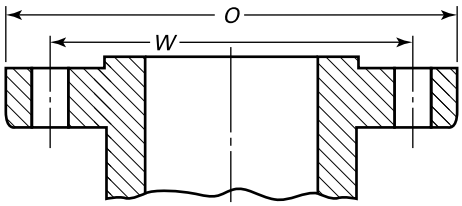
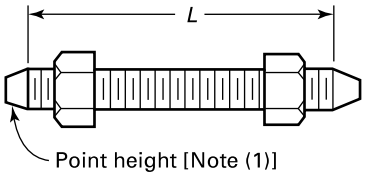
Table 17 Templates for Drilling Class 900 Pipe Flanges and Flanged Fittings (20)



Flange



Stud Bolt With Nuts

1	2	3	4	5	6	7	8	9
		Drilling (2), (3)				Length of Bolts, *L* (1), (4)		
Nominal Pipe Size, NPS	Outside Diameter of Flange, *O*	Diameter of Bolt Circle, *W*	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
½	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
¾	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1¼	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1½	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2½	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3	241	190.5	1	8	⅞	145	140	145
4	292	235.0	1¼	8	1⅛	170	165	170
5	349	279.4	1⅜	8	1¼	190	185	190
6	381	317.5	1¼	12	1⅛	190	185	195
8	470	393.7	1½	12	1⅜	220	215	220
10	546	469.9	1½	16	1⅜	235	230	235
12	610	533.4	1½	20	1⅜	255	250	255
14	641	558.8	1⅝	20	1½	275	265	280
16	705	616.0	1¾	20	1⅝	285	280	290
18	787	685.8	2	20	1⅞	325	320	335
20	857	749.3	2⅛	20	2	350	345	360
24	1,041	901.7	2⅝	20	2½	440	430	455

GENERAL NOTES:

(a) Dimensions are in millimeters, except for diameters of bolts and bolt holes, which are in inches.

(b) For other dimensions, see Tables 18 and 19.

NOTES:

(1) The length of the stud bolt does not include the height of the points (see para 6.10.2).

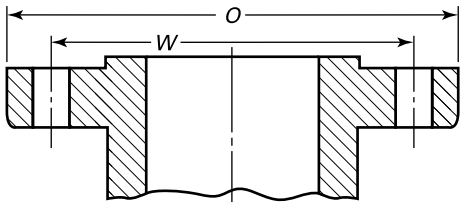
(2) For flange bolt holes, see para. 6.5.

(3) For spot facing, see para. 6.6.

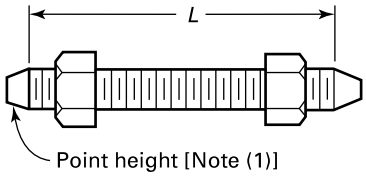
(4) Bolt lengths not shown in the table may be determined in accordance with Nonmandatory Appendix C (see para. 6.10.2).

(5) Use Class 1500 dimensions in this size.

Table 17C Templates for Drilling Class 900 Pipe Flanges and Flanged Fittings



Flange



Stud Bolt With Nuts

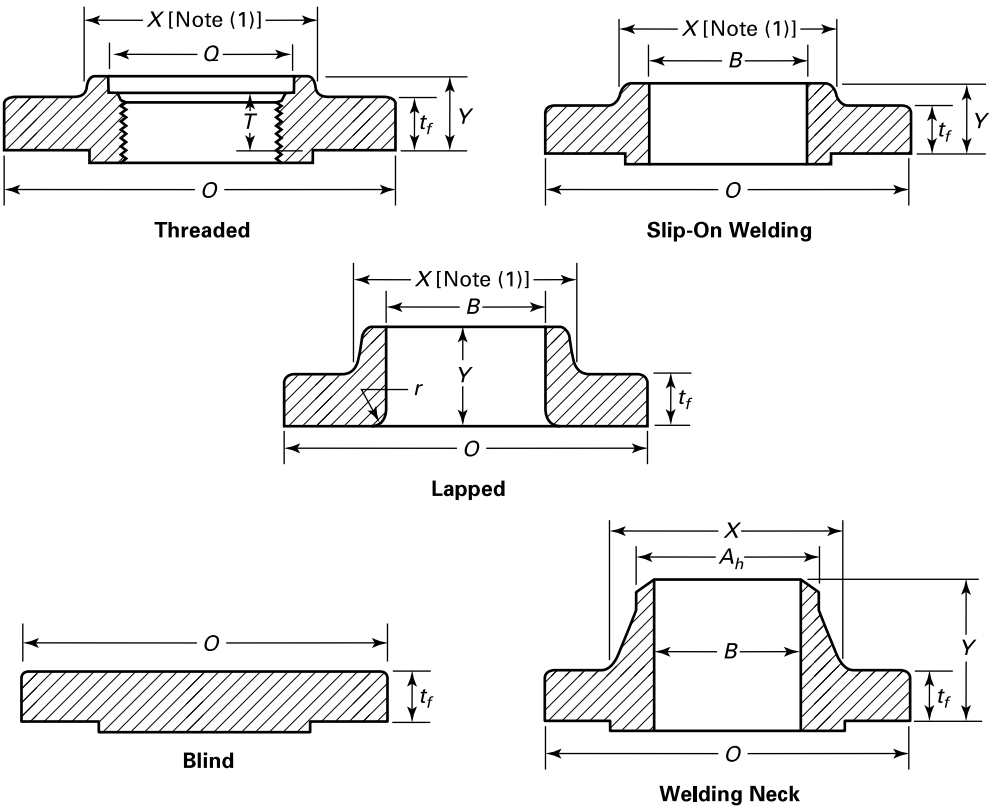
1	2	3	4	5	6	7	8	9
		Drilling (2), (3)				Length of Bolts, *L* (1), (4)		
Nominal Pipe Size	Outside Diameter of Flange, *O*	Diameter of Bolt Circle, *W*	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	Raised Face 0.25 in.	Male and Female/ Tongue and Groove	Ring Joint
½	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
¾	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1¼	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1½	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
2½	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
3	9.50	7.50	1	8	⅞	5.75	5.50	5.75
4	11.50	9.25	1¼	8	1⅛	6.75	6.50	6.75
5	13.75	11.00	1⅜	8	1¼	7.50	7.25	7.50
6	15.00	12.50	1¼	12	1⅛	7.50	7.25	7.75
8	18.50	15.50	1½	12	1⅜	8.75	8.50	8.75
10	21.50	18.50	1½	16	1⅜	9.25	9.00	9.25
12	24.00	21.00	1½	20	1⅜	10.00	9.75	10.00
14	25.25	22.00	1⅝	20	1½	10.75	10.50	11.00
16	27.75	24.25	1¾	20	1⅝	11.25	11.00	11.50
18	31.00	27.00	2	20	1⅞	12.75	12.50	13.25
20	33.75	29.50	2⅛	20	2	13.75	13.50	14.25
24	41.00	35.50	2⅝	20	2½	17.25	17.00	18.00

GENERAL NOTES:
(a) Dimensions are in inches.
(b) For other dimensions, see Table 18C and Table 19C.

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 1500 dimensions in this size.

Table 18 Dimensions of Class 900 Flanges

(20)



1	2	3	4	5	6	7	8	9	10	11	12	13	14
					Length Through Hub				Bore				
Nom. Pipe Size, NPS	Outside Diam. of Flange, *O*	Min. Thick-ness of Flange, t_f	Diam. of Hub, *X*	Hub Diam. Beginning of Chamfer Welding Neck, A_h (2)	Threaded/ Slip-On, *Y*	Lapped, *Y*	Welding Neck, *Y*	Minimum Thread Length Threaded Flange, *T* (3)	Min. Slip-On, *B*	Min. Lapped, *B*	Welding Neck, *B*	Corner Bore Radius of Lapped Flange and Pipe, *r*	Minimum Counter-bore Threaded Flange, *Q*
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)
2½	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
3	241	38.1	127	88.9	54	54	102	41	90.7	91.4	(5)	10	92.2
4	292	44.5	159	114.3	70	70	114	48	116.1	116.8	(5)	11	117.6
5	349	50.8	190	141.2	79	79	127	54	143.8	144.5	(5)	11	144.5
6	381	55.6	235	168.4	86	86	140	57	170.7	171.4	(5)	13	171.4
8	470	63.5	298	219.2	102	114	162	64	221.5	222.2	(5)	13	222.2
10	546	69.8	368	273.0	108	127	184	71	276.4	277.4	(5)	13	276.4
12	610	79.2	419	323.8	117	143	200	76	327.2	328.2	(5)	13	328.7
14	641	85.9	451	355.6	130	155	213	83	359.2	360.2	(5)	13	360.4

Table 18 Dimensions of Class 900 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
					Length Through Hub				Bore				
Nom. Pipe Size, NPS	Outside Diam. of Flange, *O*	Min. Thick-ness of Flange, t_f	Diam. of Hub, *X*	Hub Diam. Beginning of Chamfer Welding Neck, A_h (2)	Threaded/ Slip-On, *Y*	Lapped, *Y*	Welding Neck, *Y*	Minimum Thread Length Threaded Flange, *T* (3)	Min. Slip-On, *B*	Min. Lapped, *B*	Welding Neck, *B*	Corner Bore Radius of Lapped Flange and Pipe, *r*	Minimum Counter-bore Threaded Flange, *Q*
16	705	88.9	508	406.4	133	165	216	86	410.5	411.2	(5)	13	411.2
18	787	101.6	565	457.2	152	190	229	89	461.8	462.3	(5)	13	462.0
20	857	108.0	622	508.0	159	210	248	92	513.1	514.4	(5)	13	512.8
24	1,041	139.7	749	609.6	203	267	292	102	616.0	616.0	(5)	13	614.4

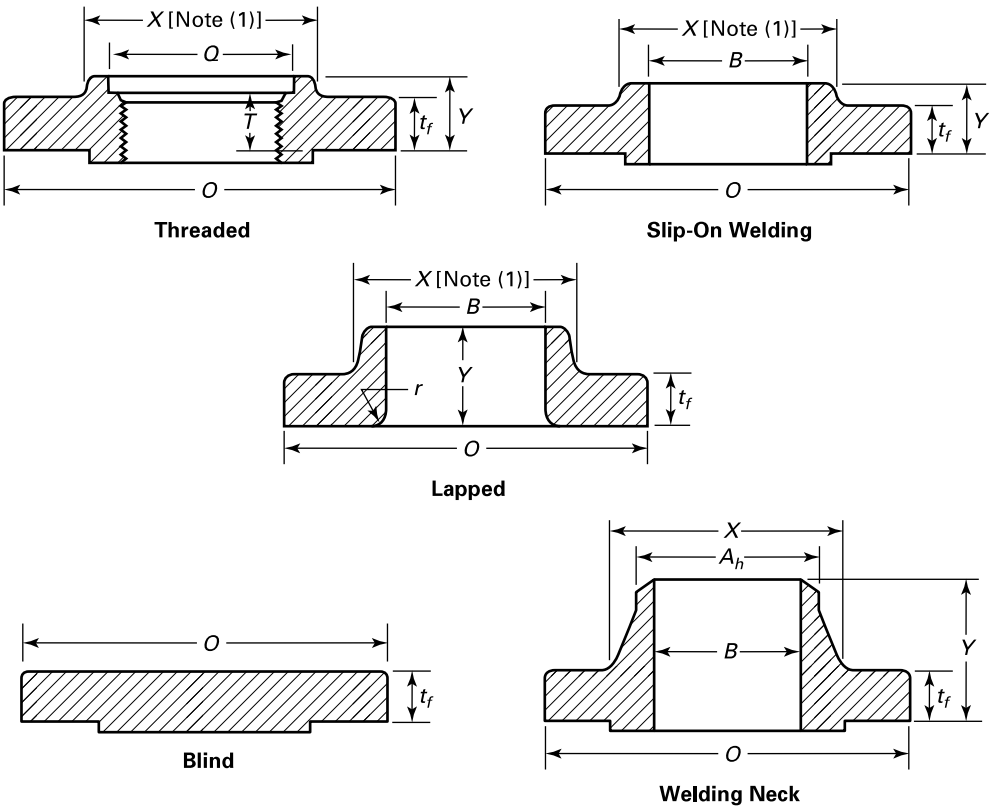
GENERAL NOTES:

(a) Dimensions are in millimeters.
(b) For tolerances, see section 7.
(c) For facings, see para. 6.4.
(d) For flange bolt holes, see para. 6.5 and Table 17.
(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 manufacture'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 1500 dimensions in this size.
(5) To be specified by the purchaser.

Table 18C Dimensions of Class 900 Flanges



1	2	3	4	5	6	7	8	9	10	11	12	13	14
					Length Through Hub				Bore				
Nom. Pipe Size	Outside Diameter of Flange, *O*	Minimum Thickness of Flange, t_f	Diam. of Hub, *X*	Hub Diameter Beginning of Chamfer Welding Neck, A_h (2)	Threaded Slip-On, *Y*	Lapped, *Y*	Welding Neck, *Y*	Minimum Thread Length Threaded Flange, *T* (3)	Min. Slip-On, *B*	Min. Lapped, *B*	Welding Neck, *B*	Corner Bore Radius of Lapped Flange and Pipe, *r*	Minimum Counterbore Threaded Flange, *Q*
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)
2½	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
3	9.50	1.50	5.00	3.50	2.12	2.12	4.00	1.62	3.57	3.60	(5)	0.38	3.63
4	11.50	1.75	6.25	4.50	2.75	2.75	4.50	1.88	4.57	4.60	(5)	0.44	4.63
5	13.75	2.00	7.50	5.56	3.12	3.12	5.00	2.12	5.66	5.69	(5)	0.44	5.69
6	15.00	2.19	9.25	6.63	3.38	3.38	5.50	2.25	6.72	6.75	(5)	0.50	6.75
8	18.50	2.50	11.75	8.63	4.00	4.50	6.38	2.50	8.72	8.75	(5)	0.50	8.75
10	21.50	2.75	14.50	10.75	4.25	5.00	7.25	2.81	10.88	10.92	(5)	0.50	10.88
12	24.00	3.12	16.50	12.75	4.62	5.62	7.88	3.00	12.88	12.92	(5)	0.50	12.94
14	25.25	3.38	17.75	14.00	5.12	6.12	8.38	3.25	14.14	14.18	(5)	0.50	14.19

Table 18C Dimensions of Class 900 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
					Length Through Hub				Bore				
Nom. Pipe Size	Outside Diameter of Flange, O	Minimum Thickness of Flange, t_f	Diam. of Hub, X	Hub Diameter Beginning of Chamfer Welding Neck, A_h (2)	Threaded Slip-On, Y	Lapped, Y	Welding Neck, Y	Minimum Thread Length Threaded Flange, T (3)	Min. Slip-On, B	Min. Lapped, B	Welding Neck, B	Corner Bore Radius of Lapped Flange and Pipe, r	Minimum Counterbore Threaded Flange, Q
16	27.75	3.50	20.00	16.00	5.25	6.50	8.50	3.38	16.16	16.19	(5)	0.50	16.19
18	31.00	4.00	22.25	18.00	6.00	7.50	9.00	3.50	18.18	18.20	(5)	0.50	18.19
20	33.75	4.25	24.50	20.00	6.25	8.25	9.75	3.62	20.20	20.25	(5)	0.50	20.19
24	41.00	5.50	29.50	24.00	8.00	10.50	11.50	4.00	24.25	24.25	(5)	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 17C.
(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) Use Class 1500 dimensions in this size.
(5) To be specified by the purchaser.