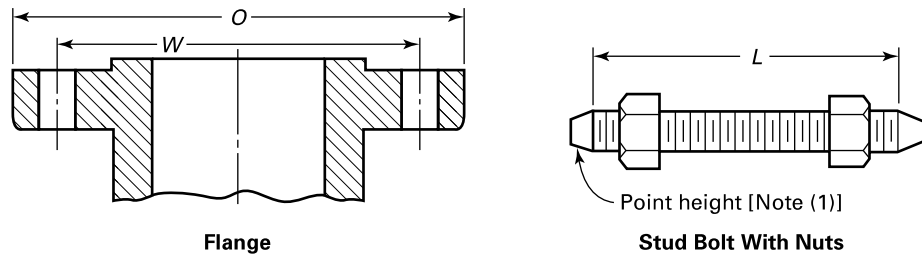


Table 13 Templates for Drilling Class 400 Pipe Flanges

(20)



1	2	3	4	5	6	7	8	9
Nominal Pipe Size, NPS	Outside Diameter of Flange, <i>O</i>	Drilling (2), (3)				Length of Bolts, <i>L</i> (1), (4)		
		Diameter of Bolt Circle, <i>W</i>	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	Raised Face 0.25 in.	Male and Female/ Tongue and Groove	Ring Joint
1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3/4	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1 1/4	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1 1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2 1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3 1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
4	254	200.2	1	8	7/8	140	135	140
5	279	235.0	1	8	7/8	145	135	145
6	318	269.7	1	12	7/8	150	145	150
8	381	330.2	1 1/8	12	1	170	165	170
10	444	387.4	1 1/4	16	1 1/8	190	185	190
12	521	450.8	1 3/8	16	1 1/4	205	195	205
14	584	514.4	1 3/8	20	1 1/4	210	205	210
16	648	571.5	1 1/2	20	1 3/8	220	215	220
18	711	628.6	1 1/2	24	1 3/8	230	220	230
20	775	685.8	1 5/8	24	1 1/2	240	235	250
22	838	743.0	1 3/4	24	1 5/8	255	250	260
24	914	812.8	1 7/8	24	1 3/4	265	260	280

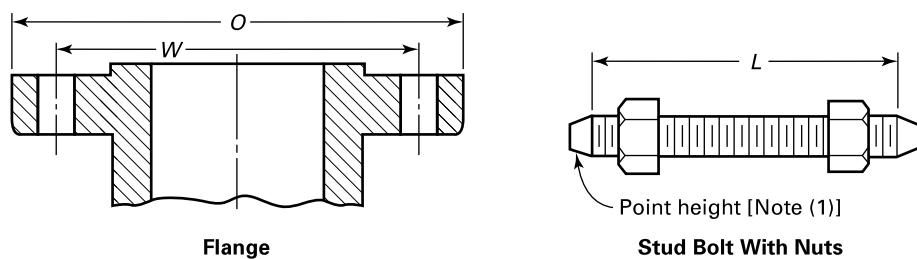
GENERAL NOTES:

- (a) Dimensions are in millimeters, except for diameters of bolts and bolt holes, which are in inches.
 (b) For other dimensions, see [Table 14](#).

NOTES:

- (1) The length of the stud bolt does not include the height of the points. See [para. 6.10.2](#).
 (2) For flange bolt holes, see [para. 6.5](#).
 (3) For spot facing, see [para. 6.6](#).
 (4) Bolt lengths not shown in the table may be determined in accordance with [Nonmandatory Appendix C](#) (see [para. 6.10.2](#)).
 (5) Use Class 600 dimensions in this size.

Table 13C Templates for Drilling Class 400 Pipe Flanges



1	2	3	4	5	6	7	8	9
Nominal Pipe Size	Outside Diameter of Flange, <i>O</i>	Drilling (2), (3)				Length of Bolts, <i>L</i> (1), (4)		
		Diameter of Bolt Circle, <i>W</i>	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	Raised Face 0.25 in.	Male and Female/ Tongue and Groove	Ring Joint
1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3/4	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1 1/4	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1 1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2 1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3 1/2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
4	10.00	7.88	1	8	7/8	5.50	5.25	5.50
5	11.00	9.25	1	8	7/8	5.75	5.25	5.75
6	12.50	10.62	1	12	7/8	6.00	5.75	6.00
8	15.00	13.00	1 1/8	12	1	6.75	6.50	6.75
10	17.50	15.25	1 1/4	16	1 1/8	7.50	7.25	7.50
12	20.50	17.75	1 3/8	16	1 1/4	8.00	7.75	8.00
14	23.00	20.25	1 3/8	20	1 1/4	8.25	8.00	8.25
16	25.50	22.50	1 1/2	20	1 3/8	8.75	8.50	8.75
18	28.00	24.75	1 1/2	24	1 3/8	9.00	8.75	9.00
20	30.50	27.00	1 5/8	24	1 1/2	9.50	9.25	9.75
22	33.00	29.25	1 3/4	24	1 5/8	10.00	9.75	10.25
24	36.00	32.00	1 7/8	24	1 3/4	10.50	10.25	11.00

GENERAL NOTES:

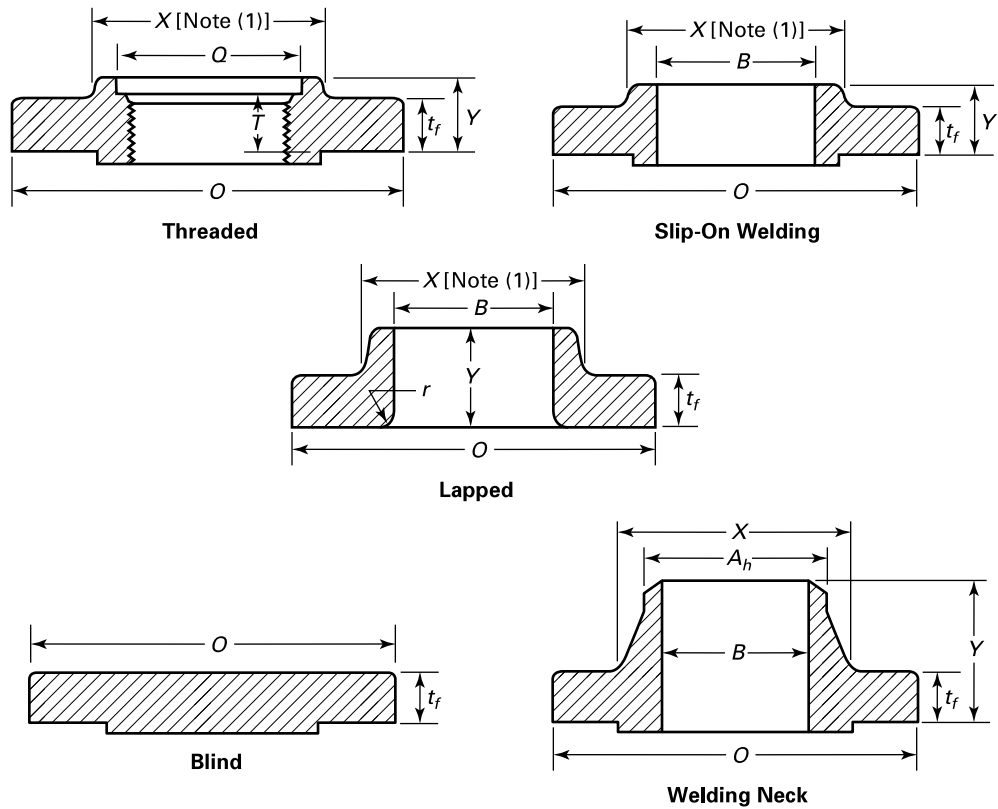
- (a) Dimensions are in inches.
 (b) For other dimensions, see Table 14C.

NOTES:

- (1) The length of the stud bolt does not include the height of the points (see para. 6.10.2).
 (2) For flange bolt holes, see para. 6.5.
 (3) For spot facing, see para. 6.6.
 (4) Bolt lengths not shown in the table may be determined in accordance with Nonmandatory Appendix C (see para. 6.10.2).
 (5) Use Class 600 dimensions in this size.

(20)

Table 14 Dimensions of Class 400 Flanges



1	2	3	4	5	Length Through Hub			9	Bore			13	14
Nom. Pipe Size, NPS	Outside Diam. of Flange, O	Min. Thickness of Flange, t_f	Diam. of Hub, X	Hub Diam. Beginning of Chamfer Welding Neck, A_h (2)				Minimum Thread Length Threaded Flange, T (3)				Corner Bore Radius of Lapped Flange and Pipe, r	Minimum Counterbore Threaded Flange, Q
					Threaded/ Slip-On, Y	Lapped, Y	Welding Neck, Y		Min. Slip- On, B	Min. Lapped, B	Welding Neck, B		
$\frac{1}{2}$	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
$\frac{3}{4}$	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
1	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
$1\frac{1}{4}$	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
$1\frac{1}{2}$	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
2	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
$2\frac{1}{2}$	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)

Table 14 Dimensions of Class 400 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nom. Pipe Size, NPS	Outside Diam. of Flange, <i>O</i>	Min. Thickness of Flange, <i>t_f</i>	Diam. of Hub, <i>X</i>	Hub Diam. Beginning of Chamfer Welding Neck, <i>A_h</i> (2)	Length Through Hub			Minimum Thread Length Threaded Flange, <i>T</i> (3)	Bore			Corner Bore Radius of Lapped Flange and Pipe, <i>r</i>	Minimum Counterbore Threaded Flange, <i>Q</i>
					Threaded/ Slip-On, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>		Min. Slip- On, <i>B</i>	Min. Lapped, <i>B</i>	Welding Neck, <i>B</i>		
3	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
3½	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
4	254	35.1	146	114.3	51	51	89	37	116.1	116.8	(5)	11	117.6
5	279	38.1	178	141.2	54	54	102	43	143.8	144.5	(5)	11	144.5
6	318	41.1	206	168.4	57	57	103	46	170.7	171.4	(5)	13	171.4
8	381	47.8	260	219.2	68	68	117	51	221.5	222.2	(5)	13	222.2
10	444	53.8	321	273.0	73	102	124	56	276.4	277.4	(5)	13	276.4
12	521	57.2	375	323.8	79	108	137	60	327.2	328.2	(5)	13	328.7
14	584	60.5	425	355.6	84	117	149	64	359.2	360.2	(5)	13	360.4
16	648	63.5	483	406.4	94	127	152	68	410.5	411.2	(5)	13	411.2
18	711	66.5	533	457.2	99	137	165	70	461.8	462.3	(5)	13	462.0
20	775	69.8	587	508.0	102	146	168	73	513.1	514.4	(5)	13	512.8
22	838	73.2	641	558.8	108	152	171	...	564.4	565.2	(5)	13	...
24	914	76.2	702	609.6	114	159	175	83	616.0	616.0	(5)	13	614.4

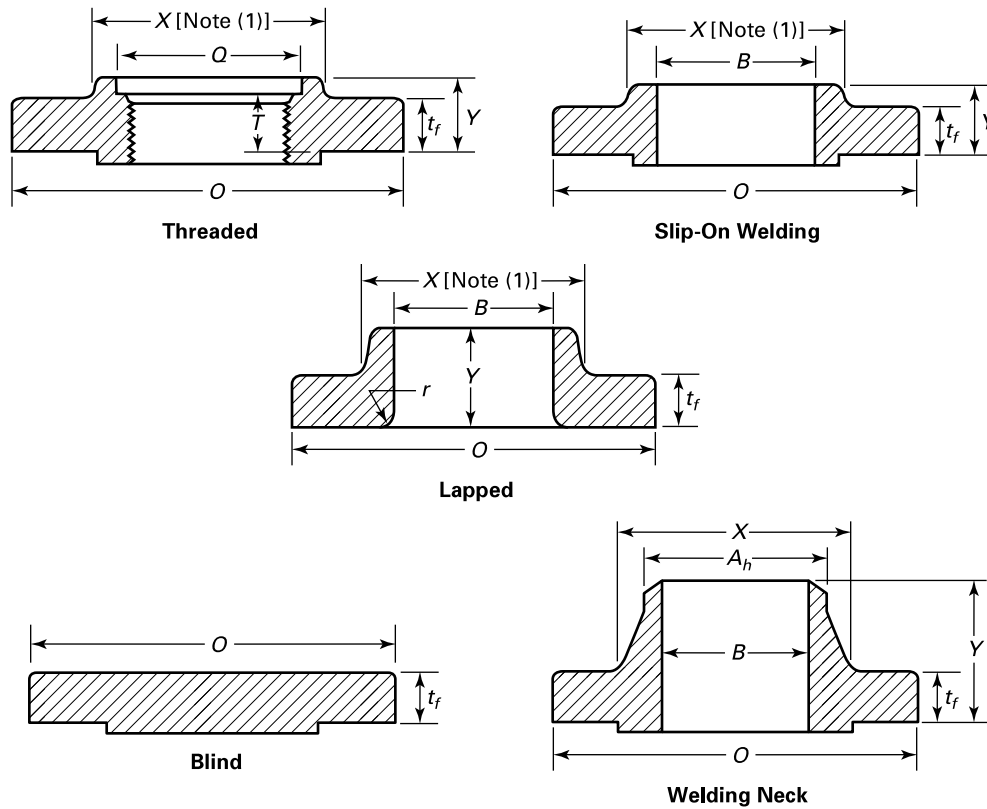
GENERAL NOTES:

- (a) Dimensions are in millimeters, except for the diameter of bolts and bolt holes, which are in inches.
 (b) For tolerances, see [section 7](#).
 (c) For facings, see [para. 6.4](#).
 (d) For flange bolt holes, see [para. 6.5](#) and [Table 13](#).
 (e) For spot facing, see [para 6.6](#).
 (f) For reducing threaded and slip-on flanges, see [Table 6](#).
 (g) Blind flanges may be made with or without hubs at the manufacturer's option.
 (h) For reducing welding neck flanges, see [para 6.8](#).

NOTES:

- (1) This dimension is for the large end of the hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and back face of the flange.
 (2) For welding end bevel, see [para. 6.7](#).
 (3) For thread of threaded flanges, see [para. 6.9](#).
 (4) Use Class 600 dimensions in this size.
 (5) To be specified by the purchaser.

Table 14C Dimensions of Class 400 Flanges



1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nom. Pipe Size	Outside Diam. of Flange, <i>O</i>	Min. Thickness of Flange, <i>t_f</i>	Diam. of Hub, <i>X</i>	Hub Diam. Beginning of Chamfer Welding Neck, <i>A_h</i> (2)	Length Through Hub			Minimum Thread Length Threaded Flange, <i>T</i> (3)	Bore			Corner Bore Radius of Lapped Flange and Pipe, <i>r</i>	Minimum Counterbore Threaded Flange, <i>Q</i>
					Threaded Slip-On, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>		Min. Slip-On, <i>B</i>	Min. Lapped, <i>B</i>	Welding Neck, <i>B</i>		
½	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
¾	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
1	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
1¼	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
1½	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
2	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)

Table 14C Dimensions of Class 400 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nom. Pipe Size	Outside Diam. of Flange, <i>O</i>	Min. Thickness of Flange, <i>t_f</i>	Diam. of Hub, <i>X</i>	Hub Diam. Beginning of Chamfer Welding Neck, <i>A_h</i> (2)	Length Through Hub			Minimum Thread Length Threaded Flange, <i>T</i> (3)	Bore			Corner Bore Radius of Lapped Flange and Pipe, <i>r</i>	Minimum Counterbore Threaded Flange, <i>Q</i>
					Threaded Slip-On, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>		Min. Slip-On, <i>B</i>	Min. Lapped, <i>B</i>	Welding Neck, <i>B</i>		
2½	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
3	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
3½	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
4	10.00	1.38	5.75	4.50	2.00	2.00	3.50	1.44	4.57	4.60	(5)	0.44	4.63
5	11.00	1.50	7.00	5.56	2.12	2.12	4.00	1.69	5.66	5.69	(5)	0.44	5.69
6	12.50	1.62	8.12	6.63	2.25	2.25	4.06	1.81	6.72	6.75	(5)	0.50	6.75
8	15.00	1.88	10.25	8.63	2.69	2.69	4.62	2.00	8.72	8.75	(5)	0.50	8.75
10	17.50	2.12	12.62	10.75	2.88	4.00	4.88	2.19	10.88	10.92	(5)	0.50	10.88
12	20.50	2.25	14.75	12.75	3.12	4.25	5.38	2.38	12.88	12.92	(5)	0.50	12.94
14	23.00	2.38	16.75	14.00	3.31	4.62	5.88	2.50	14.14	14.18	(5)	0.50	14.19
16	25.50	2.50	19.00	16.00	3.69	5.00	6.00	2.69	16.16	16.19	(5)	0.50	16.19
18	28.00	2.62	21.00	18.00	3.88	5.38	6.50	2.75	18.18	18.20	(5)	0.50	18.19
20	30.50	2.75	23.12	20.00	4.00	5.75	6.62	2.88	20.20	20.25	(5)	0.50	20.19
22	33.00	2.88	25.25	22.00	4.25	6.00	6.75	...	22.22	22.25	(5)	0.50	...
24	36.00	3.00	27.62	24.00	4.50	6.25	6.88	3.25	24.25	24.25	(5)	0.50	24.19

GENERAL NOTES:

- Dimensions are in inches.
- For tolerances, see [section 7](#).
- For facings, see [para. 6.4](#).
- For flange bolt holes, see [para. 6.5](#) and [Table 13C](#).
- For spot facing, see [para. 6.6](#).
- For reducing threaded and slip-on flanges, see [Table 6C](#).
- Blind flanges may be made with or without hubs at the manufacturer's option.
- For reducing welding neck flanges, see [para. 6.8](#).

NOTES:

- This dimension is for the large end of the hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, and lapped flanges.
- For welding end bevel, see [para. 6.7](#).
- For thread in threaded flanges, see [para. 6.9](#).
- Use Class 600 dimensions in this size.
- To be specified by the purchaser.