

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
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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 referred 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 overstressing 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