

Rosemount 1496 Orifice Flange Union



Standard flange styles are raised face (RF) weld neck, RF slip-on, or RF threaded for paddle type orifice plates, and ring type joint (RTJ) weld neck for universal type plates with plate holders. All flange unions are supplied with studs, nuts, jackscrews, gaskets, and pipe plugs. [Table 5](#) lists standard pipe schedules.

- Meets ASME B16.36
- Meets DIN 19214 part 1
- Threaded tap connection provided 180-degrees apart

The following options are available.

- Socket weld tap connections
- High temperature flange gaskets for temperatures greater than 500 °F (260 °C)
- Stainless Steel flange bolting per ASTM A193 Grade B8M/A194 Grade 8M

Ordering information

Table 2. Rosemount 1496 Orifice Flange Union Ordering Table

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.

The Expanded offering is subject to additional delivery lead time.

Model	Product description	
1496	Orifice Flange Union	
Flange union type		
WN	Raised Face, Weld Neck	★
TH	Raised Face, Threaded	★
SO	Raised Face, Slip-On	★
DN	Raised Face, Weld Neck, DIN 19214 Part 1	★
RJ	Ring Joint, Weld Neck	
Line size		
020	2 in. (DN50)	★
025	2½-in. (DN65)	★
030	3 in. (DN80)	★
040	4 in. (DN100)	★
060	6 in. (DN150)	★
080	8 in. (DN200)	★
100	10 in. (DN250)	★
120	12 in. (DN300)	★
140	14 in. (DN350)	★
160	16 in. (DN400)	★
180	18 in. (DN450)	★
200	20 in. (DN500)	★
240	24 in. (DN600)	★
Flange rating		
A3	ANSI Class 300	★
A6	ANSI Class 600	★
A9	ANSI Class 900	★

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Flange rating		
AF	ANSI Class 1500	★
AT ⁽¹⁾	ANSI Class 2500	★
D1	DIN PN10	★
D2	DIN PN16	★
D3	DIN PN25	★
D4	DIN PN40	★
D5 ⁽²⁾	DIN PN63	★
D6	DIN PN100	★
R3	Ring-Type Joint (RTJ) Class 300	
R6	Ring-Type Joint (RTJ) Class 600	
R9	Ring-Type Joint (RTJ) Class 900	
RF	Ring-Type Joint (RTJ) Class 1500	
RT	Ring-Type Joint (RTJ) Class 2500	
Flange union material type		
C	Carbon Steel	★
S	316/316L Stainless Steel	★
T	DIN 1.4571 (316Ti Stainless Steel)	★
L	304/304L Stainless Steel	★
H	Alloy C-276	
M	Alloy 400	

Options (include with selected model number)

Extended product warranty		
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★
Alternate pipe schedule/wall thickness ⁽³⁾⁽⁴⁾		
FA	Schedule 5S	★
FB	Schedule 10	★
FC	Schedule 10S	★
FD	Schedule 20	★
FE	Schedule 30	★
FF	Schedule 40	★
FG	Schedule 40S	★
FH	Schedule Standard (STD)	★
FI	Schedule 60	★
FJ	Schedule 80	★
FK	Schedule 80S	★
FL	Schedule Extra Strong (XS)	★
FM	Schedule 100	★
FN	Schedule 120	★
FP	Schedule 140	★
FQ	Schedule 160	★
FR	Schedule Double Extra Strong (XXS)	★

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High temperature gaskets		
G1 ⁽⁵⁾⁽⁶⁾	High Temperature Gaskets (spiral wound gaskets for use with 125-250 (3.2-3.6 μm) Ra flange surface finish).	★
Alternate bolting material		
SS ⁽⁷⁾	316SST Studs/Nuts	★
Alternate pressure tap type		
ST	Socketweld Pressure Taps (not available with Flange Union Type code DN)	★
Special cleaning		
P2	Cleaned for Special Services	
Special inspection		
QC1	Visual & dimensional inspection with certificate	★
Material traceability certification		
Q8	Material Traceability Certificate per and EN 10204:2004 3.1	★
Code conformance		
J5 ⁽⁸⁾	Materials conforming to NACE MR01-75	
Country certification		
J1	Canadian Registration	★
J6	Conformance to European Pressure Equipment Directive (PED) 97/23/EC	
Typical model number: 1496 WN 040 A3 S		

(1) Available in line sizes from 2-12 in.

(2) Previously PN64.

(3) Default pipe schedules are listed in [Table 5](#) for the 1496 Orifice Flange Unions.

(4) These options are not available with flange type DN. These options should only be selected if the required pipe schedule is different from the default pipe schedule, as shown in [Table 5](#). Standard wall thickness for DIN weldneck flanges is per ISO EN 1092-1 (2002). Consult the factory if a different wall thickness is required.

(5) Not available with Flange Union Type code RJ.

(6) For more gasket information please see the Temperature Limit table in the 1495/1496 Specifications section of the Product Data Sheet.

(7) Stainless steel bolting (ASTM A193 GR B8M Class 2) is classified as "low strength bolting" by the various ASME B31 piping codes and may not be suitable for all applications requiring code conformance.

(8) Materials of Construction comply with metallurgical requirements highlighted within NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.

Specifications

Functional specifications

Service and flow range

Liquid, gas or vapor turbulent flow, for pipe Reynold's Numbers greater than the following⁽¹⁾:

AGA-3: 4,000

ASME MFC-3M⁽²⁾: 5,000 and $170\beta^2 D$ (whichever is higher)

ISO-5167⁽²⁾: 5,000 and $170\beta^2 D$ (whichever is higher)

(1) For flange tap applications.

(2) D = pipe I.D. in mm. β = Beta Ratio.

Orifice plate operating limitations

Table 3. Temperature Limit (Based on Flange Rating per ANSI B16.5)

ANSI flange rating	Applicability	Gasket description	Temperature rating
300#	Default	Durlon 8500, Compressed Sheet Gasket	-100 °F to 700 °F (-73 °C to 371 °C)
	If "P2" option	Durlon 9000, Compressed Sheet Gasket	-350 °F to 520 °F (-212 °C to 271 °C)
	If "G1" option	Flexitallic CGI, Spiral Wound Gasket with Thermiculite 735 Filler	-350 °F to 1000 °F (-212 °C to 538 °C)
600#, 900#, 1500#, 2500#	Default	Flexitallic CGI, Spiral Wound Gasket with Thermiculite 735 Filler	-350 °F to 1000 °F (-212 °C to 538 °C)
	If "P2" option	Flexitallic CGI, Spiral Wound Gasket with PTFE Filler	-300 °F to 500 °F (-184 °C to 260 °C)
	If "G1" option	Flexitallic CGI, Spiral Wound Gasket with Thermiculite 735 Filler	-350 °F to 1000 °F (-212 °C to 538 °C)

Maximum working pressure

Based on flange rating per ANSI B16.5

Pipe sizes

2-in. to 24-in. (50 mm to 600 mm). Contact Emerson Process Management for pipe sizes less than 2-in. (50 mm) or greater than 24-in. (600 mm).

Operating limits

1495 Temperature Range

- -320 to 1200 °F (-196 to 649 °C)

Table 4. 1496 Temperature Range

1496 material ⁽¹⁾	Temperature rating
Carbon Steel (ASTM A105 ⁽²⁾)	-20 to 800 °F (-29 to 538 °C)
316/316L Stainless Steel (ASTM A182 F316/316L)	-325 to 1000 °F (-198 to 538 °C)
304/304L Stainless Steel (ASTM A182 F304/304L)	-425 to 1000 °F (-254 to 816 °C)
Alloy C-276 (ASTM B564 N10276)	-325 to 1250 °F (-198 to 677 °C)
Alloy 400 (ASTM B564 N04400)	-325 to 900 °F (-198 to 482 °C)
Carbon Steel I (ASTM A350-LF2 ⁽²⁾)	-50 to 1000 °F (-46 to 538 °C)
DIN 1.4571 (316Ti Stainless Steel) (ASTM A182 F316Ti)	-325 to 1000 °F (-198 to 538 °C)
Alloy C4 (ASTM B574 UNS N06455)	-325 to 800 °F (-198 to 427 °C)

(1) Depending on World Area, flanges will conform to one or more of the listed material specifications.

(2) When the J6 Option is selected, this material will be supplied as ASTM A350 LF2.

Physical specifications

Rosemount 1496 Orifice Flange Union

Standard flange styles are raised face (RF) weld neck, RF slip-on, or RF threaded for paddle type orifice plates, and ring type joint (RTJ) weld neck for universal type plates with plate holders. All flange unions are supplied with studs, nuts, jackscrews, gaskets, and pipe plugs. Table 5 lists standard pipe schedules.

- Meets ASME B16.36
- Meets DIN 19214 part 1
- Threaded tap connection provided 180-degrees apart
- The following options are available.
 - Socket weld tap connections
 - High temperature flange gaskets for temperatures greater than 500 °F (260 °C)
 - Stainless Steel flange bolting per ASTM A193 Grade B8M/A194 Grade 8M

Standard pipe schedules

Table 5. Default Pipe Schedules for 1496 Orifice Flange Unions ⁽¹⁾⁽²⁾

Nominal pipe size ⁽³⁾	ANSI 300# (WN, TH, SO)	ANSI 600# (WN, RJ)	ANSI 900# (WN, RJ)	ANSI 1500# (WN, RJ)	ANSI 2500# (WN, RJ)
2 (51)	Standard	Standard	XS	XS	160
2½- (64)	Standard	Standard	XS	XS	N/A
3 (76)	Standard	Standard	XS	N/A	N/A
4 (102)	Standard	Standard	XS	N/A	N/A
6 (152)	Standard	Standard	XS	N/A	N/A
8 (203)	Standard	Standard	N/A	N/A	N/A
10 (254)	Standard	XS	N/A	N/A	N/A
12 (305)	Standard	XS	N/A	N/A	N/A
14 (356)	Standard	N/A	N/A	N/A	N/A
16 (406)	Standard	N/A	N/A	N/A	N/A
18 (457)	Standard	N/A	N/A	N/A	N/A
20 (508)	Standard	N/A	N/A	N/A	N/A
24 (610)	XS	N/A	N/A	N/A	N/A

(1) If no default schedule provided - customer must specify pipe schedule.

(2) Standard wall thickness for DIN weldneck flanges is per ISO EN 1092-1 (2002). Consult factory if different wall thickness is required.

(3) Size in inches (millimeters).

Note

It is strongly encouraged to use the ordering codes to specify desired pipe schedule.

Table 6. Dimensions of Pipe Inner Diameter ⁽¹⁾

Nominal pipe size	Schedule					
	5S	10	10S	20	30	40
2 (51)	2.245 (57.02)	2.157 (54.79)	2.157 (54.79)	N/A	N/A	2.067 (52.501)
2½- (64)	2.709 (68.81)	2.635 (66.93)	2.635 (66.93)	N/A	N/A	2.469 (62.71)
3 (76)	2.224 (56.49)	3.26 (82.80)	3.26 (82.80)	N/A	N/A	3.068 (77.93)
4 (102)	4.334 (110.08)	4.26 (108.20)	4.26 (108.20)	N/A	N/A	4.026 (102.26)
6 (152)	6.407 (162.74)	6.357 (161.47)	6.357 (161.47)	N/A	N/A	6.065 (154.05)
8 (203)	8.407 (213.54)	8.329 (211.56)	8.329 (211.56)	8.125 (206.38)	8.071 (205)	7.981 (202.72)
10 (254)	10.482 (266.24)	10.42 (264.67)	10.42 (264.67)	10.25 (260.35)	10.136 (257.45)	10.02 (254.51)
12 (305)	12.438 (315.93)	12.39 (314.71)	12.39 (314.71)	12.25 (311.15)	12.09 (307.09)	11.938 (303.23)
14 (356)	N/A	13.5 (342.90)	13.624 (346.05)	13.376 (339.75)	13.25 (336.55)	13.124 (333.35)
16 (406)	N/A	15.5 (393.70)	15.624 (396.85)	15.376 (390.55)	15.25 (387.35)	15.0 (381.0)
18 (457)	N/A	17.5 (444.50)	17.624 (447.65)	17.376 (441.35)	17.126 (435.00)	16.976 (431.19)
20 (508)	N/A	19.5 (495.30)	19.564 (496.93)	19.25 (488.95)	19.0 (482.60)	18.814 (477.88)
24 (610)	N/A	23.5 (596.90)	23.5 (596.90)	23.25 (590.55)	22.876 (581.05)	22.626 (574.70)
Nominal pipe size	Schedule					
	40S	Standard	60	80	80S	XS
2 (51)	2.067 (52.501)	2.067 (52.50)	N/A	1.939 (49.25)	1.939 (49.25)	1.939 (49.25)
2½- (64)	2.469 (62.71)	2.469 (62.71)	N/A	2.323 (59.0)	2.323 (59.0)	2.323 (59.0)
3 (76)	3.068 (77.93)	3.068 (77.93)	N/A	2.90 (73.66)	2.90 (73.66)	2.90 (73.66)
4 (102)	4.026 (102.26)	4.026 (102.26)	N/A	3.826 (97.18)	3.826 (97.18)	3.826 (97.18)
6 (152)	6.065 (154.05)	6.065 (154.05)	N/A	5.761 (146.33)	5.761 (146.33)	5.761 (146.33)
8 (203)	7.981 (202.72)	7.981 (202.72)	7.813 (198.45)	7.625 (193.68)	7.625 (193.68)	7.625 (193.68)

Table 6. Dimensions of Pipe Inner Diameter⁽¹⁾

10 (254)	10.02 (254.51)	10.02 (254.51)	9.75 (247.65)	9.564 (242.94)	9.75 (247.65)	9.75 (247.65)
12 (305)	12.0 (304.8)	12.00 (304.80)	11.626 (41.30)	11.376 (288.95)	11.75 (298.45)	11.75 (298.45)
14 (356)	N/A	13.250 (336.55)	12.814 (325.48)	12.50 (317.50)	N/A	13.0 (330.20)
16 (406)	N/A	15.250 (387.35)	14.688 (373.08)	14.314 (363.58)	N/A	15.0 (381.0)
18 (457)	N/A	17.250 (438.15)	16.5 (419.10)	16.126 (409.60)	N/A	17.0 (425.0)
20 (508)	N/A	19.252 (488.95)	18.376 (466.75)	17.938 (455.63)	N/A	19.0 (482.60)
24 (610)	N/A	23.250 (590.55)	22.064 (560.43)	21.564 (547.73)	N/A	23.0 (584.20)
Nominal pipe size	Schedule					
	100	120	140	160	XXS	
2 (51)	N/A	N/A	N/A	1.689 (42.9)	1.503 (38.18)	
2½ (64)	N/A	N/A	N/A	2.125 (53.98)	1.771 (44.98)	
3 (76)	N/A	N/A	N/A	2.624 (66.65)	2.30 (58.42)	
4 (102)	N/A	3.624 (92.005)	N/A	3.438 (87.33)	3.152 (80.06)	
6 (152)	N/A	5.501 (139.73)	N/A	5.189 (131.80)	4.897 (124.38)	
8 (203)	7.437 (188.90)	7.189 (157.15)	7.001 (177.83)	6.813 (173.05)	6.875 (174.63)	
10 (254)	9.314 (236.58)	9.064 (230.23)	8.75 (222.25)	8.50 (215.90)	N/A	
12 (305)	11.064 (281.03)	10.75 (273.05)	10.5 (266.70)	10.126 (257.20)	N/A	
14 (356)	12.126 (308.00)	11.814 (300.08)	11.5 (37.50)	11.188 (284.18)	N/A	
16 (406)	13.938 (354.03)	13.564 (344.53)	13.124 (333.35)	12.814 (325.48)	N/A	
18 (457)	15.688 (398.27)	15.25 (387.35)	14.876 (377.85)	14.438 (366.73)	N/A	
20 (508)	17.44 (443.98)	17.0 (431.80)	16.5 (410.10)	16.064 (408.03)	N/A	
24 (610)	20.938 (531.83)	20.376 (517.55)	19.876 (504.85)	19.314 (490.58)	N/A	

(1) Measurement is in inches (millimeters).

Materials of construction

1495 Orifice Plate

Table 7. 1495 Materials of Construction

1495 material	Material specifications reference
304/304L Stainless Steel	ASTM A240 Grade 304/304L
316/316L Stainless Steel	ASTM A240 Grade 316/316L
DIN 1.4571 (316Ti SST) ⁽¹⁾	ASTM A240 Gr 316Ti (UNS S31635) (DIN Material Number 1.4571)
Alloy C-276	ASTM B575 UNS N10276
Alloy 400	ASTM B127 UNS N04400

(1) May not be available in all world areas.

Orifice bore sizes

Standard bore sizes are in 1/8-in. (3.2 mm) increments from 1/2-in. (12.7 mm) to 4-in. (101.6 mm) and in 1/4-in. (6.3 mm) increments from 4 1/4 to 6-in. (107.95 mm to 152.4 mm).

If required, Emerson Process Management can determine the orifice bore. Basic flow data is required at the time of order, see Calculation Data Sheet.

Bore tolerances are within AGA and ASME specifications.

Available options allow the user to have the Rosemount 1495 sized for specific operating conditions. The “[Rosemount 1495 Orifice Plate](#)” on page 169 specifies the physical parameters of the orifice from a detailed sizing calculation.

1496 Flange Unions

Table 8. 1496 Materials of Construction

1496 material	Material specification reference
Carbon Steel	ASTM A105 / A350
Stainless Steel	ASTM A240 Grade 316/316L
DIN 1.4571 (316Ti SST) ⁽¹⁾	ATSTM A182
DIN 1.0460 (carbon steel) ⁽¹⁾	ASTM A105 ⁽²⁾
Alloy C-276	ASTM B564/575
Alloy 400	ASTM B564/127

(1) May not be available in all world areas.

(2) When the J6 Option is selected, this material will be supplied as ASTM A350 LF2.

Standard flange mounting hardware

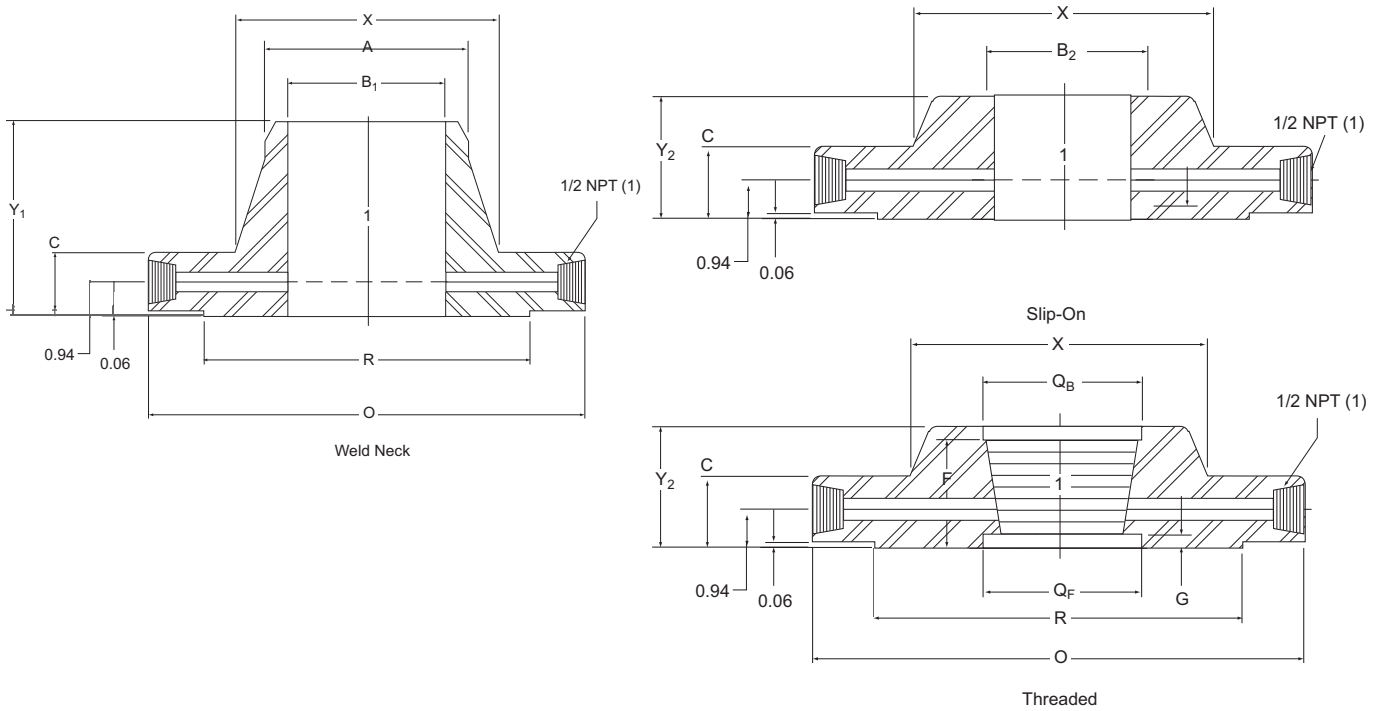
- Studs: Carbon Steel ASTM A193 Grade B7M
- Nuts: Carbon Steel ASTM A194 Gr 2H
- Gaskets: Non-asbestos ring type, Durlon[®] 8500 Green, Klingersil C4400, or equivalent
- Pipe Plugs: Match flange material

Pressure taps

Pressure tap connections are ½-in. (12.7 mm) NPT and 180° apart as standard. The tap hole diameter is ¼-in. (6.35 mm) for 2-in. (51 mm) and 2 ½-in. (63.5 mm) size, 3/8-in. (9.6 mm) for 3-in. (76.2 mm) size, and ½-in. (12.7 mm) for 4-in. (101.6 mm) and larger sizes.

1496 dimensional drawings

Figure 5. Class 300



ASME B16.36-1996

Table 40. Class 300 Orifice Flanges, Welding Neck, Slip-On, and Threaded⁽¹⁾⁽²⁾

Nominal pipe size	Outside diameter of raised face R	Outside diameter of flange ϕ	Thickness of flange, min. C	Length through hub		Diameter of hub X	Hub diameter beginning of chamfer (W.N.) A	Diameter of counter-bore		Counter-bore depth (from face)		Bore	
				Slip-on and threaded Y ₂	Weld neck Y ₁			Back Q _B	Face Q _F	F	G	Slip-On B ₂	Weld neck B ₁
1	2.00	4.88	1.50	1.88	3.25	2.12	1.32	1.41	1.30	1.44	0.75	1.36	See Note ⁽⁵⁾
1 1/2	2.88	6.12	1.50	1.88	3.38	2.75	1.90	1.99	1.89	1.47	0.72	1.95	
2	3.62	6.50	1.50	1.94	3.38	3.31	2.38	2.50	2.36	1.50	0.69	2.44	
2 1/2	4.12	7.50	1.50	2.00	3.50	3.94	2.88	3.00	2.84	1.75	0.56	2.94	
3	5.00	8.25	1.50	2.06	3.50	4.62	3.50	3.63	3.46	1.81	0.56	3.57	
4	6.19	10.00	1.50	2.12	3.62	5.75	4.50	4.63	4.45	1.88	0.56	4.57	
6	8.50	12.50	1.50	2.12	3.94	8.12	6.63	6.75	6.57	1.88	0.31	6.72	
8	10.62	15.00	1.62	2.44	4.38	10.25	8.63	8.75	8.55	2.19	0.44	8.72	
10	12.75	17.50	1.88	2.62	4.62	12.62	10.75	See Note ⁽⁶⁾				10.88	
12	15.00	20.50	2.00	2.88	5.12	14.75	12.75					12.88	
14	16.25	23.00	2.12	3.00	5.62	16.75	14.00					14.14	
16	18.50	25.50	2.25	3.25	5.75	19.00	16.00					16.16	
18	21.00	28.00	2.38	3.50	6.25	21.00	18.00					18.18	
20	23.00	30.50	2.50	3.75	6.38	23.12	20.00					20.20	
24	27.25	36.00	2.75	4.19	6.62	27.62	24.00					24.25	

Nominal pipe size ⁽¹⁾⁽²⁾	Diameter of pressure connection TT	Drilling template				Bolt length ⁽³⁾⁽⁴⁾	
		Bolt circle	Number of holes	Diameter of holes	Diameter of bolts	Machine bolts	Stud bolts
1	1/4	3.50	4	0.69	5/8	4.50	5.00
1 1/2	1/4	4.50	4	0.81	3/4	4.75	5.25
2	1/4	5.00	8	0.69	5/8	4.50	5.00
2 1/2	1/4	5.88	8	0.81	3/4	4.75	5.25
3	3/8	6.62	8	0.81	3/4	4.75	5.25
4	1/2	7.88	8	0.81	3/4	4.75	5.25
6	1/2	10.62	12	0.88	3/4	4.75	5.25
8	1/2	13.00	12	1.00	7/8	5.00	5.75
10	1/2	15.25	16	1.12	1	5.75	6.50
12	1/2	17.75	16	1.25	1 1/8	6.25	7.00
14	1/2	20.25	20	1.25	1 1/8	6.50	7.25
16	1/2	22.50	20	1.38	1 1/4	7.00	7.75
18	1/2	24.75	24	1.38	1 1/4	7.25	8.00
20	1/2	27.00	24	1.38	1 1/4	7.50	8.50
24	1/2	32.00	24	1.62	1 1/2	8.25	9.50

- (1) Weld neck flanges NPS 3 and smaller are identical to Class 600 flanges and may be so marked.
- (2) All other dimensions are in accordance with ASME B16.5.
- (3) Bolt lengths include allowance for orifice and gasket thickness of 0.25 in. for NPS 1-12 and 0.38 in. for NPS 14-24.
- (4) In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- (5) Threaded flanges are furnished in NPS 1-8 only.
- (6) Bore diameter of weld neck flanges is to be specified by the purchaser.

Figure 6. Class 600

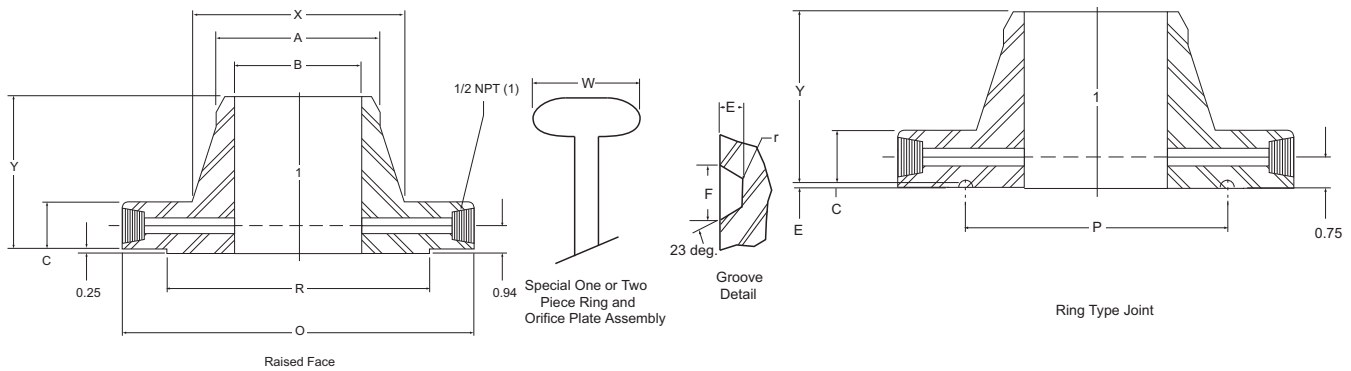


Table 41. Class 600 Orifice Flanges, Welding Neck⁽¹⁾⁽²⁾

Nominal pipe size	Outside diameter of raised face R	Outside diameter of flange ø	Thickness of flange, min. C	Length through hub Y	Height of raised face H	Ring type joint						Hub diameter beginning of chamfer A	
						Groove number	Pitch diameter P	Groove depth E	Groove width F	Radius at bottom r _{max}	Special oval ring height W		Diameter of hub X
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
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
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
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
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	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
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
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
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
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
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
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
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
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
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

Nominal pipe size ⁽¹⁾⁽²⁾	Bore B	Diameter of pressure connection TT	Drilling template				Diameter of bolts	Length of stud bolts ⁽³⁾⁽⁴⁾	
			Bolt circle	Number of holes	Diameter of holes			Raised face	Ring joint
					Raised face	Ring joint			
1	See Note (4)	1/4	3.50	4	0.69	0.75	5/8	5.00	5.50
1 1/2		1/4	4.50	4	0.81	0.88	3/4	5.25	5.50
2		1/4	5.00	8	0.69	0.75	5/8	5.00	5.50
2 1/2		1/4	5.88	8	0.81	0.88	3/4	5.25	5.75
3		3/8	6.62	8	0.81	0.88	3/4	5.25	5.75
4		1/2	8.50	8	1.00	1.00	1/8	6.00	6.50
6		1/2	11.50	12	1.12	1.12	1	7.00	7.50
8		1/2	13.75	12	1.25	1.25	1 1/8	7.75	8.25
10		1/2	17.00	16	1.38	1.38	1 1/4	8.75	9.25
12		1/2	19.25	20	1.38	1.38	1 1/4	9.00	9.50
14		1/2	20.75	20	1.50	1.50	1 3/8	9.50	10.00
16		1/2	23.75	20	1.62	1.62	1 1/2	10.25	10.75
18		1/2	25.75	20	1.75	1.75	1 5/8	11.00	11.50
20		1/2	28.50	24	1.75	1.75	1 5/8	11.75	12.50
24	1/2	33.00	24	2.00	2.00	1 7/8	13.25	13.75	

- (1) Weld neck flanges NPS 3 and smaller are identical to Class 300 flanges except for bolting and may be used for such service.
- (2) All other dimensions are in accordance with ASME B16.5.
- (3) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 1-12 and 0.38 in. for NPS 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62 in. for NPS 1-10, 0.75 in. for NPS 12-18, and 0.88 in. for NPS 20.
- (4) In conformance with ASME B16.5, stud bolt lengths do not include point heights.

Figure 7. Class 900

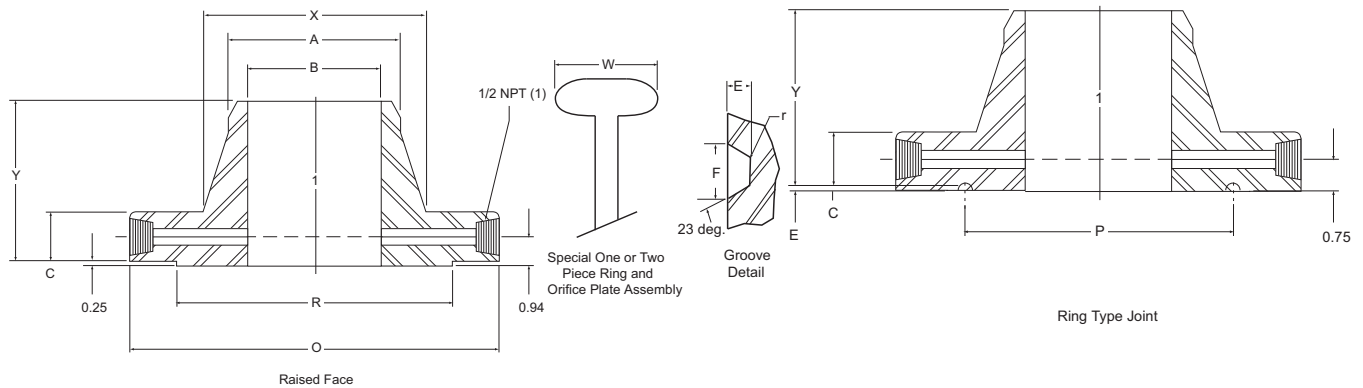


Table 42. Class 900 Orifice Flanges, Welding Neck⁽¹⁾

Nominal pipe size	Outside diameter of raised face R	Outside diameter of flange ø	Thickness of flange, min. C	Length through hub Y	Ring type joint						Diameter of hub X	Hub diameter beginning of chamfer A
					Groove number	Pitch diameter P	Groove depth E	Groove width F	Radius at bottom r _{max}	Special oval ring height W		
1	For Nominal Pipe Size (NPS) 2 ¹ / ₂ and smaller, use Class 1500.											
1 ¹ / ₂												
2												
2 ¹ / ₂												
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	6.19	11.50	1.75	4.50	R37	5.875	0.312	0.469	0.03	1.06	6.25	4.50
6	8.50	15.00	2.19	5.50	R45	8.312	0.312	0.469	0.03	1.06	9.25	6.63
8	10.62	18.50	2.50	6.38	R49	10.625	0.312	0.469	0.03	1.06	11.75	8.63
10	12.75	21.50	2.75	7.25	R53	12.750	0.312	0.469	0.03	1.06	14.50	10.75
12	15.00	24.00	3.12	7.88	R57	15.000	0.312	0.469	0.03	1.06	16.50	12.75
14	16.25	25.25	3.38	8.38	R62	16.500	0.438	0.656	0.06	1.31	17.75	14.00
16	18.50	27.75	3.50	8.50	R66	18.500	0.438	0.656	0.06	1.44	20.00	16.00
18	21.00	31.00	4.00	9.00	R70	21.000	0.500	0.781	0.06	1.56	22.25	18.00
20	23.00	33.75	4.25	9.75	R74	23.000	0.500	0.781	0.06	1.56	24.50	20.00
24	27.25	41.00	5.50	11.50	R78	27.250	0.625	1.062	0.09	1.88	29.50	24.00

Nominal pipe size ⁽¹⁾	Bore B	Diameter of pressure connection TT	Drilling template				Length of stud bolts ⁽²⁾⁽³⁾	
			Diameter of bolt circle	Number of holes	Diameter of holes	Diameter of bolts	Raised face	Ring joint
1	For Nominal Pipe Size (NPS) 2 ¹ / ₂ and smaller, use Class 1500.							
1 ¹ / ₂								
2								
2 ¹ / ₂								
3	See Note (4)	³ / ₈	7.50	8	1	¹ / ₈	6.00	6.50
4		¹ / ₂	9.25	8	1 ¹ / ₄	1 ¹ / ₈	7.00	7.50
6		¹ / ₂	12.50	12	1 ¹ / ₄	1 ¹ / ₈	7.75	8.25
8		¹ / ₂	15.50	12	1 ¹ / ₂	1 ³ / ₈	9.00	9.50
10		¹ / ₂	18.50	16	1 ¹ / ₂	1 ³ / ₈	9.50	10.00
12		¹ / ₂	21.00	20	1 ¹ / ₂	1 ³ / ₈	10.25	10.75
14		¹ / ₂	22.00	20	1 ⁵ / ₈	1 ¹ / ₂	11.00	11.50
16		¹ / ₂	24.25	20	1 ³ / ₄	1 ³ / ₈	11.50	12.00
18		¹ / ₂	27.00	20	2	1 ¹ / ₈	13.00	13.75
20		¹ / ₂	29.50	20	2 ¹ / ₈	2	14.00	14.75
24		¹ / ₂	35.50	20	2 ⁵ / ₈	2 ¹ / ₂	17.50	18.50

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

(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 3-12 and 0.38 in. for NPS 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62 in. for NPS 3-10 and 0.75 in. for NPS 12.

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

Figure 8. Class 1500

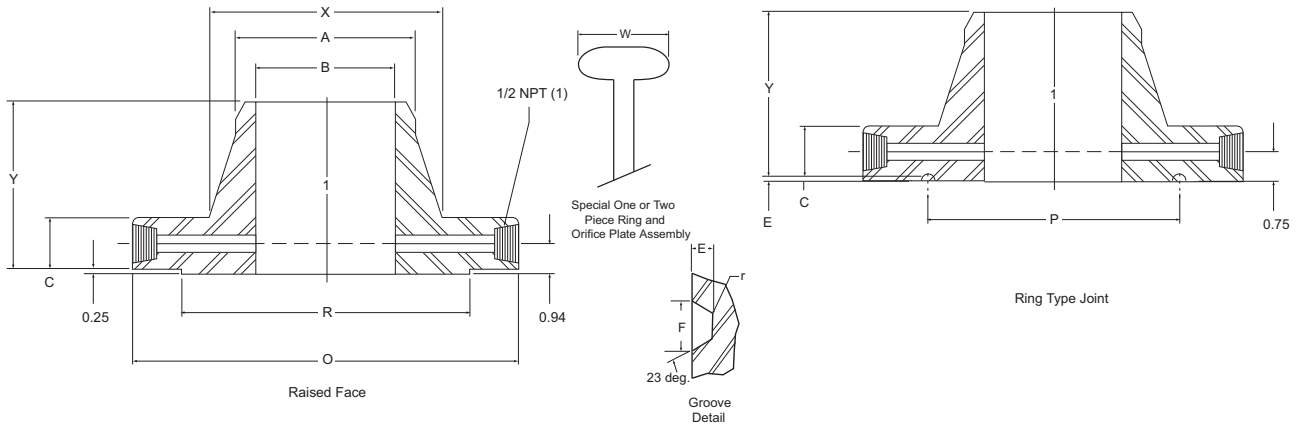


Table 43. Class 1500 Orifice Flanges, Welding Neck⁽¹⁾

Nominal pipe size	Outside diameter of raised face R	Outside diameter of flange ø	Thickness of flange, min. C	Length through hub Y	Ring type joint						Diameter of hub X	Hub diameter beginning of chamfer A
					Groove number	Pitch diameter P	Groove depth E	Groove width F	Radius at bottom r _{max}	Special oval ring height W		
1	2.00	5.88	1.50	3.25	R16	2.000	0.250	0.344	0.03	1.00	2.06	1.32
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
2	3.62	8.50	1.50	4.00	R24	3.750	0.312	0.469	0.03	1.06	4.12	2.38
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
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	6.19	12.25	2.12	4.88	R39	6.375	0.312	0.469	0.03	1.06	6.38	4.50
6	8.50	15.50	3.25	6.75	R46	8.312	0.375	0.531	0.06	1.12	9.00	6.63
8	10.62	19.00	3.62	8.38	R50	10.625	0.438	0.656	0.06	1.31	11.50	8.63
10	12.75	23.00	4.25	10.00	R54	12.750	0.438	0.656	0.06	1.31	14.50	10.75
12	15.00	26.50	4.88	11.12	R58	15.000	0.562	0.806	0.06	1.56	17.75	12.75
14	16.25	29.50	5.25	11.75	R63	16.500	0.625	1.062	0.09	1.75	19.50	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
18	21.00	36.00	6.38	12.88	R71	21.000	0.688	1.188	0.09	2.00	23.50	18.00
20	23.00	38.75	7.00	14.00	R75	23.000	0.688	1.312	0.09	2.12	25.25	20.00
24	27.25	46.00	8.00	16.00	R79	27.250	0.812	1.438	0.09	2.31	30.00	24.00

Nominal pipe size ⁽¹⁾	Bore B	Diameter of pressure connection TT	Drilling template			Length of stud bolts ⁽²⁾⁽³⁾		
			Diameter of bolt circle	Number of holes	Diameter of holes	Diameter of bolts	Raised face	Ring joint
1	See Note (4)	1/4	4.00	4	1.00	7/8	6.00	6.25
1 1/2		1/4	4.88	4	1.12	1	6.25	6.50
2		1/4	6.50	8	1.00	7/8	6.00	6.50
2 1/2		1/4	7.50	8	1.12	1	6.50	7.00
3		5/8	8.00	8	1.25	1 1/8	7.25	7.25
4		1/2	9.50	8	1.38	1 1/4	8.00	8.50
6		1/2	12.50	12	1.50	1 3/8	10.50	11.00
8		1/2	15.50	12	1.75	1 5/8	11.75	12.25
10		1/2	19.00	12	2.00	1 7/8	13.50	14.00
12		1/2	22.50	16	2.12	2	15.00	15.75
14		1/2	25.00	16	2.38	2 1/4	16.25	17.52
16		1/2	27.75	16	2.62	2 1/2	17.75	19.00
18		1/2	30.50	16	2.88	2 3/4	19.75	21.00
20		1/2	32.75	16	3.12	3	21.50	22.50
24		1/2	39.00	16	3.62	3 1/2	24.50	26.00

- (1) All other dimensions are in accordance with ASME B16.5.
- (2) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 1-12 and 0.38 in. for NPS 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62 in. for NPS 1-10, 0.75 in. for NPS 12-18, and 0.88 in. for NPS 20.
- (3) In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- (4) Bore is to be specified by the purchaser.

Figure 9. Class 2500

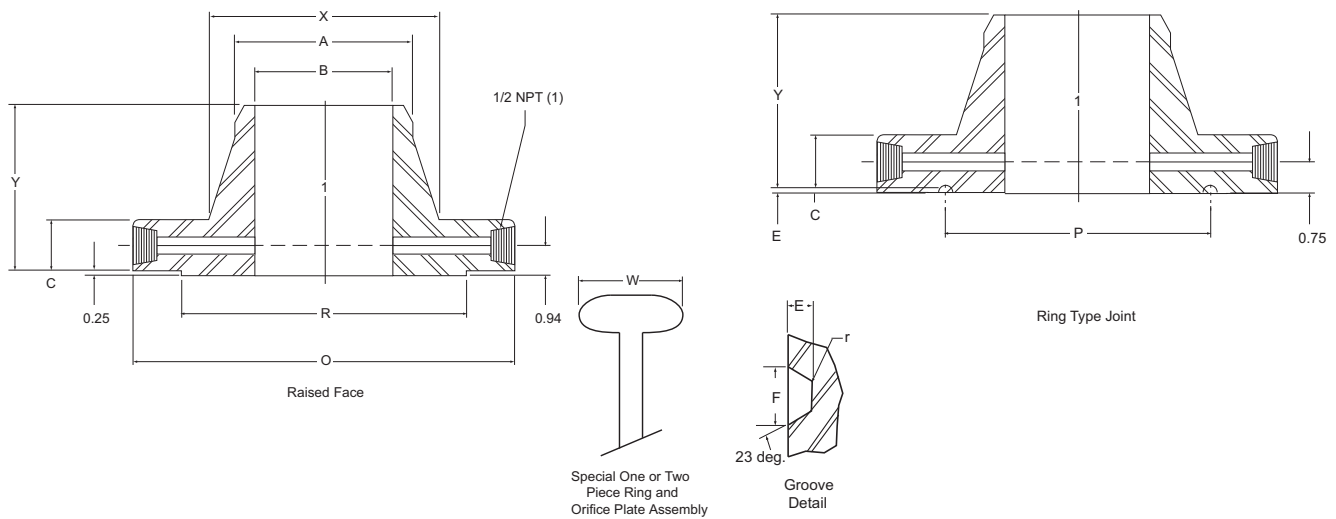


Table 44. Class 2500 Orifice Flanges, Welding Neck⁽¹⁾

Nominal pipe size	Outside diameter of raised face R	Outside diameter of flange ϕ	Thickness of flange, min. C	Length through hub Y	Ring type joint						Diameter of hub X	Hub diameter beginning of chamfer A
					Groove number	Pitch diameter P	G. roove depth E	Groove width F	Radius at bottom r_{max}	Special oval ring height W		
1	2.00	6.25	1.50	3.62	R18	2.375	0.250	0.344	0.03	1.00	2.25	1.32
1.5	2.88	8.00	1.75	4.38	R23	3.250	0.312	0.469	0.03	1.06	3.12	1.90
2	3.62	9.25	2.00	5.00	R26	4.000	0.312	0.469	0.03	1.06	3.75	2.38
2.5	4.12	10.50	2.25	5.62	R28	4.375	0.375	0.531	0.06	1.19	4.50	2.88
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	6.19	14.00	3.00	7.350	R38	6.188	0.438	0.656	0.06	1.31	6.50	4.50
6	8.50	19.00	4.25	10.75	R47	9.000	0.500	0.781	0.06	1.31	6.50	4.50
8	10.62	21.75	5.00	12.50	R51	11.000	0.562	0.906	0.06	1.56	12.00	8.63
10	12.75	26.50	6.50	16.50	R55	13.500	0.688	1.188	0.09	1.88	14.75	10.75
12	15.00	30.00	7.25	18.25	R60	16.000	0.688	1.312	0.09	2.00	17.38	12.75

Nominal pipe size ⁽¹⁾	Bore B	Diameter of pressure connection TT	Drilling template				Length of stud bolts ⁽²⁾⁽³⁾	
			Diameter of bolt circle	Number of holes	Diameter of holes	Diameter of bolts	Raised face	Ring joint
1	See Note ⁽⁴⁾	1/4	4.25	4	1.00	7/8	6.00	6.25
1.5		1/4	5.75	4	1.25	1 1/8	7.00	7.50
2		1/4	6.75	8	1.12	1	7.25	7.75
2.5		1/4	7.75	8	1.25	1 1/8	8.00	8.50
3		3/8	9.00	8	1.38	1 1/4	9.00	9.50
4		1/2	10.75	8	1.62	1 1/2	10.25	10.75
6		1/2	14.50	8	2.12	2	13.75	14.50
8		1/2	17.25	12	2.12	2	15.25	16.00
10		1/2	21.25	12	2.62	2 1/2	19.25	20.25
12		1/2	24.38	12	2.88	2 3/4	21.25	22.50

- (1) All other dimensions are in accordance with ASME B16.5.
- (2) Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25 in. for NPS 1-12 and 0.38 in. for NPS 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62 in. for NPS 1-10, 0.75 in. for NPS 12-18, and 0.88 in. for NPS 20.
- (3) In conformance with ASME B16.5, stud bolt lengths do not include point heights.
- (4) Bore is to be specified by the purchaser.