

ASME B16.4-2021
(Revision of ASME B16.4-2016)

Gray Iron Threaded Fittings

Classes 125 and 250

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

ASME B16.4-2021
(Revision of ASME B16.4-2016)

Gray Iron Threaded Fittings

Classes 125 and 250

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: February 1, 2022

The next edition of this Standard is scheduled for publication in 2026.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME B16 Committee may be published as Cases. Cases and interpretations are published on the ASME website under the Committee Pages at <http://cstools.asme.org/> as they are issued.

Errata to codes and standards may be posted on the ASME website under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be based on the date posted.

The Committee Pages can be found at <http://cstools.asme.org/>. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility only for those interpretations of this document issued in accordance with the established ASME procedures and policies, which preclude the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright © 2022 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved

CONTENTS

Foreword	i
Committee Roster	vi
Correspondence With the B16 Committee	vii
Summary of Changes	ix
List of Changes in Record Number Order	x
1 Scope	1
2 General	1
3 Pressure-Temperature Ratings	1
4 Size	2
5 Marking	2
6 Material	2
7 Dimensions and Tolerances	2
8 Threading	3
9 Ribs	3
10 Plugs, Bushings, and Locknuts	3
11 Face Bevel	3
12 Coatings	3
Mandatory Appendix	
I References	14
Nonmandatory Appendix	
A Quality System Program	15
Figures	
4.2-1 Identification of Reducing Fittings	2
8-1 Gaging of Chamfered Internal Threads	13
Tables	
3-1 Pressure-Temperature Ratings	2
7.1-1 Dimensions of Class 125 90-deg and 45-deg Elbows, Tees, and Crosses (Straight Sizes)	4
7.1-2 Dimensions of Class 125 90-deg Elbows and Crosses (Reducing Sizes)	5
7.1-3 Dimensions of Class 125 Tees (Reducing Sizes)	7
7.1-4 Dimensions of Class 125 Caps, Reducing Couplings, and Closed- and Open-Pattern Return Bends	10
7.1-5 Dimensions of Class 250 90-deg and 45-deg Elbows, Tees, and Crosses (Straight Sizes)	12
7.3-1 Inspection Tolerances	13

FOREWORD

In the spring of 1921, when the unification and extension of the flanged and threaded fittings standards in force in the United States seemed desirable, the American Engineering Standards Committee [subsequently 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. The following organizations served as joint sponsors: Heating, Piping, and Air Conditioning Contractors National Association (later the Mechanical Contractors Association of America), Manufacturers Standardization Society of the Valve and Fittings Industry, and the American Society of Mechanical Engineers.

At the second meeting of the Sectional Committee held in New York on December 16, 1921, a report was submitted by the Subcommittee on Threaded Fittings. The report indicated clearly that good progress was already being made toward the development of an American Standard for cast iron threaded fittings intended for services of 125-lb and 250-lb steam pressure. The review of the proposals of the manufacturer's Committee of Five was assigned to the Subcommittee on Threaded Fittings, and after a thorough study, it made its report to the Sectional Committee. The Standard was finally completed, approved, and published in December 1927 with the designation ASA B16.4-1927.

To bring this Standard in line with the best current practice, a revision was begun in September 1936, providing for hydraulic service ratings, material specifications, tolerances on alignment, threading of fittings, and dimensions of some additional sizes, as well as dimensional tables covering reducing couplings, caps and closed- and open-pattern return bends. The revision was approved in March 1941.

The Standard was reviewed in 1947 and was approved by the Sectional Committee. Following approval of the sponsor bodies, the Standard was presented for approval as an American Standard. It received that approval in December 1949 and was given the new designation ASA B16.4-1949.

A review was started in 1961 by Subcommittee 2. A draft involving only minor changes was approved by the Sectional Committee and sponsor bodies. Final ASA approval was granted on December 26, 1963.

As the changes in organization occurred and standards designation increased, Subcommittee 2 began a review in 1968. Minor changes included updating references and bringing the Standard into conformance with adopted policies of the B16 Committee. Final approval was granted by ANSI on January 20, 1971.

In 1975, Subcommittee B (formerly Subcommittee 2) in its regular five-year review of the document, recommended the addition of metric (SI) equivalents and updating of referenced standards. The revised edition received approval by ANSI on August 30, 1977.

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 new revision of the Standard, including rationalization of metric equivalent dimensions and updating of referenced standards, was approved and published as ANSI/ASME B16.4-1985.

The 1992 edition of B16.4 omitted metric units, established U.S. customary units as the standard, and provided for electrodeposition as an alternative to hot dipping for zinc coating. Editorial revisions were made to clarify and correct the text. Following approval by the Standards Committee and ASME, ASME B16.4-1992 was approved as an American National Standard on December 2, 1992.

In the 1998 edition of ASME B16.4, the list of referenced standards was updated, a Quality System Program Annex added, an issued Interpretation included, and several editorial revisions made. Following approval by the ASME B16 Subcommittee B and the ASME B16 Standards Committee, ANSI approved ASME B16.4-1998 as an American National Standard on November 20, 1998.

Work started during 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 by the Standards Committee and the ASME Board, ASME B16.4-2006 was approved as an American National Standard by ANSI on November 9, 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, ASME B16.4-2011 was approved by ANSI on August 9, 2011.

In the 2016 edition, section 7 was revised. Following approval by the ASME B16 Standards Committee, ASME B16.4-2016 was approved by ANSI on September 23, 2016.

In ASME B16.4-2021, 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 former Mandatory Appendix II has been redesignated. Cross-references have been updated accordingly. Also, [Mandatory Appendix I](#) (former Mandatory Appendix II) has been updated. Following approval by the ASME B16 Standards Committee, ASME B16.4-2021 was approved by ANSI on November 12, 2021.

Currently in preview, click buy full version

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.)

STANDARDS COMMITTEE OFFICERS

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

STANDARDS COMMITTEE PERSONNEL

A. Appleton , Alloy Stainless Products Co., Inc.	T. A. McMahon , Emerson Automatic Solutions
J. E. Barker , DeZURIK, Inc.	R. C. Merrick , Consultant
R. W. Barnes , ANRIC Enterprises, Inc.	W. H. Patrick , Dow Chemical Co.
D. C. Bayreuther , Neles Corp.	D. W. Raho , CCM 2000
W. B. Bedesem , Consultant	D. F. Reid , VSP Technologies
R. M. Bojarczuk , Retired	S. J. Rossi , The American Society of Mechanical Engineers
A. M. Cheta , Shell Global Solutions (U.S.)	R. A. Schmidt , Caldwell
M. A. Clark , NIBCO, Inc.	J. Sekerak , CSA Group
G. A. Cuccio , Capitol Manufacturing Co.	F. R. Volgstadt , Volgstadt and Associates, Inc.
C. E. Davila , Crane ChemPharma and Energy	F. Feng , <i>Delegate</i> , China Productivity Center for Machinery
K. S. Felder , Valero Energy	J. D. Grant , <i>Alternate</i> , DeZURIK, Inc.
D. R. Frikken , Becht Engineering Co., Inc.	P. V. Craig , <i>Contributing Member</i> , Jomar Group
J. R. Holstrom , Val-Matic Valve and Manufacturing Corp.	B. C. Fabian , <i>Contributing Member</i> , Pennsylvania Machine Works
D. H. Hunt, Jr. , Fastenal	A. G. Virella, 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

D. H. Hunt, Jr. , <i>Chair</i> , Fastenal	M. C. Coffey , Ward Manufacturing, LLC
J. R. Holstrom , <i>Vice Chair</i> , Val-Matic Valve and Manufacturing Corp.	R. Kelsey , NIBCO, Inc.
R. Rahaman , <i>Secretary</i> , The American Society of Mechanical Engineers	W. H. LeVan , Cast Iron Soil Pipe Institute
J. Atkinson , Mueller Streamline Co.	G. L. Simmons , Charlotte Pipe and Foundry
W. Bliss , Tyler Pipe Co.	G. T. Walden , Ferguson Enterprises, LLC
M. A. Clark , NIBCO, Inc.	C. A. Mueller , <i>Alternate</i> , Mueller Streamline Co.

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 B16.4-2021

SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.4-2021 was approved by the American National Standards Institute on November 12, 2021.

In ASME B16.4-2021, 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 former Mandatory Appendix II has been redesignated. Cross-references have been updated accordingly. In addition, this edition includes the following change identified by a margin note, **(21)**. The Record Number listed below is 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>
14	Mandatory Appendix I	Former Mandatory Appendix II updated (21-620)

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
21-620	Updated references in Mandatory Appendix I (former Mandatory Appendix II).

GRAY IRON THREADED FITTINGS

Classes 125 and 250

1 SCOPE

This Standard for gray iron threaded fittings, Classes 125 and 250, covers

- (a) pressure–temperature ratings
- (b) sizes 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](#), which is part of this Standard. 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:

- (a) Class 125
- (b) Class 250

2.6.2 Size. NPS, followed by a dimensionless number, is the designation for nominal 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
1 ¹ / ₄	32
1 ¹ / ₂	40
2	50
2 ¹ / ₂	65
3	80
3 ¹ / ₂	...
4	100

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