

ASME PTB-9-2014

ASME Pipeline Standards Compendium

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ASME PIPELINE STANDARDS COMPENDIUM



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FOREWORD

Established in 1880, The American Society of Mechanical Engineers (ASME) is a professional not-for-profit organization with more than 135,000 members and volunteers promoting the art, science and practice of mechanical and multidisciplinary engineering and allied sciences. ASME develops codes and standards that enhance public safety, and provides lifelong learning and technical exchange opportunities benefiting the engineering and technology community. Visit www.asme.org for more information.

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1 INTRODUCTION

This compendium describes each ASME standard referenced in 49 of the Code of Federal Regulations (CFR) Part 192, 49 CFR Part 193, and 49 CFR Part 195. For each 49 CFR Part the referenced ASME standard will be identified and, in the case of ASME B31.8S and certain other ASME standards, the relevant text will be included in this compendium.

It is intended that the reader of this compendium document will be initially reviewing the federal pipeline safety regulations and then reviewing the referenced ASME standard. This compendium document has been structured to facilitate this usage pattern.

ASME pressure technology codes and standards are used in numerous applications across various industrial sectors. This compendium is intended to aggregate those pressure-related requirements applicable to United States federal pipeline safety regulations where ASME standards are referenced, i.e., 49 CFR Part 192, “Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards,” 49 CFR Part 193, “Liquefied Natural Gas Facilities: Federal Safety Standards,” and 49 CFR Part 195, “Transportation of Hazardous Liquids by Pipeline.”

This compendium is not intended to be a complete standard covering all aspects of piping safety, including design, fabrication, installation, inspection and maintenance and should not be considered a substitution for the application of sound engineering judgment. Readers are encouraged to refer to the current version of the applicable ASME standard.

References for ASME Standards and Codes within this compendium use the versions listed in Figure 1-1.

Figure 1-1: Summary of Referenced Standards

Designator	Title	Year
ASME B16.1	Gray Iron Pipe Flanges and Flanged Fittings: (Classes 25, 125, and 250)	2010
ASME B16.5	Pipe Flanges and Flanged Fittings	2013
ASME B16.9	Factory-Made Wrought Butt-welding Fittings	2012
ASME B31G	Manual for Determining the Remaining Strength of Corroded Pipelines.	2012
ASME B31.4	Pipeline Transportation Systems for Liquids and Slurries	2012
ASME B31.8	Gas Transmission and Distribution Piping Systems	2012
ASME B31.8S	Supplement to B31.8 on Managing System Integrity of Gas Pipelines.	2012
ASME BPVC	Boiler & Pressure Vessel Code, Section I, Rules for Construction of Power Boilers	2013
ASME BPVC	Boiler & Pressure Vessel Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels	2013
ASME BPVC	Boiler & Pressure Vessel Code, Section VIII, Division 2, Alternative Rules, Rules for Construction of Pressure Vessels	2013
ASME BPVC	Boiler & Pressure Vessel Code, Section IX, Welding, Brazing, and Fusing Qualifications	2013

2 49 CFR 192 – TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS

2.1 Design of Pipeline Components

2.1.1 CFR Reference: 192.147 Flanges and Flange Accessories

2.1.1.1 CFR Language: 192.147(a)

Each flange or flange accessory (other than cast iron) must meet the minimum requirements of ASME/ANSI B16.5, MSS SP-44, or the equivalent.

2.1.1.2 ASME Standard Reference

The CFR references ASME B16.5 “Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard”, in its entirety.

2.1.1.3 CFR Language: 192.147(c)

Each flange on a flanged joint in cast iron pipe must conform in dimensions, drilling, face and gasket design to ASME/ANSI B16.1 and be cast integrally with the pipe, valve, or fitting.

2.1.1.4 ASME Standard Reference

The CFR references ASME B16.1 “Gray Iron Pipe Flanges and Flanged Fittings: (Classes 25, 125, and 250)” in its entirety.

2.1.2 CFR Reference: 192.153 Components Fabricated by Welding

2.1.2.1 CFR Language: 192.153(a)

(a) Except for branch connections and assemblies of standard pipe and fittings joined by circumferential welds, the design pressure of each component fabricated by welding, whose strength cannot be determined, must be established in accordance with paragraph UG-101 of Section VIII, Division 1, of the ASME Boiler and Pressure Vessel Code.

2.1.2.2 ASME Standard Reference

The CFR references ASME Boiler & Pressure Vessel Code, Section VIII, Division I, “Rules for Construction of Pressure Vessels”, paragraph UG-101.

2.1.2.3 CFR Language: 192.153(b)

(b) Each prefabricated unit that uses plate and longitudinal seams must be designed, constructed, and tested in accordance with Section I, Section VIII, Division 1, or Section VIII, Division 2 of the ASME Boiler and Pressure Vessel Code, except for the following:

- (1) Regularly manufactured butt-welding fittings.
- (2) Pipe that has been produced and tested under a specification listed in appendix B to this part.
- (3) Partial assemblies such as split rings or collars.
- (4) Prefabricated units that the manufacturer certifies have been tested to at least twice the maximum pressure to which they will be subjected under the anticipated operating conditions.

2.1.2.4 ASME Standard Reference

The CFR references ASME Boiler & Pressure Vessel Code, Section VIII, Division I, “Rules for Construction of Pressure Vessels” in its entirety and ASME Boiler & Pressure Vessel Code, Section VIII, Division 2, “Alternative Rules, Rules for Construction of Pressure Vessels” in its entirety.

2.1.2.5 CFR Language: 192.153(d)

(d) Except for flat closures designed in accordance with Section VIII of the ASME Boiler and Pressure Code, flat closures and fish tails may not be used on pipe that either operates at 100 psi (689 kPa) gage, or more, or is more than 3 inches (76 millimeters) nominal diameter.

2.1.2.6 ASME Standard Reference

The CFR references ASME Boiler & Pressure Vessel Code, Section VIII, Division I, “Rules for Construction of Pressure Vessels” in its entirety and ASME Boiler & Pressure Vessel Code, Section VIII, Division 2, “Alternative Rules, Rules for Construction of Pressure Vessels” in its entirety.

2.1.3 CFR Reference: 192.165 Compressor Stations: Liquid Removal

2.1.3.1 CFR Language: 192.165(b)(3)

(b) Each liquid separator used to remove entrained liquids at a compressor station must:

- (3) Be manufactured in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code, except that liquid separators constructed of pipe and fittings without internal welding must be fabricated with a design factor of 0.4, or less.

2.1.3.2 ASME Standard Reference

The CFR references ASME Boiler & Pressure Vessel Code, Section VIII, Division I, “Rules for Construction of Pressure Vessels” in its entirety and ASME Boiler & Pressure Vessel Code, Section VIII, Division 2, “Alternative Rules, Rules for Construction of Pressure Vessels” in its entirety.

2.2 Welding of Steel in Pipelines

2.2.1 CFR Reference: 192.227 Qualification of Welders

2.2.1.1 CFR Language: 192.227(a)

(a) Except as provided in paragraph (b) of this section, each welder must be qualified in accordance with Section 6 of API 1104 (incorporated by reference, see 192.7) or Section IX of the ASME Boiler and Pressure Vessel Code (incorporated by reference, see 192.7). However, a welder qualified under an earlier edition than listed in 192.7 of this part may weld but may not requalify under that earlier edition.

2.2.1.2 ASME Standard Reference

The CFR references ASME Boiler & Pressure Vessel Code, Section IX, “Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators” in its entirety.

2.3 Joining of Materials Other Than by Welding

2.3.1 CFR Reference: 192.279 Copper Pipe

2.3.1.1 CFR Language: 192.279

Copper pipe may not be threaded except that copper pipe used for joining screw fittings or valves may be threaded if the wall thickness is equivalent to the comparable size of Schedule 40 or heavier wall pipe listed in Table C1 of ASME/ANSI B16.5.

2.3.1.2 ASME Standard Language

The CFR references ASME B16.5 “Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard”. For user convenience, Table C1 of ASME B16.5 has been included as Figure 2-1.

Figure 2-1: Flange Bolting Dimensional Recommendations (B16.5 – Table C1)

Product	Carbon Steel [Note (1)]	Alloy Steel
Stud bolts	ASME B18.2.1	ASME B18.2.1
Bolts smaller than ¾ in.	ASME B18.2.1, square or heavy hex head	ASME B18.2.1, heavy hex head
Bolts equal to or larger than ¾ in.	ASME B18.2.1, square or heavy hex head	ASME B18.2.1, heavy hex head
Nuts smaller than ¾ in.	ASME B18.2.2, heavy hex	ASME B18.2.2, heavy hex
Nuts equal to or larger than ¾ in.	ASME B18.2.2, hex or heavy hex	ASME B18.2.2, heavy hex
External threads	ASME B1.1, Cl. 2A coarse series	ASME B1.1, Cl. 2A coarse series up through 1 in.; eight thread series or larger bolts
Internal threads	ASME B1.1, Cl. 2B coarse series	ASME B1.1, Cl. 2B coarse series up through 1 in.; eight thread series for larger bolts

NOTE:

(1) When B18.2.1 bolting is used, it should be threaded as close to the head as applicable to continuous and double-end stud bolts.

2.4 Requirements for Corrosion Control

2.4.1 CFR Reference: 192.485 Remedial Measures: Transmission Lines

2.4.1.1 CFR Language: 192.485(c)

Under paragraphs (a) and (b) of this section, the strength of pipe based on actual remaining wall thickness may be determined by the procedure in ASME/ANSI B31G or the procedure in AGA Pipeline Research Committee Project PR 3-805 (with RSTRENG disk). Both procedures apply to corroded regions that do not penetrate the pipe wall, subject to the limitations prescribed in the procedures.

2.4.1.2 ASME Standard Reference

The CFR references ASME B31G “Manual for Determining the Remaining Strength of Corroded Pipelines” in its entirety.