



2017 Boiler and Pressure Vessel Code AN INTERNATIONAL CODE

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The American Society of Mechanical Engineers® (ASME®)



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ASME issued its first Standard, *Code for the Conduct of Trials of Steam Boilers*, in 1884. This paper evolved into *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 31 books and 17,000 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 1,000 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 and nine Canadian provinces.

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 codes, 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.

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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, 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 single 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.

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

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 single ASME certification mark with the H, HV, and HLW 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 single ASME certification mark with the U, UM and UV 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 single ASME certification mark with the U2 and UV 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 single 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

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 single ASME certification mark with the T, TD, and TV designators are included.

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 single ASME certification mark with the RP designator 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 addresses concrete containment structures, pre-stressed or reinforced. 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 construction rules for high-temperature reactors, including both high-temperature, gas-cooled reactors (HTGRs) and liquid-metal reactors (LMRs).

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 rules for the examination, inservice testing and inspection, and repair and replacement of components and systems in light water cooled nuclear power plants. Application of Section XI begins when the requirements of the "construction code" (e.g., Section III) have been satisfied.

Section XI constitutes requirements to maintain the nuclear power plant while in operation and to return the plant to service, following plant outages, and repair or replacement activities. These rules require a mandatory program of scheduled examinations, testing, and inspections to evidence adequate safety. The method of nondestructive examination to be used and flaw size characterization are also contained within this Section.



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:

Subsection NCA, General Requirements for Division 1 and Division 2.

Subsection NB, Class 1 Components.

Subsection NC, Class 2 Component.

Subsection ND, Class 3 Components.

Subsection NE, Class MC Components.

Subsection NF, Supports.

Subsection NG, Core Support Structures.

Appendices.

Division 2-Code for Concrete Containments.

Division 3-Containments for Transportation & Storage of Spent Nuclear Fuel and High Level Radioactive Material & Waste.

Division 5, High Temperature Reactors.

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

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.

NQA-1

Quality Assurance Requirements for Nuclear Facility Applications (QA).

Provides requirements and guidelines for the establishment and execution of quality assurance programs during siting, design, construction, operation and decommissioning of nuclear facilities. This Standard reflects industry experience and current understanding of the quality assurance requirements necessary to achieve safe, reliable, and efficient utilization of nuclear energy, and management and processing of radioactive materials.

NQA-1 focuses on the achievement of results, and emphasizes the role of the individual and line management in the achievement of quality. It fosters the application of these requirements in a manner consistent with the relative importance of the item or activity.



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

Is another “service Code” – containing requirements and methods 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 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

Is another “service Code” – containing rules relating to the qualification of welding, brazing, and fusing procedures as required by other BPVC Sections. 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 – PRESSURE TECHNOLOGY / 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. They are issued four times per year 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 code-development process – striving to reflect best-practices of industry, while contributing to safety for the general public.



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:

- Indicate the highest level of conformity available;
- 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 7,300 companies in over 79 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

SECTION I POWER BOILERS

- “S” Designator – Power Boilers
- “A” Designator – Assembly of Power Boilers
- “E” Designator – Electric Boilers
- “M” Designator – Miniature Boilers
- “PP” Designator – Pressure Piping
- “PRT” Designator – Part
- “V” Designator – Boiler Safety Relief Valves

SECTION IV – HEATING BOILERS

- “H” Designator – Heating Boilers
- “HLW” Designator – Lined Potable Water Heaters
- “HV” Designator – Heating Boiler Safety Relief Valves
- “PRT” Designator – Part

SECTION VIII DIVISION 1 PRESSURE VESSELS

- “PRT” Designator – Part
- “U” Designator – Pressure Vessels
- “UM” Designator – Miniature Pressure Vessels
- “UV” Designator – Pressure Vessel Pressure Relief Valves
- “UD” Designator – Pressure Vessel Rupture Disk Devices



SECTION VIII DIVISION 2 PRESSURE VESSELS

- “PRT” Designator – Part
- “U2” Designator – Pressure Vessels (Alternative Rules for Pressure Vessels)

SECTION VIII DIVISION 3 PRESSURE VESSELS

- “U3” Designator – High Pressure Vessels
- “UV3” Designator – High Pressure Vessel Pressure Relief Valves
- “UD3” Designator – High Pressure Vessel Pressure Rupture Disk Devices (New)

SECTION X FIBER-REINFORCED PLASTIC VESSELS

- “RP” Designator – Fiber-Reinforced Plastic Vessels

SECTION XII TRANSPORTS TANKS

- “PRT” Designator – Part
- “T” Designator – Transport Tanks
- “TV” Designator – Transport Tanks Pressure Relief Valves
- “TD” Designator – Transport Tanks Pressure Relief Devices

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 Certification 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 and storage containments

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.





NQA-1 CERTIFICATION

Entering the nuclear supply chain can be a daunting and costly task. To support the nuclear industry, ASME developed its new NQA-1 certification program to assess and certify companies that are committed to understanding 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.



VOLUNTEERING

BENEFITS OF VOLUNTEERING FOR BPVC COMMITTEES

For more than 100 years, ASME has successfully attracted volunteer technical experts to develop, maintain and disseminate ASME codes and standards. Participation by volunteers is the lifeblood of the BPVC.

INDIVIDUALS

BPVC committee volunteers gain:

- Early Awareness ... of critical technical and regulatory issues that could directly impact your business.
- Benchmarking ... leading organizations in your industry, to see how your business practices measure up.
- Professional Networking ... with nearly 1,000 leading nuclear technical experts from across the country and around the world.

COMPANIES

Involvement on BPVC committees provides companies with critical information, plus opportunities to expand their global networks and strengthen involvement in the decision-making process.

Being involved in the development of ASME codes and standards provides early and ongoing awareness of technical issues in industry and how others are dealing with them. This awareness allows participants to avoid these issues within their own organizations or to have solutions prepared should problems arise.

GOVERNMENT

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

“BOILER CODE WEEKS”

The BPVC is kept current by a volunteer group of nearly 1,000 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.

ASME STANDARDS TECHNOLOGY, LLC

ASME STANDARDS TECHNOLOGY, LLC

ASME Standards Technology, LLC (ASME ST, LLC) is a not-for-profit company established in 2004. ASME ST, LLC bridges the gap between new technology and applicable standards development by managing research projects through all key steps, including: (a) identification of need, (b) proposal creation, (c) project initiation, (d) results review and publication, and (e) initiation of ASME standards actions. ASME ST, LLC's project managers, project engineers, and consultants (e.g., scientists, technical experts) possess the hands-on experience necessary to develop, perform, and manage the most challenging research project. Technology proponents can be confident in the results: every ASME ST, LLC project goes through a rigorous qualification, validation, and peer review process.

EXCEED RESEARCH GOALS WITH A TEAM OF HANDS-ON INDUSTRY EXPERTS

ASME ST, LLC approaches its projects as well as meets client needs with the following capabilities:

- Standards and certification involvement in research projects helps ensure results will be relevant to standards committees.
- Collaborative research projects minimize individual investment while maximizing benefits.
- International partnerships of government, industry and academia help build consensus leading to technically relevant standards.
- Experienced project managers and project engineers successfully coordinate a project to meet stakeholder needs, including meeting project milestones, schedule, and budget as well as providing complete oversight of publishing of final reports.

Visit asmestllc.org

COMMERCIALIZATION THROUGH STANDARDS DEVELOPMENT

The commercialization of new technology is critical to meeting many global challenges, and the role of codes and standards in bringing new technology to market is changing. ASME ST LLC projects help knowledge make the transition from science to engineering, which allows technology proponents to achieve their vision.

Conducting relevant research is important to getting standards written or updated and approved. ASME ST LLC has contributed significantly to the advancement of industry through its dozens of published research projects. With new technologies constantly being proposed, the appropriate research plays a critical role in getting standards developed for these technologies.

ASME ST, LLC'S PRE-STRESSED CONCRETE PROJECT

"This testing program on full-scale pre-stressed concrete slabs under blast loading was initiated and developed under ASME Section III Division 2 Committee as a part of a joint ASME-ACI effort on the update of design code provisions for nuclear structures under. It will provide currently missing test data related to the behavior of pre-stressed concrete structures under blast loading. Eight pre-stressed concrete slabs, with different design features, will be tested under different blast load conditions. The specificities of design features and targeted structural performance require testing full-scale specimens (16 feet x 16 feet x 11 inches slabs).

"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 results will allow improving 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

TRAINING AND DEVELOPMENT COURSES



“The Instructor was great and the course materials (Piping Vibration) are very helpful. This course will be very useful to me as there are multiple situations in the Plant that I am working to reduce vibration and eliminate failures. I can use this training tomorrow to start fixing these issues!”

—Patrick Coleman,
Oklahoma Gas & Electric

ASME is a recognized leader in workforce learning solutions for engineers and technical professionals. We empower individuals to expand their knowledge and organizations to develop their core human assets.

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- Professional instruction by industry experts
- Most Code courses developed and delivered by ASME Code Committee members
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Please see our Learning Matrices on the following two pages, which include numerous Best Sellers... Knowledge-building and networking opportunities await you!

BOILERS AND PRESSURE VESSELS LEARNING MATRIX

	FUNDAMENTAL	INTERMEDIATE	ADVANCED	
BOILERS AND PRESSURE VESSELS	BPV Code, Section I: Power Boilers (LC) – PD665 Top Seller	BPV Code, Section VIII, Division 2: Design & Fabrication of Pressure Vessels (LC) PD448 (also online – EL502) Top Seller	Bases and Application of Heat Exchanger Mechanical Design Rules in Section VIII of the Boiler and Pressure Vessel Code (MC) – MC104	
	BPV Code, Section VIII, Division 1: Design & Fabrication of Pressure Vessels (LC) – PD442 (Also online – EL501) Top Seller	Design by Analysis Requirements in ASME Boiler and Pressure Vessel Code Section VIII, Division 2 – Alternative Rules (MC) – MC121 Top Seller	Flow-Induced Vibration with Applications to Failure Analysis (LC) – PD146 Top Seller	
	BPV Code, Section VIII, Division 1 Combo Course (combines PD441 and PD442) (LC) – PD443 Top Seller	Inspections, Repairs and Alterations of Pressure Equipment (LC) – PD441 (Also online – EL503) Top Seller	Materials and Design for High Temperatures (MC) – MC112	
	Pressure Relief Devices: Design, Sizing, Construction, Inspection & Maintenance (LC) – PD583 Top Seller	Failure Prevention, Repair & Life Extension of Piping, Vessels and Tanks (LC) – PD077 Top Seller	Techniques and Methods Used in API 579-1/ASME FFS-1 for Advanced Fitness-For-Service (FFS) Assessments (MC) – MC113	
	Non-Destructive Examination – Applying ASME Code Requirements (BPV Code, Section V) (LC) – PD389 Top Seller	Repair Strategies and Considerations for Pressure Vessels and Piping (MC) – MD114		
	Pressure Relief Devices: Design, Sizing, Construction, Inspection & Maintenance (LC) – PD583	API 579-1/ASME FFS-1 Fitness-for-Service (LC) – PD395 Top Seller		
	Inspection, Repairs, and Alterations of Pressure Equipment (LC) – PD441	How to Predict Thermal-Hydraulic Loads on Pressure Vessels and Piping (LC) PD382		
		Seismic Design and Retrofit of Equipment and Piping (LC) PD394		
	PIPING	BPV Code, Section III, Division 1: Class 1 Piping Design (SS) – EL542	Failure Prevention, Repair & Life Extension of Piping, Vessels and Tanks (LC) – PD077 Top Seller	Flow Induced Vibration with Applications to Failure Analysis (LC) – PD146 Top Seller
		BPV Code, Section III, Division 1: Class 2 & 3 Piping Design (SS) – EL543	Repair Strategies and Considerations for Pressure Vessels and Piping (MC) – MC114	Techniques and Methods Used in API 579-1/ASME FFS-1 for Advanced Fitness-For-Service (FFS) Assessments (MC) – MC113
B31 Piping Fabrication and Examination (LC) – PD445		API 579-1/ASME FFS-1 Fitness-for-Service (LC) – PD395 Top Seller		
B31.1 Power Piping Code (LC) – PD013 Top Seller		How to Predict Thermal-Hydraulic Loads on Pressure Vessels & Piping (LC) – PD382		
B31.3 Process Piping Design (LC) PD014 Top Seller		Seismic Design and Retrofit of Equipment and Piping (LC) – PD394		
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				
FRP Piping Fabrication and Installation Processes (LC) – PD593 (Also online – EL522)				
WELDING	Non-Destructive Examination – Applying ASME Code Requirements (BPV Code, Section V) (LC) – PD389 Top Seller			
	BPV Code, Section IX: Welding, Brazing and Fusing Qualifications (LC) – PD190 (Also online – EL516) Top Seller			
	Practical Welding Technology (LC) – PD359 Top Seller			
	Principles of Welding (IS) – EL515			

KEY FOR COURSE TYPE: LC = Live Course MC = MasterClass Series IS = Instructor-Supported eLearning SS = Self-study eLearning

NUCLEAR LEARNING MATRIX

	FUNDAMENTAL	INTERMEDIATE	ADVANCED
FACILITY CONSTRUCTION	<p>BPV Code, Section III: Introduction (IS) EL509 Top Seller</p> <p>BVP Code, Section III, Division 1: The Code and Regulation (LC) – PD184</p> <p>Overview of Codes & Standards for Nuclear Power Plants – PD633</p> <p>Design in Codes, Standards and Regulations for Nuclear Power Plant Construction (LC) – PD632 Top Seller</p>	<p>Manufacturing, Fabrication & Examination Responsibilities in Codes, Standards and Regulations for Nuclear Power Plant Construction (LC) – PD631</p> <p>BPV Code, Section III, Division 1: Class 1, 2, & 3 Piping Design (LC) – PD615 Top Seller</p> <p>Design of Buried High Density Polyethylene (HDPE) Piping Systems (SS) – EL544</p>	<p>Advanced Design & Construction of Nuclear Facility Components per BVP Code, Section III (LC) –PD644 (Also online – ZI320)</p> <p>Design Basis vs. Beyond Design Basis Considerations in Nuclear Plants (MC) MC120</p> <p>Structural Materials and Design for Elevated to High Temperatures (MC) MC112</p> <p>Techniques and Methods Used in API 579-1/ASME FFS-1 for Advanced Fitness-for-Service (FFS) Assessments (MC) MC113</p>
QUALITY ASSURANCE	<p>ASME NQA-1 Quality Assurance Requirements for Nuclear Facility Applications (LC) – PD635</p> <p>NQA-1 Requirements for Computer Software Used in Nuclear Facilities (LC) – PD606</p> <p>ASME NQA-1 Lead Auditor Training (LC) – PD675 Top Seller</p> <p>ASME NQA-1 and DOE Quality Assurance Rule 10 CFR 830 (LC) – PD711</p> <p>Comparison of Global Quality Assurance & Management System Standards used for Nuclear Applications (LC) – PD634 (Also online – EL526)</p>		<p>Real World Application of Commercial Grade Dedication (MC) – MC102</p> <p>Identifying and Preventing the Use of Counterfeit, Fraudulent, and Suspect Items (MC) – MC103</p> <p>Software Dedication Training on Use of Commercial Grade Computer Programs for Design and Analysis in Nuclear Applications (MC) – MC105</p>
BALANCE OF PLANT	<p>BPV Code, Section VIII, Division 1: Design & Fabrication of Pressure Vessels (LC) – PD442 (Also online – EL501) Top Seller</p> <p>Inspection, Repairs and Alterations of Pressure Vessels (LC) – PD441 (Also online – EL503) Top Seller</p> <p>BPV Code, Section VIII, Division 2: Alternative Rules for Design & Fabrication of Pressure Vessels (LC) PD448 (also online – EL502) Top Seller</p> <p>Flow-Induced Vibration with Applications to Failure Analysis (LC) – PD146 Top Seller</p> <p>Non-Destructive Examination – Applying ASME Code Requirements (BPV Code, Section V) (LC) – PD389 Top Seller</p> <p>Pressure Relief Devices: Design, Sizing, Construction, Inspection & Maintenance (LC) – PD583 Top Seller</p> <p>B31.1 Power Piping Code (LC) – PD013 Top Seller</p>	<p>How to Predict Thermal-Hydraulic Loads on Pressure Vessels & Piping (LC) – PD382</p> <p>Seismic Design and Retrofit of Equipment and Piping (LC) – PD394</p>	<p>Bases and Application of Heat Exchanger Mechanical Design Rules in Section VIII of the ASME Boiler and Pressure Vessel Code (MC) MC104</p> <p>Bases and Application of Piping Flexibility Analysis to ASME B31 Codes (MC) MC110</p> <p>Piping Vibration Causes and Remedies – A Practical Approach (MC) MC111 Top Seller</p> <p>Piping Failures – Causes and Prevention (MC) MC117 Top Seller</p>
INSERVICE	<p>Overview of Probabilistic Risk Assessment (PRA) Standard (SS) – EL541)</p> <p>Developing a 10-Year Pump Inservice Test Program (LC) – PD595</p> <p>Developing a 10-Year Valve IST Program (LC) – PD596</p> <p>Inservice Testing of Pumps (IS) EL523</p> <p>Inservice Testing of Valves (IS) EL521</p>	<p>BPV Code, Section XI: Inservice Inspection of Nuclear Power Plant Components (LC) – PD192 Top Seller</p> <p>Risk-Informed Inservice Testing Program (LC) – PD597 (Also online –ZI309)</p>	<p>Run-or-Repair Operability Decisions for Pressure Equipment and Piping Systems in Nuclear Plants (MC) – MC115</p>

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PUBLISHING



ASME Press publishes more than 190 eBooks. Print editions are also available. Specific titles related to Boilers and Pressure Vessels include:

- *Companion Guide to the ASME Boiler and Pressure Vessel and Piping Codes, Fifth Edition-Volumes 1 & 2 (2017)*
- *Global Applications of the ASME Boiler & Pressure Vessel Code (2016)*
- *Companion Guide to the ASME Boiler and Pressure Vessel and Piping Codes, Fifth Edition-Volumes 1 & 2 (2015)*
- *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-Volume 103 (2014)*
- *Primer on Engineering Standards (2014)*

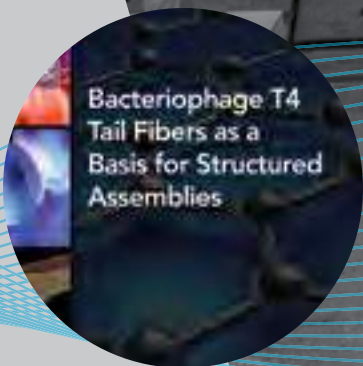
Specific titles related to Piping and Pipeline Systems include:

- *Power Piping: The Complete Guide to ASME B31.1 (2013)*
- *Pipeline Integrity Management Systems: A Practical Approach (2016)*
- *Supplement to Fluid Mechanics, Water Hammer, Dynamic Stresses, and Piping Design (2015)*
- *Fluid Mechanics, Water Hammer, Dynamic Stresses, and Piping Design (2013)*
- *Pipeline Pumping and Compression Systems: A Practical Approach, Second Edition (2013)*
- *Pipeline Operation and Maintenance: A Practical Approach, Second Edition (2010)*
- *Process Piping: The Complete Guide to ASME B31.3, Third Edition (2009)*

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Companion Guide to the ASME Boiler and Pressure Vessel and Piping Codes, Fifth Edition-Volumes 1 & 2 (2015)

The fifth edition of the classic "Companion Guide" to the ASME Pressure Vessel & Piping Codes has been fully updated to the current Code Edition. Available in Spring 2017.

K. R. Rao, Editor



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