

ASME B16.36-2015
(Revision of ASME B16.36-2009)

Orifice Flanges

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers

ASME B16.36-2015
(Revision of ASME B16.36-2009)

Orifice Flanges

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: July 15, 2015

The next edition of this Standard is scheduled for publication in 2020.

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 Code Cases. Code Cases and interpretations are published on the ASME Web site under the Committee Pages at <http://cstools.asme.org/> as they are issued.

Errata to codes and standards may be posted on the ASME Web site 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.

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 assumes 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 for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes 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 © 2015 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

CONTENTS

<i>Foreword</i>	iv
<i>Committee Roster</i>	v
<i>Correspondence With the B16 Committee</i>	vi
<i>Summary of Changes</i>	vii
1 Scope.....	1
2 General.....	1
3 Pressure–Temperature Ratings.....	1
4 Material.....	1
5 Size.....	2
6 Marking.....	2
7 Flange Facing Finish.....	2
8 Gaskets for Raised Face Flanges.....	2
9 Pressure Taps.....	2
10 Jack Screw Provision.....	2
11 Flange Dimensions.....	3
12 Flange Threads.....	3
13 Tolerances.....	3
Figures	
1 Corner Taps.....	4
2 Angular Meter Tap for RTJ Flanges.....	4
3 Jack Bolts.....	4
Tables	
1 Class 300 Orifice Flanges, Welding Neck, Threaded, and Slip-On.....	5
2 Class 600 Orifice Flanges, Welding Neck.....	6
3 Class 900 Orifice Flanges, Welding Neck.....	7
4 Class 1500 Orifice Flanges, Welding Neck.....	8
5 Class 2500 Orifice Flanges, Welding Neck.....	9
Mandatory Appendices	
I Dimensional Data for Classes 300, 600, 900, 1500, and 2500 Flanges in U.S. Customary.....	1
II Dimensional Data for Class 400 Flanges in U.S. Customary.....	1
III References.....	1
Nonmandatory Appendix	
A Quality System Program.....	20

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.

Requests for interpretations or suggestions for revisions should be sent to the Secretary, B16 Committee, Two Park Avenue, New York, NY 10016-5990. As an alternative, inquiries may be submitted via e-mail to: SecretaryB16@asme.org.

This revision was approved by the American National Standards Institute on February 24, 2015.

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

W. Bedesem, *Chair*
G. Jolly, *Vice Chair*
C. E. O'Brien, *Secretary*

STANDARDS COMMITTEE PERSONNEL

A. Appleton, Alloy Stainless Products Co., Inc.	G. A. Jolly, Flowserve/Gestra, USA
R. W. Barnes, Anric Enterprises, Inc.	M. Katcher, Haynes International
W. B. Bedesem, Consultant	T. A. McMahon, Emerson Process Management
R. Bojarczuk, ExxonMobil Research & Engineering Co.	M. L. Nayyar, NICE
A. M. Cheta, Shell Exploration and Production Co.	C. E. O'Brien, The American Society of Mechanical Engineers
M. A. Clark, Nibco, Inc.	W. H. Patrick, The Dow Chemical Co.
G. A. Cuccio, Capitol Manufacturing Co.	D. Rahoi, Consultant
C. E. Davila, Crane Energy	R. A. Schmidt, Canadoil
D. Frikken, Becht Engineering Co.	H. R. Sonderegger, Fluoroseal Valves USA
R. B. Hai, RBH Associates	W. M. Stephan, Flexitallic LP
K. A. Hettler, U.S. Coast Guard	F. Volgstadt, Volgstadt & Associates, Inc.
	D. A. Williams, Southern Co. Generation

SUBCOMMITTEE C — STEEL FLANGES AND FLANGED FITTINGS

C. E. Davila, <i>Chair</i> , Crane Valves	J. R. Holstrom, Val-Matic Valve & Manufacturing Corp.
J. P. Ellenberger, <i>Vice Chair</i> , Consultant	M. Katcher, Haynes International
R. Lucas, <i>Secretary</i> , The American Society of Mechanical Engineers	M. L. Nayyar, NICE
A. Appleton, Alloy Stainless Products Co., Inc.	W. H. Patrick, The Dow Chemical Co.
W. B. Bedesem, Consultant	D. Rahoi, Consultant
W. J. Birkholz, Ezefflow USA, Inc.	T. V. Ramakrishnan, Forged Vessel Connections
A. M. Cheta, Shell Exploration & Production Co.	R. A. Schmidt, Canadoil
B. Dennis, Kerkau Manufacturing	D. E. Tezzo, Tyco Valves & Controls
D. Frikken, Becht Engineering Co.	J. P. Tucker, Flowserve
E. Gulgun, International Standard Valve, Inc.	G. T. Walden, Wolseley
G. B. Hailegiorgis, <i>Contributing Member</i> , Ameriforge Group, Inc.	M. M. Zaidi, KBR

v

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, 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

As an alternative, inquiries may be submitted via e-mail to: SecretaryB16@asme.org.

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 for the purpose of providing 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, 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 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.

The request for 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.
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. 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 this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the

intent of the original request.

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 that are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B16 Standards Committee.

ASME B16.36-2015

SUMMARY OF CHANGES

Following approval by the B16 Committee and ASME, and after public review, ASME B16.36-2015 was approved by the American National Standards Institute on February 24, 2015.

ASME B16.36-2015 includes editorial changes, revisions, and corrections, which are identified by a margin designator, (15), placed next to the affected area.

<i>Page</i>	<i>Location</i>	<i>Change</i>
1	1	First paragraph revised
	2.4	Revised
	4.1	Revised
4	Table 1	In illustration and throughout table, “weld” revised to read “welding”
5	Table 2	In General Note (b), “weld” read “welding”
12	Table I-1	In illustration and throughout table, “weld” revised to read “welding”
13	Table I-2	In General Note (b), “weld” revised to read “welding”

INTENTIONALLY LEFT BLANK

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

ORIFICE FLANGES

(15) 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, 600, 900, 1500, and 2500. U.S. Customary units are presented in Mandatory Appendix I.

(b) slip-on and threaded Class 300.

(c) welding neck flanges Class 400 in U.S. Customary units in Mandatory Appendix II.

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 III.

2.2 Quality Systems

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

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 or in separate tables. 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. Except for Class 400, the values in U.S. Customary units are in Mandatory Appendix I. The main text of this Standard does not contain requirements for Class 400 welding neck flanges; however, Mandatory Appendix II does contain requirements for this class, expressed in U.S. Customary units only.

(15) 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

(a) Class, followed by a dimensionless number, is the designation for pressure-temperature ratings as follows: Classes 300 600 900 1500 2500.

(b) Class 400 is retained in the U.S. Customary tables.

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 $p25 \times (NPS)$.

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

(a) 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. Assembly of multiple pieces into the finished product by welding or other means is not permitted by this Standard.

(15)

(b) For materials manufactured to editions of the material specification other than those listed in Mandatory Appendix III of ASME B16.5, refer to para. 4.3.

4.2 Bolting

Bolting material recommendations are given in ASME B16.5. For materials manufactured to editions of the material specification other than those listed in Mandatory Appendix III of ASME B16.5, refer to para. 4.3.

4.3 Materials Manufactured to Other Editions

Materials may meet the requirements of material specification editions other than those listed in Mandatory Appendix III of ASME B16.5, provided

(a) the materials are the same specification, e.g., grade, type, class, or alloy, and heat-treated conditions, as applicable

(b) the flange manufacturer certifies that the requirements of the edition of the specification listed in Mandatory Appendix III of ASME B16.5 have been met

4.4 Plugs

Pressure-retaining plugs shall conform to ASME B16.11, unless otherwise agreed between purchaser and manufacturer. Plug material shall be at least as corrosion resistant as the corresponding flange material.

5 SIZE

Orifice flange sizes are indicated by the nominal pipe size to which they are attached. Only those listed in Tables 1 through 5, Tables 1-1 through 1-5, and Mandatory Appendix II are considered standard.

6 MARKING

Flanges shall be marked as required in ASME B16.5.

For welding neck flanges only, the bore diameter shall be marked.

7 FLANGE FACING FINISH

The finish of contact faces shall conform to the

conditions, its location may be altered to accommodate other than 1.5 mm (0.06 in.) thick gaskets or ring-type joint gaskets whose thickness may vary from that listed in Tables 2 through 5 or those listed in Tables 1-2 through 1-5 or Mandatory Appendix II.

The alteration of location may also be accomplished by the removal of 2 mm (0.06 in.) from the raised face of the flange. If an original 2 mm (0.06 in.) high raised face is removed, the user is cautioned to limit the outside diameter of the gasket or orifice plate to the tabulated *R* dimension.

9 PRESSURE TAPS

9.1 General

Each orifice flange shall be provided with two pressure tap holes extending radially from the outside diameter of the flange to the inside diameter of the flange. Corner taps may be used on NPS 1½ and smaller if space permits. See Fig. 1.

For ring joint flanges listed in Tables 2 through 5, Tables 1-2 through 1-5, and Mandatory Appendix II, where radial taps will interfere with the ring groove, angular meter taps, as illustrated in Fig. 2, will be required. Each pressure tap hole shall be equipped with a pipe plug.

9.2 Location

9.2.1 Measurement. The 24 mm (0.94 in.) dimension for raised face and 19 mm (0.75 in.) for ring joint shall be measured at the bore.

9.2.2 Identification. For ring joint flanges requiring alteration of pressure tap location due to interference with the ring groove other than methods provided in this Standard, such alteration shall be identified per agreement between purchaser and manufacturer.

9.3 Pipe Connection

Unless otherwise specified, pressure tap holes may be either tapped NPT in accordance with ASME B1.20.1 1½

requirements of ASME B16.5.

8 GASKETS FOR RAISED FACE FLANGES

8.1 Gasket Thickness

Flange dimensions are based on the use of 1.5 mm (0.06 in.) thick gaskets.

8.2 Flange Gaskets Requiring Dimensional Changes

When the location of the pressure tap with respect to the orifice plate is critical to the service and metering

or $1/2$ NPS socket connection in accordance with ASME B16.11.

10 JACK SCREW PROVISION

10.1 Location

Each flange shall have a machine bolt mounted in a hole drilled on the flange bolt circle centerline at 90 deg from the pressure taps, for use as a jack screw. The machine bolt shall be regular with one heavy hex nut. See Fig. 3.

10.2 Slot for Nut

A slot shall be provided in the flange 2 mm (0.06 in.) wider than the width across flats of the nut. The depth of

the slot shall admit the nut so that there is no interference with the joining of the flanges when bolted together without orifice plate.

10.3 Tapped Hole

As an alternative to para. 10.2, a tapped hole may be provided and the hex nut omitted when agreed on between the purchaser and the manufacturer.

11 FLANGE DIMENSIONS

Dimensions are listed in Tables 1, 2, 3, 4, and 5 for metric, and Tables 1-1, 1-2, 1-3, 1-4, and 1-5, and Mandatory Appendix II for U.S. Customary.

12 FLANGE THREADS

Threaded flanges shall have an American National Standard taper pipe thread conforming to ASME B1.20.1.

(a) The thread shall be concentric with the axis of the flange. Variations in alignment shall not exceed 5 mm/m (0.06 in./ft).

(b) The flanges are made with counterbores at the back of the flange and the threads shall be chamfered to the diameter of the counterbore at an angle of approximately 45 deg with the axis of the thread to afford easy

entrance in making a joint. The counterbore and chamfer shall be concentric with the thread.

(c) In order to permit the pipe to be inserted to the face of the flange, the threads should have full root diameters through to the face of the flange, or shall have a counterbore at the face of the flange.

(d) The gaging notch of the working gage shall come flush with the bottom of the chamfer in all threaded flanges and shall be considered as being the intersection of the chamfer cone and the pitch cone of the thread. This depth of chamfer is approximately equal to one-half the pitch of the thread.

(e) The maximum allowable thread variation is one turn large or small from the gaging notch.

13 TOLERANCES

Tolerances on all dimensions shall be as shown in ASME B16.5 except for those shown below.

13.1 Pressure Tap Location

Tolerance on location of center of pressure tap hole¹ from flange face shall be

(a) ± 0.5 mm (± 0.02 in.) for flanges smaller than NPS 4

(b) ± 0.8 mm (± 0.03 in.) for flanges NPS 4 and larger

13.2 Bore Diameter

Bore diameter tolerance (welding neck flanges only) is $\pm 0.5\%$ of nominal value.

¹ See para. 9.2.

3

Fig. 1 Corner Taps

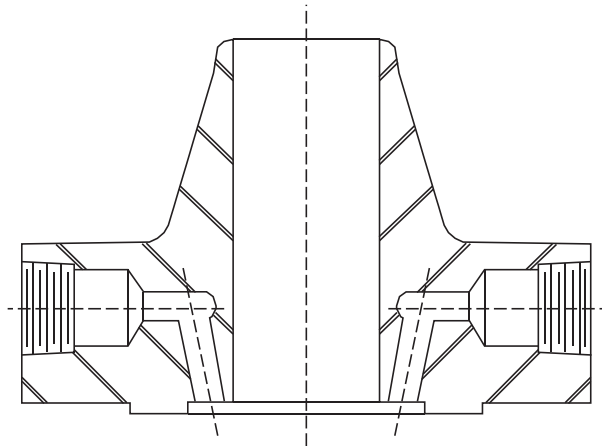


Fig. 2 Angular Meter Tap for RTJ Flanges

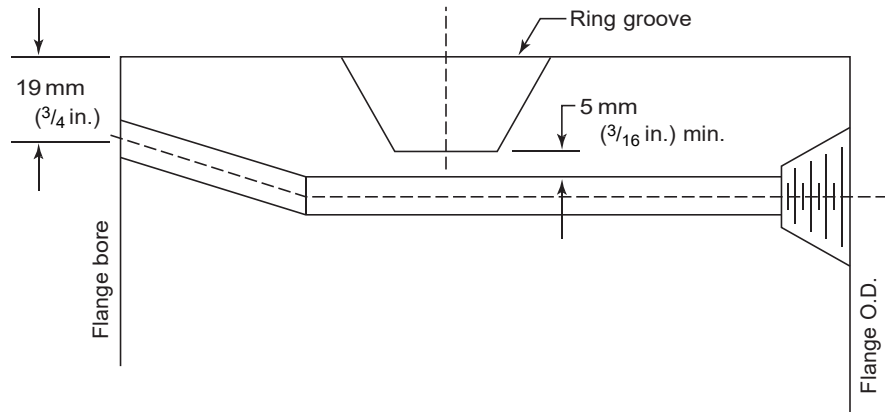
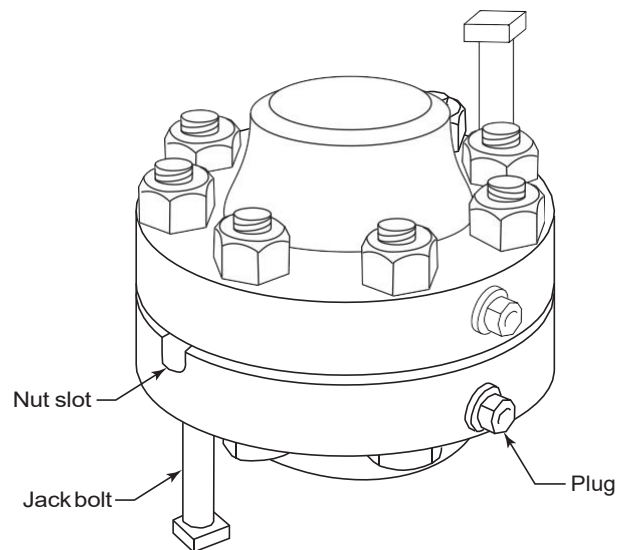
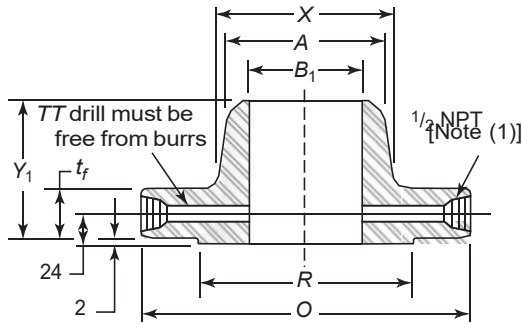


Fig. 3 Jack Bolts

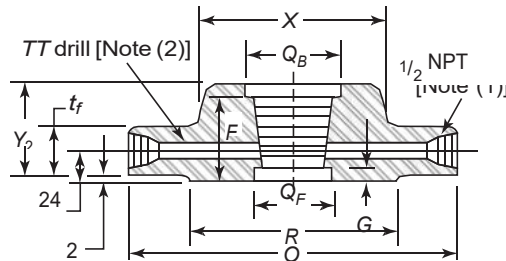


(15)

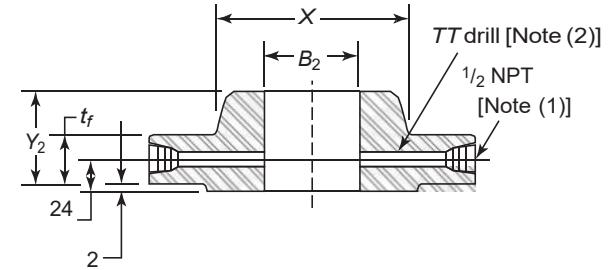
Table 1 Class 300 Orifice Flanges, Welding Neck, Threaded, and Slip-On



Welding Neck



Threaded



Slip-On

Nom- Minimum	Outside	Outside	Length Through			Hub Diameter	Diameter of	Counterb			Diameter of	Drilling Template			Bolt Length					
	Diameter		Hub	Slip-On and	Welding			ore Counterbore	Depth Bore	Pressure Diameter		Number	Diameter	[(3), (4)]						
Pipe Size	Face, R	of Flange, O	of Flange, t_f	Threaded, Y_2	Neck, Y_1	of Hub, X	of Chamfer (W.N.), A	Back, Q_B	Q_F	(From Face) F	G	Slip-On, Stud Bolt B_2	Welding Neck, B_1	Connection, TT	Circle	Bolt Hole	Holes	of Bolts	of Bolts	Machine
1	50.8	125	36.6	46	81	54	33.4	35.8	33.0	36.5	19.0	34.5	(5)	6.4	88.9	4				
1½	73.0	155	36.6	46	84	70	48.3	50.5	48.0	37.3	18.3	49.5	(5)	6.4	114.3	4	11/16	5/8	115	125
2	92.1	165	36.6	48	84	84	60.3	63.5	59.9	38.1	17.5	61.9	(5)	6.4	127.0	8	13/16	3/4	120	125
2½	104.8	190	36.6	49	87	100	73.0	76.2	72.1	44.4	14.3	74.6	(5)	6.4	149.2	8	11/16	5/8	115	125
3	127.0	210	36.6	51	87	117	88.9	92.2	87.9	46.0	14.3	90.7	(5)	9.5	168.3	8	13/16	3/4	120	135
4	157.2	255	36.6	52	90	146	114.3	117.6	113.0	47.6	14.3	116.1	(5)	12.7	200.0	8	13/16	3/4	120	135
6	215.9	320	36.6	52	98	206	168.3	171.4	166.9	47.6	7.9	170.7	(5)	12.7	269.9	12	13/16	3/4	120	135
8	269.9	380	39.7	60	110	260	219.1	222.2	217.2	55.6	11.1	221.5	(5)	12.7	330.2	12	7/8	3/4	120	135
10	323.8	445	46.1	65	116	321	273.0	(6)	(6)	(6)	(6)	276.2	(5)	12.7	387.4	16	1	7/8	125	145
12	381.0	520	49.3	71	129	375	323.8	(6)	(6)	(6)	(6)	327.0	(5)	12.7	450.8	16	1½	1	145	165
14	412.8	585	52.4	75	141	425	355.6	(6)	(6)	(6)	(6)	359.2	(5)	12.7	514.4	20	1¼	1½	160	180
16	469.9	650	55.6	81	144	483	406.4	(6)	(6)	(6)	(6)	410.5	(5)	12.7	571.5	20	1¼	1½	165	185
18	533.4	710	58.8	87	157	533	457.0	(6)	(6)	(6)	(6)	461.8	(5)	12.7	628.6	24	1½	1¼	180	195
20	584.2	775	62.0	94	160	587	508.0	(6)	(6)	(6)	(6)	513.1	(5)	12.7	685.8	24	1¾	1¼	185	205
24	692.2	915	68.3	105	167	702	610.0	(6)	(6)	(6)	(6)	616.0	(5)	12.7	812.8	24	1¾	1¼	190	215
																	1½	1½	210	240

GENERAL NOTES:

(a) Dimensions are in millimeters, except for bolts and bolt holes. Reference Mandatory Appendix I for U.S. Customary.

(b) Welding neck flanges NPS 3 and smaller are dimensionally identical to Class 600 flanges and may be so marked.

(c) All other dimensions are in accordance with ASME B16.5.

NOTES:

(1) Other NPT sizes may be furnished if required.

(2) For slip-on and threaded flanges, verify that TT drilling extends to inside diameter of pipe after assembly and is free from burrs.

(3) Bolt lengths include allowance for orifice and gasket thickness of 6 mm (0.25 in.) for NPS 1 to NPS 12 and 10 mm (0.38 in.) for NPS 14 to NPS 24.

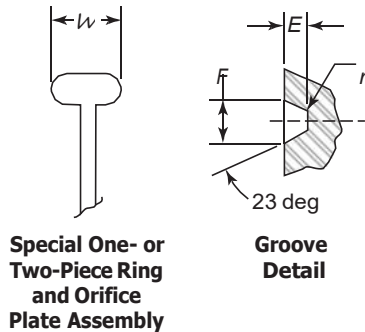
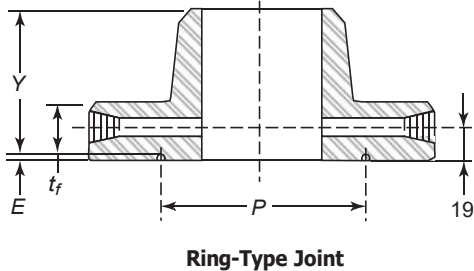
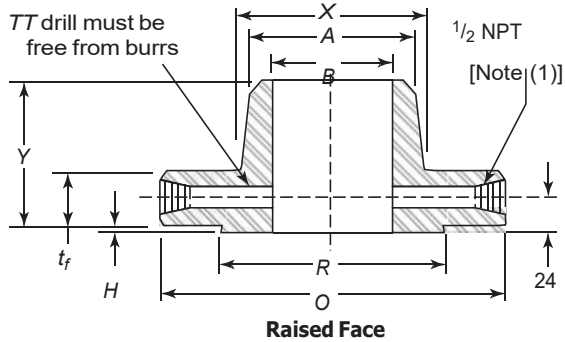
(4) In conformance with ASME B16.5, stud bolt lengths do not include point heights.

(5) Bore diameter of welding neck flanges is to be specified by the purchaser.

(6) Threaded flanges are furnished in NPS 1 to NPS 8 only.

(15)

Table 2 Class 600 Orifice Flanges, Welding Neck



Pipe Size	Outside Diameter of		Ring-Type Joint										Hub		Diam- eter		Drilling Template				Length of	
	Face, R	Outside Diameter Pitch O	Minimum Groove Flange, t _f	Num- ber Y	Height Length Nominal H	Radius Nominal R	Diameter Pitch P	Ring Depth E	Width, F	Bottom, r	Thick- ness W	Special Hub, X	Raised Pressure A	Bore B	Groove Con- nection, T	Bolt Circ C	of Hole D	Diameter of Holes		Dia- meter Bolts E	Stud Bolts (2), (3)	
																		Raise Face F	Join Join J		Raise Face F	Join Join J
1	50.8	125	36.6	81	2	R16	50.80	6.35	8.74	0.8	25.4	54	33.5	(4)	6.4	88.9	4	13/16	3/4	5/8	125	140
1½	73.0	155	36.6	84	2	R20	68.27	6.35	8.74	0.8	25.4	70	48.3	(4)	6.4	114.3	4	11/16	3/4	5/8	135	140
2	92.1	165	36.6	84	2	R23	82.55	7.92	11.91	0.8	27.0	84	60.3	(4)	6.4	127.0	8	13/16	7/8	3/4	125	140
2½	104.8	190	36.6	87	2	R26	101.60	7.92	11.91	0.8	27.0	100	73.0	(4)	6.4	149.2	8	13/16	7/8	3/4	135	145
3	127.0	210	36.6	87	2	R31	123.83	7.92	11.91	0.8	27.0	117	88.9	(4)	9.5	168.3	8				135	145
4	157.2	275	38.1	102	7	R37	149.23	7.92	11.91	0.8	27.0	152	114.3	(4)	12.7	215.9	8	1	1	7/8	150	165
6	215.9	355	47.7	117	7	R45	211.12	7.92	11.91	0.8	27.0	222	168.3	(4)	12.7	292.1	12	1½	1½	1	180	190
8	269.9	420	55.6	133	7	R49	269.88	7.92	11.91	0.8	27.0	273	219.1	(4)	12.7	349.2	12	1¾	1¾	1½	195	210
10	323.8	510	63.5	152	7	R53	323.85	7.92	11.91	0.8	27.0	343	273.0	(4)	12.7	431.8	16	1¾	1¾	1¾	220	235
12	381.0	560	66.7	156	7	R57	381.00	7.92	11.91	0.8	27.0	400	323.8	(4)	12.7	489.0	20	1¾	1¾	1¾	230	240
14	412.8	605	69.9	165	7	R61	419.10	7.92	11.91	0.8	27.0	432	355.6	(4)	12.7	527.0	20	1½	1½	1¾	240	255
16	469.9	685	76.2	178	7	R65	469.90	7.92	11.91	0.8	30.2	495	406.4	(4)	12.7	603.2	20	1¾	1¾	1½	260	275
18	533.4	745	82.6	184	7	R69	533.40	7.92	11.91	0.8	30.2	546	457.2	(4)	12.7	654.0	20	1¾	1¾	1¾	280	290
20	584.2	815	88.9	190	7	R73	584.20	9.53	13.49	1.5	31.8	610	508.0	(4)	12.7	723.9	24	1¾	1¾	1¾	300	320
24	692.2	940	101.6	203	7	R77	692.15	11.13	16.66	1.5	36.5	718	609.6	(4)	12.7	838.2	24	2	2	1¾	335	350

GENERAL NOTES:

- (a) Dimensions are in millimeters, except for bolts and bolt holes. Reference Mandatory Appendix I for U.S. Customary.
(b) Welding neck flanges NPS 3 and smaller are identical to Class 300 flanges except for bolting and may be used for such service.
(c) All other dimensions are in accordance with ASME B16.5.
(d) Ring joint flange in NPS 24 will require an angular meter tap as shown in Fig. 2.

NOTES:

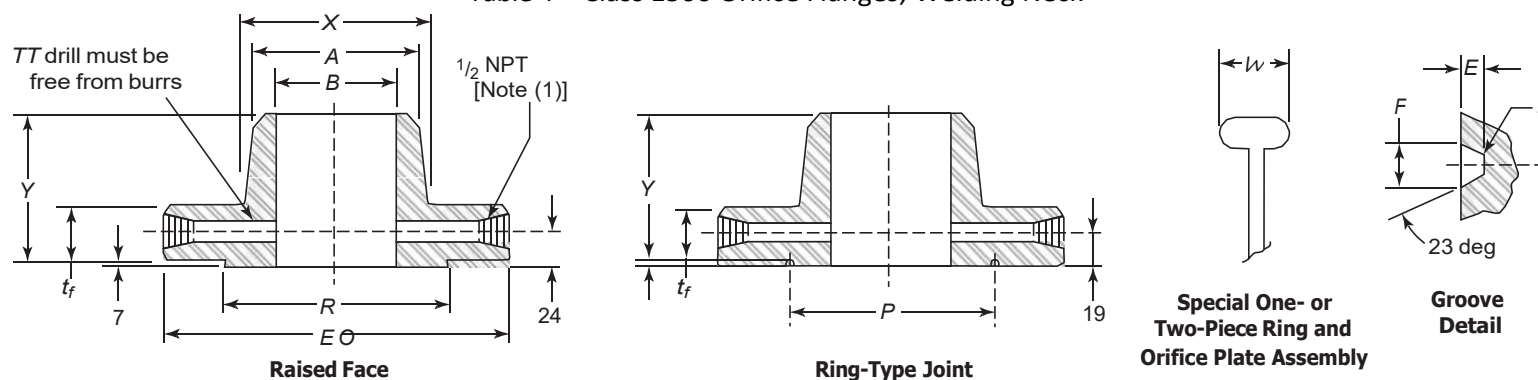
- (1) Other NPT sizes may be furnished if required.
(2) In conformance with ASME B16.5, stud bolt lengths do not include point heights.
(3) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 6 mm (0.25 in.) for NPS 1 to NPS 12 and 10 mm (0.38 in.) for NPS 14 to NPS 24. Bolt lengths for ring-type joint flanges include allowance of 15 mm (0.62 in.) for NPS 1 to NPS 10, 19 mm (0.75 in.) for NPS 12 to NPS 18, and 22 mm (0.88 in.) for NPS 20.
(4) Bore is to be specified by the purchaser.

Special One- or Two-Piece Ring and Orifice Plate Assembly

Groove Detail

(4) Bore is to be specified by the purchaser.

Table 4 Class 1500 Orifice Flanges, Welding Neck



Nominal	Diameter of Raised Face, Circle	Outside Diameter of Flange, Raised Holes	Thickness of Flange, Ring Size Holes	Length of Hub, Bolts	Number of Faces	Through Diameter, Joint	Groove Diameter, Depth, O	Radius Width, t _f	Special Bottom, Y	Diameter of Groove, P	Diameter at Hub, E	Diameter at Flange, F	Pressure of Chamfer, r	Diameter of Bore, W	Diameter of Ring, X	Beginning Bolt A	Stud Bolts ((2), (3))	Number of B	TT
1	50.8	150	38.1	83	R16	50.80	6.35	8.74	0.8	25.4	52	33.5	(4)	6.4	101.6	4	1	150	160
1½	73.0	180	38.1	89	R20	68.27	6.35	8.74	0.8	25.4	70	48.3	(4)	6.4	123.8	4	1½	160	165
2	92.1	215	38.1	102	R24	95.25	7.92	11.91	0.8	27.0	105	60.3	(4)	6.4	165.1	8	1	150	165
2½	104.8	245	41.3	105	R27	107.95	7.92	11.91	0.8	27.0	124	73.0	(4)	6.4	190.5	8	1½	165	180
3	127.0	265	47.7	117	R35	136.53	7.92	11.91	0.8	27.0	133	88.9	(4)	9.5	203.2	8	1¼	185	185
4	157.2	310	54.0	124	R39	161.93	7.92	11.91	0.8	27.0	162	114.3	(4)	12.7	241.3	8	1½	205	215
6	215.9	395	82.6	171	R46	211.14	9.52	13.49	1.5	28.6	229	168.3	(4)	12.7	317.5	12	1½	265	280
8	269.9	485	92.1	213	R50	269.88	11.13	16.66	1.5	33.3	292	219.1	(4)	12.7	393.7	12	1¾	300	310
10	323.8	585	108.0	254	R54	323.85	11.13	16.66	1.5	33.3	368	273.0	(4)	12.7	482.6	12	2	345	355
12	381.0	675	123.9	283	R58	381.00	14.27	23.01	1.5	39.7	451	323.8	(4)	12.7	571.6	16	2½	380	400
14	412.8	750	133.4	298	R63	419.10	15.88	26.97	2.4	44.4	495	355.6	(4)	12.7	635.0	16	2¾	415	445
16	469.9	825	146.1	311	R67	469.90	17.48	30.18	2.4	50.8	552	406.4	(4)	12.7	704.8	16	2½	450	485
18	533.4	915	162.0	327	R71	533.40	17.48	30.18	2.4	50.8	597	457.2	(4)	12.7	774.7	16	2¾	500	535
20	584.2	985	177.8	356	R75	584.20	17.48	33.32	2.4	54.0	641	508.0	(4)	12.7	831.8	16	3½	545	570
24	692.2	1170	203.2	406	R79	692.15	20.62	36.53	2.4	58.7	762	609.6	(4)	12.7	990.6	16	3½	620	660

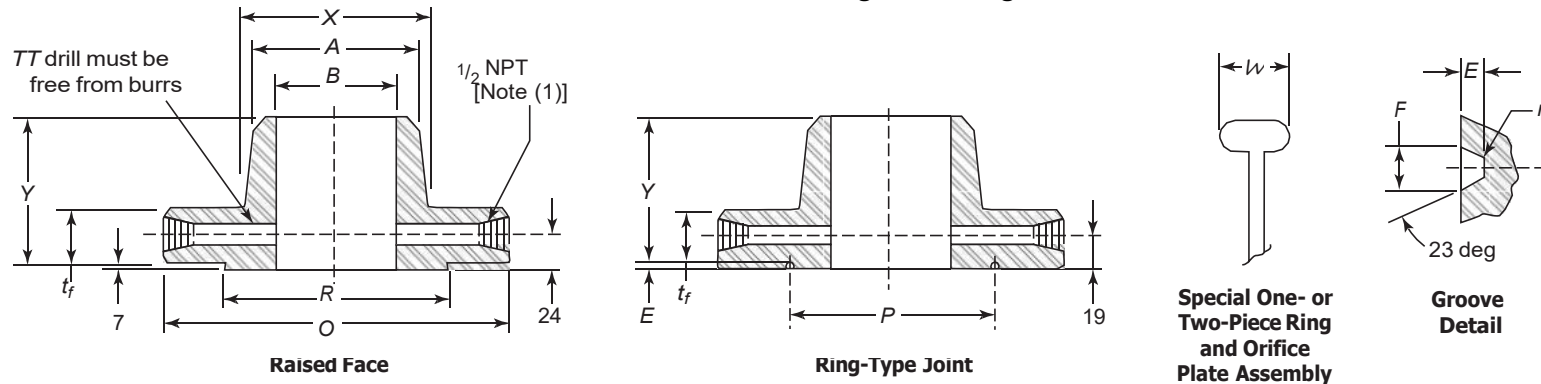
GENERAL NOTES:

- Dimensions are in millimeters, except for bolts and bolt holes.
- All other dimensions are in accordance with ASME B16.5.
- Ring joint flanges larger than NPS 6 will require angular meter taps shown in Fig. 2.

NOTES:

- Other NPT sizes may be furnished if required.
- In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 6 mm (0.25 in.) for NPS 1 to NPS 12 and 10 mm (0.38 in.) for NPS 14 to NPS 24. Bolt lengths for ring-type joint flanges include allowance of 15 mm (0.62 in.) for NPS 1 to NPS 6.
- Bore is to be specified by the purchaser.

Table 5 Class 2500 Orifice Flanges, Welding Neck



Nominal Pipe Size	Outside Diameter of Face, <i>R</i>	Outside Diameter of <i>O</i>	Minimum Thick- ness of Flange, <i>t_f</i>	Length Thru Hub, <i>Y</i>	Ring-Type Joint										Diam- eter of Pres- sure Con- nection, <i>TT</i>	Diam- eter of Bolt Circle	Drilling Template			Length of Stud										
					Groov Num- ber	Pitch Diameter <i>P</i>	Groov Depth <i>E</i>	Groove Width, <i>F</i>	Radius at Bottom <i>r</i>	Special Oval Ring Height <i>W</i>	Diam- eter of Hub, <i>X</i>	Hub Diameter Beginnin <i>A</i>	Bore, <i>B</i>	Bolts			Number of Ring Holes	Diam- eter of Holes Face	Diam- eter of Holes Joint	Diam- eter of Holes	Length of Stud	Length of Stud								
																							Bore, <i>B</i>	Bolts	Number of Ring Holes	Diam- eter of Holes Face	Diam- eter of Holes Joint	Diam- eter of Holes	Length of Stud	Length of Stud
(2)	(3)																													
1	50.8	160	38.1	92	R18	60.33	6.35	8.74	0.8	25.4	57	33.5	(4)	6.4	108.0															
1½	73.0	205	44.5	111	R23	82.55	7.92	11.91	0.8	27.0	79	48.3	(4)	6.4	146.0	4	1¼	1⅛	180	190										
2	92.1	235	50.8	127	R26	101.60	7.92	11.91	0.8	27.0	95	60.3	(4)	6.4	171.4	8	1⅛	1	185	195										
2½	104.8	265	57.2	143	R28	111.13	9.53	13.49	1.5	30.2	114	73.0	(4)	6.4	196.8	8	1¼	1⅛	205	215										
3	127.0	305	66.7	168	R32	127.00	9.53	13.49	1.5	30.2	133	88.9	(4)	9.5	228.6	8	1⅜	1¼	230	240										
4	157.2	355	76.2	190	R38	157.18	11.13	16.66	1.5	33.3	165	114.3	(4)	12.7	273.0	8	1⅝	1½	260	275										
6	215.9	485	108.0	273	R47	228.60	12.70	19.84	1.5	36.5	235	168.3	(4)	12.7	368.3	8	2⅛	2	350	370										
8	269.9	550	127.0	318	R51	279.40	14.27	23.01	1.5	39.7	305	219.1	(4)	12.7	438.2	12	2⅝	2	385	405										
10	323.8	675	165.1	419	R55	342.90	17.48	30.18	2.4	47.6	375	273.0	(4)	12.7	539.8	12	2⅝	2½	490	515										
12	381.0	760	184.2	464	R60	406.40	17.48	33.32	2.4	50.8	441	323.8	(4)	12.7	619.1	12	2⅞	2¾	540	570										

GENERAL NOTES:

- Dimensions are in millimeters, except for bolts and bolt holes.
- All other dimensions are in accordance with ASME B16.5.
- Ring joint flanges larger than NPS 3 will require angular meter taps as shown in Fig. 2.

NOTES:

- Other NPT sizes may be furnished if required.
- In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 6 mm (0.25 in.) for NPS 1 to NPS 12. Bolt lengths for ring-type joint flanges include allowance of 15 mm (0.62 in.) for NPS 1 to NPS 3.
- Bore is to be specified by the purchaser.

INTENTIONALLY LEFT BLANK

MANDATORY APPENDIX I

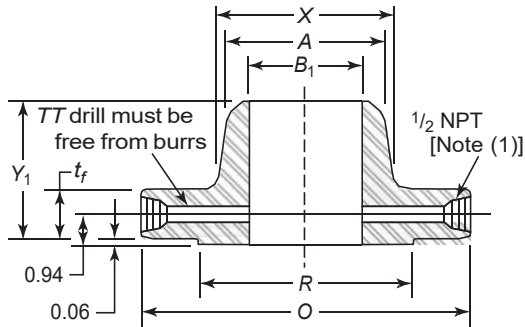
DIMENSIONAL DATA FOR CLASSES 300, 600, 900, 1500, AND 2500 FLANGES IN U.S. CUSTOMARY UNITS

This Mandatory Appendix is an integral part of ASME B16.36, and is placed after the main text for convenience. Tables I-1 through I-5, included in this Appendix, provide dimensional data in U.S. Customary units for the following: Classes 300, 600, 900, 1500, and 2500 flanges.

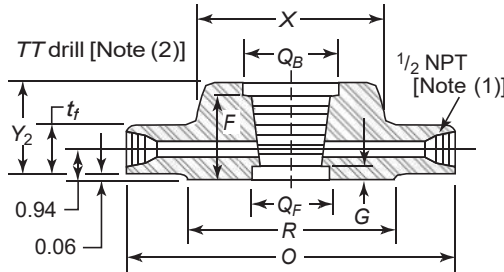
Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

(15)

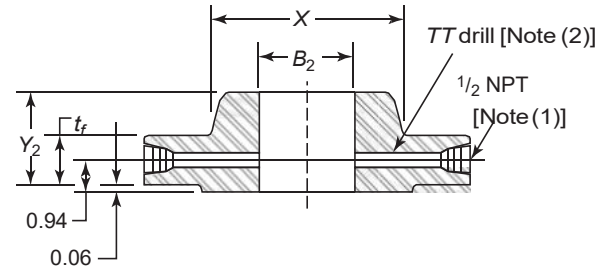
Table I-1 Class 300 Orifice Flanges, Welding Neck, Threaded, and Slip-On



Welding Neck



Threaded



Slip-On

Nom- m	Outside Diameter		Length Through Hub		Slip-On and Threaded, Y ₂	Welding of Hub, X	Hub Diameter of Chamfer (W.N.), A	Diameter of Counterbore				Pressure Diameter of Connection, TT	Drilling Template			Bolt Length				
	Face, R	of Flange, O	Thickness of Flange, t _f	Thickness Y ₂				Neck, Y ₁	Back, Q _B	Depth Bore (From Face) F	G		Slip-On, Stud	Welding Neck, G	Number of Bolt Holes	Diameter of Bolt Holes	[(3), (4)]			
																	of Machine	Bolts		
Pipe Size	Face, R	of Flange, O	Thickness of Flange, t _f	Threaded, Y ₂	Neck, Y ₁	of Hub, X	of Chamfer (W.N.), A	Back, Q _B	Q _F	(From Face) F	G	Slip-On, Stud	Welding Neck, G	Pressure Diameter of Connection, TT	Circle	Holes	Holes	Bolts	Bolts	Bolt S
1	2.00	4.88	1.44	1.81	3.19	2.12	1.32	1.41	1.30	1.44	0.75	1.36	(5)	1/4	3.50	4	11/16	5/8	4.50	
1½	2.88	6.12	1.44	1.81	3.31	2.75	1.90	1.99	1.89	1.47	0.72	1.95	(5)	1/4	4.50	4	13/16	¾	4.75	5.00
2	3.62	6.50	1.44	1.88	3.31	3.31	2.38	2.50	2.36	1.50	0.69	2.44	(5)	1/4	5.00	8	11/16	5/8	4.50	5.00
2½	4.12	7.50	1.44	1.94	3.44	3.94	2.88	3.00	2.84	1.75	0.56	2.94	(5)	1/4	5.88	8	13/16	¾	4.75	5.25
3	5.00	8.25	1.44	2.00	3.44	4.62	3.50	3.63	3.46	1.81	0.56	3.57	(5)	¾	6.62	8	13/16	¾	4.75	5.25
4	6.19	10.00	1.44	2.06	3.56	5.75	4.50	4.63	4.45	1.88	0.56	4.57	(5)	1/2	7.88	8	13/16	¾	4.75	5.25
6	8.50	12.50	1.44	2.06	3.88	8.12	6.63	6.75	6.57	1.88	0.31	6.72	(5)	1/2	10.62	12	7/8	¾	4.75	5.25
8	10.62	15.00	1.56	2.38	4.31	10.25	8.63	8.75	8.55	2.19	0.44	8.72	(5)	1/2	13.00	12	1	7/8	5.00	5.75
10	12.75	17.50	1.81	2.56	4.56	12.62	10.75	(6)	(6)	(6)	(6)	10.88	(5)	1/2	15.25	16	1½	1	5.75	6.50
12	15.00	20.50	1.94	2.81	5.06	14.75	12.75	(6)	(6)	(6)	(6)	12.88	(5)	1/2	17.75	16	1¼	1⅛	6.25	7.00
14	16.25	23.00	2.06	2.94	5.56	16.75	14.00	(6)	(6)	(6)	(6)	14.14	(5)	1/2	20.25	20	1¼	1⅛	6.50	7.25
16	18.50	25.50	2.19	3.19	5.69	19.00	16.00	(6)	(6)	(6)	(6)	16.16	(5)	1/2	22.50	20	1⅜	1¼	7.00	7.75
18	21.00	28.00	2.31	3.44	6.19	21.00	18.00	(6)	(6)	(6)	(6)	18.18	(5)	1/2	24.75	24	1⅜	1¼	7.25	8.00
20	23.00	30.50	2.44	3.69	6.31	23.12	20.00	(6)	(6)	(6)	(6)	20.20	(5)	1/2	27.00	24	1⅜	1¼	7.50	8.50
24	27.25	36.00	2.69	4.12	6.56	27.62	24.00	(6)	(6)	(6)	(6)	24.25	(5)	1/2	32.00	24	1⅝	1½	8.25	9.50

GENERAL NOTES:

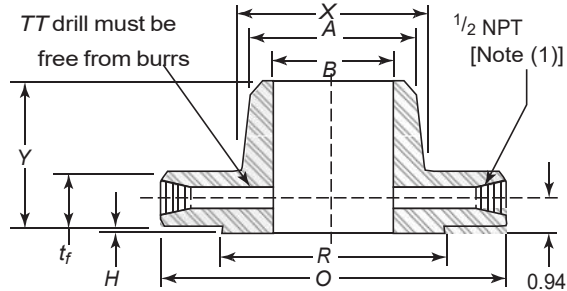
- Dimensions are in inches.
- Welding neck flanges NPS 3 and smaller are dimensionally identical to Class 600 flanges and may be so marked.
- All other dimensions are in accordance with ASME B16.5.

NOTES:

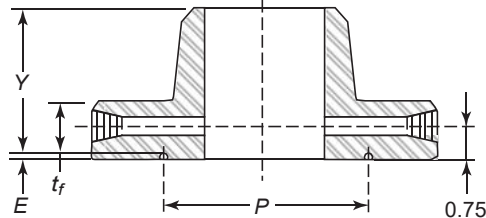
- Other NPT sizes may be furnished if required.
- For slip-on and threaded flanges, verify that TT drilling extends to inside diameter of pipe after assembly and is free from burrs.
- Bolt lengths include allowance for orifice and gasket thickness of 0.25 in. for NPS 1 to NPS 12 and 0.38 in. for NPS 14 to NPS 24.
- In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- Bore diameter of welding neck flanges is to be specified by the purchaser.
- Threaded flanges are furnished in NPS 1 to NPS 8 only.

(15)

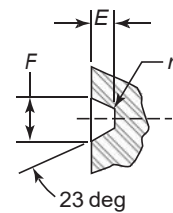
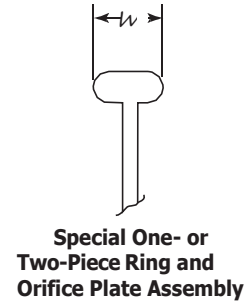
Table I-2 Class 600 Orifice Flanges, Welding Neck



raised face



ring-type joint



Groove Detail

Nomin al Pipe	Outside Diamet er	Outsid Diamet er of Flange	Minimu Thick- ness of Flange	Length of Hub	Height of Face	Ring-Type Joint					Special Diam- eter of Hub , X	Hub Diameter	Diam- eter of Pressure Convec- tion, B	Drilling Template					Length of Stud Bolts [(2), (3)]			
						Pitch Diamet er, P	Groov e Depth	Groov e Width	Radius at Bottom	Oval Ring Height,				Bolt Circul e	Num- ber of Hole s	Hole s	Rin g	of Ring Bolts				
1	2.00	4.88	1.44	3.19	0.06	R16	2.000	0.250	0.344	0.03	1.00	2.12	1.32	(4)	1/4	4.50	4	0.81	0.88	5/8	5.00	5.50
1 1/2	2.88	6.12	1.44	3.32	0.06	R20	2.688	0.250	0.344	0.03	1.00	2.75	1.90	(4)	1/4	5.00	8	0.69	0.75	3/4	5.25	5.50
2	3.62	6.50	1.44	3.32	0.06	R23	3.250	0.312	0.469	0.03	1.06	3.31	2.38	(4)	1/4	5.88	8	0.81	0.88	5/8	5.00	5.50
2 1/2	4.12	7.50	1.44	3.44	0.06	R26	4.000	0.312	0.469	0.03	1.06	3.94	2.88	(4)	1/4	6.62	8	0.81	0.88	3/4	5.25	5.75
3	5.00	8.25	1.44	3.44	0.06	R31	4.875	0.312	0.469	0.03	1.06	4.62	3.50	(4)	3/8	8.50	8	1.00	1.00	3/4	5.25	5.75
4	6.19	10.75	1.50	4.00	0.25	R37	5.875	0.312	0.469	0.03	1.06	6.00	4.50	(4)	1/2	11.50	12	1.12	1.12	7/8	6.00	6.50
6	8.50	14.00	1.88	4.62	0.25	R45	8.312	0.312	0.469	0.03	1.06	8.75	6.63	(4)	1/2	13.75	12	1.25	1.25	1 1/8	7.75	8.25
8	10.62	16.50	2.19	5.25	0.25	R49	10.625	0.312	0.469	0.03	1.06	10.75	8.63	(4)	1/2	17.00	16	1.38	1.38	1 1/4	8.75	9.25
10	12.75	20.00	2.50	6.00	0.25	R53	12.750	0.312	0.469	0.03	1.06	13.50	10.75	(4)	1/2	19.25	20	1.38	1.38	1 1/4	9.00	9.50
12	15.00	22.00	2.62	6.12	0.25	R57	15.000	0.312	0.469	0.03	1.06	15.75	12.75	(4)	1/2	20.75	20	1.50	1.50	1 3/8	9.50	10.00
14	16.25	23.75	2.75	6.50	0.25	R61	16.500	0.312	0.469	0.03	1.06	17.00	14.00	(4)	1/2	23.75	20	1.62	1.62	1 1/2	10.25	10.75
16	18.50	27.00	3.00	7.00	0.25	R65	18.500	0.312	0.469	0.03	1.19	19.50	16.00	(4)	1/2	25.75	20	1.75	1.75	1 5/8	11.00	11.50
18	21.00	29.25	3.25	7.25	0.25	R69	21.000	0.312	0.469	0.03	1.19	21.50	18.00	(4)	1/2	28.50	24	1.75	1.75	1 5/8	11.75	12.50
20	23.00	32.00	3.50	7.50	0.25	R73	23.000	0.375	0.531	0.06	1.25	24.00	20.00	(4)	1/2	33.00	24	2.00	2.00	1 7/8	13.25	13.75
24	27.25	37.00	4.00	8.00	0.25	R77	27.250	0.438	0.656	0.06	1.44	28.25	24.00	(4)	1/2							

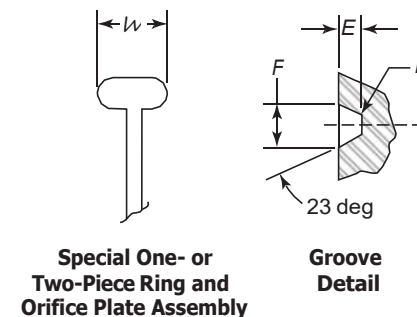
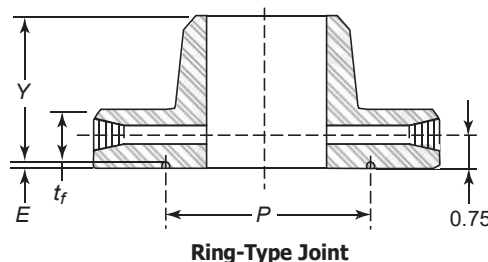
GENERAL NOTES:

- Dimensions are in inches.
- Welding neck flanges NPS 3 and smaller are identical to Class 300 flanges except for bolting and may be used for such service.
- All other dimensions are in accordance with ASME B16.5.
- Ring joint flange in NPS 24 will require an angular meter tap as shown in Fig. 2.

NOTES:

- Other NPT sizes may be furnished if required.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 1 to NPS 12 and 0.38 in. for NPS 14 to NPS 24. Bolt lengths for ring-type joint flanges include allowance of 0.62 in. for NPS 1 to NPS 10, 0.75 in. for NPS 12 to NPS 18, and 0.88 in. for NPS 20.
- In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- Bore is to be specified by the purchaser.

Technical drawing of a raised face flange. The drawing shows a cross-section of the flange with various dimensions labeled. The overall height is Y . The thickness of the flange is t_f . The distance from the centerline to the outer edge is R . The overall width is O . The distance from the centerline to the start of the raised face is X . The distance from the centerline to the start of the raised face is A . The distance from the centerline to the start of the raised face is B . The distance from the centerline to the start of the raised face is $1/2$ NPT [Note (1)]. The distance from the centerline to the start of the raised face is 0.25 . The distance from the centerline to the start of the raised face is 0.94 . The drawing includes a note: "TT drill must be free from burrs".

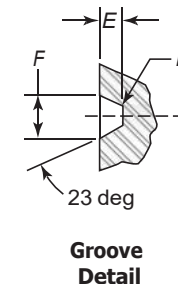
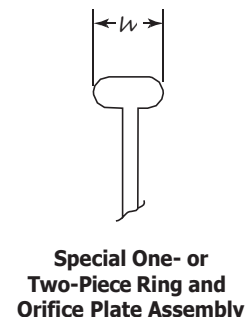
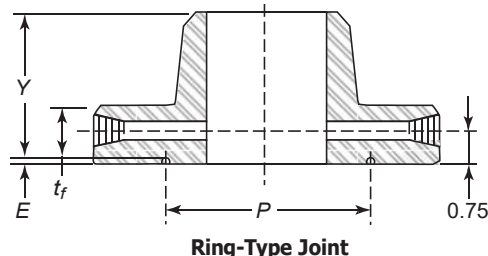
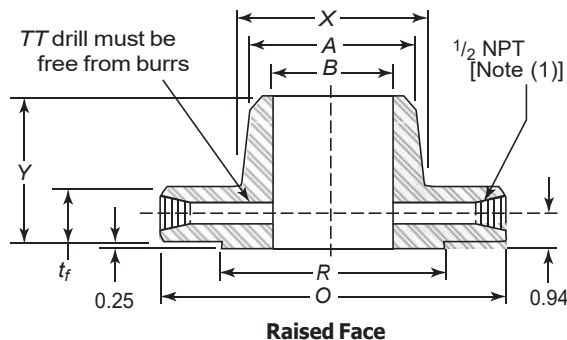


Nominal Pipe Size	Outside Minimum		Ring-Type Joint								Hub		Diam- eter of	Drilling Template				Length of		
	Diameter of Raised	Outside Diameter	Thick- ness of Conne- cting Flange,	Length of Hub,	Num- ber of	Through Diam- eter,	Groove Diam- eter,	Radius Pitch	Special Groove	Diam- eter of	Diameter at	Pressure Oval Ring	Diam- eter of	Beginning	Stud Bolts [(2), (3)]					
	Face, Raised	of Flange, Ring Size	Flange, Size	Hub, R	Num- ber of	Diam- eter, O	Depth, D _f	Width, Y	Bottom, Ber	Height, P	Hub, E F	of Chamfer, r W	Bore, X	tion, A	ber of B	eter of T				
1 1½ 2 2½	For NPS 2½ and smaller, use Class 1500.																			
3	5.00	9.50	1.50	4.00	R31	4.875	0.312	0.469	0.03	1.06	5.00	3.50	(4)	⅜	7.50	8	1.00	⅞	6.00	6.50
4	6.19	11.50	1.75	4.50	R37	5.875	0.312	0.469	0.03	1.06	6.25	4.50	(4)	½	9.25	8	1.25	1⅛	7.00	7.50
6	8.50	15.00	2.19	5.50	R45	8.312	0.312	0.469	0.03	1.06	9.25	6.63	(4)	½	12.50	12	1.25	1⅛	7.75	8.25
8	10.62	18.50	2.50	6.38	R49	10.625	0.312	0.469	0.03	1.06	11.75	8.63	(4)	½	15.50	12	1.50	1⅜	9.00	9.50
10	12.75	21.50	2.75	7.25	R53	12.750	0.312	0.469	0.03	1.06	14.50	10.75	(4)	½	18.50	16	1.50	1⅜	9.50	10.00
12	15.00	24.00	3.12	7.88	R57	15.000	0.312	0.469	0.03	1.06	16.50	12.75	(4)	½	21.00	20	1.50	1⅜	10.25	10.75
14	16.25	25.25	3.38	8.38	R62	16.500	0.438	0.656	0.06	1.31	17.75	14.00	(4)	½	22.00	20	1.62	1½	11.00	11.50
16	18.50	27.75	3.50	8.50	R66	18.500	0.438	0.656	0.06	1.44	20.00	16.00	(4)	½	24.25	20	1.75	1⅝	11.50	12.00
18	21.00	31.00	4.00	9.00	R70	21.000	0.500	0.781	0.06	1.56	22.25	18.00	(4)	½	27.00	20	2.00	1⅞	13.00	13.75
20	23.00	33.75	4.25	9.75	R74	23.000	0.500	0.781	0.06	1.56	24.50	20.00	(4)	½	29.50	20	2.12	2	14.00	14.75
24	27.25	41.00	5.50	11.50	R78	27.250	0.625	1.062	0.09	1.88	29.50	24.00	(4)	½	35.50	20	2.62	2½	17.50	18.50

- (a) Dimensions are in inches.
- (b) All other dimensions are in accordance with ASME B16.5.
- (c) Ring joint flanges larger than NPS 12 will require angular meter taps as shown in Fig. 2.

- (1) Other NPT sizes may be furnished if required.
- (2) In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- (3) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 3 to NPS 12 and 0.38 in. for NPS 14 to NPS 24. Bolt lengths for ring-type joint flanges include allowance of 0.62 in. for NPS 3 to NPS 10 and 0.75 in. for NPS 12.
- (4) Bore is to be specified by the purchaser.

Table I-4 Class 1500 Orifice Flanges, Welding Neck



Nomin al Pipe Size	Outside Diamet er of Raised Face,	Outside Diamet er of Flange,	Minimu m Thick- ness of Flange,	Length Throu gh Hub,	Groov e Num-	Pitch Diamet er, P	Groov e Depth	Groov e Width	Radiu s at Botto m, r	Special Oval Ring Height,	Diam - eter of Hub,	Hub Diameter Beginnin g of Chamfer,	Bore Diameter of Conne- ction, B	Diam - eter of Pressure Conne- ction, TT	Drilling Template				Length of	
															Diam- eter of Bolt Circle	Num- ber of Holes	Diam- eter of Holes	Num- ber of Bolts	Stud Bolts [(2), (3)]	
																			Raise d	Rin g
1	2.00	5.88	1.50	3.25	R16	2.000	0.250	0.344	0.03	1.00	2.06	1.32	(4)	TT					6.00	6.25
1 1/2	2.88	7.00	1.50	3.50	R20	2.688	0.250	0.344	0.03	1.00	2.75	1.90	(4)						6.25	6.50
2	3.62	8.50	1.50	4.00	R24	3.750	0.312	0.469	0.03	1.06	4.12	2.38	(4)	1/4	4.88	4	1.12	1	6.00	6.25
2 1/2	4.12	9.62	1.62	4.12	R27	4.250	0.312	0.469	0.03	1.06	4.88	2.88	(4)	1/4					6.25	6.50
3	5.00	10.50	1.88	4.62	R35	5.375	0.312	0.469	0.03	1.06	5.25	3.50	(4)	1/4	6.50	8	1.00	7/8	6.00	6.50
4	6.19	12.25	2.12	4.88	R39	6.375	0.312	0.469	0.03	1.06	6.38	4.50	(4)	1/4	7.50	8	1.12	1	6.50	7.00
6	8.50	15.50	3.25	6.75	R46	8.312	0.375	0.531	0.06	1.12	9.00	6.63	(4)	3/8	8.00	8	1.25	1 1/8	7.25	7.25
8	10.62	19.00	3.62	8.38	R50	10.625	0.438	0.656	0.06	1.31	11.50	8.63	(4)	1/2	9.50	8	1.38	1 1/4	8.00	8.50
10	12.75	23.00	4.25	10.00	R54	12.750	0.438	0.656	0.06	1.31	14.50	10.75	(4)	1/2	12.50	12	1.50	1 3/8	10.50	11.00
12	15.00	26.50	4.88	11.12	R58	15.000	0.562	0.906	0.06	1.56	17.75	12.75	(4)	1/2	15.50	12	1.75	1 5/8	11.75	12.25
14	16.25	29.50	5.25	11.75	R63	16.500	0.625	1.062	0.09	1.75	19.50	14.00	(4)	1/2	19.00	12	2.00	1 7/8	13.50	14.00
16	18.50	32.50	5.75	12.25	R67	18.500	0.688	1.188	0.09	2.00	21.75	16.00	(4)	1/2	22.50	16	2.12	2	15.00	15.75
18	21.00	36.00	6.38	12.88	R71	21.000	0.688	1.188	0.09	2.00	23.50	18.00	(4)	1/2						
20	23.00	38.75	7.00	14.00	R75	23.000	0.688	1.312	0.09	2.12	25.25	20.00	(4)	1/2	25.00	16	2.38	2 1/4	16.25	17.50
24	27.25	46.00	8.00	16.00	R79	27.250	0.812	1.438	0.09	2.31	30.00	24.00	(4)	1/2	27.75	16	2.62	2 1/2	17.75	19.00
														1/2	30.50	16	2.88	2 3/4	19.75	21.00
														1/2	32.75	16	3.12	3	21.50	22.50
														1/2	39.00	16	3.62	3 1/2	24.50	26.00

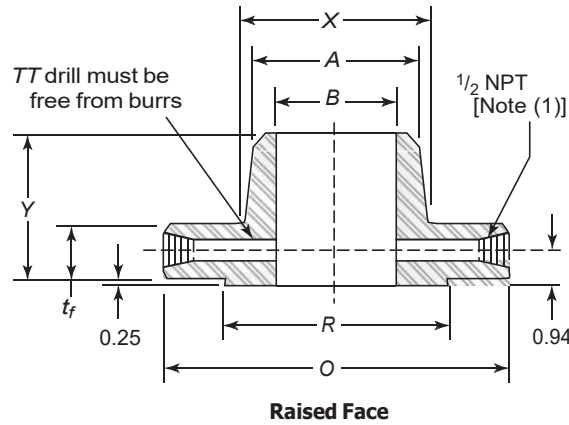
GENERAL NOTES:

- Dimensions are in inches.
- All other dimensions are in accordance with ASME B16.5.
- Ring joint flanges larger than NPS 6 will require angular meter taps shown in Fig. 2.

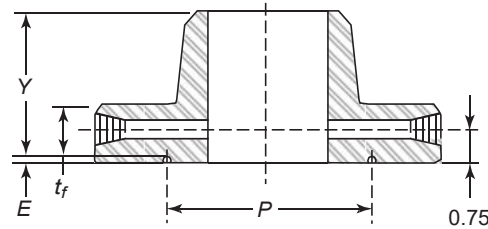
NOTES:

- Other NPT sizes may be furnished if required.
- In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 1 to NPS 12 and 0.38 in. for NPS 14 to NPS 24. Bolt lengths for ring-type joint flanges include allowance of 0.62 in. for NPS 1 to NPS 6.
- Bore is to be specified by the purchaser.

Table I-5 Class 2500 Orifice Flanges, Welding Neck



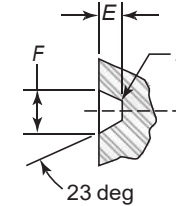
Raised Face



Ring-Type Joint



Special One- or Two-Piece Ring and Orifice Plate Assembly



Groove Detail

Nomin al Pipe Size	Outside Diamet er of Raised Face, F	Outside Diamet er of Flange, G	Minimum Thick- ness of Flang e, t_f	Length Throu gh Hub, L	Ring-Type Joint						Special Oval Ring Heigh t, W	Diam - eter of Hub, H	Hub Diameter Beginn ing of Chamfer, J	Conne ction, Bore, K	Diam- eter of Pres- sure Bolt TT	Drilling Template				Length of Stud Bolts [(2), (3)]	
					Groov e Num- ber, P	Pitch Diamet er, P	Groov e Depth	Groov e Width	Radiu s at Botto m, r	Diam- eter of Circle						Num- ber of Holes	Diam- eter of Holes	Diam- eter of Bolts	Raised Face		
1	2.00	6.25	1.50	3.62	R18	2.375	0.250	0.344	0.03	1.00	2.25	1.32	(4)								
1½	2.88	8.00	1.75	4.38	R23	3.250	0.312	0.469	0.03	1.06	3.12	1.90	(4)	¼	4.25	4	1.00	⅞	6.00	6.25	
2	3.62	9.25	2.00	5.00	R26	4.000	0.312	0.469	0.03	1.06	3.75	2.38	(4)	¼	5.75	4	1.25	1⅛	7.00	7.50	
2½	4.12	10.50	2.25	5.62	R28	4.375	0.375	0.531	0.06	1.19	4.50	2.88	(4)	¼	6.75	8	1.12	1	7.25	7.75	
3	5.00	12.00	2.62	6.62	R32	5.000	0.375	0.531	0.06	1.19	5.25	3.50	(4)	¼	7.75	8	1.25	1⅛	8.00	8.50	
														⅜	9.00	8	1.38	1¼	9.00	9.50	
4	6.19	14.00	3.00	7.50	R38	6.188	0.438	0.656	0.06	1.31	6.50	4.50	(4)	½	10.75	8	1.62	1½	10.25	10.75	
6	8.50	19.00	4.25	10.75	R47	9.000	0.500	0.781	0.06	1.44	9.25	6.63	(4)	½	14.50	8	2.12	2	13.75	14.50	
8	10.62	21.75	5.00	12.50	R51	11.000	0.562	0.906	0.06	1.56	12.00	8.63	(4)	½	17.25	12	2.12	2	15.25	16.00	
10	12.75	26.50	6.50	16.50	R55	13.500	0.688	1.188	0.09	1.88	14.75	10.75	(4)	½	21.25	12	2.62	2½	19.25	20.25	
12	15.00	30.00	7.25	18.25	R60	16.000	0.688	1.312	0.09	2.00	17.38	12.75	(4)	½	24.38	12	2.88	2¾	21.25	22.50	

GENERAL NOTES:

- Dimensions are in inches.
- All other dimensions are in accordance with ASME B16.5.
- Ring joint flanges larger than NPS 3 will require angular meter taps as shown in Fig. 2.

NOTES:

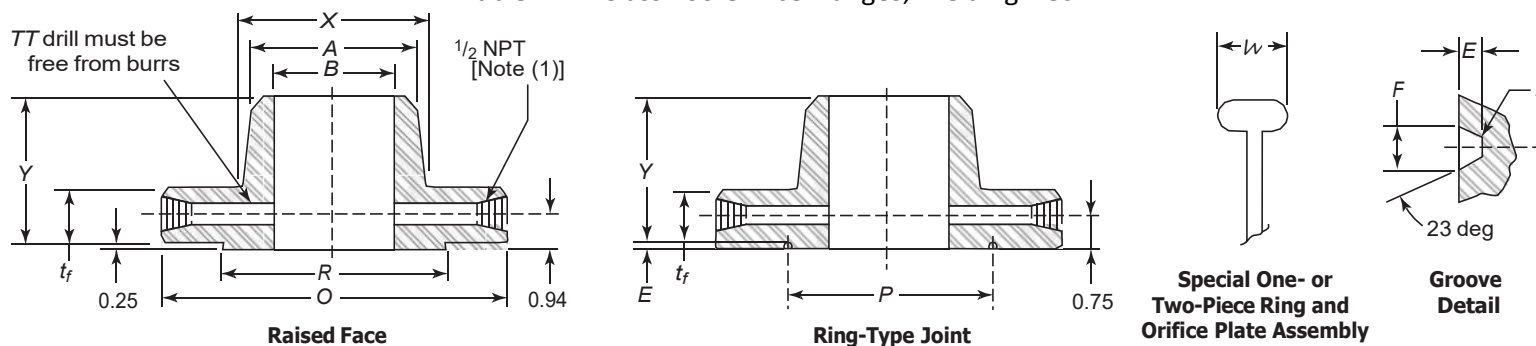
- Other NPT sizes may be furnished if required.
- In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 1 to NPS 12. Bolt lengths for ring-type joint flanges include allowance of 0.62 in. for NPS 1 to NPS 3.
- Bore is to be specified by the purchaser.

MANDATORY APPENDIX II

DIMENSIONAL DATA FOR CLASS 400 FLANGES IN U.S. CUSTOMARY UNITS

This Mandatory Appendix is an integral part of ASME B16.36, and is placed after the main text for convenience. Table II-1, included in this Appendix, provides dimensional data in U.S. Customary units for Class 400 flanges.

Table II-1 Class 400 Orifice Flanges, Welding Neck



Nominal Pipe Size	Outside Diameter of Raised Face	Minimum Outside Diameter of Flange Ring	Thick- ness of Con- nect- ing Flange	Length of Hub, R	Num- ber of Bolts Face	Ring-Type Joint					Hub			Drilling Template		Length of			
						Through Diam- eter, O	Groove Diam- eter, t _f	Radius Pitch Width, Y	Special Groove Bottom, ber	Diam- eter Height, P	Diam- eter Hub, E	Diam- eter at F	Pressure Oval Ring Chamfer, r	Diam- eter of Bore, X	Beginning tion, A	Stud Bolts [(2), (3)]			
						Joint													
1	Circle	Holes	Holes	Bolts	Face	Joint													
1½																			
2																			
2½																			
3																			
4	6.19	10.00	1.50	3.50	R37	5.875	0.312	0.469	0.03	1.06	5.75	4.50	(4)	½	7.88	8	1.00	⅞	5.50 6.00
6	8.50	12.50	1.62	4.06	R45	8.312	0.312	0.469	0.03	1.06	8.12	6.63	(4)	½	10.62	12	1.00	⅞	6.25 6.50
8	10.62	15.00	1.88	4.62	R49	10.625	0.312	0.469	0.03	1.06	10.25	8.63	(4)	½	13.00	12	1.12	1	6.75 7.25
10	12.75	17.50	2.12	4.88	R53	12.750	0.312	0.469	0.03	1.06	12.62	10.75	(4)	½	15.25	16	1.25	1⅛	7.50 8.00
12	15.00	20.50	2.25	5.38	R57	15.000	0.312	0.469	0.03	1.06	14.75	12.75	(4)	½	17.75	16	1.38	1¼	8.00 8.50
14	16.25	23.00	2.39	5.88	R61	16.500	0.312	0.469	0.03	1.06	16.75	14.00	(4)	½	20.25	20	1.38	1¼	8.25 9.00
16	18.50	25.50	2.50	6.00	R65	18.500	0.312	0.469	0.03	1.19	19.00	16.00	(4)	½	22.50	20	1.50	1⅜	8.75 9.25
18	21.00	28.00	2.62	6.50	R69	21.000	0.312	0.469	0.03	1.19	21.00	18.00	(4)	½	24.75	24	1.50	1⅜	9.25 9.50
20	23.00	30.50	2.75	6.62	R73	23.000	0.375	0.531	0.06	1.25	23.12	20.00	(4)	½	27.00	24	1.62	1½	9.75 10.25
24	27.25	36.00	3.00	6.88	R77	27.250	0.438	0.656	0.06	1.44	27.62	24.00	(4)	½	32.00	24	1.88	1¾	11.00 11.50

GENERAL NOTES:

- Dimensions are in inches.
- All other dimensions are in accordance with ASME B16.5.
- Ring joint flange in NPS 24 will require an angular meter tap as shown in Fig. 2.

NOTES:

- Other NPT sizes may be furnished if required.
- In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 4 to NPS 12 and 0.38 in. for NPS 14 to NPS 24. Bolt lengths for ring-type joint flanges include allowance of 0.62 in. for NPS 4 to NPS 10, 0.75 in. for NPS 12 to NPS 18, and 0.88 in. for NPS 20.
- Bore is to be specified by the purchaser.

MANDATORY APPENDIX III REFERENCES

The following is a list of publications referenced in this Standard. The latest editions of ASME publications are to be used.

ASME B1.20.1, *Pipe Threaded, General*

Purpose (Inch) ASME B16.5, *Pipe Flanges and Flanged Fittings*

ASME B16.11, *Forged Fittings, Socket-Welding and Threaded*

ASME B16.21, *Nonmetallic Gaskets for Pipe Flanges* ASME Boiler and Pressure Vessel Code: Section I, *Power*

Boilers; Section II, Materials; Section III, Nuclear Power Plant Components; Section VIII, Divisions 1 and 2, Pressure Vessels

Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

ISO 9000:2005, *Quality management systems — Fundamentals and vocabulary*

ISO 9001:2008, *Quality management systems — Requirements*

ISO 9004:2000, *Quality management systems — Guidelines for performance improvements*

Publisher: International Organization for Standardization (ISO), 1 ch. de la Voie-Creuse, Case postale 56, CH-1211 Genève 20, Switzerland/Suisse (www.iso.org)

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

NONMANDATORY APPENDIX A QUALITY SYSTEM PROGRAM

The products manufactured in accordance with this Standard shall be produced under a quality system program following the principles of an appropriate standard from the ISO 9000 series.¹ A determination of the need for registration, certification, or both, of the product

manufacturer's quality system program by an independent organization shall be the responsibility of the manufacturer. The detailed documentation demonstrating program compliance shall be available to the purchaser at the manufacturer's facility. A written summary description of the program utilized by the product manufacturer shall be available to the purchaser upon request. The product manufacturer is defined as the entity whose name or trademark appears on the product in accordance with the marking or identification requirements of this Standard.

¹ The series is also available from the American National Standards Institute (ANSI) and the American Society for Quality (ASQ) as American National Standards that are identified by a prefix "Q," replacing the prefix "ISO." Each standard of the series is listed under References in Mandatory Appendix III.

ASME B16.36-2015

ISBN 978-0-7918-7016-7



9 780791 870167



J04615