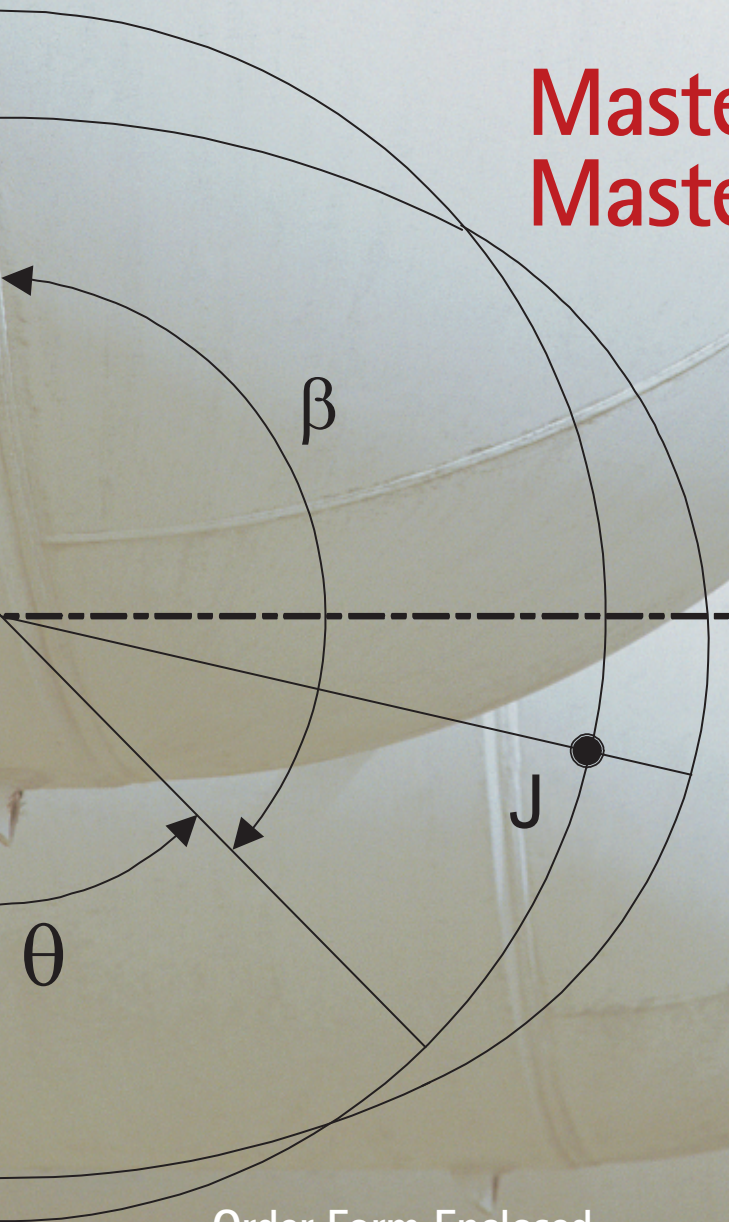


# 2010

## ASME Boiler and Pressure Vessel Code with Addenda

AN INTERNATIONAL CODE

**Master The Code.  
Master Your Markets.**



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## The 2010 ASME Boiler and Pressure Vessel Code with Addenda Setting the Standard in Design, Engineering and Care

The ASME Boiler and Pressure Vessel Code (BPVC) establishes rules of safety 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.

Advancements in design and material, and the evidence of experience, are constantly being added. Further value is added for BPVC purchasers through ASME's ongoing conformity-assessment programs, referenced and related standards, training courses, technical publications, and industry conferences.

### Serving the Public for over 90 Years

Originating in 1914, the BPVC is now adopted, in part or in its entirety, by all 50 states and numerous municipalities and territories of the United States, and by all 10 provinces of Canada. More than 92,000 copies of the BPVC are in use in 100 countries around the world, with translations in a number of languages.

The BPVC is "An International Historic Mechanical Engineering Landmark," widely recognized as a model for codes and standards worldwide. Its development process remains open and transparent throughout, yielding "living documents" that have improved public safety and facilitated trade across global markets and jurisdictions for nearly a century.

### Current and "LIVE"

The BPVC is kept current by the Boiler and Pressure Vessel Committee, a volunteer group of more than 950 engineers, regulators and technical experts. The Committee meets regularly to consider requests for interpretations, revisions, and to develop new rules. Its activities culminate in a new edition of the BPVC every three years.

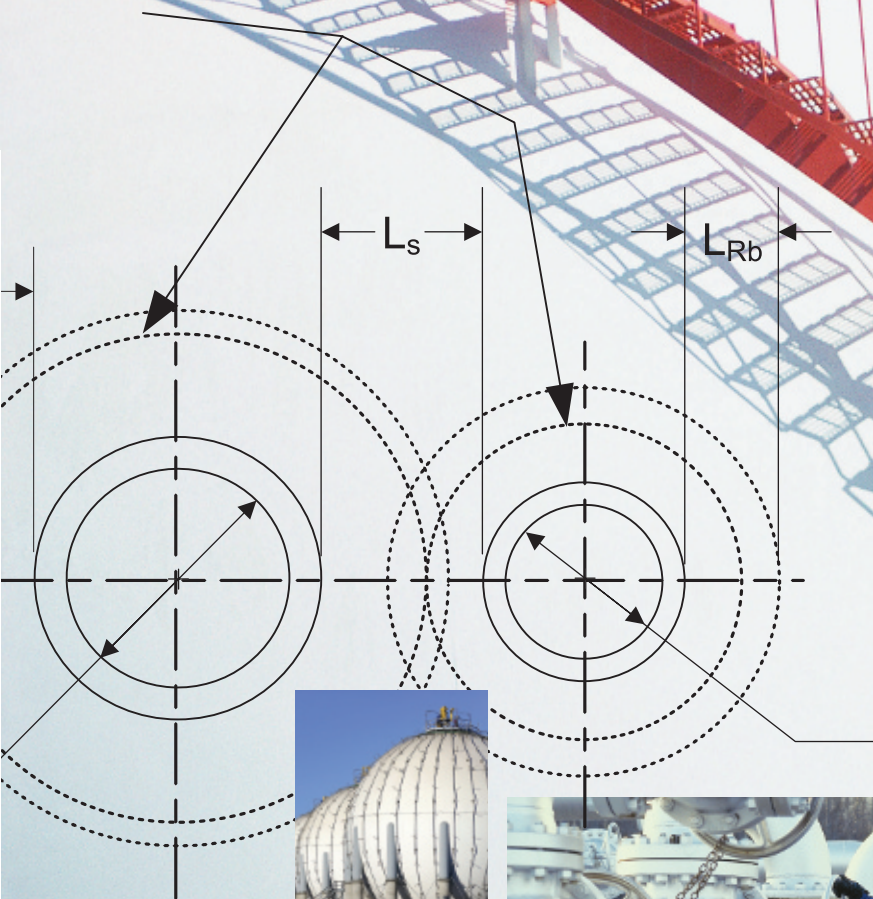
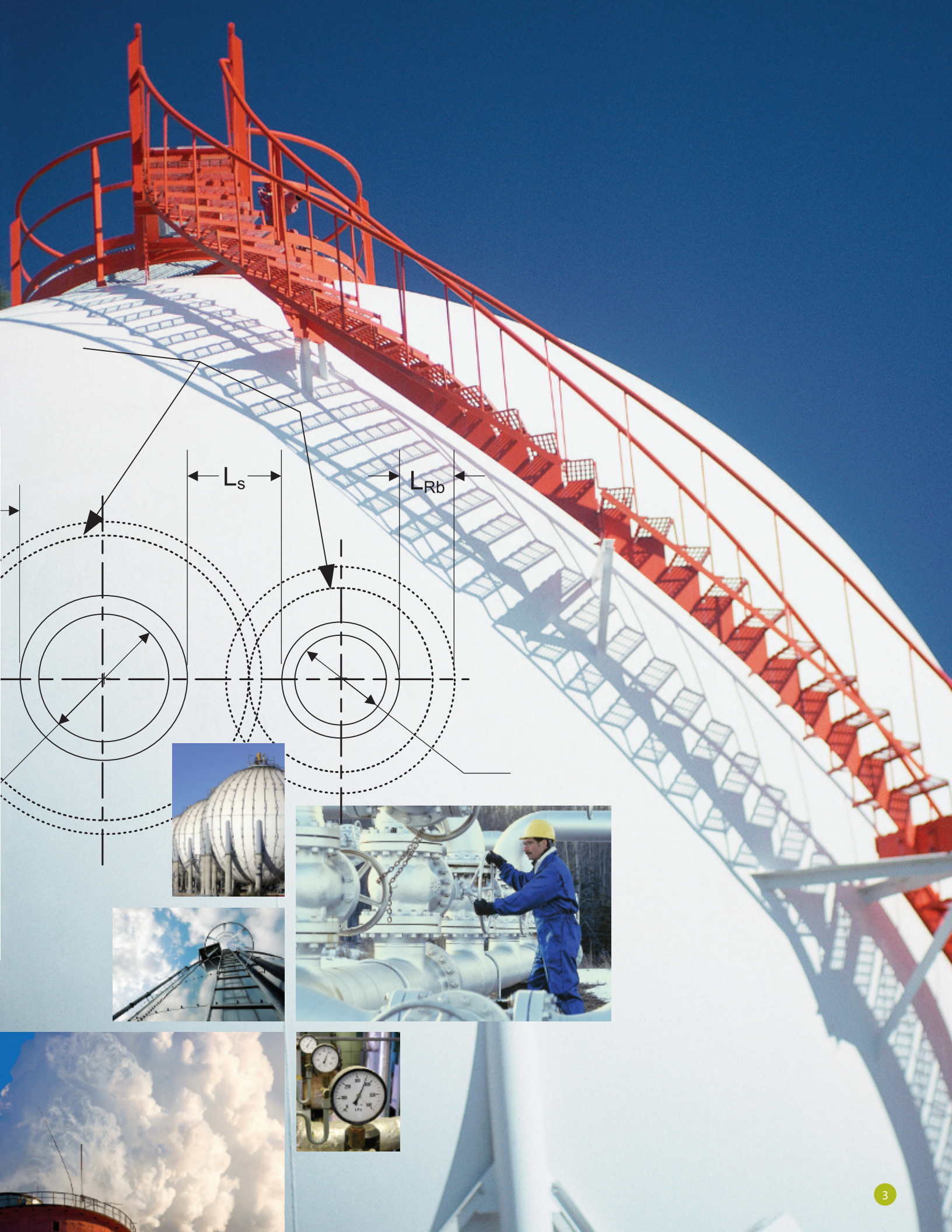
In the formulation of its rules and in the establishment of maximum design and operating pressures, the Committee considers technological advances including materials, construction, methods of fabrication, inspection, certification, and overpressure protection. The results reflect the best practices of industry, while continuing to improve safety for the general public.

*"We're helping people. We're trying to provide safe environments for people to live in."*

- Richard W. Barnes  
Senior Engineer  
Anric Enterprises, Inc.

[go.asme.org/bpvc10](http://go.asme.org/bpvc10)







## The 2010 ASME Boiler and Pressure Vessel Code with Addenda Improving Public Safety and Facilitating Global Trade

### Section I - Power Boilers

Has rules for construction of power, electric, and miniature boilers; high temperature water boilers for stationary service; and power boilers for locomotive, portable, and traction service. Spanish-language version is now available.

### Section II - Materials:

#### Section II Part A -

##### Ferrous Material Specifications

Provides material specifications for ferrous materials adequate for safety for pressure equipment. Includes requirements for mechanical properties, test specimens, and methods of testing.

#### Section II Part B -

##### Nonferrous Material Specifications

Provides material specifications for nonferrous materials adequate for safety for pressure equipment, including requirements for mechanical properties, test specimens, & methods of testing.

#### Section II Part C -

##### Specifications for Welding Rods, Electrodes and Filler Metals

Has material specifications for manufacture, acceptability, testing requirements and procedures, operating characteristics, and intended uses for welding rods, electrodes and filler metals.

#### Section II Part D - Properties (Customary)

A service Code for reference by boiler and pressure vessel construction Codes having tables of design stress, tensile and yield strength values, and tables and charts of material properties.

#### Section II Part D - Properties (Metric)

A service Code for reference by boiler and pressure vessel construction Codes having tables of design stress, tensile and yield strength values, and tables and charts of material properties.

### Section III - Rules for Construction of Nuclear Facility Components:

#### Section III Subsection NCA -

##### General Requirements for Division 1 and Division 2

Contains the glossary and rules pertaining to Duties and Responsibilities, design documentation, quality assurance, Authorized Nuclear Inspection and the use of Code symbol stamps.

#### Section III Division 1 Subsection NB - Class 1 Components

Contains requirements for assuring the structural integrity of Class 1 items - materials, design, fabrication, examination, testing and overpressure protection.

#### Section III Division 1 Subsection NC - Class 2 Components

Contains requirements for assuring the structural integrity of Class 2 items - material, design, fabrication, examination, testing and overpressure protection.

#### Section III Division 1 Subsection ND - Class 3 Components

Contains requirements for assuring the structural integrity of Class 3 items - material, design, fabrication, examination, testing and overpressure protection.

#### Section III Division 1 Subsection NE - Class MC Components

Contains requirements for assuring the structural integrity of Class MC items - material, design, fabrication, examination, testing and overpressure protection.

#### Section III Division 1 Subsection NF - Supports

Contains requirements for material, design, fabrication, and examination of metal supports designed to transmit loads from the components or piping to the building structure.

#### Section III Division 1 Subsection NG - Core Support Structures

Contains requirements for material, design, fabrication, and examination for structures that directly support or restrain the core within the reactor pressure vessel.

#### Section III Division 1 Subsection NH - Class 1 Components in Elevated Temperature Service

Contains requirements for material, design, fabrication, examination, testing and overpressure protection of Class 1 items when temperatures exceed those covered by Subsection NB.

#### Section III Division 1 - Appendices

Contains appendices, both mandatory and nonmandatory for Section III, Divisions 1 and 2, including a listing of design and design analysis methods, information, and Data Report Forms.

#### Section III Division 2 - Code for Concrete Reactor Vessels and Containments

Contains requirements for material, design, construction, fabrication, testing, examination, and overpressure protection of concrete vessels and concrete containment structures.

#### Section III Division 3 - Containment Systems and Transport Packaging for Spent Nuclear Fuel and High Level Radioactive Waste

Requirements for the design and construction of the containment system of a nuclear spent fuel or high level radioactive waste transport packaging.

#### Section III Division 5 - High Temperature Reactors

Construction rules for high-temperature reactors, including both gas-cooled reactors and liquid-metal reactors.

## **Section IV - Heating Boilers**

Provides rules for design, fabrication, installation and inspection of steam generating boilers, and low pressure hot water boilers that are directly fired by oil, gas, electricity, or coal.

## **Section V - Nondestructive Examination**

Contains radiographic, ultrasonic and liquid penetrant methods required by other Code Sections, which detect discontinuities in materials, welds, and fabricated parts and components.

## **Section VI - Recommended Rules for the Care and Operation of Heating Boilers**

Has guidelines applicable to steel and cast iron boilers within the operating range for Section IV Heating Boilers, including associated controls and automatic fuel burning equipment.

## **Section VII - Recommended Guidelines for the Care of Power Boilers**

Has guidelines applicable to stationary, portable, and traction type boilers within the operating range for Section I Power Boilers, to assist operators in maintaining plant safety.

## **Section VIII - Pressure Vessels:**

### **Section VIII Division 1**

Provides requirements for design, fabrication, inspection, testing, and certification of fired or unfired pressure vessels operating at pressures exceeding 15 psig.

### **Section VIII Division 2 – Alternative Rules**

Has requirements for construction and certification of pressure vessels operating at pressures over 15 psig using design by analysis methods, and design stresses higher than Division 1.

### **Section VIII Division 3 – Alternative Rules for the Construction of High Pressure Vessels**

Provides requirements applicable to the design, fabrication, inspection, testing, and certification of pressure vessels operating at either internal or external pressures above 10,000 psi.

## **Section IX - Welding and Brazing Qualifications**

Has rules for qualification of welding and brazing procedures and welders, brazers, and welding and brazing operators for component manufacture. Data cover variables for the process used.

## **Section X - Fiber-Reinforced Plastic Pressure Vessels**

Has requirements for construction of an FRP pressure vessel including production, processing, fabrication, inspection and testing methods required for two Classes of vessel design.

## **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 and liquid metal cooled nuclear power plants.

## **Section XII - Rules for Construction and Continued Service of Transport Tanks**

Covers construction and continued service of pressure vessels for transportation of dangerous goods by highway, rail, air or water at pressures up to 3,000 psig and volumes over 120 gallons.

## **Code Cases:**

### **Code Cases: Boilers and Pressure Vessels**

Provided when the need is urgent, such as: rules for materials or constructions not covered by existing Code rules.

### **Code Cases: Nuclear Components**

Provided when the need is urgent, such as: rules for materials or constructions not covered by existing Code rules.

For additional information and to order:

Phone: 1.800.843.2763

Email: [infocentral@asme.org](mailto:infocentral@asme.org)

Website: [go.asme.org/bpvc10](http://go.asme.org/bpvc10)

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## Build your BPVC reference library

### Master The Code...

#### Referenced BPVC Sections

Individual BPVC Sections often reference other BPVC Sections, typically:

- Section II, Parts A-B-D (Materials)
- Sections IX and II, Part C (Welding)
- Section V (Nondestructive Examination)

That's why savvy users purchase the complete BPVC and save!

#### Referenced Standards

Individual BPVC Sections often reference other ASME Standards, typically:

- B1 series (Screw Threads)
- B16 series (Valves, Flanges, Fittings, and Gaskets)
- B18 series (Fasteners)
- B31.1-2010 Power Piping
- B36 series (Steel Pipes)
- NQA-1-2008, Quality Assurance Requirements for Nuclear Facility Applications
- CSD-1-2009 Controls and Safety Devices for Automatically Fired Boilers
- PTC 25--2008 Pressure Relief Devices
- QAI-1-2010 Qualifications for Authorized Inspection

Purchasers of the complete BPVC will want to have all 36 documents readily at hand in their corporate or departmental libraries.

#### Related Standards & Guidelines

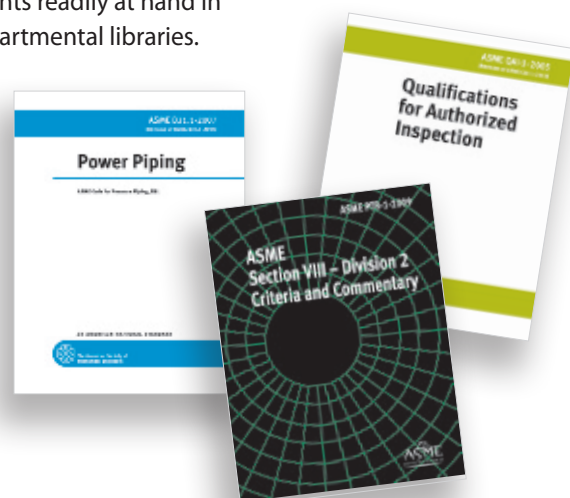
Several related ASME Standards & Guidelines have proven popular with BPVC purchasers, notably:

- B31.3-2010 Process Piping
- B31.8S-2010 Managing System Integrity of Gas Pipelines
- FFS series (Fitness-for-Service)
- PTB-1-2009 ASME Section VIII Division 2 Criteria and Commentary
- PTB-2-2009 Guide to Life Cycle Management of Pressure Equipment Integrity

These documents, plus 26 others, govern key processes common to various BPVC purchasers.

*"ASME Codes and Standards are central to the safety, the integrity, of nuclear power plant equipment."*

- J.R. Sims  
Senior Engineering Fellow  
Becht Engineering Co., Inc.



## Capitalize on BPVC career resources

### Master your Profession...

#### Training Courses

ASME offers 41 BPVC-related training courses in three convenient formats – live classes, online, and CD-ROM – including:

- Section III Fundamentals
- Section III, Division 1: Rules for Construction of Nuclear Facility Components
- Nondestructive Examination: Applying ASME Code Requirements (Section V)
- Section VIII Div. 1 Design & Fabrication of Pressure Vessels
- Section VIII, Division 2 Pressure Vessels
- Section IX Welding & Brazing Qualifications
- Section XI: In-service Inspection of Nuclear Power Plant Components
- Quality Assurance (QA) Considerations for New Nuclear Facility Construction
- API 579-1/ASME FFS-1 Fitness for Service
- B31.1 Power Piping Design and Fabrication
- B31.3 Process Piping Design

Our expert instructors typically serve on ASME code-development committees, so you gain unrivalled insight into the BPVC, along with the professional quality and real-world applications you've come to expect from ASME.

#### ASME Press Books

ASME Press enlists code-development experts to bring the BPVC to life.

- Companion Guide to the ASME Boiler & Pressure Vessel Code, Third Edition, Volumes 1, 2 & 3, edited by K.R. Rao
- Guidebook for the Design of ASME Section VIII Pressure Vessels, Third Edition, by James R. Farr and Maan H. Jawad
- Pipe Stress Engineering, by Liang-Chuan Peng and Tsen-Loong Peng

These definitive titles, plus eight others of direct BPVC relevance, provide in-depth explanations and insights for real-world problem-solving.



#### Personnel Certification

Savvy plant managers get their personnel ASME-certified:

- QFO - Certification of High Capacity Fossil Fuel Fired Plant (Boiler) Operators
- QRO - Certification for the Municipal Solid Waste Combustion Facilities Operators

They demonstrate to area regulators the proficiency of their operators to a federally-endorsed national standard, while benchmarking their own training processes for optimal effectiveness.

To learn more and apply, visit:

[www.asme.org/kb/standards/certification-accreditation/personnel-certification](http://www.asme.org/kb/standards/certification-accreditation/personnel-certification)

## Keep current with BPVC developments

### Master your Industry...

#### Journals

ASME maintains the premier, peer-reviewed journals on three topics of direct BPVC relevance:

- Journal of Pressure Vessel Technology
- Journal of Engineering for Gas Turbines and Power
- Journal of Turbomachinery

These titles present the highest-quality research and interpretative reports in their fields.

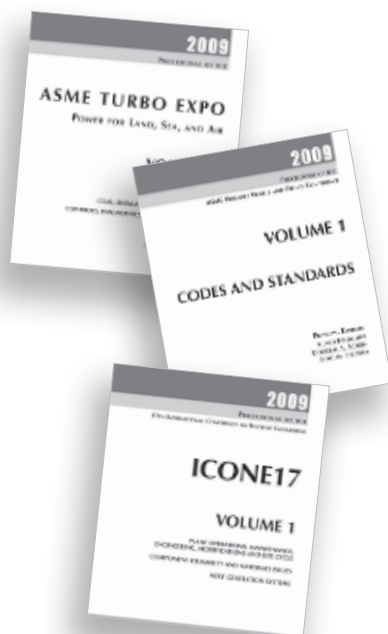


#### Conferences & Related Proceedings

ASME produces three international events popular among various BPVC users:

- ASME Pressure Vessels and Piping Conference (PVP)
- ICONE - International Conference on Nuclear Engineering
- ASME Turbo Expo: Power for Land, Sea and Air

Unable to attend? Then purchase the printed proceedings from recent or past conferences.



#### ASME Standards Technology, LLC

Thanks to ASME Standards Technology, LLC, an independent research-and-development arm, code-development can now proceed in tandem with emerging technologies – thus assisting in commercialization.

- STP-PT-006 Design Guidelines for Hydrogen Piping and Pipelines
- STP-PT-011 Integrity Management of Stress Corrosion Cracking in Gas Pipeline High Consequence Areas
- STP-PT-002 ASME Section I Power Boilers - PED Guide: Supplement to Guide for ASME Stamp Holders Use of Section I to Meet EC Pressure Equipment Directive (97/23/EC)

These documents, plus others, present twenty-four BPVC-related projects on the cutting edge.

For additional information and to order:

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New York, NY  
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## 2010 ASME Boiler and Pressure Vessel Code with Addenda

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# ASME guides you through The Code....

This third edition of the *Companion Guide to the ASME Boiler and Pressure Vessel Code*, Volumes 1, 2 and 3, edited by K.R. Rao, has been updated to the 2007 ASME BPVC. Since the first edition, a total of 140 authors have contributed to this publication; in this edition there are 107 contributors drawn from around the world, including 51 new authors.

The first two volumes covering BPVC Sections I through XI address organizational changes of ASME BPVC Committees and special topics relating to the application of the BPVC. Volume 1 covers BPVC Sections I through VII, B31.1 and B31.3 piping codes. Volume 2 has chapters addressing BPVC Sections VIII through XI, refurbished with additional code material consistent with the 2007 BPVC. Notable updates included in this volume relate to maintenance rule, accreditation, dynamic loads, functionality, operability criteria, fluids, pipe vibration analysis, code design and evaluation for cyclic loading for BPVC Sections III and VIII.

Volume 3 addresses BPVC Section XII and issues for the success of current and the next generation of Nuclear Reactors and Internals, License Renewal, Public Safety, PRA and Spent Fuel Pool-related issues. The impact of globalization and inter-dependency of ASME B and PV Codes is recognized in this volume, by inclusion of several countries that own and operate nuclear reactors or have nuclear steam supply vendors and fabricators that use BPVC Sections I through XII.



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