

ASME B16.3-2021
(Revision of ASME B16.3-2016)

Malleable Iron Threaded Fittings

Classes 150 and 300

AN AMERICAN NATIONAL STANDARD



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Mechanical Engineers**

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Two Park Avenue • New York, NY • 10016 USA

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FOREWORD

In 1921, the American Engineering Standards Committee, later the American Standards Association (ASA) and currently the American National Standards Institute (ANSI), authorized the organization of a Sectional Committee on the Standardization of Pipe Flanges and Flanged Fittings, with the following organizations as joint sponsors: Heating, Piping, and Air Conditioning Contractors National Association [later the Mechanical Contractors Association of America (MCAA)], Manufacturers Standardization Society of the Valves and Fittings Industry (MSS), and The American Society of Mechanical Engineers (ASME).

Threaded fittings were also included in the scope of the B16 Committee, and Subcommittee Number 2 (now Subcommittee B) was made responsible for threaded fittings other than steel. The first edition of a standard covering 150-lb malleable iron fittings was approved as an American Tentative Standard by ASA in December 1927. In 1936, a revision was undertaken to add hydraulic service ratings, material specifications, alignment tolerances, and dimensions for additional sizes. It was approved with the designation American Standard B16c-1939.

Pipe plugs, bushings, and locknuts, included in the first editions, are now covered in a separate standard, B16.14. A revision begun in 1947 amplified the sections on threading, inspection, and tolerances and added dimensions for additional sizes of elbows, reducing crosses, reducing tees, straight and reducing end plugs, caps, and return bends. It was approved as ASA B16.3-1951.

Meanwhile, MSS, in cooperation with the Association of American Railroads (AAR), developed the first standard for 300-lb malleable iron threaded fittings, published as MSS SP-31 of 1932. The 1950 edition of SP-31, which agreed with AAR Purchase Specification M-404, was submitted to ASA Sectional Committee B16 and assigned to Subcommittee Number 2. After balloting, it was approved as a separate standard, ASA B16.19-1951.

Work was begun to combine the two standards (for 150 lb and 300 lb) into a single document in 1961. The resulting standard was approved as ASA B16.3-1963. Subsequent revisions of the standard, leading to revisions approved as ANSI B16.3-1971 and ANSI B16.3-1977, involved updating referenced standards and the introduction of metric (SI) dimensions and ratings. In the 1977 edition, 150 lb and 300 lb were redesignated as Class 150 and Class 300, respectively.

In 1982, American National Standards Committee B16 became the ASME B16 Standards Committee, operating with the same scope under ASME procedures accredited by ANSI. A further revision of the standard, approved and published as ANSI/ASME B16.3-1985, provided for electrodeposition as an alternative to hot dipping when zinc coating was required.

The 1992 edition of B16.3 omitted metric units, establishing U.S. Customary units as the standard. Clarifications and editorial revisions were made to improve the text following approval by the Standards Committee and ASME, the 1992 edition received approval as an American National Standard on December 2, 1992, with the designation ASME B16.3-1992.

In the 1998 edition of ASME B16.3 the references section was updated; a Quality System Program Annex was added; and several editorial revisions were made. Following approval by ASME B16 Subcommittee B and B16 Main Committee, ANSI approved it as an American National Standard on November 20, 1998.

In the 2006 edition, metric dimensions became the primary units and inch dimensions were incorporated into this Standard as secondary units and shown in parentheses. The added metric dimensions constitute an independent but equal standard to the inch units. Following approval by the Standards Committee and the ASME Board, this revision to the 1998 edition of this Standard was approved as an American National Standard by ANSI on November 9, 2006, with the new designation ASME B16.3-2006.

In the 2011 edition, references to ASME standards were revised to no longer list specific edition years; the latest edition of ASME publications applies unless stated otherwise. The 2011 edition also established that materials manufactured to other editions of the referenced ASTM standards may be used to manufacture fittings meeting the requirements of this Standard as long as the fitting manufacturer verifies the material meets the requirements of the referenced edition. Following approval by the Standards Committee and the ASME Board on Pressure Technology Codes and Standards, the 2011 revision was approved as an American National Standard by ANSI on August 9, 2011, with the new designation ASME B16.3-2011.

In the 2016 edition, provisions were made to update verbiage and readings. Following the approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on September 26, 2016, with the new designation ASME B16.3-2016.

In ASME B16.3-2021, the U.S. Customary tables in former Mandatory Appendix I have been merged with the SI tables in the main text. The tables and figures have been redesignated, former Mandatory Appendix I has been deleted, and the subsequent Mandatory Appendix has been redesignated. Cross-references have been updated accordingly. Also in this edition, the sketch in [Table 8.1-1](#) (formerly Tables 9 and I-9) has been revised, and the references in [Mandatory Appendix I](#) (formerly Mandatory Appendix II) have been updated. Following approval by the ASME B16 Standards Committee, ASME B16.3-2021 was approved by ANSI on November 15, 2021.

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ASME B16 COMMITTEE

Standardization of Valves, Flanges, Fittings, and Gaskets

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

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R. M. Bojarczuk, *Vice Chair*
S. J. Rossi, *Secretary*

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J. R. Holstrom , Val-Matic Valve and Manufacturing Corp.	B. G. Fajian , <i>Contributing Member</i> , Pennsylvania Machine Works
D. Hunt, Jr. , Fastenal	G. Kireta, Jr. , <i>Contributing Member</i> , Copper Development Association, Inc.
G. A. Jolly , Samshin Ltd.	
E. J. Lain , Exelon Nuclear	

SUBCOMMITTEE B — THREADED FITTINGS (EXCEPT STEEL), FLANGES, AND FLANGED FITTINGS

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CORRESPONDENCE WITH THE B16 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B16 Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
<http://go.asme.org/Inquiry>

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued to provide alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee web page.

Requests for Cases shall provide a Statement of Need and Background information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the B16 Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B16 Standards Committee.

Requests for interpretation should preferably be submitted through the online Interpretation Submittal Form. The form is accessible at <http://go.asme.org/InterpretationRequest>. Upon submittal of the form, the Inquirer will receive an automatic e-mail confirming receipt.

If the Inquirer is unable to use the online form, he/she may e-mail the request to the Secretary of the B16 Standards Committee at SecretaryB16@asme.org or mail it to the above address. The request for an interpretation should be clear and unambiguous. It is further recommended that the Inquirer submit his/her request in the following format:

Subject: Cite the applicable paragraph number(s) and the topic of the inquiry in one or two words.
Edition: Cite the applicable edition of the Standard for which the interpretation is being requested.
Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. Please provide a condensed and precise question, composed in such a way that a "yes" or "no" reply is acceptable.
Proposed Reply(ies): Provide a proposed reply(ies) in the form of "Yes" or "No," with explanation as needed. If entering replies to more than one question, please number the questions and replies.
Background Information: Provide the Committee with any background information that will assist the Committee in understanding the inquiry. The Inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in the format described above may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

Moreover, ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the Inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not “approve,” “certify,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B16 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the B16 Standards Committee.

ASME B16.3-2021

SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.3-2021 was approved by the American National Standards Institute on November 15, 2021.

In ASME B16.3-2021, the U.S. Customary tables in former Mandatory Appendix I have been merged with the SI tables in the main text. The tables and figures have been redesignated, former Mandatory Appendix I has been deleted, and the subsequent Mandatory Appendix has been redesignated. Cross-references have been updated accordingly. In addition, this edition includes the following changes identified by a margin note, **(21)**. The Record Numbers listed below are explained in more detail in the “List of Changes in Record Number Order” following this Summary of Changes.

<i>Page</i>	<i>Location</i>	<i>Change (Record Number)</i>
20	Table 8.1-1	Upper left sketch revised (17-1243)
22	Mandatory Appendix I	Former Mandatory Appendix II updated (21-619)

LIST OF CHANGES IN RECORD NUMBER ORDER

<u>Record Number</u>	<u>Change</u>
17-1243	Revised threads in upper left illustration of Table 8.1-1 (former Tables 9 and I-9).
21-619	Updated references in Mandatory Appendix I (former Mandatory Appendix II).

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MALLEABLE IRON THREADED FITTINGS

Classes 150 and 300

1 SCOPE

This Standard covers malleable iron threaded fittings, Classes 150 and 300. It also contains provisions for using steel for caps and couplings in Class 150 for NPS $\frac{3}{8}$ and smaller. This Standard includes

- (a) pressure-temperature ratings
- (b) size and method of designating openings of reducing fittings
- (c) marking
- (d) material
- (e) dimensions and tolerances
- (f) threading
- (g) coatings

2 GENERAL

2.1 References

Standards and specifications adopted by reference in this Standard are shown in [Mandatory Appendix I](#). It is not considered practical to identify in the text the specific edition of each referenced standard and specification. 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 manufacturers' quality system programs are described in [Nonmandatory Appendix A](#).

2.3 Relevant Units

This Standard states values in both SI (metric) and U.S. Customary units. These systems of units are to be regarded separately as standard. In this Standard, 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. Combining values from the two systems constitutes nonconformance with this 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 150 and Class 300.

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

NPS	DN
$\frac{1}{4}$	8
$\frac{1}{2}$	15
1	25
$1\frac{1}{4}$	32
$1\frac{1}{2}$	40
2	50
$2\frac{1}{2}$	65
3	80
4	100

GENERAL NOTE: For $NPS \geq 4$, the related $DN = 25 \times NPS$.

3 PRESSURE-TEMPERATURE RATINGS

(a) Pressure-temperature ratings for these fittings are shown in [Table 3-1](#).

(b) All ratings are independent of the contained fluid and are the maximum allowable working gage pressures at the tabulated temperatures. Intermediate ratings may be obtained by linear interpolation between the temperatures shown.

(c) The temperatures shown for the corresponding pressure rating shall be the material temperature of the pressure-retaining structure. It may be assumed