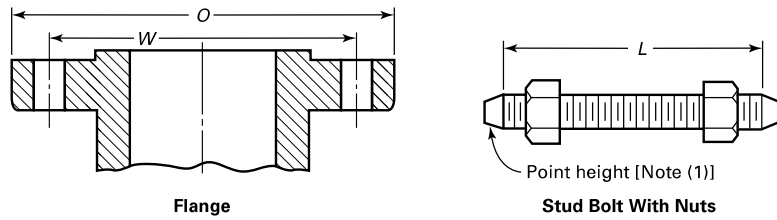


(17)

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



1	2	3	4	5	6	7	8	9
Nominal Pipe Size, NPS	Outside Diameter of Flange, O	Drilling [Notes (2), (3)]				Length of Bolts, L [Notes (1), (4)]		
		Diameter of Bolt Circle, W	Diameter of Bolt Holes, in.	Number of Bolts	Diameter of Bolts, in.	7-mm Raised Face	Male and Female/Tongue and Groove	Ring Joint
1/2	95	66.7	5/8	4	1/2	75	70	75
3/4	115	82.6	3/4	4	5/8	90	85	90
1	125	88.9	3/4	4	5/8	90	85	90
1 1/4	135	98.4	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	149.2	7/8	8	3/4	120	115	120
3	210	168.3	7/8	8	3/4	125	120	125
3 1/2	230	184.2	1	8	7/8	140	135	140
4	275	215.9	1	8	7/8	145	140	145
5	330	266.7	1 1/8	8	1	165	160	165
6	355	292.1	1 1/8	12	1	170	165	170
8	420	349.2	1 1/4	12	1 1/8	190	185	195
10	510	431.8	1 3/8	16	1 1/4	215	210	215
12	560	489.0	1 3/8	20	1 1/4	220	215	220
14	605	527.0	1 1/2	20	1 3/8	235	230	235
16	685	603.2	1 5/8	20	1 1/2	255	250	255
18	745	654.0	1 3/4	20	1 5/8	275	265	275
20	815	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:

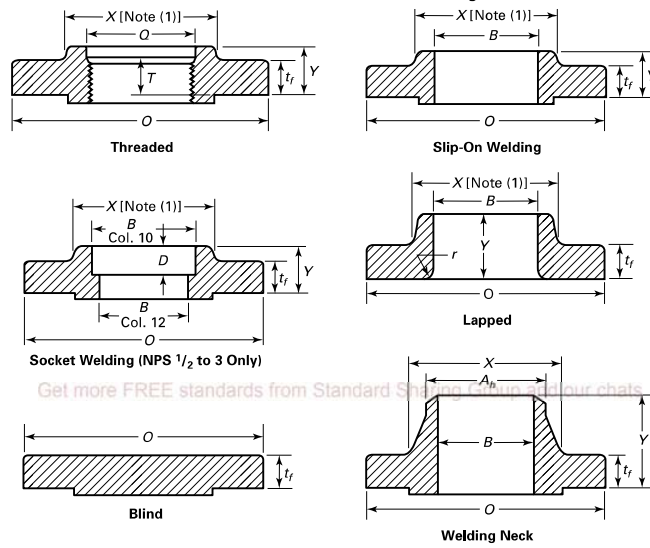
- (a) Dimensions of Table 15 are in millimeters, except for the diameters of the bolts and bolt holes, which are expressed in inch units. For dimensions in inch units, refer to Mandatory Appendix II, Table II-15.
- (b) For other dimensions, see Table 16.

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).

(17)

Table 16 Dimensions of Class 600 Flanges



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ASME B16.5-2017

1	2	3	4	5	6			8	9	10			12	13	14	15
					Threaded/ Slip-On/ Socket Welding, Y	Lapped, Y	Welding Neck, Y			Minimum Thread Length Threaded Flange, T [Note (3)]	Minimum Slip-On/ Socket Welding, B	Minimum Lapped, B				
Nominal Pipe Size, NPS	Outside Diameter of Flange, O	Minimum Thickness of Flange, tr	Diameter of Hub, X	Hub Diameter Beginning of Chamfer Welding Neck, Ah [Note (2)]	Length Through Hub					Bore			Corner Bore Radius of Flange and Pipe, r	Minimum Counterbore Threaded Flange, Q	Depth of Socket, D	
1/2	95	14.3	38	21.3	22	22	52	16	22.2	22.9	Note (4)	3	23.6	10		
3/4	115	15.9	48	26.7	25	25	57	16	27.7	28.2	Note (4)	3	29.0	11		
1	125	17.5	54	33.4	27	27	62	18	34.5	34.9	Note (4)	3	35.8	13		
1 1/4	135	20.7	64	42.2	29	29	67	21	43.2	43.7	Note (4)	5	44.4	14		
1 1/2	155	22.3	70	48.3	32	32	70	23	49.5	50.0	Note (4)	6	50.6	16		
2	165	25.4	84	60.3	37	37	73	29	61.9	62.5	Note (4)	8	63.5	17		

(17)

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

1	2	3	4	5	6			9	10	11	12	13	14	15
					Length Through Hub										Bore
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> [Note (2)]	Threaded/ Slip-On/ Socket Welding, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>	Minimum Thread Length Threaded Flange, <i>T</i> [Note (3)]	Minimum Slip-On/ Socket Welding, <i>B</i>	Minimum Lapped, <i>B</i>	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>
3	210	31.8	117	88.9	46	46	83	35	90.7	91.4	Note (4)	10	92.2	21
3½	230	35.0	133	101.6	49	49	86	40	103.4	104.1	Note (4)	10	104.9	...
4	275	38.1	152	114.3	54	54	102	42	116.1	116.8	Note (4)	11	117.6	...
5	330	44.5	189	141.3	60	60	114	48	143.8	144.4	Note (4)	11	144.4	...
6	355	47.7	222	168.3	67	67	117	51	170.7	171.4	Note (4)	13	171.4	...
8	420	55.6	273	219.1	76	76	133	58	221.5	222.2	Note (4)	13	222.2	...
10	510	63.5	343	273.0	86	111	152	66	276.2	277.4	Note (4)	13	276.2	...
12	560	66.7	400	323.8	92	117	156	70	327.0	328.2	Note (4)	13	328.6	...
14	605	69.9	432	355.6	94	127	165	74	359.2	360.2	Note (4)	13	360.4	...
16	685	76.2	495	406.4	106	140	178	78	410.5	411.2	Note (4)	13	411.2	...
18	745	82.6	546	457.0	117	152	184	80	461.8	462.3	Note (4)	13	462.0	...
20	815	88.9	610	508.0	127	165	190	83	513.1	514.4	Note (4)	13	512.8	...
22	870	95.2	663	558.8	133	175	197	...	564.4	565.2	Note (4)	13	...	...
24	940	101.6	718	610.0	140	184	203	93	616.0	616.0	Note (4)	13	614.4	...

GENERAL NOTES:

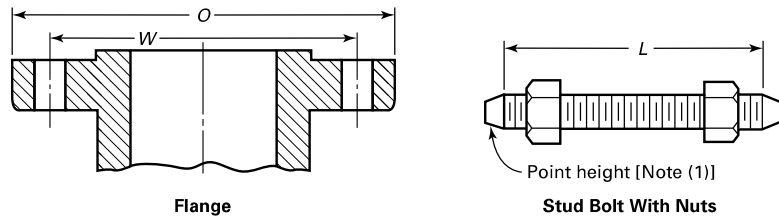
- (a) Dimensions of Table 16 are in millimeters. For dimensions in inch units, refer to Mandatory Appendix II, Table II-16.
 (b) For tolerance, see section 7.
 (c) For facings, see para. 6.4.
 (d) For flange bolt holes, see para. 6.5 and Table 15.
 (e) For spot facing, see para. 6.6.
 (f) For reducing 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.

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



Nominal Pipe Size, NPS	Outside Diameter of Flange, O	Drilling [Notes (2), (3)]				Length of Bolts, L [Notes (1), (4)]		
		Diameter of Bolt Circle, W	Diameter of Bolt Holes, in.	Number of Bolts	Diameter of Bolts, in.	7-mm Raised Face	Male and Female/Tongue and Groove	Ring Joint
1/2								
3/4								
1								
1 1/4								
1 1/2								
2								
2 1/2								
3	240	190.5	1	8	7/8	145	140	145
4	290	235.0	1 1/4	8	1 1/8	170	165	170
5	350	279.4	1 3/8	8	1 1/4	190	185	190
6	380	317.5	1 1/4	12	1 1/8	190	185	195
8	470	393.7	1 1/2	12	1 3/8	220	215	220
10	545	469.9	1 1/2	16	1 3/8	235	230	235
12	610	533.4	1 1/2	20	1 3/8	255	250	255
14	640	558.8	1 5/8	20	1 1/2	275	265	280
16	705	616.0	1 3/4	20	1 5/8	285	280	290
18	785	685.8	2	20	1 7/8	325	320	335
20	855	749.3	2 1/8	20	2	350	345	360
24	1,040	901.7	2 5/8	20	2 1/2	440	430	455

Use Class 1500 dimensions in these sizes

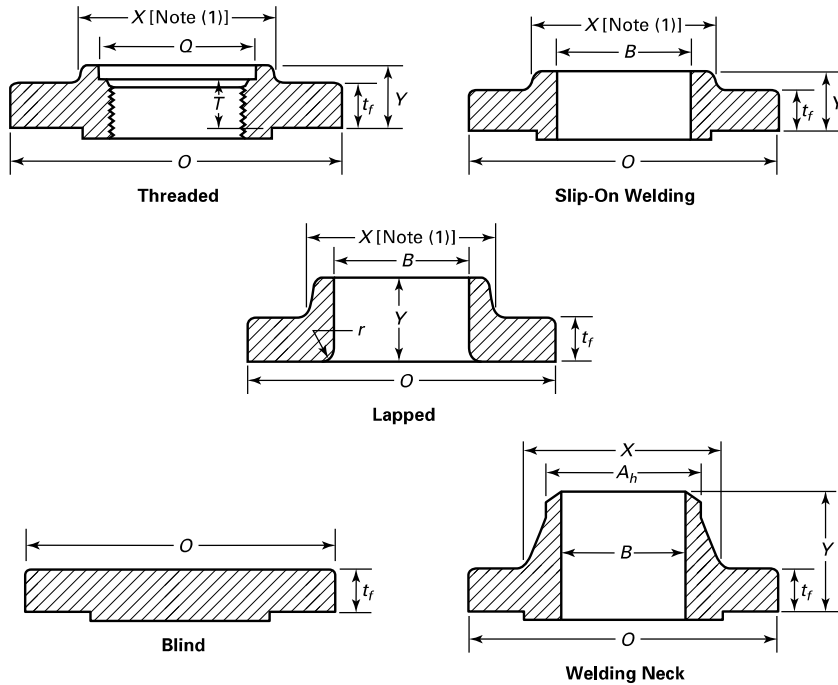
GENERAL NOTES:

- (a) Dimensions of Table 17 are in millimeters, except for diameters of bolts and bolt holes, which are in inch units. For dimensions in inch units, refer to Mandatory Appendix II, Table II-17.
- (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).

Table 18 Dimensions of Class 900 Flanges



1	2	3	4	5	Length Through Hub			Bore			13	14	
					6	7	8	9	10	11			12
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 [Note (2)]	Threaded/Slip-On, Y	Lapped, Y	Welding Neck, Y	Minimum Thread Length Threaded Flange, T [Note (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
$\frac{1}{2}$													
$\frac{3}{4}$													
1													
$1\frac{1}{4}$													
$1\frac{1}{2}$													
2													
$2\frac{1}{2}$													
3	240	38.1	127	88.9	54	54	102	42	90.7	91.4	Note (5)	10	92.2
4	290	44.5	159	114.3	70	70	114	48	116.1	116.8	Note (5)	11	117.6
5	350	50.8	190	141.3	79	79	127	54	143.8	144.4	Note (5)	11	144.4
6	380	55.6	235	168.3	86	86	140	58	170.7	171.4	Note (5)	13	171.4
8	470	63.5	298	219.1	102	114	162	64	221.5	222.2	Note (5)	13	222.2
10	545	69.9	368	273.0	108	127	184	72	276.2	277.4	Note (5)	13	276.2
12	610	79.4	419	323.8	117	143	200	77	327.0	328.2	Note (5)	13	328.6
14	640	85.8	451	355.6	130	156	213	83	359.2	360.2	Note (5)	13	360.4
16	705	88.9	508	406.4	133	165	216	86	410.5	411.2	Note (5)	13	411.2
18	785	101.6	565	457.0	152	190	229	89	461.8	462.3	Note (5)	13	462.0

Use Class 1500 dimensions in these sizes [Note (4)]

Table 18 Dimensions of Class 900 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, O	Min. Thickness of Flange, t_f	Diam. of Hub, X	Hub Diam. Beginning of Chamfer Welding Neck, A_h [Note (2)]	Length Through Hub			Minimum Thread Length Threaded Flange, T [Note (3)]	Bore			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		
20	855	108,0	622	508,0	159	210	248	93	513,1	514,4	Note (5)	13	512,8
24	1,040	139,7	749	610,0	203	267	292	102	616,0	616,0	Note (5)	13	614,4

GENERAL NOTES:

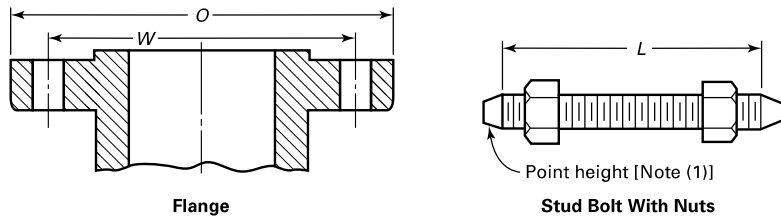
- (a) Dimensions of Table 18 are in millimeters. For dimensions in inch units, refer to Mandatory Appendix II, Table II-18.
 (b) For tolerances, see section 7.
 (c) For facings, see para. 6.4.
 (d) For flange bolt holes, see para. 6.5 and Table 17.
 (e) For spot facing, see para 6.6.
 (f) For reducing 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) Socket welding flanges may be provided in NPS $\frac{1}{2}$ through NPS $2\frac{1}{2}$, using Class 1500 dimensions.
 (5) To be specified by the purchaser.

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Table 19 Templates for Drilling Class 1500 Pipe Flanges



1	2	3	4	5	6	7	8	9	
Nominal Pipe Size, NPS	Outside Diameter of Flange, O	Drilling [Notes (2), (3)]				Diameter of Bolts, in.	Length of Bolts, L [Notes (1), (4)]		
		Diameter of Bolt Circle, W	Diameter of Bolt Holes, in.	Number of Bolts	7-mm Raised Face		Male and Female/Tongue and Groove	Ring Joint	
1/2	120	82.6	7/8	4	3/4	110	100	110	
3/4	130	88.9	7/8	4	3/4	115	110	115	
1	150	101.6	1	4	7/8	125	120	125	
1 1/4	160	111.1	1	4	7/8	125	120	125	
1 1/2	180	123.8	1 1/8	4	1	140	135	140	
2	215	165.1	1	8	7/8	145	140	145	
2 1/2	245	190.5	1 1/8	8	1	160	150	160	
3	265	203.2	1 1/4	8	1 1/8	180	170	180	
4	310	241.3	1 3/8	8	1 1/4	195	190	195	
5	375	292.1	1 5/8	8	1 1/2	250	240	250	
6	395	317.5	1 1/2	12	1 3/8	260	255	265	
8	485	393.7	1 3/4	12	1 5/8	290	285	300	
10	585	482.6	2	12	1 7/8	335	330	345	
12	675	571.5	2 1/8	16	2	375	370	385	
14	750	635.0	2 3/8	16	2 1/4	405	400	425	
16	825	704.8	2 5/8	16	2 1/2	445	440	470	
18	915	774.7	2 7/8	16	2 3/4	495	490	525	
20	985	831.8	3 1/8	16	3	540	535	565	
24	1 170	990.6	3 5/8	16	3 1/2	615	610	650	

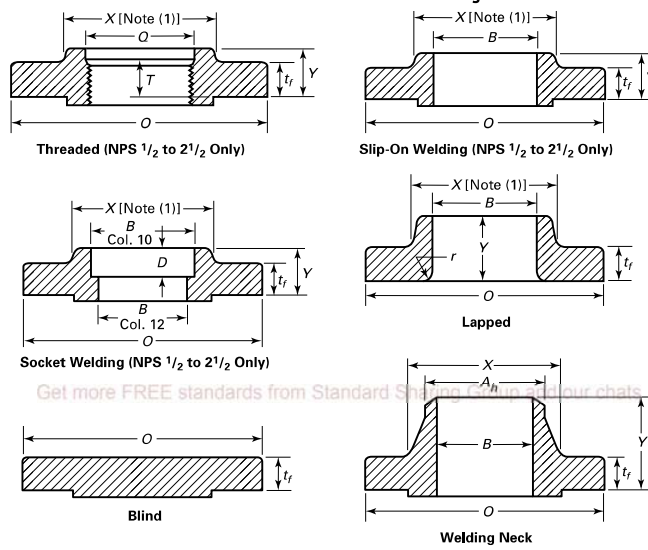
GENERAL NOTES:

- (a) Dimensions of Table 19 are in millimeters, except for the diameters of the bolts and bolt holes, which are in inch units. For dimensions in inch units, refer to Mandatory Appendix II, Table II-19.
- (b) For other dimensions, see Table 20.

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).

Table 20 Dimensions of Class 1500 Flanges



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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, tr	Diameter of Hub, X	Hub Diameter Beginning of Chamfer Welding Neck, Ab [Note (2)]	Length Through Hub			Minimum Thread Length Threaded Flange, T [Note (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	120	22.3	38	21.3	32	32	60	23	22.2	22.9	Note (4)	3	23.6	10
3/4	130	25.4	44	26.7	35	35	70	26	27.7	28.2	Note (4)	3	29.0	11
1	150	28.6	52	33.4	41	41	73	29	34.5	34.9	Note (4)	3	35.8	13
1 1/4	160	28.6	64	42.2	41	41	73	31	43.2	43.7	Note (4)	5	44.4	14
1 1/2	180	31.8	70	48.3	44	44	83	32	49.5	50.0	Note (4)	6	50.6	16
2	215	38.1	105	60.3	57	57	102	39	61.9	62.5	Note (4)	8	63.5	17
2 1/2	245	41.3	124	73.0	64	64	105	48	74.6	75.4	Note (4)	8	76.2	19

Table 20 Dimensions of Class 1500 Flanges (Cont'd)

1	2	3	4	5	6			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_b [Note (2)]	Length Through Hub			Minimum Thread Length Threaded Flange, T [Note (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			
3	265	47.7	133	88.9	...	73	117	...	...	91.4	Note (4)	10	...	...
4	310	54.0	162	114.3	...	90	124	...	...	116.8	Note (4)	11	...	...
5	375	73.1	197	141.3	...	105	156	...	...	144.4	Note (4)	11	...	...
6	395	82.6	229	168.3	...	119	171	...	...	171.4	Note (4)	13	...	...
8	485	92.1	292	219.1	...	143	213	...	...	222.2	Note (4)	13	...	...
10	585	108.0	368	273.0	...	178	254	...	...	277.4	Note (4)	13	...	...
12	675	123.9	451	323.8	...	219	283	...	...	328.2	Note (4)	13	...	...
14	750	133.4	495	355.6	...	241	298	...	...	360.2	Note (4)	13	...	...
16	825	146.1	552	406.4	...	260	311	...	...	411.2	Note (4)	13	...	...
18	915	162.0	597	457.0	...	276	327	...	...	462.3	Note (4)	13	...	...
20	985	177.8	641	508.0	...	292	356	...	...	514.4	Note (4)	13	...	...
24	1 170	203.2	762	610.0	...	330	406	...	...	616.0	Note (4)	13	...	...

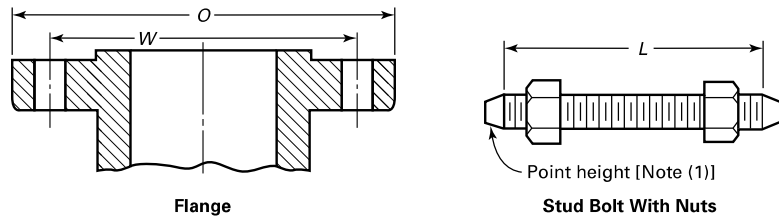
GENERAL NOTES:

- (a) Dimensions of Table 20 are in millimeters. For dimensions in inch units, refer to Mandatory Appendix II, Table II-20.
- (b) For tolerances, see section 7.
- (c) For facings, see para. 6.4.
- (d) For flange bolt holes, see para. 6.5 and Table 19.
- (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 21 Templates for Drilling Class 2500 Pipe Flanges



1	2	3	4	5	6	7	8	9
Nominal Pipe Size, NPS	Outside Diameter of Flange, O	Drilling [Notes (2), (3)]				Length of Bolts, L [Notes (1), (4)]		
		Diameter of Bolt Circle, W	Diameter of Bolt Holes, in.	Number of Bolts	Diameter of Bolts, in.	7-mm Raised Face	Male and Female/Tongue and Groove	Ring Joint
1/2	135	88,9	7/8	4	3/4	120	115	120
3/4	140	95,2	7/8	4	3/4	125	120	125
1	160	108,0	1	4	7/8	140	135	140
1 1/4	185	130,2	1 1/8	4	1	150	145	150
1 1/2	205	146,0	1 1/4	4	1 1/8	170	165	170
2	235	171,4	1 1/8	8	1	180	170	180
2 1/2	265	196,8	1 1/4	8	1 1/8	195	190	205
3	305	228,6	1 3/8	8	1 1/4	220	215	230
4	355	273,0	1 5/8	8	1 1/2	255	250	260
5	420	323,8	1 7/8	8	1 3/4	300	290	310
6	485	368,3	2 1/8	8	2	345	335	355
8	550	438,2	2 1/8	12	2	380	375	395
10	675	539,8	2 5/8	12	2 1/2	490	485	510
12	760	619,1	2 7/8	12	2 3/4	540	535	560

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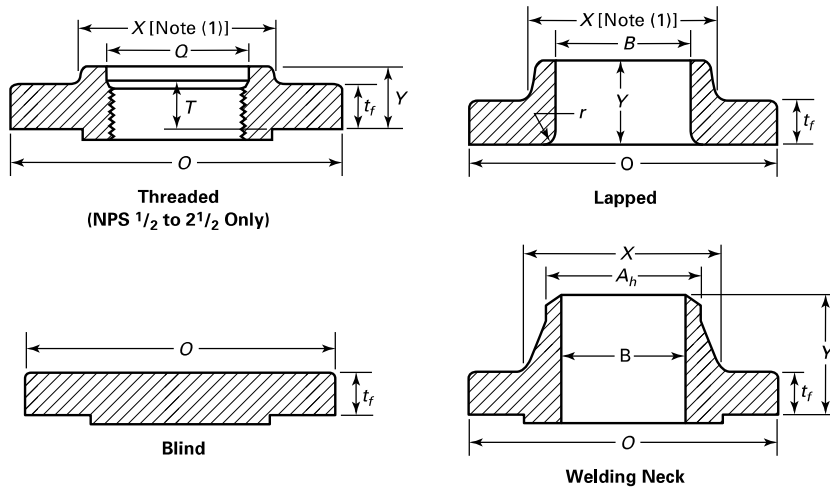
GENERAL NOTES:

- (a) Dimensions of Table 21 are in millimeters, except for diameters of bolts and bolt holes, which are in inch units. For dimensions in inch units, refer to Mandatory Appendix II, Table II-21.
- (b) For other dimensions, see Table 22.

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 with Nonmandatory Appendix C (see para. 6.10.2).

Table 22 Dimensions of Class 2500 Flanges



1	2	3	4	5	Length Through Hub			8	Bore		12	13
					6	7	8		9	10			11
Nom. Pipe Size, NPS	Outside Diam. of Flange, O	Min. Thickness of Flange, t _f	Hub Diam. of Hub, X	Hub Diam. Beginning of Chamfer of Neck, A _h [Note (2)]	Threaded, Y	Lapped, Y	Welding Neck, Y	Minimum Thread Length Threaded Flange, T [Note (3)]	Min. Lapped, B	Welding Neck, B	Corner Bore Radius of Lapped Flange and Pipe, r	Minimum Counterbore Threaded Flange, Q
1/2	135	30.2	43	21.3	40	40	73	29	22.9	Note (4)	3	23.6
3/4	140	31.8	51	26.7	43	43	79	32	28.2	Note (4)	3	29.0
1	160	35.0	57	33.4	48	48	89	35	34.9	Note (4)	3	35.8
1 1/4	185	38.1	73	42.2	52	52	95	39	43.7	Note (4)	5	44.4
1 1/2	205	44.5	79	48.3	60	60	111	45	50.0	Note (4)	6	50.6
2	235	50.9	95	60.3	70	70	127	51	62.5	Note (4)	8	63.5
2 1/2	265	57.2	114	73.0	79	79	143	58	75.4	Note (4)	8	76.2
3	305	66.7	133	88.9	...	92	168	...	91.4	Note (4)	10	...
4	355	76.2	165	114.3	...	108	190	...	116.8	Note (4)	11	...
5	420	92.1	203	141.3	...	130	229	...	144.4	Note (4)	11	...
6	485	108.0	235	168.3	...	152	273	...	171.4	Note (4)	13	...
8	550	127.0	305	219.1	...	178	318	...	222.2	Note (4)	13	...
10	675	165.1	375	273.0	...	229	419	...	277.4	Note (4)	13	...
12	760	184.2	441	323.8	...	254	464	...	328.2	Note (4)	13	...

GENERAL NOTES:

- (a) Dimensions of Table 22 are in millimeters, except for diameters of bolts and bolt holes, which are in inch units. For dimensions in inch units, refer to Mandatory Appendix II, Table II-22.
- (b) For tolerances, see section 7.
- (c) For facings, see para. 6.4.
- (d) For flange bolt holes, see para. 6.5 and Table 21.
- (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 and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and back face of the flange.