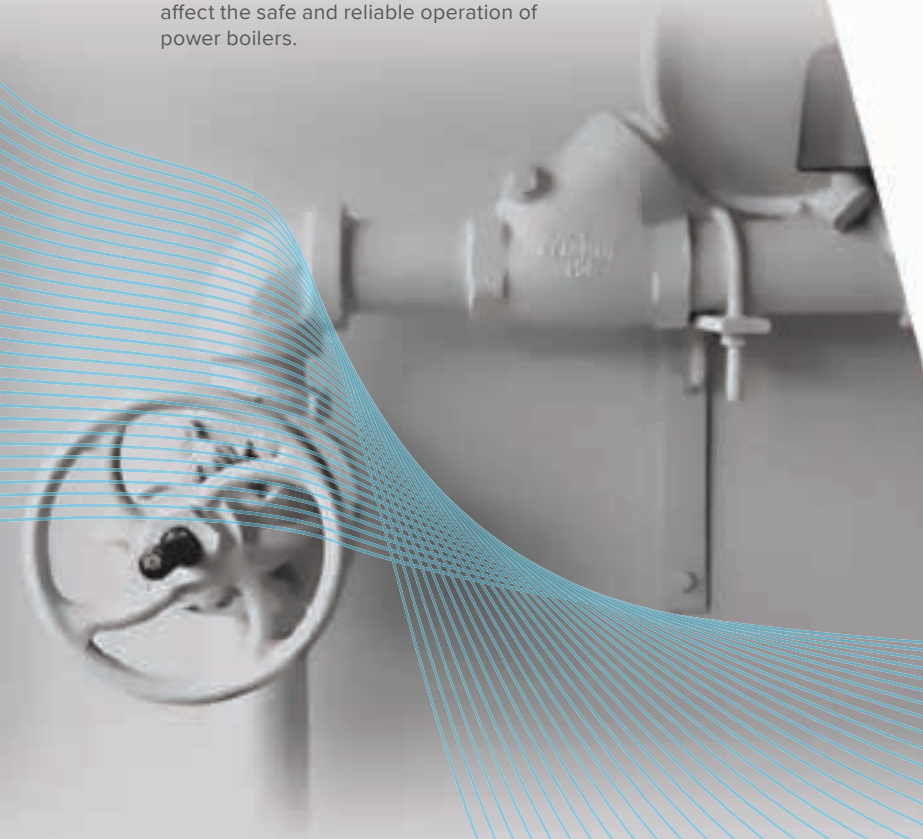
POWER BOILERS

SECTION I
POWER BOILERS

Provides requirements for all methods of construction of power, electric, and miniature boilers; high temperature water boilers, heat recovery steam generators, solar receiver steam generators, certain fired pressure vessels, and liquid phase thermal fluid heaters to be used in stationary service; and power boilers used in locomotive, portable, and traction service. Rules pertaining to use of the ASME Certification Mark with the S, M, E, A, PP, V, and PRT Designators are also included.

SECTION VII
CARE OF POWER BOILERS

Provides guidelines to assist those directly responsible for operating, maintaining, and examining power boilers. These boilers include stationary, portable, and traction type boilers, but not locomotive and high-temperature water boilers, miniature boilers, nuclear power-plant boilers (see Section XI), heating boilers (see Section VI), pressure vessels, or marine boilers. Guidelines are also provided for operation of auxiliary equipment and appliances that affect the safe and reliable operation of power boilers.



REFERENCED
BPVC SECTIONS

BPVC-II, A, B, C,D
Section II, Materials, Parts A through D.

BPVC-V
Section V, Nondestructive Examination.

BPVC-VIII-1
Section VIII, Rules for Construction of Pressure Vessels, Division 1.

BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

REFERENCED
ASME STANDARDS

B1.20.1
Pipe Threads, General Purpose, Inch.

Thirteen Standards from the B16 Series on pipe flanges and fittings.

B18.1.2
Large Rivets.

B31.1
Power Piping.

B36.10M
Welded and Seamless Wrought Steel Pipe.

PTC 25
Pressure Relief Devices.

QAI-1
Qualifications for Authorized Inspection.

CA-1
Conformity Assessment Requirements.

HEATING BOILERS

SECTION IV
HEATING BOILERS

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. Rules pertaining to use of the ASME Certification Mark with the H, HV, HLW and PRT Designators are also included.

SECTION VI
CARE AND OPERATION OF HEATING BOILERS

Covers operation guidelines applicable to steel and cast-iron boilers limited to the operating ranges of Section IV Heating Boilers. Section VI includes guidelines for associated controls and automatic fuel-burning equipment. Also included is a glossary of terms commonly associated with boilers, controls, and fuel-burning equipment.

REFERENCED BPVC SECTIONS

BPVC-I
Section I, Rules for Construction of Power Boilers.

BPVC-II, A, B, C, D
Section II, Materials, Parts A through D.

BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

REFERENCED ASME STANDARDS

Seven Standards from the B16 Series on pipe flanges and fittings.

PTC 25
Pressure Relief Devices.

QAI-1
Qualifications for Authorized Inspection.

CA-1
Conformity Assessment Requirements.

PRESSURE VESSELS

SECTION VIII PRESSURE VESSELS

Division 1 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. Specific requirements apply to several classes of material used in pressure vessel construction, and also to fabrication methods such as welding, forging and brazing.

Division 1 contains mandatory and non-mandatory appendices detailing supplementary design criteria, nondestructive examination and inspection acceptance standards. Rules pertaining to the use of the ASME Certification Mark with the U, UM, UV, UD, and PRT Designators are also included.

Division 2 requirements on materials, design, and nondestructive examination are more rigorous than in Division 1; however, higher design stress intensity values are permitted. These rules may also apply to human occupancy pressure vessels typically in the diving industry. Rules pertaining to the use of the ASME Certification Mark with the U2, UV, and PRT Designators are also included.

Division 3 requirements are applicable to pressure vessels operating at either internal or external pressures generally above 10,000 psi. It 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 ASME Certification Mark with the U3, UV3 and UD3 Designator are also included.

REFERENCED BPVC SECTIONS

BPVC-II, A, B, C, D
Section II, Materials, Parts A through D.

BPVC-V
Section V, Nondestructive Examination.

BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

ASME'S PRESSURE TECHNOLOGY BOOKS

PTB-1, ASME Section VIII Division 2 Criteria and Commentary.

PTB-2, Guide to Life Cycle Management of Pressure Equipment Integrity.

PTB-3, ASME Section VIII-Division 2 Example Problem Manual.

PTB-4, ASME Section VIII-Division 1 Example Problem Manual.

PTB-5, ASME Section VIII-Division 3 Example Problem Manual.

PTB-6, Guidelines for Strain Gaging of Pressure Vessels Subjected to External Pressure Loading in the PVHO-1 Standard.

PTB-7, Criteria for Shell-and-Tube Heat Exchangers According to Part UHX of ASME Section VIII-Division 1.

PTB-8, Procurement Guidelines for Metallic Materials.

PTB-10, Guide for ASME Section VIII Division 1 Stamp Holders.

REFERENCED ASME STANDARDS

DIVISION 1

Five Standards from the B1 Series on screw threads.

Thirteen Standards from the B16 Series on pipe flanges and fittings.

Nine Standards from the B18 Series on hex bolts.

B36.10M
Welded and Seamless Wrought Steel Pipe.

B36.19M
Stainless Steel Pipe.

NQA-1
Quality Assurance Program Requirements for Nuclear Facilities.

QAI-1
Qualifications for Authorized Inspection.

PCC-1
Guidelines for Pressure Boundary Bolted Flange Joint Assembly.

PCC-2
Repair of Pressure Equipment and Piping.

PTC 25
Pressure Relief Devices.

QAI-1
Qualifications for Authorized Inspection.

CA-1
Conformity Assessment Requirements.

DIVISION 2

API 579-1/ASME FFS-1
Fitness-For-Service.

Three Standards from the B1 Series on screw threads.

Nine Standards from the B16 Series on pipe flanges and fittings.

Four Standards from the B18 Series on hex bolts.

B36.10M
Welded and Seamless Wrought Steel Pipe.

B36.19M
Stainless Steel Pipe.

NQA-1
Quality Assurance Program Requirements for Nuclear Facilities.

PCC-1
Guidelines for Pressure Boundary Bolted Flange Joint Assembly.

PTC 25
Pressure Relief Devices.

QAI-1
Qualifications for Authorized Inspection.

CA-1
Conformity Assessment Requirements.

DIVISION 3

API 579-1/ASME FFS-1
Fitness-For-Service.

B1.1
Unified Inch Screw Threads (UN and UNR Thread Form).

B16.5
Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.

B18.2.2
Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series).

B18.2.6M
Metric Fasteners for Use in Structural Applications.

B31.3
Process Piping.

B36.10M
Welded and Seamless Wrought Steel Pipe.

B46.1
Surface Texture (Surface Roughness, Waviness and Lay).

PTC 25
Pressure Relief Devices.

QAI-1
Qualifications for Authorized Inspection.

CA-1
Conformity Assessment Requirements.

PCC-3
Inspection Planning Using Risk-Based Methods.

TRANSPORT TANKS

SECTION XII TRANSPORT TANKS

Provides 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” refers to inspection, testing, repair, alteration, and recertification of a transport tank that has been in service. Rules pertaining to the use of the ASME Certification Mark with the T, TD, TV and PRT Designators are included.

The US Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) is currently working on a rulemaking that will incorporate by reference the ASME Boiler Pressure Vessel Code Section XII in the Hazardous Materials Regulations.

REFERENCED BPVC SECTIONS

BPVC-II, A, B, C, D
Section II, Materials, Parts A through D.

BPVC-V
Section V, Nondestructive Examination.

BPVC-VIII-1-2
Section VIII, Pressure Vessels, Division 1 and Division 2.

BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

REFERENCED ASME STANDARDS

B1.1
Unified Inch Screw Threads (UN and UNR Thread Form).

B1.20.1
Pipe Threads, General Purpose, Inch.

Nine Standards from the B16 Series on pipe flanges and fittings.

B18.2.2
Square and Hex Nuts.

B36.10M
Welded and Seamless Wrought Steel Pipe.

PTC 25
Pressure Relief Devices.

QAI-1
Qualifications for Authorized Inspection.

CA-1
Conformity Assessment Requirements.

FIBER-REINFORCED PLASTIC PRESSURE VESSELS

SECTION X FIBER-REINFORCED PLASTIC PRESSURE VESSELS

Provides requirements for construction of a fiber-reinforced plastic pressure vessel (FRP) 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. Rules pertaining to the use of the ASME Certification Mark with the RP Designators are also included.

REFERENCED BPVC SECTIONS

BPVC-V
Nondestructive Examination

Referenced ASME Standards

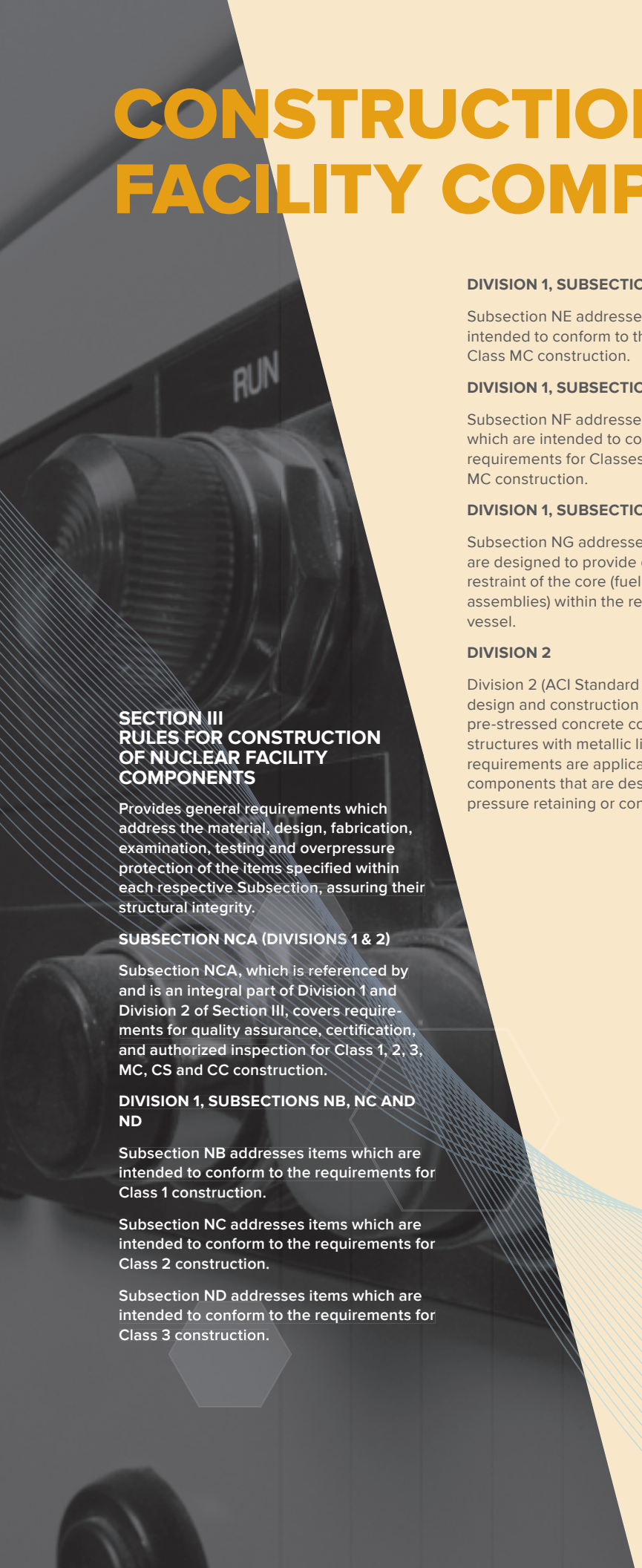
B16.1
Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250

B16.5
Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard

B18.22.1
Plain Washers

CA-1
Conformity Assessment Requirements.

CONSTRUCTION OF NUCLEAR FACILITY COMPONENTS



SECTION III RULES FOR CONSTRUCTION OF NUCLEAR FACILITY COMPONENTS

Provides general requirements which address the material, design, fabrication, examination, testing and overpressure protection of the items specified within each respective Subsection, assuring their structural integrity.

SUBSECTION NCA (DIVISIONS 1 & 2)

Subsection NCA, which is referenced by and is an integral part of Division 1 and Division 2 of Section III, covers requirements for quality assurance, certification, and authorized inspection for Class 1, 2, 3, MC, CS and CC construction.

DIVISION 1, SUBSECTIONS NB, NC AND ND

Subsection NB addresses items which are intended to conform to the requirements for Class 1 construction.

Subsection NC addresses items which are intended to conform to the requirements for Class 2 construction.

Subsection ND addresses items which are intended to conform to the requirements for Class 3 construction.

DIVISION 1, SUBSECTION NE

Subsection NE addresses items, which are intended to conform to the requirements for Class MC construction.

DIVISION 1, SUBSECTION NF

Subsection NF addresses the supports, which are intended to conform to the requirements for Classes 1, 2, 3, and MC construction.

DIVISION 1, SUBSECTION NG

Subsection NG addresses structures, which are designed to provide direct support or restraint of the core (fuel and blanket assemblies) within the reactor pressure vessel.

DIVISION 2

Division 2 (ACI Standard 359) addresses design and construction of reinforced and pre-stressed concrete containment structures with metallic liners. These requirements are applicable only to those components that are designed to provide a pressure retaining or containing barrier.

DIVISION 3

Division 3 addresses the design and construction of the containment systems, including internal support structures, used for the transportation and/or storage of spent nuclear fuel and high-level radioactive material.

DIVISION 5

Division 5 provides rules for the construction of high-temperature reactors, including high temperature gas reactors, liquid metal cooled reactors, and molten salt reactors.

APPENDICES

Section III Appendices contain both mandatory and non-mandatory appendices referenced by all Divisions of Section III. The mandatory appendices contain requirements for construction (e.g., design and design analysis methods, Data Report Forms), while the non-mandatory appendices provide additional information or guidance for the use of Section III (e.g., guidance on preparing a Design Report).

REFERENCED BPVC SECTIONS

BPVC-II, A, B, C, D
Section II, Materials, Parts A through D.

BPVC-V
Section V, Nondestructive Examination.

BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

BPVC-XI
Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components.

REFERENCED ASME STANDARDS

Three Standards from the B1 Series on screw threads.

Eight Standards from the B16 Series on pipe flanges and fittings.

Three Standards from the B18 Series on hex bolts.

B36.10M – Welded and Seamless Wrought Steel Pipe.

B36.19M – Stainless Steel Pipe.

NQA-1 – Quality Assurance Program Requirements for Nuclear Facilities.

QAI-1 – Qualifications for Authorized Inspection.

NUCLEAR INSERVICE

SECTION XI RULES FOR INSERVICE INSPECTION OF NUCLEAR POWER PLANT COMPONENTS

Provides requirements to maintain the nuclear power plant while in operation and to return the plant to service following plant outages. The rules require a mandatory program to evidence adequate safety and manage deterioration and aging effects. The rules also stipulate duties of the Authorized Nuclear Inservice Inspector to verify that the mandatory program has been completed, permitting the plant to return to service in a safe and expeditious manner. Application of this Section begins when the requirements of the Construction Code have been satisfied.

DIVISION 1

This Division provides rules for the examination, inspection, and testing; NDE methods, qualifications, and requirements; evaluation and acceptance standards for flaws, defects, and relevant conditions; repair/replacement processes and correction actions/measures in light water cooled nuclear power plants.

DIVISION 2

This Division provides the requirements for the creation of the Reliability and Integrity Management (RIM) Programs for advanced nuclear reactor designs. The RIM Programs address the entire life cycle for all types of nuclear power plants, it requires a combination of monitoring, examination, tests, operation, and maintenance requirements that ensures each Structure, System, and Component (SSC) meets plant risk and reliability goals that are selected for the RIM Programs.

REFERENCED BPVC SECTIONS

BPVC-II, A, B, C, D
Section II, Materials, Parts A through D.

BPVC-III
Section III, Rules for Construction of Nuclear Facility Components.

BPVC-V
Section V, Nondestructive Examination.

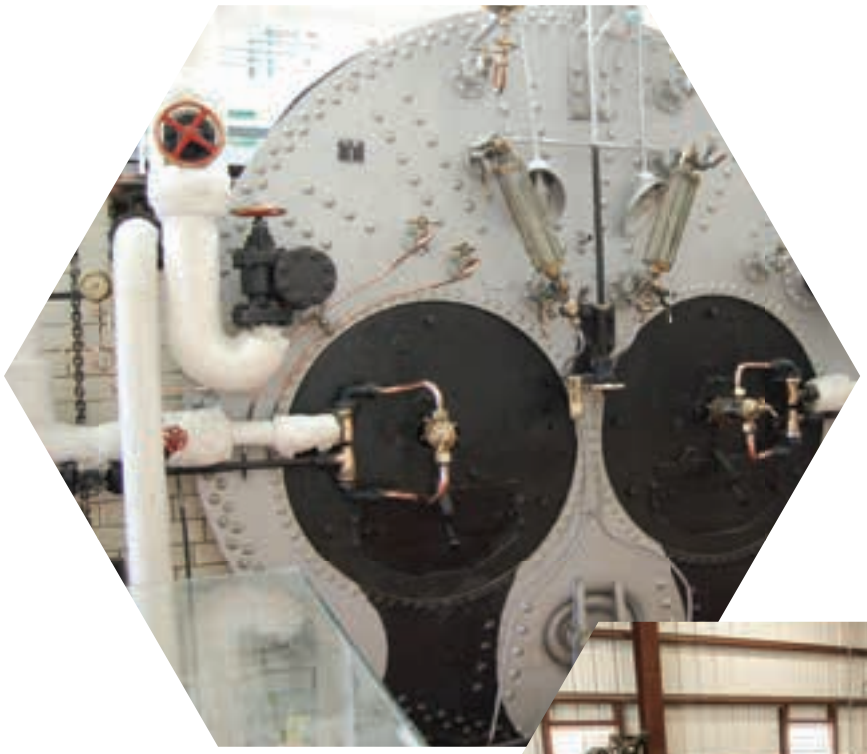
BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

REFERENCED ASME STANDARDS

NQA-1
Quality Assurance Requirements for Nuclear Facilities Applications (QA).

QAI-1
Qualifications for Authorized Inspection.

RA-S
Standard for Level 1 / Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications.



SERVICE SECTIONS/ CODE CASES

SECTION II MATERIALS

Part A covers Ferrous Material; Part B covers Nonferrous Material; Part C covers Welding Rods, Electrodes, and Filler Metals; and Part D covers Material Properties in both Customary and Metric units of measure.

Together, these four parts of Section II comprise a “service Code” to other BPVC Sections, providing material specifications 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. Part A and Part B specifications are designated by SA or SB numbers, respectively, and are identical with or similar to those of specifications published by ASTM and other recognized national or international organizations. Part C specifications are designated by SFA numbers and are derived from AWS specifications.

SECTION V NONDESTRUCTIVE EXAMINATION

Section V is another “service Code” to other BPVC Sections, providing requirements and methods for nondestructive examination. It also includes manufacturer’s examination responsibilities, duties of authorized inspectors and requirements for qualification of personnel performing inspections 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.

SECTION IX WELDING, BRAZING, AND FUSING QUALIFICATIONS

Section IX is another “service Code” to other BPVC Sections, providing requirements relating to the qualification of welding, brazing, and fusing procedures.

It also covers rules relating to the qualification and requalification of welders, brazers, and welding and brazing operators in order that they may perform welding or brazing in component manufacture. Welding, brazing and fusing data cover essential and nonessential variables specific to the welding, brazing or fusing process used.

CODE CASES BOILERS AND PRESSURE VESSELS / NUCLEAR

The BPVC is revised every two years. But what happens in the interim with new materials or alternative constructions? How does the BPVC keep current with the latest in technology and applications?

Code Cases are approved actions by the BPVC Committees on these alternatives, intended to allow early and urgent implementation of requirements. Each Code Cases book is updated with 7 supplements in two categories: Boiler and Pressure Vessels (CC-BPV) and Nuclear (CC-NUC). Users may purchase individual publications at any time. Or they may subscribe to receive full sets of Code Cases as they are published for the duration of that BPVC edition’s cycle.

This responsiveness to requests illustrates the unique openness and transparency of ASME’s standards development process – striving to reflect best-practices of industry, while contributing to safety for the general public.

Visit **go.asme.org/BPVC**

CONFORMITY ASSESSMENT

*Give your business a **competitive edge***

ASME's product certification programs qualify a manufacturer's or assembler's quality control system in accordance with ASME Codes and Standards. They are the clearest way to tell all relevant parties that your company is committed to public safety and product quality.

ASME PRODUCT CERTIFICATIONS:

- Are a clear demonstration that your quality assurance program has followed all aspects of the applicable ASME Codes and Standards
- Provides confidence to others that your products, parts, and process conform to code requirements for safety and reliability.
- Give your business a competitive edge – providing access to global markets and facilitating global commerce.

Achieving product certification by ASME is a means of complying with the laws and regulations in most all U.S. States, nine Canadian provinces, and innumerable jurisdictions elsewhere. Today, more than 7,000 companies in over 70 countries are certified by ASME. Even in countries where the ASME Certification Mark is not legally required, it remains invaluable for assuring that stamped items conform to established safety standards.

BOILER AND PRESSURE VESSEL CERTIFICATION

The ASME BPV Certification Program conforms to the rules governing the design, fabrication, assembly, and inspection of boiler and pressure vessel components during construction. Products manufactured by ASME BPV Certificate Holders are certified and stamped with the Certification Mark (a.k.a., Code Symbol Stamp) in accordance with the applicable ASME BPVC Section. Only organizations that hold an ASME Certificate of Authorization are permitted to use The MARK, with the appropriate designator.

SECTION I POWER BOILERS

S – Power Boilers

A – Assembly of Power Boilers

E – Electric Boilers

M – Miniature Boilers

PP – Pressure Piping

PRT – Part Fabrication

V – Boiler Safety Relief Valves

SECTION IV – HEATING BOILERS

H – Heating Boilers

HLW – Lined Potable Water Heaters

HV – Heating Boiler Safety Relief Valves

PRT – Part Fabrication

SECTION VIII DIVISION 1 PRESSURE VESSELS

PRT – Part Fabrication

U – Pressure Vessels

UM – Miniature Pressure Vessels

UV – Pressure Vessel Pressure Relief Valves

UD – Pressure Vessel Rupture Disk Devices

SECTION VIII DIVISION 2 PRESSURE VESSELS

PRT – Part Fabrication

U2 – Pressure Vessels (Alternative Rules for Pressure Vessels)

UV – Pressure Vessel Pressure Relief Valves

SECTION VIII DIVISION 3 PRESSURE VESSELS

U3 – High Pressure Vessels

UV3 – High Pressure Vessel Pressure Relief Valves

UD3 – High Pressure Vessel Pressure Rupture Disk Devices

SECTION X FIBER-REINFORCED PLASTIC VESSELS

RP – Fiber-Reinforced Plastic Vessels

SECTION XII TRANSPORTS TANKS

PRT – Part Fabrication

T – Transport Tanks

TV – Transport Tanks Pressure Relief Valves

TD – Transport Tanks Pressure Relief Devices

FOR DETAILS, CALL 1-800-THE-ASME (1-800-843-2763) (OR) 1-973-882-1170 (OR) VISIT GO.ASME.ORG/BPVC

NUCLEAR COMPONENT CERTIFICATION

Nuclear-type Certificates of Authorization issued by ASME verify the adequacy of an organization's quality assurance program and allow the certificate holder to design, fabricate, and install components and supports used in nuclear power plants and other nuclear facilities. These components will be certified and stamped with the ASME Single Certification Mark (the MARK) in accordance with Section III of the ASME BPVC.

N – Vessels, pumps, valves, piping systems, storage tanks, core support structures, concrete containments, and transport packaging

NA – Field installation and shop assembly of all items

NPT – Parts, appurtenances, welded tubular products, and piping subassemblies

NS – Supports

NV – Pressure relief valves

N3 – Transportation containments, storage containments and internal support structures

OWN – Nuclear power plant owner

NUCLEAR MATERIAL ORGANIZATION CERTIFICATION

The Nuclear Material Organization Certification Program certifies organizations that provide materials and services to the nuclear power industry.

Quality System Certificates (QSC) issued by ASME verify the adequacy of a Material Organization's quality system program. This quality system program provides assurance that the organization's operations, processes, and services related to the procurement, manufacture, and supply of material, source material, and unqualified source material are performed in accordance with the requirements of the ASME BPVC, Section III, NCA-3800 and NCA-3900.

Visit
go.asme.org/certification
to learn more.

NQA-1 CERTIFICATION

Entering the nuclear supply chain can be a daunting and costly task. To support the nuclear industry, ASME developed its NQA-1 certification program to assess and certify companies that are committed to quality and producing high-quality products and services. The ASME NQA-1 certification is designed to assess a supplier's capability in implementing a quality assurance program that meets the requirements of the NQA-1 Standard.

Suppliers who achieve NQA-1 certification, may:

- Gain a competitive edge in the marketplace.
- Save time and money by reducing length and frequency of audits.
- Inspire confidence in the safety of your company and its products.

"We have been able to secure millions of dollars in contracts based solely on our company having an NQA-1 Certificate. Recently we were awarded a contract because one of the requirements was to be NQA-1 Certified by ASME."

– Doug Saye,
President and Chairman, Premier Technologies, Inc., Blackfoot, Idaho

ANDE PERSONNEL CERTIFICATION

ASME has been setting the standard in personnel certification for over two decades. Over 3,000 professionals in 20 countries have achieved these respected credentials.

ASME NDE (ANDE) is a new certification program for Non-Destructive Examination (NDE) personnel and quality control (QC) inspectors. It provides independent, third-party centralized certification for NDE & QC inspection personnel as an alternate option to the historical, employer-based NDE & QC certification systems.

ANDE focuses on nuclear in-service inspection and new nuclear construction. Ultimately, it will ultimately expand to include pressure-boundary and structural applications in other industries throughout the globe.

Visit
go.asme.org/ANDE
to learn more.

ASME PERSONNEL CERTIFICATION

VOLUNTEERING

BENEFITS OF VOLUNTEERING ON ASME STANDARDS DEVELOPMENT COMMITTEES

For more than 130 years, ASME has successfully attracted volunteer technical experts to serve on ASME committees for developing and revising ASME standards. Participation by volunteers on ASME standards development committees is the lifeblood of the ASME standards-writing process. Committee participation provides value to the individuals involved, their employers, and the general public. Committees benefit from a broad range of volunteer experience, from early career engineers to engineering executives and experienced technical experts in their fields. This mix helps assure that the resulting standards are truly visionary, while also being practical and applicable for the end-users.

BENEFITS TO ORGANIZATIONS THAT SPONSOR VOLUNTEERS

Committee involvement provides companies with critical information, plus opportunities to expand their global networks and strengthen involvement in the decision making process. For example:

- The volunteer becomes knowledgeable in the standards with which the sponsoring organization works. This allows the organization to be more thorough and confident in their application of standards rules, leading to increased efficiencies.
- The volunteer learns about technical problems in the industry early and how others are dealing with them, thus avoiding these problems or having developed solutions should the problem arise in the organization.
- The volunteer has the opportunity to interact with other technical experts with similar interests providing unmatched resources for solving technical problems and gaining experience in teamwork that can be applied within the organization.
- The volunteer learns how ASME committees operate, by participating in the development and updating of standards, and this knowledge plus their attendance at committee meetings can facilitate processing urgent items such as Code Cases and interpretations that might be needed by the organization.

BENEFITS TO INDIVIDUALS

By participating, you can influence the quality and direction of the standards of your chosen field. What's more, you'll reap personal and professional rewards.

- Become aware of critical technical and regulatory issues that could directly impact your organization.
- Realize the satisfaction of seeing your own efforts incorporated into a globally recognized body of work.
- Interact and network with and learn from the foremost technical experts in a given field from around the world.

BENEFITS TO GOVERNMENT AND REGULATORY AUTHORITIES

ASME also helps governments ensure the safety of their citizens and their environment through the adoption of ASME standards as one means of satisfying regulations. Use of ASME standards lessens the burden on governments by providing a technically sound basis for achieving regulatory goals without imposing an unnecessary burden on industry. Government involvement on committees provides officials with critical information and strengthens involvement in the decision-making process, so that regulations are understood and enforceable.

COMMITTEE MEMBERSHIP

Committee participation is free, open to anyone with an interest in the subject area and the requisite technical expertise. Membership in ASME is encouraged but not required. Note that committee members are always viewed as individuals, not as representatives of their employers or other organizations. Criteria for committee membership appointments include:

- Your experience and technical qualifications
- Your ability to participate in committee activities
- The business interest of the organization, if any, that supports your committee participation (interest classification)
- Committee size limits

At the committee's discretion, you may be asked to attend one or more meetings before being considered for committee membership.

JOINING A COMMITTEE

To learn more and join, visit **go.asme.org/GetInvolved**

"BOILER CODE WEEKS"

The BPVC is kept current by a volunteer group of over 1,600 technical experts, balanced between the interests of industry, government and R&D. The BPVC committees meet in person four times per year during "Boiler Code Weeks" to consider requests for interpretations, revisions, and to develop new rules. Its consensus activities are conducted in a fully open and transparent manner; and culminate in a new edition of the BPVC, published every two years.

BPVC committees benefit from a broad range of volunteer experience, from department heads and the top technical experts in their fields all the way to young engineers in their early-career stages. This mix helps assure that the resulting standards are truly visionary, while also being practical and applicable for everyday end-users. All those interested are welcome to apply.

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"Taking into account the size of the specimens and the magnitude of the blast loading – this testing program is unique in the world. The test resulted our understanding of governing phenomena in order to establish new, performance based, set of design criteria. The ultimate goal of the testing program and ASME-ACI code update is to enhance the safety of existing and new nuclear facility. ... The whole team is very enthusiastic about our project and I am sure that we will get very good results."

—Neb Orbovic
Canadian Nuclear Safety Commission

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BOILERS AND PRESSURE VESSELS LEARNING MATRIX

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BOILERS AND PRESSURE VESSELS	BPV Code, Section I: Power Boilers (LC) – PD665 **Top Seller!** BPV Code, Section VIII, Division 1: Design & Fabrication of Pressure Vessels (LC) – PD442 (Also online – EL501) **Top Seller!** BPV Code, Section VIII, Division 1 Combo Course (combines PD441 and PD442) (LC) – PD443 **Top Seller!** Pressure Relief Devices: Design, Sizing, Construction, Inspection & Maintenance (LC) – PD583 **Top Seller!** Non-Destructive Examination – Applying ASME Code Requirements (BPV Code, Section V) (LC) – PD389 **Top Seller!** Pressure Relief Devices: Design, Sizing, Construction, Inspection & Maintenance (LC) – PD583	BPV Code, Section VIII, Division 2: Alternative Rules for Design & Fabrication of Pressure Vessels (LC) – PD448 (also online – EL502) **Top Seller!** Inspection, Repairs, and Alterations of Pressure Equipment (LC) PD441 (also online – EL503) **Top Seller!** Design by Analysis Requirements in ASME Boiler and Pressure Vessel Code Section VIII, Division 2 – Alternative Rules (LC) – MC121 **Top Seller!** Inspections, Repairs and Alterations of Pressure Equipment (LC) – PD441 (Also online – EL503) **Top Seller!** Failure Prevention, Repair & Life Extension of Piping, Vessels and Tanks (LC) – PD077 **Top Seller!** Repair Strategies and Considerations for Pressure Vessels and Piping (LC) – MC114 API 579-1/ASME FFS-1 Fitness-for-Service (LC) – PD395 **Top Seller!** How to Predict Thermal-Hydraulic Loads on Pressure Vessels and Piping (MC) – MC114 Seismic Design and Retrofit of Equipment and Piping (LC) – PD382 Boiler Operation and Maintenance (LC) – PD769 Flow Induced Vibration with Applications to Failure Analysis (LC) – PD146 **Top Seller!**	Bases and Application of Heat Exchanger Mechanical Design Rules in Section VIII of the Boiler and Pressure Vessel Code (LC) – MC104 Structural Materials and Design for Elevated to High Temperatures (LC) – MC112 Techniques and Methods Used in API 579-1/ASME FFS-1 for Advanced Fitness-For-Service (FFS) Assessments (LC) – MC113 Static, Elastic Finite Element Analysis (FEA) Approaches to Address ASME Section VIII, Division 2, Part 5 Design Requirements (LC) – MC149 Design-by-Rule (DBR) Methods of ASME Boiler and Pressure Vessel Code Section VIII Division 2 (LC) – MC151 Design by Analysis Requirements in ASME Boiler & Pressure Vessel Code Section VIII, Division 2 (LC) – MC121 Fatigue Analysis Requirements in ASME Boiler and Pressure Vessel Code Section VIII, Division 2 – Alternative Rules (LC) – MC123 Directive Using ASME Codes to meet the EU Pressure Equipment (LC) – MC135 Techniques and Methods Used in API 579-1/ASME FFS-1 for Advanced Fitness-For-Service (FFS) Assessments (LC) – MC113
PIPING	BPV Code, Section III, Division 1: Class 1 Piping Design (SS) – EL542 BPV Code, Section III, Division 1: Class 2 & 3 Piping Design (SS) – EL543 B31 Piping Fabrication and Examination (LC) – PD445 B31.1 Power Piping Design and Fabrication (LC) – PD642 **Top Seller!** B31.3 Process Piping Design (LC) PD643 **Top Seller!** B31.3 Process Piping Materials, Fabrication, Examination and Testing (LC) – PD457 B31.3 Process Piping Design, Materials, Fabrication, Examination and Testing Combo Course (combines PD104 and PD457) (LC) – PD581 B31.4 Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids (LC) – PD391 **Top Seller!** B31.8 Gas Transmission and Distribution Piping Systems (LC) – PD370 **Top Seller!**	Failure Prevention, Repair & Life Extension of Piping, Vessels and Tanks (LC) – PD077 **Top Seller!** Repair Strategies and Considerations for Pressure Vessels and Piping (LC) – MC114 API 579-1/ASME FFS-1 Fitness-for-Service (LC) – PD395 **Top Seller!** How to Predict Thermal-Hydraulic Loads on Pressure Vessels & Piping (LC) – PD382 Seismic Design and Retrofit of Equipment and Piping (LC) – PD394 Nuclear Piping Systems: BPV Code Section III and B31.1: Design, Integrity-Operabilitiy Assessment and Repairs (LC) – PD615	Creating and Implementing Effective Inspection Plans for Pressure Equipment and High Energy Piping Systems using ASME PCC-3 – MC137 ASME B31.8S Integrity Management of Natural Gas Pipelines Using ASME B31.8S Standard ASME MASTERCLASS – MC142
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QUALITY ASSURANCE	ASME NQA-1 Quality Assurance Requirements for Nuclear Facility Applications (LC) – PD635	ASME NQA-1 Lead Auditor Training (LC) – PD675 **TopSeller** ASME NQA-1 and DOE Quality Assurance Rule 10 CFR 830 (LC) – PD711 NQA-1 Requirements for Computer Software Used in Nuclear Facilities (LC) – PD606 Comparison of Global Quality Assurance & Management System Standards used for Nuclear Applications (LC) – PD634 (also online – EL526)	Real World Application of Commercial Grade Dedication (MC) – MC102 Identifying and Preventing the Use of Counterfeit, Fraudulent, and Suspect Items (MC) – MC103 Software Dedication Training on Use of Commercial Grade Computer Programs for Design and Analysis in Nuclear Applications (MC) – MC105
BALANCE OF PLANT	BPV Code, Section VIII, Division 1: Design & Fabrication of Pressure Vessels (LC) – PD442 (also online – EL501) **Top Seller** Inspection, Repairs and Alterations of Pressure Vessels (LC) – PD441 (Also online – EL503) **Top Seller** BPV Code, Section VIII, Division 2: Alternative Rules for Design & Fabrication of Pressure Vessels (LC) PD448 (also online – EL502) **Top Seller**	How to Predict Thermal-Hydraulic Loads on Pressure Vessels & Piping (LC) – PD382 Seismic Design and Retrofit of Equipment and Piping (LC) – PD394	Bases and Application of Heat Exchanger Mechanical Design Rules in Section VIII of the ASME Boiler and Pressure Vessel Code (MC) – MC104 Bases and Application of Piping Flexibility Analysis to ASME B31 Codes (MC) – MC110 Piping Vibration Causes and Remedies – A Practical Approach (MC) – MC111 **Top Seller** Piping Failures – Causes and Prevention (MC) – MC117 **Top Seller**
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- *Continuing and Changing Priorities of the ASME Boiler and Pressure Vessel Codes and Standards (2014)*
- *Power Boilers: A Guide to Section I of the ASME Boiler and Pressure Vessel Code, Second Edition (2011)*
- *Guidebook for the Design of ASME Section VIII Pressure Vessels, Fourth Edition (2010)*
- *Consensus on Best Tube Sampling Practices for Boilers & Nonnuclear Steam Generators, CRTD 103 (2014)*
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- *Pipeline Operation and Maintenance: A Practical Approach, Third Edition (2018)*
- *Process Piping: The Complete Guide to ASME B31.3, Third Edition (2009)*

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