ASME B16.1-2026
(Revision of ASME B16.1-2020)

Gray Iron Pipe Flanges and Flanged Fittings

Classes 25, 125, and 250

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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FOREWORD

In 1894, the American Society of Mechanical Engineers (ASME) adopted a standard flange template ("ASME Standard") for low-pressure service. A "Manufacturers Standard" for pressures up to 250 psi followed in 1901. Around 1910, a group of fittings manufacturers formed an organization that was the forerunner of the present Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) and undertook the design of a line of flanged fittings. A document covering this work was published in 1912.

During the years 1912 through 1914, a Joint Committee of the ASME and the Manufacturers Committee formulated compromise standard dimensions for pipe flanges and flanged fittings for use under saturated steam pressures of 125 psi and 250 psi pressure ranges. The Joint Committee's report was accepted at a conference attended by representatives of ASME, the Manufacturers Committee, the U.S. government, and the National Association of Master Steam and Hot Water Fitters. ASME published this report as the "American Standard for Pipe Flanges, Fittings and Their Bolting" in 1914. In 1918, work was started on standards for 50-lb steam flanges and for 800-lb, 1,200-lb, and 3,000-lb hydraulic flanges, which were subsequently approved by this group.

In 1921, the American Engineering Standards Committee, later known as the American Standards Association (ASA), United States of America Standards Institute (USAS), and more recently, the American National Standards Institute (ANSI), organized Sectional Committee B16 to unify and further develop national standards for pipe flanges and fittings (and later for valves and gaskets). Cosponsors of the B16 Committee were ASME, MSS, and the Heating and Piping Contractors Association [now the Mechanical Contractors Association of America (MCAA)]. Work already in progress on flanges and flanged fittings was assigned to Subcommittee 1 (now Subcommittee A). Following approval by the Subcommittee, the B16 Committee, the cosponsors, and ASA, the standards were published in 1928.

In later work, Subcommittee 1 developed the 25-lb Flange and Flanged Fitting Standard (approved in 1931 as ASA B16b2), which replaced the 50-lb standard that had been originally approved in 1918. Work on the 800-lb Hydraulic Flange Standard was published as ASA B16b1 in 1931. Revision of thicknesses, tolerances, and service pressure ratings of the 125-lb and 250-lb flanges and flanged fittings led to approval and publication of ASA B16a-1939.

An American war standard entitled "Pressure Ratings for Cast Iron Flanges and Flanged Fittings, 125 lb" (ASA B16a1) was published in 1943. A complete review of the 125-lb and 250-lb standards resulted in new editions of each: ASA B16.1-1948 and ASA B16.2-1948. In 1960, editions of B16.1 and B16.2 were issued in which ratings were presented in graphic form and special requirements were added for testing flanges.

A review of all gray iron flange and flanged fittings standards initiated in 1962 resulted in the withdrawal of B16.16, "300 lb Refrigerant Flanges and Flanged Fittings," and the combining of the remaining standard into a single document, with B16.1 and B16.2 coming together as USAS B16.1-1967. In this edition, the presentation of ratings was restored to tabular form.

The increasing use of higher grades of gray iron necessitated the establishment of a second set of ratings for the smaller sizes. A revised edition published as ANSI B16.1-1975 incorporated these new ratings along with metric (SI) equivalents for dimensions and minor corrections to the 1967 edition text.

In 1982, American National Standards Committee B16 was recognized as an ASME Committee operating under procedures accredited by ANSI. Following approval by the ASME B16 Subcommittee A and B16 Committee, ANSI approved ASME/ANSI B16.1-1989 on March 8, 1989. Changes included revised marking requirements, revised bolt length increments ($\frac{1}{2}$ in. rather than $\frac{1}{4}$ in.), elimination of metric equivalents, a correction of the Class 800 flange raised-face height to 0.25 in. from the 0.06 in. shown previously, and editorial changes to the text.

In the 1998 edition of ASME B16.1, Reference Standards were updated, a Quality System Program Annex was added, Class 800 was deleted, and several editorial revisions were made. Following approval by ASME B16 Subcommittee B and B16 Main Committee, ANSI approved ASME B16.1-1998 on November 20, 1998.

Work was started in 1999 to revise the standard to include metric units as the primary reference units while maintaining U.S. Customary units in either parenthetical or separate forms. Following approval of the Standard Committee and ASME, approval as an American National Standard was given by ANSI on July 8, 2005, with the new designation ASME B16.1-2005.

In the 2010 edition of ASME B16.1, the Scope was separated into its own paragraph with all following paragraphs renumbered accordingly, references were updated, and several editorial revisions were made. Following approval of the B16 Standards Committee, approval as an American National Standard was given by ANSI on November 17, 2010.

In the 2015 edition, provisions were made to provide bolt hole tolerances that are appropriate to this Standard. Following the approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on July 29, 2015.

In the 2020 edition, the U.S. Customary tables in former Mandatory Appendix I were merged with the SI tables in the main text. The tables and figures were redesignated, former Mandatory Appendix I was deleted, and the subsequent Mandatory Appendix was redesignated. Cross-references were updated accordingly. Also in the 2020 edition, entries for NPS 66, NPS 78, and NPS 90 were added to Table 7.6.1-2 (formerly Tables 9 and I-9), and the references in Mandatory Appendix I (formerly Mandatory Appendix II) were updated.

In this 2026 edition, language has been revised throughout so the words “may,” “shall,” and “should” indicate permissions, requirements, and recommendations, respectively. Also, references have been updated in Mandatory Appendix I. Following the approval by the ASME B16 Standards Committee, ASME B16.1-2026 was approved as an American National Standard by ANSI on March 5, 2026.

ASME B16 COMMITTEE
Standardization of Valves, Flanges, Fittings, Gaskets, and Valve Actuators

(The following is the roster of the committee at the time of approval of this Standard.)

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In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

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(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

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Interpretations are published in the ASME Interpretations Database at https://go.asme.org/Interpretations as they are issued.

Committee Meetings. The B16 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/B16committee.

ASME B16.1-2026
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.1-2026 was approved by the American National Standards Institute on March 5, 2026.

ASME B16.1-2026 includes the following changes identified by a margin note, **(26)**. The Record Numbers listed below are explained in more detail in the "List of Changes in Record Number Order" following this Summary of Changes.

Page	*Location*	*Change (Record Number)*
1	2.7	Added *(25-456)*
2	3.2	Second sentence revised *(25-456)*
30	Table 7.6.1-2	Note (3) revised *(25-456)*
32	Table 7.6.1-3	Note (3) revised *(25-456)*
36	Mandatory Appendix I	Updated *(25-899)*

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
25-456	Added para. 2.7 to define “may,” “shall,” and “should.” Revised “must” to “shall” in second sentence of para. 3.2 and in Note (3) of Tables 7.6.1-2 and 7.6.1-3.
25-899	Updated references in Mandatory Appendix I.

GRAY IRON PIPE FLANGES AND FLANGED FITTINGS
Classes 25, 125, and 250

1 SCOPE

This Standard covers Classes 25, 125, and 250 Gray Iron Pipe Flanges and Flanged Fittings. It includes

(a) pressure–temperature ratings
(b) sizes and method of designating openings of reducing fittings
(c) marking
(d) materials
(e) dimensions and tolerances
(f) bolting and gaskets
(g) pressure testing

2 GENERAL

2.1 References

Standards and specifications adopted by reference in this Standard are shown in Mandatory Appendix I, which is part of this Standard. It is not considered practical to identify the specific edition of each referenced standard and specification in the text, when referenced. Instead, the specific editions of the referenced standards and specifications are listed in Mandatory Appendix I.

2.2 Quality Systems

Requirements relating to the product manufacturer's Quality System Programs are described in Nonmandatory Appendix A.

2.3 Relevant Units

This Standard states values in both SI and U.S. Customary units. As an exception, diameter of bolts and flange bolt holes are expressed in inch units only. These systems of units are to be regarded separately as standard. Within the text, the U.S. Customary units are shown in parentheses. The values stated in each system are not exact equivalents; therefore, it is required that each system of units be used independently of the other. Except for diameter of bolts and flange bolt holes, combining values from the two systems constitutes nonconformance with the Standard.

2.4 Service Conditions

Criteria for selection of materials suitable for particular fluid service are not within the scope of this Standard.

2.5 Convention

For determining conformance with this Standard, the convention for fixing significant digits where limits (maximum and minimum values) are specified shall be as defined in ASTM E29. This requires that an observed or calculated value be rounded off to the nearest unit in the last right-hand digit used for expressing the limit. Decimal values and tolerances do not imply a particular method of measurement.

2.6 Denotation

2.6.1 Pressure Rating Designation. Class, followed by a dimensionless number, is the designation for pressure–temperature ratings as follows:

Class	25	125	250

2.6.2 Size. NPS, followed by a dimensionless number, is the designation for nominal flange or flange fitting size. NPS is related to the reference nominal diameter, DN, used in international standards. The relationship is, typically, as follows:

NPS	DN
1	25
1¼	32
1½	40
2	50
2½	65
3	80
3½	...
4	100

GENERAL NOTE: For NPS ≥ 4, the related DN = 25 × (NPS).

2.7 Definitions (26)

may: the term used to denote permission, neither a requirement nor a recommendation.

shall: the term used to denote a requirement.

should: the term used to denote a recommendation.