

ASME B31.1-2020
(Revision of ASME B31.1-2018)

Power Piping

ASME Code for Pressure Piping, B31

AN INTERNATIONAL PIPING CODE®



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Mechanical Engineers**

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**The American Society of
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: September 30, 2020

The next edition of this Code is scheduled for publication in 2022. This Code will become effective 6 months after the Date of Issuance.

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CONTENTS

Foreword	ix
Committee Roster	x
Introduction	xiii
Summary of Changes	xvi
Chapter I	Scope and Definitions 1
100	General 1
Chapter II	Design 16
Part 1	Conditions and Criteria 16
101	Design Conditions 16
102	Design Criteria 18
Part 2	Pressure Design of Piping Components 23
103	Criteria for Pressure Design of Piping Components 23
104	Pressure Design of Components 25
Part 3	Selection and Limitations of Piping Components 38
105	Pipe 38
106	Fittings, Bends, and Intersections 39
107	Valves 40
108	Pipe Flanges, Blanks, Flange Facings, Gaskets, and Bolting 41
Part 4	Selection and Limitations of Piping Joints 42
110	Piping Joints 42
111	Welded Joints 42
112	Flanged Joints 42
113	Expanded or Rolled Joints 42
114	Threaded Joints 42
115	Flared, Flareless, and Compression Joints, and Unions 46
116	Bell End Joints 47
117	Brazed and Soldered Joints 47
118	Sleeve Coupled and Other Proprietary Joints 47
Part 5	Expansion, Flexibility, and Pipe-Supporting Elements 47
119	Expansion and Flexibility 47
120	Loads on Pipe-Supporting Elements 50
121	Design of Pipe-Supporting Elements 51
Part 6	Systems 54
122	Design Requirements Pertaining to Specific Piping Systems 54
Chapter III	Materials 69
123	General Requirements 69
124	Limitations on Materials 70
125	Creep Strength Enhanced Ferritic Materials 72

Chapter IV	Reference Specifications, Codes, and Standards	74
126	Specifications and Standards for Standard and Nonstandard Piping Components	74
Chapter V	Fabrication, Assembly, and Erection	83
127	Welding	83
128	Brazing and Soldering	91
129	Bending and Forming	94
130	Requirements for Fabricating and Attaching Pipe Supports	98
131	Welding Preheat	98
132	Postweld Heat Treatment	100
133	Stamping	105
135	Assembly	105
Chapter VI	Inspection, Examination, and Testing	107
136	Inspection and Examination	107
137	Pressure Tests	112
Chapter VII	Operation and Maintenance	116
138	General	116
139	Operation and Maintenance Procedures	116
140	Condition Assessment of CPS	116
141	CPS Records	117
142	Piping and Pipe-Support Maintenance Program and Personnel Requirements	118
143	Repair of CPS	118
144	CPS Walkdowns	118
145	Material Degradation Mechanisms	118
146	Dynamic Loading	118
149	Rerating Piping Systems	119
 Mandatory Appendices		
A	Allowable Stress Tables	120
B	Thermal Expansion Data	233
C	Moduli of Elasticity	243
D	Flexibility and Stress Intensification Factors	251
F	Referenced Standards	259
G	Nomenclature	263
H	Preparation of Technical Inquiries	269
N	Rules for Nonmetallic Piping and Piping Lined With Nonmetals	270
O	Use of Alternative Ultrasonic Acceptance Criteria	301
P	Metallic Bellows Expansion Joints	304
 Nonmandatory Appendices		
II	Rules for the Design of Safety Valve Installations	308
IV	Corrosion Control for ASME B31.1 Power Piping Systems	329
V	Recommended Practice for Operation, Maintenance, and Modification of Power Piping Systems	333
VII	Procedures for the Design of Restrained Underground Piping	347
VIII	Guidelines for Determining If Low-Temperature Service Requirements Apply	358

Figures

100.1.2-1	Code Jurisdictional Limits for Piping — An Example of Forced-Flow Steam Generators With No Fixed Steam and Waterline	2
100.1.2-2	Code Jurisdictional Limits for Piping — An Example of Steam Separator Type Forced-Flow Steam Generators With No Fixed Steam and Waterline	3
100.1.2-3	Code Jurisdictional Limits for Piping — Drum-Type Boilers	4
100.1.2-4	Code Jurisdictional Limits for Piping — Isolable Economizers Located in Feedwater Piping and Isolable Superheaters in Main Steam Piping (Boiler Pressure Relief Valves, Blowoff, and Miscellaneous Piping for Boiler Proper Not Shown for Clarity)	5
100.1.2-5	Code Jurisdictional Limits for Piping — Reheaters and Nonintegral Separately Fired Superheaters	6
100.1.2-6	Code Jurisdictional Limits for Piping — Spray-Type Desuperheater	7
100.1.2-7	Code Jurisdictional Limits for Piping — HRSG — Desuperheater Protection Devices	8
100.1.2-8	Code Jurisdictional Limits for Piping — Firetube Boiler	9
102.4.5-1	Nomenclature for Pipe Bends	22
104.3.1-1	Reinforcement of Branch Connections	29
104.3.1-2	Reinforced Extruded Outlets	32
104.5.3-1	Types of Permanent Blanks	36
104.8-1	Equations (15), (16), and (17)	37
104.8.4-1	Cross Section Resultant Moment Loading	38
122.1.7-1	Typical Globe Valves	58
122.4-1	Desuperheater Schematic Arrangement	63
127.3-1	Butt Welding of Piping Components With Internal Misalignment	84
127.4.2-1	Welding End Transition — Maximum Envelope	86
127.4.4-1	Fillet Weld Size	88
127.4.4-2	Welding Details for Slip-On and Socket-Welding Flanges; Some Acceptable Types of Flange Attachment Welds	89
127.4.4-3	Minimum Welding Dimensions Required for Socket Welding Components Other Than Flanges	89
127.4.8-1	Typical Welded Branch Connection Without Additional Reinforcement	89
127.4.8-2	Typical Welded Branch Connection With Additional Reinforcement	89
127.4.8-3	Typical Welded Angular Branch Connection Without Additional Reinforcement	90
127.4.8-4	Some Acceptable Types of Welded Branch Attachment Details Showing Minimum Acceptable Welds	91
127.4.8-5	Some Acceptable Details for Integrally Reinforced Outlet Fittings	92
127.4.8-6	Typical Full Penetration Weld Branch Connections for NPS 3 (DN 80) and Smaller Half Couplings or Adapters	93
127.4.8-7	Typical Partial Penetration Weld Branch Connection for NPS 2 (DN 50) and Smaller Fittings	94
135.5.3-1	Typical Threaded Joints Using Straight Threads	106
D-1	Branch Connection Dimensions	256
D-2	Flexibility Factor, <i>k</i> , and Stress Intensification Factor, <i>i</i>	257
D-3	Correction Factor, <i>c</i>	258
N-100.2.1-1	Winding Angle of Filament-Wound Thermosetting Resin Pipe	273
N-102.3.1-1	Typical Allowable Stress Curve for Filament-Wound Reinforced Thermosetting Resin Pipe	280
N-127.7.1-1	Solvent-Cemented Joint	295
N-127.7.2-1	Heat Fusion Joints	296

N-127.7.3-1	Thermoplastic Electrofusion Joints	296
N-127.8.1-1	Thermosetting Resin Joints	297
O-8-1	Surface and Subsurface Indications	302
II-1.2-1	Safety Valve Installation (Closed Discharge System)	309
II-1.2-2	Safety Valve Installation (Open Discharge System)	310
II-2.2.1-1	Discharge Elbow (Open Discharge Installation)	312
II-2.2.1-2	Compressible Flow Analysis	313
II-2.2.1-3	Vent Pipe (Open Discharge Installation)	314
II-3.5.1.3-1	Safety Valve Installation (Open Discharge System)	318
II-3.5.1.3-2	Dynamic Load Factors for Open Discharge System	319
II-6-1	Examples of Safety Valve Installations	322
II-7-1	Sample Problem Figure 1	323
II-7-2	Sample Problem Figure 2	324
II-7.1.9-1	Sample Problem Figure 3	328
V-13.1.2-1	Effect of Various Steady Operating Temperatures on Time to Failure Due to Creep	344
VII-3.3.2-1	Element Category A, Elbow or Bend	351
VII-3.3.2-2	Element Category B, Branch Pipe Joining the P Leg	351
VII-3.3.2-3	Element Category C, Tee on End of P Leg	351
VII-3.3.2-4	Element Category D, Straight Pipe	351
VII-5-1	Plan of Example Buried Pipe	353
VII-6.4.4-1	Computer Model of Example Pipe	357
VII-6.6-1	Example Plan of Element 1 as a Category D Element	357

Tables

102.4.3-1	Longitudinal Weld Joint Efficiency Factors	21
102.4.5-1	Bend Thinning Allowance	21
102.4.6-1	Maximum Severity Level for Casting Thickness $4^{1/2}$ in. (114 mm) or Less	22
102.4.6-2	Maximum Severity Level for Casting Thickness Greater Than $4^{1/2}$ in. (114 mm)	23
102.4.7-1	Weld Strength Reduction Factors (WSRFs) to Be Applied When Calculating the Minimum Wall Thickness or Allowable Design Pressure of Components Fabricated With a Longitudinal Seam Fusion Weld	24
104.1.2-1	Values of y	26
112-1	Piping Flange Bolting, Facing, and Gasket Requirements (Refer to Paras. 108, 110, and 112)	43
114.2.1-1	Threaded Joints Limitations	46
121.5-1	Suggested Steel Pipe-Support Spacing	52
121.7.2-1	Carrying Capacity of Threaded ASTM A36, ASTM A575, and ASTM A576 Hot-Rolled Carbon Steel	53
122.2-1	Design Pressure for Blowoff/Blowdown Piping Downstream of BEP Valves	60
122.8.2-1	Minimum Wall Thickness Requirements for Toxic Fluid Piping	66
126.1-1	Specifications and Standards	75
127.4.2-1	Reinforcement of Girth and Longitudinal Butt Welds	87
129.3.1-1	Approximate Lower Critical Temperatures	95
129.3.3.1-1	Post-Cold-Forming Strain Limits and Heat Treatment Requirements for Creep Strength Enhanced Ferritic Steels	96
129.3.4.1-1	Post-Cold-Forming Strain Limits and Heat Treatment Requirements for Austenitic Materials and Nickel Alloys	97

131.4.1-1	Preheat Temperatures	99
132.1.1-1	Postweld Heat Treatment	101
132.1.1-2	Alternate Postweld Heat Treatment Requirements for Carbon and Low Alloy Steels, P-Nos. 1 and 3	102
132.1.3-1	Postweld Heat Treatment of P36/F36	102
132.2-1	Exemptions to Mandatory Postweld Heat Treatment	103
136.4.1-1	Mandatory Minimum Nondestructive Examinations for Pressure Welds or Welds to Pressure-Retaining Components	109
136.4.1-2	Weld Imperfections Indicated by Various Types of Examination	110
A-1	Carbon Steel	122
A-2	Low and Intermediate Alloy Steel	134
A-3	Stainless Steels	146
A-4	Nickel and High Nickel Alloys	180
A-5	Cast Iron	194
A-6	Copper and Copper Alloys	198
A-7	Aluminum and Aluminum Alloys	204
A-8	Temperatures 1,200°F and Above	214
A-9	Titanium and Titanium Alloys	222
A-10	Bolts, Nuts, and Studs	226
B-1	Thermal Expansion Data	234
B-1 (SI)	Thermal Expansion Data	238
C-1	Moduli of Elasticity for Ferrous Material	244
C-1 (SI)	Moduli of Elasticity for Ferrous Material	245
C-2	Moduli of Elasticity for Nonferrous Material	246
C-2 (SI)	Moduli of Elasticity for Nonferrous Material	248
D-1	Flexibility and Stress Intensification Factors	252
N-102.2.1-1	Hydrostatic Design Stresses (HDS) and Recommended Temperature Limits for Thermoplastic Piping Components	275
N-102.2.1-2	Design Stresses (DS) and Recommended Temperature Limits for Laminated Reinforced Thermosetting Resin Piping Components	277
N-102.2.1-3	Hydrostatic Design Basis (HDB) for Machine-Made Reinforced Thermosetting Resin Pipe	278
N-119.6.1-1	Thermal Expansion Coefficients, Nonmetals	286
N-119.6.2-1	Modulus of Elasticity, Nonmetals	287
N-126.1-1	Nonmetallic Material and Product Standards	292
N-136.4.1-1	Acceptance Criteria for Bonds	300
O-9-1	Discontinuity Acceptance Criteria for Weld Thickness Under 1.0 in. (25 mm)	303
O-9-2	Surface Discontinuity Acceptance Criteria for Weld Thickness 1.0 in. (25 mm) and Over	303
O-9-3	Subsurface Discontinuity Acceptance Criteria for Weld Thickness 1.0 in. (25 mm) and Over	303
II-2.2.1-1	Values of <i>a</i> and <i>b</i>	312
IV-5.2-1	Flow-Accelerated Corrosion Rates	331
VII-3.2.3-1	Approximate Safe Working Values of C_D for Use in Modified Marston Formula	350
VII-6.3-1	Equations for Calculating Effective Length L' or L''	355
VIII-1	Low-Temperature Service Requirements by Material Group	359
VIII-2	Material Groupings by Material Specification	361

Forms

V-7.5-1	Piping System Support Design Details	338
V-7.5-2	Hot Walkdown of Piping System Supports	339
V-7.5-3	Cold Walkdown of Piping System Supports	340

FOREWORD

The general philosophy underlying this Power Piping Code is to parallel those provisions of Section I, Power Boilers, of the ASME Boiler and Pressure Vessel Code, as they can be applied to power piping systems. The allowable stress values for power piping are generally consistent with those assigned for power boilers. This Code is more conservative than some other piping codes, reflecting the need for long service life and maximum reliability in power plant installations.

The Power Piping Code as currently written does not differentiate among the design, fabrication, and erection requirements for critical and noncritical piping systems, except for certain stress calculations and mandatory nondestructive tests of welds for heavy wall, high-temperature applications. The problem involved is to try to reach agreement on how to evaluate criticality, and to avoid the inference that noncritical systems do not require competence in design, fabrication, and erection. Someday such levels of quality may be definable, so that the need for the many different piping codes will be overcome.

There are many instances where the Code serves to warn a designer, fabricator, or erector against possible pitfalls; however, the Code is not a handbook and cannot substitute for education, experience, and sound engineering judgment.

Nonmandatory Appendices are included in the Code. Each contains information on a specific subject, and is maintained current with the Code. Although written in mandatory language, these Appendices are offered for application at the user's discretion.

The Code never intentionally puts a ceiling limit on conservatism. A designer is free to specify more-rigid requirements as he/she feels they may be justified. Conversely, a designer who is capable of applying a more complete and rigorous analysis consistent with the design criteria of this Code may justify a method different from that specified in the Code, and still satisfy the Code requirements.

The Power Piping Committee strives to keep abreast of the current technological improvements in new materials, fabrication practices, and testing techniques; and endeavors to keep the Code updated to permit the use of acceptable new developments.

The 2020 edition of ASME B31.1 was approved by the American National Standards Institute on June 10, 2020.

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Code for Pressure Piping

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INTRODUCTION

(20)

The ASME B31 Code for Pressure Piping consists of a number of individually published Sections, each an American National Standard, under the direction of ASME Committee B31, Code for Pressure Piping.

Rules for each Section have been developed considering the need for application of specific requirements for various types of pressure piping. Applications considered for each Code Section include

- B31.1 Power Piping: piping typically found in electric power generating stations, industrial and institutional plants, geothermal heating systems, and central and district heating and cooling systems
- B31.3 Process Piping: piping typically found in petroleum refineries; onshore and offshore petroleum and natural gas production facilities; chemical, pharmaceutical, textile, paper, ore-processing, semiconductor, and cryogenic plants; food- and beverage-processing facilities, and related processing plants and terminals
- B31.4 Pipeline Transportation Systems for Liquids and Slurries: piping transporting products that are predominately liquid between plants and terminals, and within terminals and pumping, regulating, and metering stations
- B31.5 Refrigeration Piping and Heat Transfer Components: piping for refrigerants and secondary coolants
- B31.8 Gas Transmission and Distribution Piping Systems: piping transporting products that are predominately gas between sources and terminals, including compressor, regulating, and metering stations; and gas gathering pipelines
- B31.9 Building Services Piping: piping typically found in industrial, institutional, commercial, and public buildings, and in multi-unit residences, which does not require the range of sizes, pressures, and temperatures covered in ASME B31.1
- B31.12 Hydrogen Piping and Pipelines: piping in gaseous and liquid hydrogen service, and pipelines in gaseous hydrogen service

This is the B31.1 Power Piping Code Section. Hereafter, in this Introduction and in the text of this Code Section B31.1, where the word *Code* is used without specific identification, it means this Code Section.

It is the owner's responsibility to select the Code Section that most nearly applies to a proposed piping installation. Factors to be considered by the owner include limitations of the Code Section, jurisdictional requirements, and the applicability of other codes and standards. All applicable requirements of the selected Code Section shall be met. For some installations, more than one Code Section may apply to different parts of the installation. The owner is also responsible for imposing requirements supplementary to those of the selected Code Section, if necessary, to assure safe piping for the proposed installation.

Certain piping within a facility may be subject to other codes and standards, including but not limited to

- ASME Boiler and Pressure Vessel Code, Section III: nuclear power piping
- ANSI Z223.1/NFPA 54 National Fuel Gas Code: piping for fuel gas from the point of delivery to the connection of each fuel utilization device
- NFPA Fire Protection Standards: fire protection systems using water, carbon dioxide, halon, foam, dry chemicals, and wet chemicals
- NFPA 85 Boiler and Combustion Systems Hazards Code
- building and plumbing codes, as applicable, for potable hot and cold water, and for sewer and drain systems

The Code specifies engineering requirements deemed necessary for safe design, construction, operation, and maintenance of pressure piping. While safety is the overriding consideration, this factor alone will not necessarily govern the final specifications for any piping installation or operation. The Code is not a design handbook. Many decisions that must be made to produce a safe piping installation and to maintain system integrity are not specified in detail within this Code. The Code does not serve as a substitute for sound engineering judgment by the owner and the designer.

To the greatest possible extent, Code requirements for design are stated in terms of basic design principles and formulas. These are supplemented as necessary with specific requirements to ensure uniform application of principles and to guide selection and application of piping elements. The Code prohibits designs and practices known to be unsafe and contains warnings where caution, but not prohibition, is warranted.

The Code generally specifies a simplified approach for many of its requirements.

For design and construction, a designer may choose to use a more rigorous analysis to develop design and construction requirements. When the designer decides to take this approach, the designer shall provide to the owner details and calculations demonstrating that design, construction, examination, and testing are consistent with the criteria of the Code. These details shall be adequate for the owner to verify the validity of the approach and shall be approved by the owner. The details shall be documented in the engineering design.

For operation and maintenance, an owner may choose to use a more rigorous approach to develop operation and maintenance requirements. When the owner decides to take this approach, the owner shall provide details and calculations demonstrating that such alternative practices are consistent with the general philosophy of the Code. The details shall be documented in the operating records and retained for the lifetime of the facility.

This Code Section includes the following:

(a) references to acceptable material specifications and component standards, including dimensional requirements and pressure-temperature ratings

(b) requirements for design of components and assemblies, including pipe supports

(c) requirements and data for evaluation and limitation of stresses, reactions, and movements associated with pressure, temperature changes, and other forces

(d) guidance and limitations on the selection and application of materials, components, and joining methods

(e) requirements for the fabrication, assembly, and erection of piping

(f) requirements for examination, inspection, and testing of piping

(g) requirements for operation and maintenance of piping systems

Either U.S. Customary (USC) or International System (SI, also known as metric) units may be used with this edition. Local customary units may also be used to demonstrate compliance with this Code. One system of units should be used consistently for requirements applying to a specific installation. It is the responsibility of the organization performing calculations to ensure that a consistent system of units is used.

It is intended that this edition of Code Section B31.1 not be retroactive. Unless agreement is specifically made between contracting parties to use another edition, or the regulatory body having jurisdiction imposes the use of another edition, the latest edition issued at least 6 months prior to the original contract date for the first phase of activity covering a piping system or systems shall be the governing document for all design, materials, fabrication, erection, examination, and testing for the piping until the completion of the work and initial operation.

Users of this Code are cautioned against making use of revisions without assurance that they are acceptable to the proper authorities in the jurisdiction where the piping is to be installed.

Code users will note that clauses in the Code are not necessarily numbered consecutively. Such discontinuities result from following a common outline, insofar as practicable, for all Code Sections. In this way, corresponding material is correspondingly numbered in most Code Sections, thus facilitating reference by those who have occasion to use more than one Section.

The Code is under the direction of ASME Committee B31, Code for Pressure Piping, which is organized and operates under procedures of The American Society of Mechanical Engineers that have been accredited by the American National Standards Institute. The Committee is a continuing one, and keeps all Code Sections current with new developments in materials, construction, and industrial practice. New editions are published at intervals of two to five years.

When no Section of the ASME Code for Pressure Piping specifically covers a piping system, at the user's discretion, he/she may select any Section determined to be generally applicable. However, it is cautioned that supplementary requirements to the Section chosen may be necessary to provide for a safe piping system for the intended application. Technical limitations of the various Sections, legal requirements, and possible applicability of other codes or standards are some of the factors to be considered by the user in determining the applicability of any Section of this Code.

The Committee has established an orderly procedure to consider requests for interpretation and revision of Code requirements. To receive consideration, inquiries must be in writing and must give full particulars (see [Mandatory Appendix H](#) covering preparation of technical inquiries). The Committee will not respond to inquiries requesting assignment of a Code Section to a piping installation.

The approved reply to an inquiry will be sent directly to the inquirer. In addition, the question and reply will be published on the ASME Interpretation Database.

A Case is the prescribed form of reply to an inquiry when study indicates that the Code wording needs clarification or when the reply modifies existing requirements of the Code or grants permission to use new materials or alternative constructions. The Case will be published on the B31.1 web page at <http://cstools.asme.org/>.

The ASME B31 Standards Committee took action to eliminate Code Case expiration dates effective September 21, 2007. This means that all Code Cases in effect as of this date will remain available for use until annulled by the ASME B31 Standards Committee.

Materials are listed in the stress tables only when sufficient usage in piping within the scope of the Code has been shown. Materials may be covered by a Case. Requests for

listing shall include evidence of satisfactory usage and specific data to permit establishment of allowable stresses, maximum and minimum temperature limits, and other restrictions. Additional criteria can be found in the guidelines for addition of new materials in ASME Boiler and Pressure Vessel Code, Section II. (To develop usage

and gain experience, unlisted materials may be used in accordance with [para. 123.1](#).)

Requests for interpretation and suggestions for revision should be addressed to the Secretary, ASME B31 Committee, Two Park Avenue, New York, NY 10016-5990.

ASME B31.1-2020 SUMMARY OF CHANGES

Following approval by the ASME B31 Committee and ASME, and after public review, ASME B31.1-2020 was approved by the American National Standards Institute on June 10, 2020.

ASME B31.1-2020 includes the following changes identified by a margin note, **(20)**.

<i>Page</i>	<i>Location</i>	<i>Change</i>
xiii	Introduction	(1) Descriptions of B31.1, B31.3, B31.4, and B31.9 updated (2) Paragraph after (g) added (3) Eighteenth through 20th paragraphs revised
1	100	Second paragraph revised
1	100.1	(1) In para. 100.1.1, second paragraph revised (2) In para. 100.1.2, paragraph after (a)(3) revised (3) In para. 100.1.4, title added (4) Paragraph 100.1.5 added
2	Figure 100.1.2-1	Title, figure, and legend revised
3	Figure 100.1.2-2	Title, figure, and legend revised
4	Figure 100.1.2-3	Figure and legend revised
5	Figure 100.1.2-4	Figure and legend revised
6	Figure 100.1.2-5	Legend revised
7	Figure 100.1.2-6	Figure and legend revised
8	Figure 100.1.2-7	Legend revised
9	Figure 100.1.2-8	Added
7	100.2	(1) Definition of <i>covered piping system (CPS)</i> revised (2) Definitions of <i>ferrous material</i> ; <i>indication</i> , <i>linear indication</i> ; <i>indication</i> , <i>rounded indication</i> ; <i>maintenance</i> ; <i>nonferrous</i> ; <i>postweld hydrogen bakeout</i> ; and <i>volumetric examination</i> added
16	101.1	Revised
16	101.2.6	Added
16	101.3.2	In subpara. (a), last sentence added
16	101.3.3	Added
17	101.4.3	Added
17	101.5.5	Added
18	101.9	Added
18	102.2.4	Second paragraph revised
19	102.3.2	Title and subparas. (a), (a)(1), and (b)(1) revised
25	104.1.2	(1) Title revised by errata (2) Subparagraph (a) revised
27	104.3.1	Subparagraphs (c)(2) and (f) revised
33	104.3.3	First paragraph and subparas. (c)(3)(-a) and (c)(3)(-b) revised
35	104.7.2	Subparagraph (d) revised

<i>Page</i>	<i>Location</i>	<i>Change</i>
36	104.8	Revised
37	Figure 104.8-1	Added
36	104.8.1	Revised
37	104.8.2	Revised
37	104.8.3	Revised
38	104.8.4	Revised in its entirety
38	Figure 104.8.4-1	Deleted
40	107.8.3	Subparagraph (e) revised
43	Table 112-1	(1) Under "Gaskets," (d)(1), (d)(2), (d)(3), (h)(1), (h)(2), (h)(3), (i)(1), and (i)(2) revised (2) Notes (1), (9), and (11) revised
46	114.2.1	Title added
46	114.2.2	Title added
46	114.2.3	Title added
47	119.2	Revised
49	119.7.3	First and second paragraphs and footnote 4 revised
54	121.8.2	Subparagraph (b) revised
55	122.1.2	Subparagraph (a) made regular text and (1) through (5) redesignated as (a) through (e)
57	122.1.7	Subparagraphs (a)(2) and (d) revised
59	122.2	Subparagraph (b) revised
60	122.3.1	First paragraph revised
61	123.3.3	Revised
61	122.3.4	Subparagraphs (a) and (c) revised
61	122.3.6	Subparagraph (a) made regular text and (1) through (5) redesignated as (a) through (e)
62	122.4	Subparagraph (a)(9) revised
70	123.1.6	(1) Subparagraphs (a), (b), and (d) [formerly (c)] revised (2) Subparagraph (c) added and subsequent paragraph redesignated
70	123.3	Revised
72	124.10	Revised in its entirety
74	Chapter IV	Title revised
74	126	Title revised
74	126.1	Revised
82	Table 126.1-1	(1) ASME B16.1 title revised (2) ASME B16.36, ASME B18.31M, ASME B18.31.2, ASME B31P, Component Specifications list, and Note (2) added (3) Notes (1) and (2) redesignated as Notes (3) and (1), respectively
74	126.4	Added
84	Figure 127.3-1	SI equivalencies revised
84	127.3	Subparagraphs (c) and (e) revised
84	127.4.1	Subparagraph (d) revised
84	127.4.2	SI equivalencies in subparas. (b)(4) and (c)(3) revised

<i>Page</i>	<i>Location</i>	<i>Change</i>
85	127.4.4	(1) Second and third paragraphs redesignated as (a) and (c) (2) Subparagraph (b) added
85	127.4.8	Subparagraphs (b) and (f) revised
87	Table 127.4.2-1	SI equivalencies revised
89	Figure 127.4.4-2	SI equivalencies revised
89	Figure 127.4.4-3	SI equivalency revised
93	Figure 127.4.8-6	Revised
94	Figure 127.4.8-7	SI equivalency revised
87	127.4.9	(1) First and second paragraphs designated as (a) and (b), and subparas. (a) through (c) redesignated as (b)(1) through (b)(3) (2) Subparagraph (b)(2) [formerly (b)] revised (3) Subparagraph (d) deleted (4) Subparagraph (b)(4) added
88	127.4.10	Last sentence added
95	129.3	First paragraph added
98	131.1	Last paragraph added
98	131.3	Subparagraph (b) revised
98	131.6.1	(1) Title added (2) First paragraph and subpara. (c) revised
98	131.6.2	Revised in its entirety
100	132.1.1	Last paragraph added
99	Table 131.4.1-1	In 9th, 11th through 13th, and 17th rows, degrees Celsius revised
100	132.2	Subparagraphs (c) and (d) added and subsequent subparagraphs redesignated
101	Table 132.1.1-1	For P-No. 9B, Group 1, degrees Celsius revised
100	132.3.3	Revised
103	Table 132.2-1	Revised
102	132.5	Revised
107	136.1.2	Subparagraph (a) revised
108	136.3.2	Subparagraphs (c) and (e) and last paragraph revised
108	136.4.2	(1) First paragraph redesignated as (a) and former subpara. (a) redesignated as (b) (2) Subparagraphs (a), (b)(2) [formerly (a)(2)], (b)(7) [formerly (a)(7)], and (b)(8) [formerly (a)(8)] revised (3) Subparagraph (a)(9) added
110	136.4.3	Subparagraphs (a)(3), (b), (b)(2), and (b)(3) revised
109	Table 136.4.1-1	In third column and Note (4), SI equivalencies revised
110	136.4.4	Subparagraphs (a)(3), (b), (b)(2), and (b)(3) revised
111	136.4.5	(1) First paragraph designated as (a) and subpara. (a) redesignated as (b) (2) Subparagraphs (b)(2)(-a) through (b)(2)(-c) [formerly (a)(2)(-a) through (a)(2)(-c)] and (b)(7) [formerly (a)(5)] revised (3) Note deleted (4) Subparagraphs (b)(5) and (b)(6) added and former subpara. (a)(5) redesignated as (b)(7)

<i>Page</i>	<i>Location</i>	<i>Change</i>
111	136.4.6	Subparagraphs (b)(2)(-a) through (b)(2)(-c) revised
111	136.4.7	Added
112	137.3.2	Second paragraph and subparas. (a) through (b)(2) added
113	137.4.6	Added
114	137.5.6	Added
114	137.8	Added and former para. 137.8 redesignated as 137.9
115	137.9.3	Formerly 137.8.3, subpara. (a) revised
117	141.1	Subparagraph (i) added
118	143	Added
118	145	(1) Second paragraph revised (2) Third paragraph added
119	149	Added
122	Table A-1	Note (1) revised
134	Table A-2	(1) Last row for A369 added (2) Note (1) revised
146	Table A-3	(1) For A312 S31254, order of Maximum Allowable Stress Values changed (2) Under Seamless Pipe and Tube, Austenitic, rows A789 S32550 and A790 S32550 relocated (3) Under Welded Pipe and Tube — Without Filler Metal: Austenitic, rows A789 S32550 and A790 S32550 relocated (4) Note (1) revised
180	Table A-4	Note (1) revised
194	Table A-5	Note (1) revised
198	Table A-6	Note (1) revised
204	Table A-7	(1) Under Drawn Seamless Tube, for B210 A93003 and Alclad A93003, stress values revised (2) Under Seamless Pipe and Seamless Extruded Tube, for B241 A93003 and Alclad A93003, stress values revised; and for B241 A96063, size or thickness and stress values revised (3) Under Drawn Seamless Condenser and Heat Exchanger Tube, for B234 A93003, Alclad A93003, and A95454, stress values revised (4) Under Arc-Welded Round Tube, for B547 A93003, Alclad A93003, and A95454, stress values revised (5) Under Sheet and Plate, for B209 A93003, Alclad A93009, and A95454, size or thickness and stress values revised (6) Under Die and Hand Forgings, for B247 A93003, stress values revised (7) Under Rods, Bar, and Shapes, for B221 A91060, A93003, A95454, and A96063, stress values revised (8) Notes (1), (15), (16), and (20) revised (9) Notes (8) and (10) deleted
214	Table A-8	(1) Note (1) revised (2) Note (10) added
222	Table A-9	Note (1) revised

<i>Page</i>	<i>Location</i>	<i>Change</i>
226	Table A-10	(1) Under Carbon Steel, new third row added (2) Note (2) revised
246	Table C-2	Under High Nickel Alloys, third group, third row revised
259	Mandatory Appendix F	(1) ASCE/SEI Standard revised (2) Under ASME Codes and Standards, A13.1, B16.36, B18.31.1M, B18.31.2, B31P, and PCC-3 added; B16.1, B16.34, B31.3, B31.4, B31.8, B31T, B36.10M, B36.19M, and TDP-1 updated (3) Under ASTM Specifications, F1476 and F1548 added (4) Under WWA and ANSI/AWWA Standards, C606 updated (5) Under National Fire Codes and Standards, NFPA 56 updated (6) Note (1) added and former Note (1) redesignated as Note (2) (7) Address for American Petroleum Institute updated
263	Mandatory Appendix G	(1) Definitions of A_p , F_a , F_b , F_c , I_i , I_o , I_b , i_a , i_b , i_o , i_b , M_{iA} , M_{oA} , M_{tA} , M_{iB} , M_{oB} , M_{tB} , M_{iC} , M_{oC} , M_{tC} , and S_o added (2) Definitions of i , j , M , and r_b deleted (3) Definitions of S_E and t_m and paragraph references for Z revised
269	Mandatory Appendix H, H-2	Subparagraph (b) revised
272	Mandatory Appendix N, N-100.2.2	PP-R added
275	Table N-102.2.1-1	SI units added
277	Table N-102.2.1-2	SI units added
278	Table N-102.2.1-3	SI units added
281	Mandatory Appendix N, N-104.1.1	In definitions of c and t_m , SI units added
281	Mandatory Appendix N, N-104.1.2	Subparagraph (a)(3) revised
283	Mandatory Appendix N, N-112	Subparagraph (a) made regular text and subparas. (1) and (2) redesignated as (a) and (b)
284	Mandatory Appendix N, N-114.1.5	Revised
286	Table N-119.6.1-1	Polypropylene — random added
287	Table N-119.6.2-1	Polypropylene — random added
287	Mandatory Appendix N, N-122.7.1	First paragraph and subpara. (a) revised
287	Mandatory Appendix N, N-122.8.1	Revised
289	Mandatory Appendix N, N-124.1.3	SI equivalency added
289	Mandatory Appendix N, N-124.1.5	Subparagraph (a) revised
289	Mandatory Appendix N, N-124.1.6	In subpara. (b), SI equivalency added
294	Mandatory Appendix N, N-127.5.3	Subparagraphs (c)(1)(-a), (c)(1)(-b), and (c)(2)(-a) revised
295	Mandatory Appendix N, N-127.7.1	Subparagraph (a) revised
298	Mandatory Appendix N, N-135.3.5	Subparagraph (a) made regular text and subparas. (1) through (3) redesignated as (a) through (c)
329	Nonmandatory Appendix IV, Foreword	First paragraph revised
329	Nonmandatory Appendix IV, IV-1	(1) Introductory paragraph revised (2) Paragraph IV-1.1 revised
330	Nonmandatory Appendix IV, IV-2.3.2	Revised
330	Nonmandatory Appendix IV, IV-2.4	(1) Paragraph IV-2.4.4 redesignated as IV-2.5.4 (2) Paragraph IV-2.4.5 redesignated as IV-2.4.4
330	Nonmandatory Appendix IV, IV-3.1	Last sentence revised

<i>Page</i>	<i>Location</i>	<i>Change</i>
331	Nonmandatory Appendix IV, IV-4	Last sentence added
331	Nonmandatory Appendix IV, IV-5	Title revised
331	Nonmandatory Appendix IV, IV-5.1	Revised
331	Nonmandatory Appendix IV, IV-5.2	Title, first paragraph, and last two paragraphs revised
331	Table IV-5.2-1	Revised
331	Nonmandatory Appendix IV, IV-5.3	Revised
332	Nonmandatory Appendix IV, IV-5.4	Subparagraphs (a), (a)(2), and (b) revised
332	Nonmandatory Appendix IV, IV-5.5	Revised
332	Nonmandatory Appendix IV, IV-6	(1) Redesignated from IV-5.6 (2) Revised
333	Nonmandatory Appendix V, Foreword	Penultimate paragraph added
334	Nonmandatory Appendix V, V-2.3.2	Added
337	Nonmandatory Appendix V, V-8.1.1	Revised
343	Nonmandatory Appendix V, V-12	Added and subsequent sections, including figures, redesignated
366	Table VIII-2	(1) In Spec. No. A351, second line deleted and last three lines added (2) In Spec. No. A671, second and third row, Type/Grade/Class revised and fourth and fifth rows added (3) In Spec. No. A672, first row, Type/Grade/Class; third row, Type/Grade/Class and Notes revised and fourth and fifth rows added (4) In Spec. No. A815, third row added (5) In Spec. No. Various, first row, Product Form revised (6) Note (8) added and subsequent Notes renumbered

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Chapter I

Scope and Definitions

(20) 100 GENERAL

This Power Piping Code is one of several Sections of The American Society of Mechanical Engineers (ASME) Code for Pressure Piping, B31. This Section is published as a separate document for convenience.

Standards and specifications specifically incorporated by reference into this Code are shown in [Table 126.1-1](#). It is not considered practical to refer to a dated edition of each of the standards and specifications in this Code. Instead, the dated edition references are included in [Mandatory Appendix F](#).

(20) 100.1 Scope

Rules for this Code Section have been developed considering the needs for applications that include piping typically found in electric power generating stations, industrial and institutional plants, geothermal heating systems, and central and district heating and cooling systems.

100.1.1 This Code prescribes requirements for the design, materials, fabrication, erection, examination, testing, inspection, operation, and maintenance of piping systems. Where service requirements necessitate measures beyond those required by this Code, such measures shall be specified by the engineering design.

Piping as used in this Code includes pipe, flanges, bolting, gaskets, valves, pressure-relieving valves/devices, fittings, and the pressure-containing portions of other piping components, whether manufactured in accordance with standards listed in [Table 126.1-1](#) or specially designed. It also includes hangers and supports and other equipment items necessary to prevent over-stressing the pressure-containing components.

Rules governing piping for miscellaneous appurtenances, such as water columns, remote water level indicators, pressure gages, and gage glasses, are included within the scope of this Code, but the requirements for boiler appurtenances shall be in accordance with ASME Boiler and Pressure Vessel Code (BPVC), Section I, PG-60.

The users of this Code are advised that in some areas legislation may establish governmental jurisdiction over the subject matter covered by this Code. However, any such legal requirement shall not relieve the owner of

his/her inspection responsibilities specified in [para. 136.1](#).

100.1.2 Power piping systems as covered by this Code apply to all piping and their component parts except as excluded in [para. 100.1.3](#). They include but are not limited to steam, water, oil, gas, and air services.

(a) This Code covers boiler external piping as defined below for power boilers and high-temperature, high-pressure water boilers in which steam or vapor is generated at a pressure of more than 15 psig [100 kPa (gage)]; and high-temperature water is generated at pressures exceeding 160 psig [1 103 kPa (gage)] and/or temperatures exceeding 250°F (120°C).

Boiler external piping shall be considered as piping that begins where the boiler proper terminates at

- (1) the first circumferential joint for welding end connections; or
- (2) the face of the first flange in bolted flanged connections; or
- (3) the first threaded joint in that type of connection, and that extends up to and including the valve or valves required by [para. 122.1](#).

The terminal points themselves are considered part of the boiler external piping. The terminal points and piping external to power boilers are illustrated by [Figures 100.1.2-1](#) through [100.1.2-8](#).

Piping between the terminal points and the valve or valves required by [para. 122.1](#) shall be provided with Data Reports, inspection, and stamping as required by ASME BPVC, Section I. All welding and brazing of this piping shall be performed by manufacturers or contractors authorized to use the ASME Certification Mark and appropriate Designators shown in ASME CA-1, Conformity Assessment Requirements. The installation of boiler external piping by mechanical means may be performed by an organization not holding an ASME Certification Mark. However, the holder of a valid ASME Certification Mark, Certificate of Authorization, with an "S," "A," or "PP" Designator shall be responsible for the documentation and hydrostatic test, regardless of the method of assembly. The quality control system requirements of ASME BPVC, Section I; ASME CA-1; and ASME QAI-1, Qualifications for Authorized Inspectors, shall apply.

The valve or valves required by [para. 122.1](#) are part of the boiler external piping, but do not require ASME BPVC, Section I inspection and stamping except for safety, safety