ASME B16.36-2020
(Revision of ASME B16.36-2015)

Orifice Flanges

AN AMERICAN NATIONAL STANDARD

The American Society of
Mechanical Engineers

ASME B16.36-2020
(Revision of ASME B16.36-2015)

Orifice Flanges

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: December 31, 2020

The next edition of this Standard is scheduled for publication in 2025.

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 used 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.

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

CONTENTS

FOREWORD

August of 1956 marked the first recorded correspondence noting the lack of standardization for orifice flanges. There were, and still are, several codes for the performance and calibration of orifice flanges, but there had been no standardization of the flanges themselves. Over the ensuing 3 years, correspondence continued among the Instrument Society of America, American Gas Association, and the B16 Standards Committee.

On December 3, 1959, Subcommittee 3 (now Subcommittee C) of B16 authorized the appointment of a Task Force to undertake drafting of a standard. Although the initial work progressed smoothly, a controversy developed over the standard size of taps to be specified for the flanges. This required many years to resolve. It was finally achieved in 1973 with the issuance of a draft from the Task Force. Comments and objections to this draft from members of Subcommittee C were resolved, and a redraft was approved by the Subcommittee late in 1974. The B16 Standards Committee was balloted in the spring of 1975 and approval was gained. Comments from B16 members from the gas industry requested that the Class 400 orifice flange be included, and the B16 Subcommittee C agreed to consider this for a possible addendum. The Standard was approved by ANSI on August 15, 1975.

On April 30, 1979, an addenda was issued, which added Class 400 flanges and Mandatory Appendix II covering reference documents and organizations.

In 1982, American National Standards Committee B16 was reorganized as an ASME Committee operating under procedures accredited by ANSI. In the 1988 edition, figures were added to illustrate jack bolts and corner taps, metric units were omitted, and references to other standards were updated. Following approval by the B16 Main Committee and the ASME Supervisory Board, the Standard was approved as an American National Standard by ANSI on February 18, 1988.

In 1996, several revisions were made, including the addition of angular meter taps for ring joint flanges in sizes not previously covered. Following approval by the B16 Main Committee and the ASME Supervisory Board, the Standard was approved as an American National Standard by ANSI on November 6, 1996.

In 2006, several revisions were made, including the use of metric units as the primary reference units, while maintaining U.S. Customary units in either parenthetical or separate forms. Changes to dimensions and nomenclature followed that were contained within the 2003 edition of ASME B16.5. This includes the change of minimum flange thickness from C to t_f and corrections for Y_1 and Y_2. Class 400 remains in U.S. Customary tables in Mandatory Appendix II, but is not given in the metric dimensional tables. There were numerous requirement clarifications and editorial revisions. Following the approvals of the Standards Committee and ASME, approval for the new edition was granted by the American National Standards Institute on November 6, 2006.

In the 2009 edition, Mandatory Appendix III was revised and updated. Also, section 4, the materials section, was revised to cover requirements of material specification editions other than those listed in Mandatory Appendix III of ASME B16.5.

In ASME B16.36-2020, 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 subsequent Mandatory Appendices have been redesignated. Cross-references have been updated accordingly. In addition, this edition adds caution regarding O.D. of raised faces, updates requirements for nipple connections, and clarifies several sections. Following approval by the ASME B16 Standards Committee, this revision to the 2015 edition was approved as an American National Standard by ANSI on December 4, 2020, with the designation ASME B16.36-2020.

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*
C. Ramcharran, *Secretary*

STANDARDS COMMITTEE PERSONNEL

A. Appleton, Alloy Stainless Products Co., Inc.
J. E. Barker, DeZURIK, Inc.
R. W. Barnes, ANRIC Enterprises, Inc.
D. C. Bayreuther, Neles Corp.
W. B. Bedesem, Consultant
R. M. Bojarczuk, ExxonMobil Research and Engineering Co.
A. M. Cheta, Qatar Shell GTL
M. A. Clark, Consultant
G. A. Cuccio, Capitol Manufacturing Co.
J. D'Avanzo, Fluoroseal Valves
C. E. Davila, Crane ChemPharma and Energy
K. S. Felder, Valero Energy
D. R. Frikken, Becht Engineering Co., Inc.
D. Hunt, Jr., Fastenal
G. A. Jolly, Samshin, Ltd.
E. J. Lain, Exelon Nuclear
T. A. McMahon, Emerson Process Management
R. C. Merrick, Fluor Enterprises
M. L. Nayyar, NICE
W. H. Patrick, The Dow Chemical Co.
D. W. Rahoi, CCM 2000
C. Ramcharran, The American Society of Mechanical Engineers
D. Reid, VSP Technologies
R. A. Schmidt, Canadoil
J. P. Tucker, Flowserve
F. R. Volgstadt, Volgstadt and Associates, Inc.
F. Feng, *Delegate,* China Productivity Center for Machinery
J. D. Grant, *Alternate,* DeZURIK, Inc.
P. V. Craig, *Contributing Member,* Jomar Group
B. G. Fabian, *Contributing Member,* Pennsylvania Machine Works
A. G. Kireta, Jr., *Contributing Member,* Copper Development Association, Inc.

SUBCOMMITTEE C — STEEL FLANGES AND FLANGED FITTINGS

A. Cheta, *Chair,* Qatar Shell GTL
A. Carrion, *Secretary,* The American Society of Mechanical Engineers
A. Appleton, Alloy Stainless Products Co., Inc.
W. B. Bedesem, Consultant
C. E. Davila, Crane ChemPharma and Energy
B. Dennis, Kerkau Manufacturing
J. G. Dominguez, Welding Outlets, Inc.
J. P. Ellenberger, Retired
D. R. Frikken, Becht Engineering Co., Inc.
E. Gulgun, International Standard Valve, Inc.
G. B. Hailegiorgis, AFGlobal
M. M. Haynie, Bechtel
J. R. Holstrom, Val-Matic Valve and Manufacturing Corp.
G. A. Jolly, Samshin, Ltd.
R. C. Merrick, Fluor Enterprises
M. L. Nayyar, NICE
W. H. Patrick, The Dow Chemical Co.
D. W. Rahoi, CCM 2000
T. V. Ramakrishnan, Forged Components, Inc.
R. A. Schmidt, Canadoil
D. E. Tezzo, Emerson
J. A. Tubb, JCM Industries, Inc.
J. P. Tucker, Flowserve
G. T. Walden, Ferguson
M. M. Zaidi, Worley

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 B16.36-2020
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.36-2020 was approved by the American National Standards Institute on December 4, 2020.

In ASME B16.36-2020, 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 subsequent Mandatory Appendices have been redesignated. Cross-references have been updated accordingly. In addition, this edition includes the following changes identified by a margin note, **(20)**. 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	1	Subparagraphs (a) and (b) revised and subpara. (c) deleted *(18-2822)*
1	2.3	Last two sentences revised *(18-2822)*
1	2.5.1	Revised *(18-2822)*
1	4.1	Revised *(18-2822)*
2	4.2	Revised *(18-2822)*
	8.2	Revised in its entirety *(18-2822)*
2	9	(1) In para. 9.1, last sentence in second paragraph deleted *(18-2822)*
		(2) Paragraphs 9.2 and 9.3 revised in their entirety *(18-2822)*
3	11	Revised *(18-2808)*
23	Figure 9.3.2-1	Added *(18-2822)*
27	Mandatory Appendix II	Former Mandatory Appendix III redesignated and updated *(18-2822)*

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
18-2808	Revised section 11 to include requirements so that flanges with ring joint flanges have a minimum thickness at the ring groove.
18-2822	Revised sections 1, 2, and 3, and para. 2.5.1 to clarify and simplify language. Revised para. 8.2 to correct caution regarding O.D. of raised faces. Revised paras. 9.1, 9.2.1, 9.2.2, 9.3, and added new paras. 9.3.1 and 9.3.2, and new Figure 9.3.2-1 to clarify requirements and add nipple connection requirements. Revised paras. 4.1 and 4.2 to clarify and simplify language and add permission to weld when nipples are specified. Updated references in Mandatory Appendix II (former Mandatory Appendix III).

ORIFICE FLANGES

(20) 1 SCOPE

This Standard covers pressure–temperature ratings, materials, dimensions, tolerances, testing, and making of flanges (similar to those covered in ASME B16.5) that have orifice pressure differential connections. Coverage is limited to the following:

(a) welding neck flanges Classes 300, 400, 600, 900, 1500, and 2500

(b) slip-on and threaded Class 300

2 GENERAL

2.1 References

Codes, standards, and specifications containing provisions to the extent referenced herein constitute requirements of this Standard. These reference documents are listed in Mandatory Appendix II.

2.2 Quality Systems

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

(20) 2.3 Relevant Units

This Standard states values in both SI (Metric) 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. The main text of this Standard does not contain requirements expressed in SI units for Class 400 flanges; however, Mandatory Appendix I does contain requirements for this class, expressed in U.S. Customary units only.

2.4 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.

2.5 Denotation

2.5.1 Pressure Rating Designation. Class, followed by a dimensionless number, is the designation for pressure–temperature ratings as follows: Classes 300, 400, 600, 900, 1500, and 2500. (20)

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

NPS	DN
1	25
1½	40
2	50
2½	65
3	80
4	100

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

2.6 Service Conditions

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

3 PRESSURE–TEMPERATURE RATINGS

The pressure–temperature ratings, including all use recommendations and limitations, and the method of rating given in ASME B16.5 apply to these flanges.

4 MATERIAL

4.1 General (20)

Flange materials shall be in accordance with the requirements of ASME B16.5. Flanges shall be manufactured as one piece in accordance with the applicable materials specification. Except when the purchaser chooses flanges with nipples welded to the flange taps, assembly of multiple pieces into the finished product by welding or other means is not permitted by this Standard.