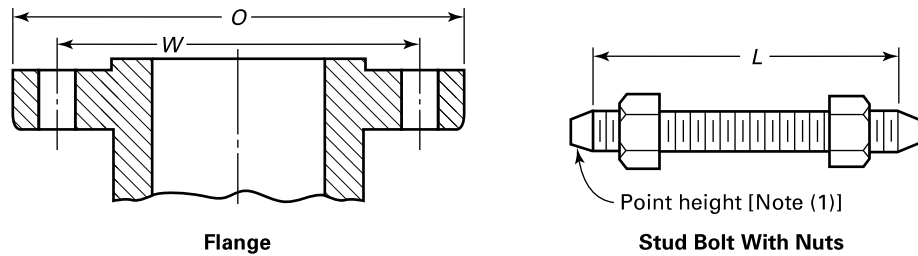


Table 15 Templates for Drilling Class 600 Pipe Flanges and Flanged Fittings

(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, in.	Number of Bolts	Diameter of Bolts, in.	6.4-mm Raised Face	Male and Female/ Tongue and Groove	Ring Joint
1/2	95	66.5	5/8	4	1/2	75	70	75
3/4	117	82.6	3/4	4	5/8	90	85	90
1	124	88.9	3/4	4	5/8	90	85	90
1 1/4	133	98.6	3/4	4	5/8	95	90	95
1 1/2	155	114.3	7/8	4	3/4	110	100	110
2	165	127.0	3/4	8	5/8	110	100	110
2 1/2	190	149.4	7/8	8	3/4	120	115	120
3	210	168.1	7/8	8	3/4	125	120	125
3 1/2	229	184.2	1	8	7/8	140	135	140
4	273	215.9	1	8	7/8	145	140	145
5	330	266.7	1 1/8	8	1	165	160	165
6	356	292.1	1 1/8	12	1	170	165	170
8	419	349.2	1 1/4	12	1 1/8	190	185	195
10	508	431.8	1 3/8	16	1 1/4	215	210	215
12	559	489.0	1 3/8	20	1 1/4	220	215	220
14	603	527.0	1 1/2	20	1 3/8	235	230	235
16	686	603.2	1 5/8	20	1 1/2	255	250	255
18	743	654.0	1 3/4	20	1 5/8	275	265	275
20	813	723.9	1 3/4	24	1 5/8	285	280	290
22	870	777.7	1 7/8	24	1 3/4	305	...	310
24	940	838.2	2	24	1 7/8	330	325	335

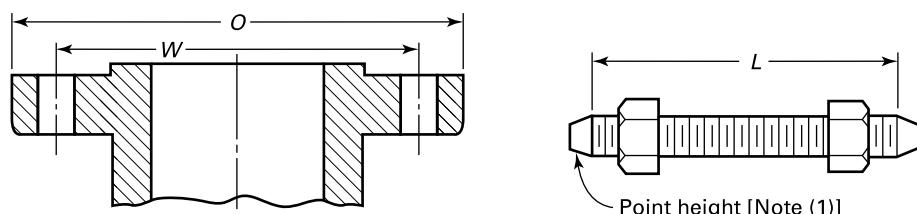
GENERAL NOTES:

- (a) Dimensions are in millimeters, except for the diameters of the bolts and bolt holes, which are expressed in inches.
- (b) For other dimensions, see Table 16.

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 in accordance with Nonmandatory Appendix C (see para 6.10.2).

Table 15C Templates for Drilling Class 600 Pipe Flanges and Flanged Fittings



Flange

Stud Bolt With Nuts

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	3.75	2.62	5/8	4	1/2	3.00	2.75	3.00
3/4	4.62	3.25	3/4	4	5/8	3.50	3.25	3.50
1	4.88	3.50	3/4	4	5/8	3.50	3.25	3.50
1 1/4	5.25	3.88	3/4	4	5/8	3.75	3.50	3.75
1 1/2	6.12	4.50	7/8	4	3/4	4.25	4.00	4.25
2	6.50	5.00	3/4	8	5/8	4.25	4.00	4.25
2 1/2	7.50	5.88	7/8	8	3/4	4.75	4.50	4.75
3	8.25	6.62	7/8	8	3/4	5.00	4.75	5.00
3 1/2	9.00	7.25	1	8	7/8	5.50	5.25	5.50
4	10.75	8.50	1	8	7/8	5.75	5.50	5.75
5	13.00	10.50	1 1/8	8	1	6.50	6.25	6.50
6	14.00	11.50	1 1/8	12	1	6.75	6.50	6.75
8	16.50	13.75	1 1/4	12	1 1/8	7.50	7.25	7.75
10	20.00	17.00	1 3/8	16	1 1/4	8.50	8.25	8.50
12	22.00	19.25	1 3/8	20	1 1/4	8.75	8.50	8.75
14	23.75	20.75	1 1/2	20	1 3/8	9.25	9.00	9.25
16	27.00	23.75	1 5/8	20	1 1/2	10.00	9.75	10.00
18	29.25	25.75	1 3/4	20	1 5/8	10.75	10.50	10.75
20	32.00	28.50	1 3/4	24	1 5/8	11.25	11.00	11.50
22	34.25	30.62	1 7/8	24	1 3/4	12.00	...	12.25
24	37.00	33.00	2	24	1 7/8	13.00	12.75	13.25

GENERAL NOTES:

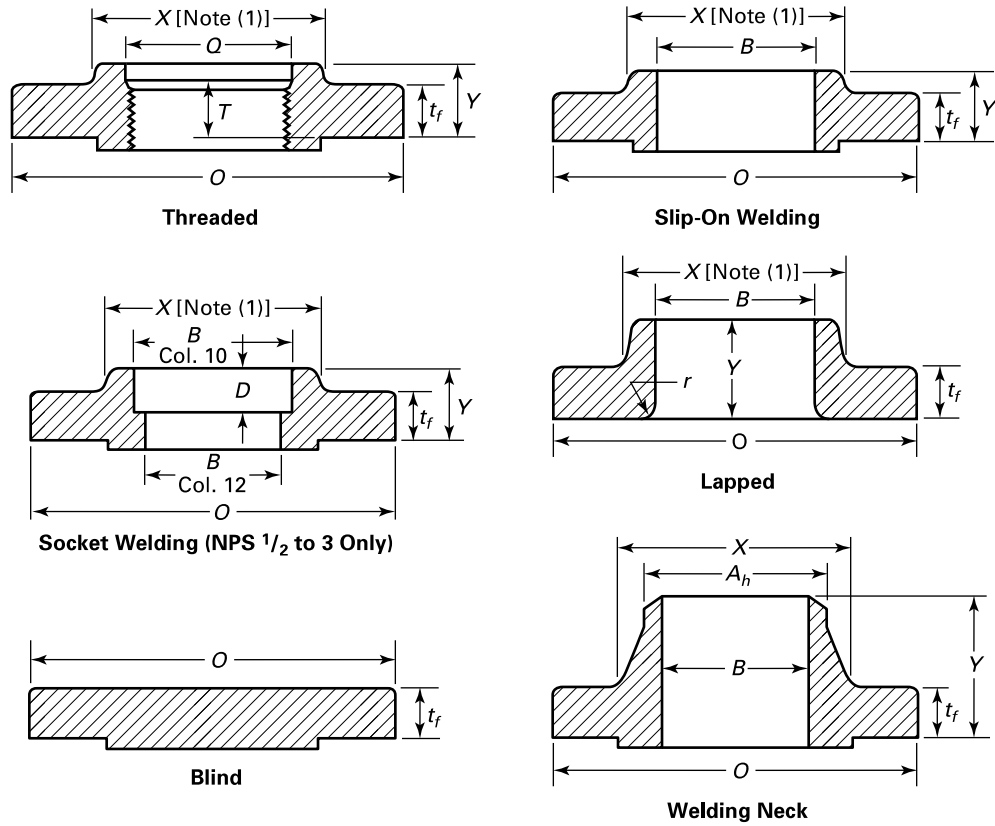
- (a) Dimensions are in inches.
 (b) For other dimensions, see Table 16C.

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).

(20)

Table 16 Dimensions of Class 600 Flanges



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Nominal Pipe Size, NPS	Outside Diameter of Flange, O	Minimum Thickness of Flange, t_f	Diameter of Hub, X	Hub Diameter Beginning of Chamfer Welding Neck, A_h (2)	Length Through Hub			Minimum Thread Length Threaded Flange, T (3)	Bore			Corner Bore Radius of Lapped Flange and Pipe, r	Minimum Counterbore Threaded Flange, Q	Depth of Socket, D
					Threaded/ Slip-On/ Socket Welding, Y	Lapped, Y	Welding Neck, Y		Minimum Slip-On/ Socket Welding, B	Minimum Lapped, B	Welding Neck/ Socket Welding, B			
1/2	95	14.2	38	21.3	22	22	52	16	22.4	22.9	(4)	3	23.6	10
3/4	117	15.7	48	26.7	25	25	57	16	27.7	28.2	(4)	3	29.0	11
1	124	17.5	54	33.5	27	27	62	18	34.5	35.1	(4)	3	35.8	13
1 1/4	133	20.6	64	42.2	28	28	67	21	43.2	43.7	(4)	5	44.4	14
1 1/2	155	22.4	70	48.3	32	32	70	22	49.5	50.0	(4)	6	50.5	16

Table 16 Dimensions of Class 600 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Nominal Pipe Size, NPS	Outside Diameter of Flange, <i>O</i>	Minimum Thickness of Flange, <i>t_f</i>	Diameter of Hub, <i>X</i>	Hub Diameter Beginning of Chamfer Welding Neck, <i>A_h</i> (2)	Length Through Hub			Minimum Thread Length Threaded Flange, <i>T</i> (3)	Bore		Welding Neck/ Socket Welding, <i>B</i>	Corner Bore Radius of Lapped Flange and Pipe, <i>r</i>	Minimum Counterbore Threaded Flange, <i>Q</i>	Depth of Socket, <i>D</i>
					Threaded/ Slip-On/ Socket Welding, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>		Minimum Slip-On/ Socket Welding, <i>B</i>	Minimum Lapped, <i>B</i>				
2	165	25.4	84	60.5	37	37	73	28	62.0	62.5	(4)	8	63.5	18
2½	190	28.4	100	73.2	41	41	79	32	74.7	75.4	(4)	8	76.2	19
3	210	31.8	117	88.9	46	46	83	35	90.7	91.4	(4)	10	92.2	21
3½	229	35.1	133	101.6	49	49	86	40	103.4	104.1	(4)	10	104.9	...
4	273	38.1	152	114.3	54	54	102	41	116.1	116.8	(4)	11	117.6	...
5	330	44.4	189	141.2	60	60	114	48	143.8	144.5	(4)	11	144.5	...
6	356	47.8	222	168.4	67	67	117	51	170.7	171.4	(4)	13	171.4	...
8	419	55.6	273	219.2	76	76	133	57	221.5	222.2	(4)	13	222.2	...
10	508	63.5	343	273.0	86	111	152	65	276.2	277.4	(4)	13	276.4	...
12	559	66.5	400	323.8	92	117	155	70	327.0	328.2	(4)	13	328.7	...
14	603	69.8	432	355.6	94	127	165	73	359.2	360.2	(4)	13	360.4	...
16	686	76.2	495	406.4	106	140	178	78	410.5	411.2	(4)	13	411.2	...
18	743	82.6	546	457.2	117	152	184	79	461.8	462.3	(4)	13	462.0	...
20	813	88.9	610	508.0	127	165	190	83	513.1	514.4	(4)	13	512.8	...
22	870	95.2	663	558.8	133	175	197	...	564.4	565.2	(4)	13	...	...
24	940	101.6	718	609.6	140	184	203	92	616.0	616.0	(4)	13	614.4	...

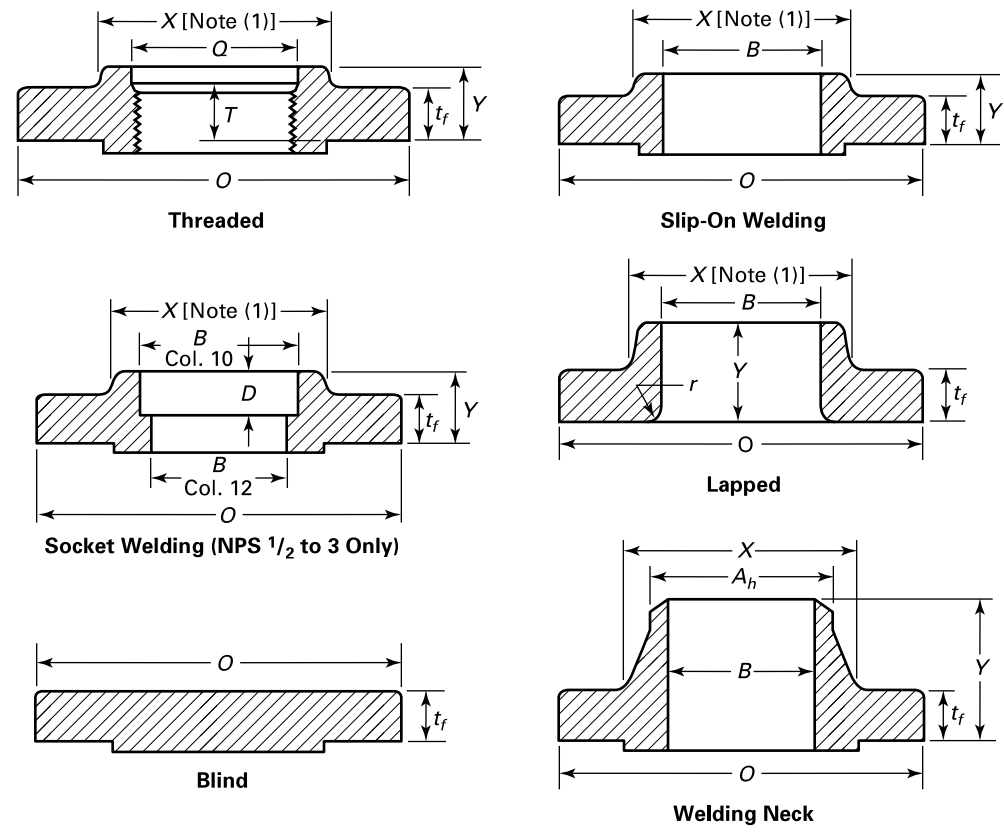
GENERAL NOTES:

- (a) Dimensions are in millimeters.
- (b) For tolerance, see [section 7](#).
- (c) For facings, see [para. 6.4](#).
- (d) For flange bolt holes, see [para. 6.5](#) and [Table 15C](#).
- (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) To be specified by the purchaser.

Table 16C Dimensions of Class 600 Flanges



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Nominal Pipe Size	Outside Diameter of Flange, <i>O</i>	Minimum Thickness of Flange, <i>t_f</i>	Diameter of Hub, <i>X</i>	Hub Diameter 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 Counter- bore Threaded Flange, <i>Q</i>	Depth of Socket, <i>D</i>
					Threaded Slip-On Socket Welding, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>		Minimum Slip-On/ Socket Welding, <i>B</i>	Minimum Lapped, <i>B</i>	Welding Neck/ Socket Welding, <i>B</i>			
1/2	3.75	0.56	1.50	0.84	0.88	0.88	2.06	0.62	0.88	0.90	(4)	0.12	0.93	0.38
3/4	4.62	0.62	1.88	1.05	1.00	1.00	2.25	0.62	1.09	1.11	(4)	0.12	1.14	0.44
1	4.88	0.69	2.12	1.32	1.06	1.06	2.44	0.69	1.36	1.38	(4)	0.12	1.41	0.50
1 1/4	5.25	0.81	2.50	1.66	1.12	1.12	2.62	0.81	1.70	1.72	(4)	0.19	1.75	0.56
1 1/2	6.12	0.88	2.75	1.90	1.25	1.25	2.75	0.88	1.95	1.97	(4)	0.25	1.99	0.62

Table 16C Dimensions of Class 600 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Nominal Pipe Size	Outside Diameter of Flange, <i>O</i>	Minimum Thickness of Flange, <i>t_f</i>	Diameter of Hub, <i>X</i>	Hub Diameter 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 Counter- bore Threaded Flange, <i>Q</i>	Depth of Socket, <i>D</i>
					Threaded Slip-On Socket Welding, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>		Minimum Slip-On/ Socket Welding, <i>B</i>	Minimum Lapped, <i>B</i>	Welding Neck/ Socket Welding, <i>B</i>			
2	6.50	1.00	3.31	2.38	1.44	1.44	2.88	1.12	2.44	2.46	(4)	0.31	2.50	0.69
2½	7.50	1.12	3.94	2.88	1.62	1.62	3.12	1.25	2.94	2.97	(4)	0.31	3.00	0.75
3	8.25	1.25	4.62	3.50	1.81	1.81	3.25	1.38	3.57	3.60	(4)	0.38	3.63	0.81
3½	9.00	1.38	5.25	4.00	1.94	1.94	3.38	1.56	4.07	4.10	(4)	0.38	4.13	...
4	10.75	1.50	6.00	4.50	2.12	2.12	4.00	1.62	4.57	4.60	(4)	0.44	4.63	...
5	13.00	1.75	7.44	5.56	2.38	2.38	4.50	1.88	5.66	5.69	(4)	0.44	5.69	...
6	14.00	1.88	8.75	6.63	2.62	2.62	4.62	2.00	6.72	6.75	(4)	0.50	6.75	...
8	16.50	2.19	10.75	8.63	3.00	3.00	5.25	2.25	8.72	8.75	(4)	0.50	8.75	...
10	20.00	2.50	13.50	10.75	3.38	4.38	6.00	2.56	10.88	10.92	(4)	0.50	10.88	...
12	22.00	2.62	15.75	12.75	3.62	4.62	6.12	2.75	12.88	12.92	(4)	0.50	12.94	...
14	23.75	2.75	17.00	14.00	3.69	5.00	6.50	2.88	14.14	14.18	(4)	0.50	14.19	...
16	27.00	3.00	19.50	16.00	4.19	5.50	7.00	3.06	16.16	16.19	(4)	0.50	16.19	...
18	29.25	3.25	21.50	18.00	4.62	6.00	7.25	3.12	18.18	18.20	(4)	0.50	18.19	...
20	32.00	3.50	24.00	20.00	5.00	6.50	7.50	3.25	20.20	20.25	(4)	0.50	20.19	...
22	34.25	3.75	26.25	22.00	5.25	6.88	7.75	...	22.22	22.25	(4)	0.50	...	...
24	37.00	4.00	28.25	24.00	5.50	7.25	8.00	3.62	24.25	24.25	(4)	0.50	24.19	...

GENERAL NOTES:

- (a) Dimensions 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 15C](#).
 (e) For spot facing, see [para. 6.6](#).
 (f) For reducing threaded and slip-on flanges, see [Table 6C](#).
 (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.
 (2) For welding end bevel, see [para. 6.7](#).
 (3) For threads in threaded flanges, see [para. 6.9](#).
 (4) To be specified by the purchaser.