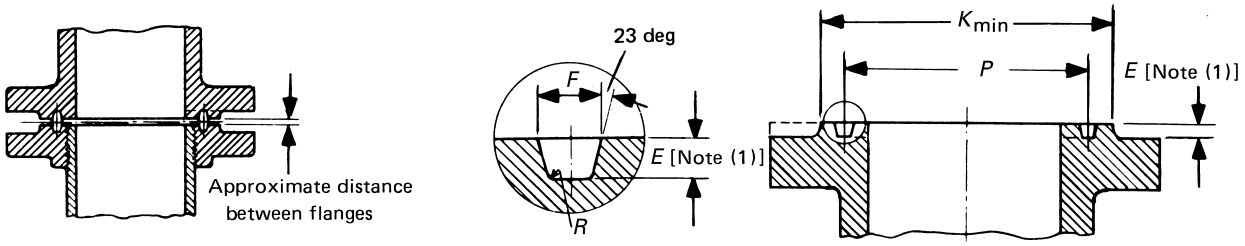
Table 5 Dimensions of Ring-Joint Facings (All Pressure Rating Classes)



1	2	3	4	5	6	7	8	9	10	11	12
Nominal Size								Groove Dimensions			
Class 150 NPS	Class 300 NPS	Class 400 NPS	Class 600 NPS	Class 900 NPS	Class 1500 NPS	Class 2500 NPS	Groove Number	Pitch Diameter, *P*	Depth, *E* [Note (1)]	Width, *F*	Radius at Bottom, *R*
...	1/2	...	1/2	...	...	...	R11	34.14	5.54	7.14	0.8
...	...	...	...	...	1/2	...	12	39.67	6.35	8.74	0.8
...	3/4	...	3/4	...	...	1/2	13	42.88	6.35	8.74	0.8
...	...	...	...	...	3/4	...	14	44.45	6.35	8.74	0.8
1	...	...	...	...	...	...	15	47.63	6.35	8.74	0.8
...	1	...	1	...	1	3/4	16	50.80	6.35	8.74	0.8
1 1/4	...	...	...	...	...	...	17	57.15	6.35	8.74	0.8
...	1 1/4	...	1 1/4	...	1 1/4	1	18	60.33	6.35	8.74	0.8
1 1/2	...	...	...	...	...	...	19	65.07	6.35	8.74	0.8
...	1 1/2	...	1 1/2	...	1 1/2	...	20	68.27	6.35	8.74	0.8
...	...	...	...	...	...	1 1/4	21	72.23	7.92	11.91	0.8
2	...	...	...	...	...	...	22	82.55	6.35	8.74	0.8
...	2	...	2	...	...	1 1/2	23	82.55	7.92	11.91	0.8
...	...	...	...	...	2	...	24	95.25	7.92	11.91	0.8
2 1/2	...	...	...	...	...	...	25	101.60	6.35	8.74	0.8
...	2 1/2	...	2 1/2	...	...	2	26	101.60	7.92	11.91	0.8
...	...	...	...	...	2 1/2	...	27	107.95	7.92	11.91	0.8
...	...	...	...	...	...	2 1/2	28	111.13	9.53	13.49	1.5
3	...	...	...	...	...	...	29	114.30	6.35	8.74	0.8
...	[Note (2)]	...	[Note (2)]	...	...	...	30	117.48	7.92	11.91	0.8
...	3 [Note (2)]	...	3 [Note (2)]	3	...	...	31	123.83	7.92	11.91	0.8
...	...	...	...	...	...	3	32	127.00	9.53	13.49	1.5
3 1/2	...	...	...	...	...	...	33	131.78	6.35	8.74	0.8
...	3 1/2	...	3 1/2	...	...	...	34	131.78	7.92	11.91	0.8
...	...	...	...	...	3	...	35	136.53	7.92	11.91	0.8
4	...	...	...	...	...	...	36	149.23	6.35	8.74	0.8
...	4	4	4	4	...	...	37	149.23	7.92	11.91	0.8
...	...	...	...	...	...	4	38	157.18	11.13	16.66	1.5
...	...	...	...	...	4	...	39	161.93	7.92	11.91	0.8
5	...	...	...	...	...	...	40	171.45	6.35	8.74	0.8
...	5	5	5	5	...	...	41	180.98	7.92	11.91	0.8
...	...	...	...	...	...	5	42	190.50	12.70	19.84	1.5
6	...	...	...	...	...	...	43	193.68	6.35	8.74	0.8
...	...	...	...	...	5	...	44	193.68	7.92	11.91	0.8
...	6	6	6	6	...	...	45	211.12	7.92	11.91	0.8
...	...	...	...	...	6	...	46	211.14	9.53	13.49	1.5
...	...	...	...	...	...	6	47	228.60	12.70	19.84	1.5
8	...	...	...	...	...	...	48	247.65	6.35	8.74	0.8
...	8	8	8	8	...	...	49	269.88	7.92	11.91	0.8

Table 5 Dimensions of Ring-Joint Facings (All Pressure Rating Classes) (Cont'd)

13	14	15	16	17	18	19	20	21	22	23	24
Diameter of Raised Portion, *K*					Approximate Distance Between Flanges						
Class 150	Class 300 400 600	Class 900	Class 1500	Class 2500	Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
...	51.0	...	...	...	...	3	...	3	...	...	...
...	...	...	60.5	...	...	...	...	...	...	4	...
...	63.5	...	...	65.0	...	4	...	4	...	...	4
...	...	...	66.5	...	...	...	...	...	...	4	...
63.5	...	...	...	...	4	...	...	...	...	...	...
...	70.0	...	71.5	73.0	...	4	...	4	...	4	4
73.0	...	...	...	...	4	...	...	...	...	...	...
...	79.5	...	81.0	82.5	...	4	...	4	...	4	4
82.5	...	...	...	...	4	...	...	...	...	...	...
...	90.5	...	92.0	...	...	4	...	4	...	4	...
...	...	...	...	102	...	...	...	...	...	...	3
102	...	...	...	...	4	...	...	...	...	...	...
...	108	...	...	114	...	6	...	5	...	...	3
...	...	...	124	...	...	...	...	...	...	3	...
121	...	...	...	...	4	...	...	...	...	...	...
...	127	...	...	133	...	6	...	5	...	...	3
...	...	...	137	...	...	...	...	...	...	3	...
...	...	...	...	149	...	...	...	...	...	...	3
133	...	...	...	...	4	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
...	146	156	...	...	...	6	...	5	4	...	...
...	...	...	...	168	...	...	...	...	...	...	3
154	...	...	...	...	4	...	...	...	...	...	...
...	159	...	...	...	...	6	...	5	...	...	...
...	...	...	168	...	...	...	...	...	...	3	...
171	...	...	...	...	4	...	...	...	...	...	...
...	175	181	...	...	...	6	6	5	4	...	...
...	...	...	...	203	...	...	...	...	...	...	4
...	...	...	194	...	...	...	...	...	...	3	...
194	...	...	...	...	4	...	...	...	...	...	...
...	210	216	...	...	...	6	6	5	4	...	...
...	...	...	...	241	...	...	...	...	...	...	4
219	...	...	...	...	4	...	...	...	...	...	...
...	...	...	229	...	...	...	...	...	...	3	...
...	241	241	...	...	...	6	6	5	4	...	...
...	...	...	248	...	...	...	...	...	...	3	...
...	...	...	...	279	...	...	...	...	...	...	4
273	...	...	...	...	4	...	...	...	...	...	...
...	302	308	...	...	...	6	6	5	4	...	...

Table 5 Dimensions of Ring-Joint Facings (All Pressure Rating Classes) (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12
Nominal Size								Groove Dimensions			
Class 150 NPS	Class 300 NPS	Class 400 NPS	Class 600 NPS	Class 900 NPS	Class 1500 NPS	Class 2500 NPS	Groove Number	Pitch Diameter, *P*	Depth, *E*	Width, *F*	Radius at Bottom, *R*
...	...	...	...	...	8	...	50	269.88	11.13	16.66	1.5
...	...	...	...	...	...	8	51	279.40	14.27	23.01	1.5
10	...	...	...	...	...	...	52	304.80	6.35	8.74	0.8
...	10	10	10	10	...	...	53	323.85	7.92	11.91	0.8
...	...	...	...	...	10	...	54	323.85	11.13	16.66	1.5
...	...	...	...	...	...	10	55	342.90	17.48	30.18	2.4
12	...	...	...	...	...	...	56	381.00	6.35	8.74	0.8
...	12	12	12	12	...	...	57	381.00	7.92	11.91	0.8
...	...	...	...	...	12	...	58	381.00	14.27	23.01	1.5
14	...	...	...	...	...	...	59	396.88	6.35	8.74	0.8
...	...	...	...	...	...	12	60	406.40	17.48	33.32	2.4
...	14	14	14	...	...	...	61	419.10	7.92	11.91	0.8
...	...	...	...	14	...	...	62	419.10	11.13	16.66	1.5
...	...	...	...	...	14	...	63	419.10	15.88	26.97	2.4
16	...	...	...	...	...	...	64	454.03	6.35	8.74	0.8
...	16	16	16	...	...	...	65	469.90	7.92	11.91	0.8
...	...	...	...	16	...	...	66	469.90	11.13	16.66	1.5
...	...	...	...	...	16	...	67	469.90	17.48	30.18	2.4
18	...	...	...	...	...	...	68	517.53	6.35	8.74	0.8
...	18	18	18	...	...	...	69	533.40	7.92	11.91	0.8
...	...	...	...	18	...	...	70	533.40	12.70	19.84	1.5
...	...	...	...	...	18	...	71	533.40	17.48	30.18	2.4
20	...	...	...	...	...	...	72	558.80	6.35	8.74	0.8
...	20	20	20	...	...	...	73	584.20	9.53	13.49	1.5
...	...	...	...	20	...	...	74	584.20	12.70	19.84	1.5
...	...	...	...	...	20	...	75	584.20	17.48	33.32	2.4
24	...	...	...	...	...	...	76	673.10	6.35	8.74	0.8
...	24	24	24	...	...	...	77	692.15	11.13	16.66	1.5
...	...	...	...	24	...	...	78	692.15	15.88	26.97	2.4
...	...	...	...	...	24	...	79	692.15	20.62	36.53	2.4

Table 5 Dimensions of Ring-Joint Facings (All Pressure Rating Classes) (Cont'd)

13	14	15	16	17	18	19	20	21	22	23	24
Diameter of Raised Portion, *K*					Approximate Distance Between Flanges						
Class 150	Class 300 400 600	Class 900	Class 1500	Class 2500	Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
...	...	...	318	...	...	...	...	...	...	4	...
...	...	...	...	340	...	...	...	...	...	...	5
330	...	...	...	...	4	...	...	...	...	...	...
...	356	362	...	...	...	6	6	5	4	...	...
...	...	...	371	...	...	...	...	...	...	4	...
...	...	...	...	425	...	...	...	...	...	...	6
406	...	...	...	...	4	...	...	...	...	...	...
...	413	419	...	...	...	6	6	5	4	...	...
...	...	...	438	...	...	...	...	...	...	5	...
425	...	...	...	...	3	...	...	...	...	...	...
...	...	...	...	495	...	...	...	...	...	...	8
...	457	...	...	...	...	6	6	5	...	...	...
...	...	467	...	...	...	...	...	...	4	...	...
...	...	...	489	...	...	...	...	...	...	6	...
483	...	...	...	...	3	...	...	...	...	...	...
...	508	...	...	...	...	6	6	5	...	...	...
...	...	524	...	...	...	...	...	...	4	...	...
...	...	...	546	...	...	...	...	...	...	8	...
546	...	...	...	...	3	...	...	...	...	...	...
...	575	...	...	...	...	6	6	5	...	...	...
...	...	594	...	...	...	...	...	...	5	...	...
...	...	...	613	...	...	...	...	...	...	8	...
597	...	...	...	...	3	...	...	...	...	...	...
...	635	...	...	...	...	6	6	5	...	...	...
...	...	648	...	...	...	...	...	...	5	...	...
...	...	...	673	...	...	...	...	...	...	10	...
711	...	...	...	...	3	...	...	...	...	...	...
...	749	...	...	...	...	6	6	6	...	...	...
...	...	772	...	...	...	...	...	...	6	...	...
...	...	...	794	...	...	...	...	...	...	11	...

GENERAL NOTES:

(a) Dimensions are in millimeters. For dimensions in inch units, refer to Table II-5 of Mandatory Appendix II.

(b) For facing requirements for flanges and flanged fitting, see para. 6.4.1 and Fig. 7.

(c) For facing requirements for lapped joints, see para. 6.4.3 and Fig. 7.

(d) See para. 4.2.7 for marking requirements.

(e) Use Class 600 sizes NPS $\frac{1}{2}$ to NPS $3\frac{1}{2}$ for Class 400.

(f) Use Class 1500 in sizes NPS $\frac{1}{2}$ to NPS $2\frac{1}{2}$ for Class 900.

NOTES:

(1) The height of the raised portion is equal to the depth of the groove dimension, *E*, but is not subjected to the tolerances for *E*. Former full-face contour may be used.

(2) For ring joints with lapped flanges in Classes 300 and 600, ring and groove number R30 is used instead of R31.

TOLERANCES:

E (depth) +0.4, −0.0

F (width) ±0.2

P (pitch diameter) ±0.13

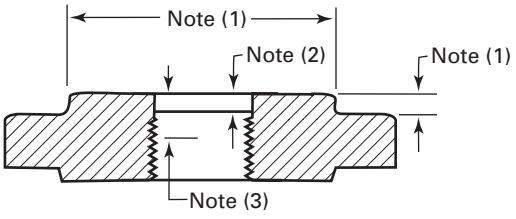
R (radius at bottom)

$R \leq 2 + 0.8, -0.0$

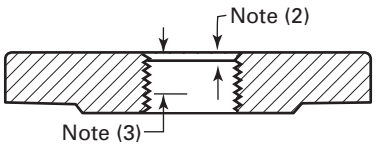
$R > 2 \pm 0.8$

23 deg (angle) ± $\frac{1}{2}$ deg

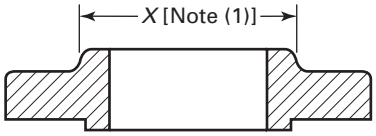
Table 6 Reducing Threaded and Slip-On Pipe Flanges for Classes 150 Through 2500



Threaded



Blind Flange



Slip-On Welding

1	2	3	4	5	6
Nominal Pipe Size [Note (4)]	Smallest Size of Reducing Outlet Requiring Hub Flanges [Note (1)]	Nominal Pipe Size [Note (4)]	Smallest Size of Reducing Outlet Requiring Hub Flanges [Note (1)]	Nominal Pipe Size [Note (4)]	Smallest Size of Reducing Outlet Requiring Hub Flanges [Note (1)]
NPS	NPS	NPS	NPS	NPS	NPS
1	$\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{1}{2}$	12	$3\frac{1}{2}$
$1\frac{1}{4}$	$\frac{1}{2}$	4	$1\frac{1}{2}$	14	$3\frac{1}{2}$
$1\frac{1}{2}$	$\frac{1}{2}$	5	$1\frac{1}{2}$	16	4
2	1	6	$2\frac{1}{2}$	18	4
$2\frac{1}{2}$	$1\frac{1}{4}$	8	3	20	4
3	$1\frac{1}{4}$	10	$3\frac{1}{2}$	24	4

GENERAL NOTE: Dimensions are in millimeters. For dimensions in inches, refer to Mandatory Appendix II, Table II-6.

NOTES:

(1) The hub dimensions shall be at least as large as those of the standard flanges of the size to which the reduction is being machined, except flanges reducing to a size smaller than those of Columns 2, 4, and 6 may be made from blind flanges (see Example).

(2) Class 150 flanges do not have a counterbore. Class 300 and higher pressure flanges will have depth of counterbore *Q* of 7 mm for NPS 2 and smaller tapping and 9.50 mm for NPS $2\frac{1}{2}$ and larger. The diameter *Q* of counterbore is the same as that given in the tables of threaded flanges for the corresponding tapping.

(3) Minimum length of effective threads shall be at least equal dimension *T* of the corresponding pressure class threaded flange as shown in tables but does not necessarily extend for the face of the flange. For thread of threaded flanges, see para. 6.9.

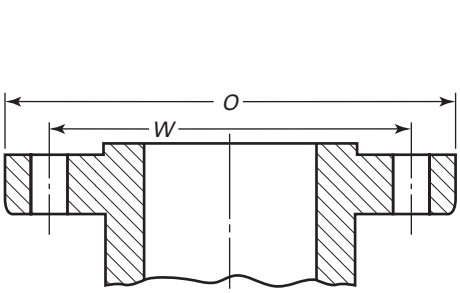
(4) For method of designating reducing threaded and reducing slip-on flanges, see para. 3.3 and Examples below.

EXAMPLES:

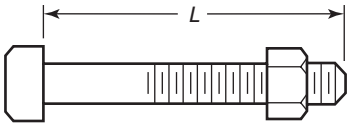
(1) The size designation is NPS 6 × $2\frac{1}{2}$ — Class 300 reducing threaded flange. This flange has the following dimensions:
- NPS $2\frac{1}{2}$ = taper pipe thread tapping (ASME B1.20.1)
- 320 mm = diameter of regular NPS 6 Class 300 threaded flange
- 35 mm = thickness of regular NPS 6 Class 300 threaded flange
- 178 mm = diameter of hub for regular NPS 5 Class 300 threaded flange. Hub diameter may be one size small to reduce machining. In this example, a hub diameter of NPS $2\frac{1}{2}$ would be the smallest acceptable.
- 15.5 mm = height of hub for regular NPS 5 Class 300 threaded flange

(2) The size designation is NPS 6 × 2 — Class 300 reducing threaded flange. Use regular NPS 6 Class 300 blind flange tapped with NPS 2 taper pipe thread (ASME B1.20.1).

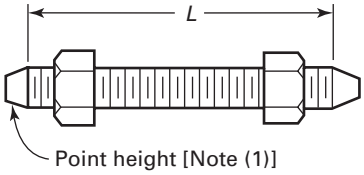
Table 7 Templates for Drilling Class 150 Pipe Flanges and Flanged Fittings



Flange



Machine Bolt With Nuts



Stud Bolt With Nuts

1	2	3	4	5	6	7	8	9
						Length of Bolts, *L* [Notes (1), (4)]		
		Drilling [Notes (2), (3)]				Stud Bolts [Note (1)]		Machine Bolts
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.	2-mm Raised Face	Ring Joint	2-mm Raised Face
1/2	90	60.3	5/8	4	1/2	55	...	50
3/4	100	69.9	5/8	4	1/2	65	...	50
1	110	79.4	5/8	4	1/2	65	75	55
1 1/4	115	88.9	5/8	4	1/2	70	85	55
1 1/2	125	98.4	5/8	4	1/2	70	85	65
2	150	120.7	3/4	4	5/8	85	95	70
2 1/2	180	139.7	3/4	4	5/8	90	100	75
3	190	152.4	3/4	4	5/8	90	100	75
3 1/2	215	177.8	3/4	8	5/8	90	100	75
4	230	190.5	3/4	8	5/8	90	100	75
5	255	215.9	7/8	8	3/4	95	110	85
6	280	241.3	7/8	8	3/4	100	115	85
8	345	298.5	7/8	8	3/4	110	120	90
10	405	362.0	1	12	7/8	115	125	100
12	485	431.8	1	12	7/8	120	135	100
14	535	476.3	1 1/8	12	1	135	145	115
16	595	539.8	1 1/8	16	1	135	145	115
18	635	577.9	1 1/4	16	1 1/8	145	160	125
20	700	635.0	1 1/4	20	1 1/8	160	170	140
24	815	749.3	1 3/8	20	1 1/4	170	185	150

GENERAL NOTES:

(a) Dimensions of Table 7 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-7.

(b) For other dimensions, see Tables 8 and 9.

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 8 Dimensions of Class 150 Flanges

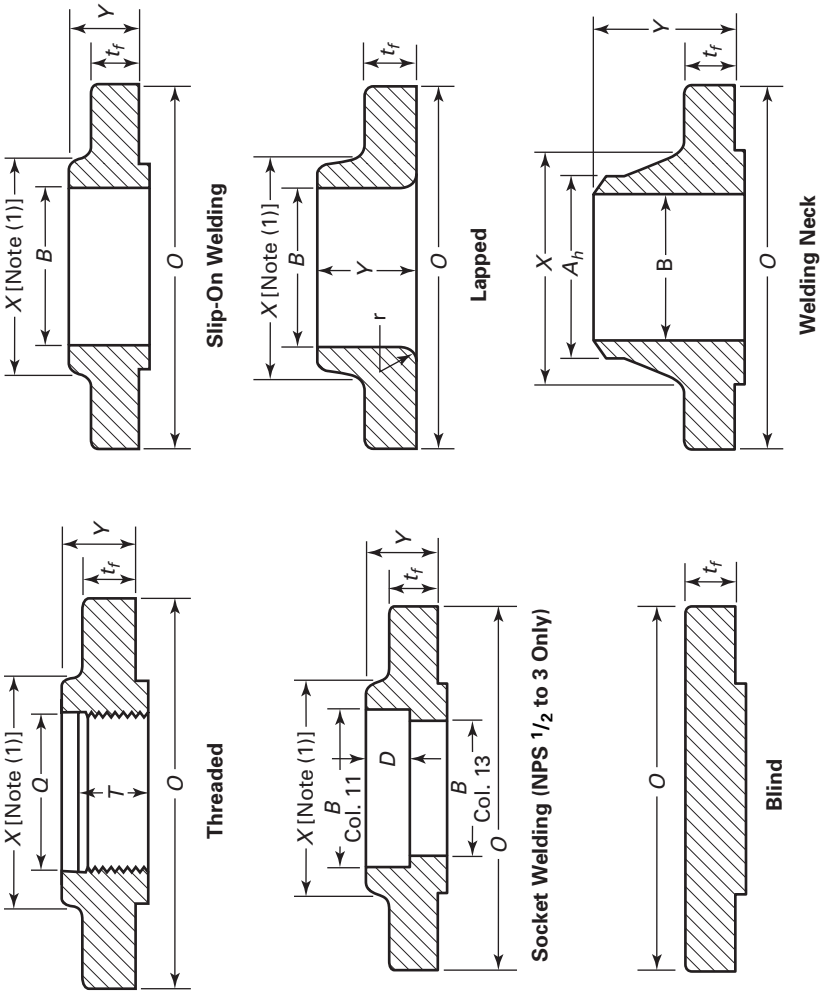


Table 8 Dimensions of Class 150 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
						Length Through Hub				Bore				
Nominal Pipe Size, NPS	Outside Diameter of Flange, *O*	Minimum Thickness of Flange, t_f [Notes (2)-(4)]	Minimum Thickness Lap Joint, t_f	Diameter of Hub, *X*	Hub Diameter Beginning of Chamfer Welding Neck, A_h [Note (5)]	Threaded/ Slip-on/ Socket Welding, *Y*	Lapped, *Y*	Welding Neck, *Y*	Minimum Thread Length Threaded, *T* [Note (6)]	Minimum Slip-on/ Socket Welding, *B*	Minimum Lapped, *B*	Welding Neck/ Socket Welding, *B* [Note (7)]	Corner Bore Radius of Lapped Flange and Pipe, *r*	Depth of Socket, *D*
1/2	90	9.6	11.2	30	21.3	14	16	46	16	22.2	22.9	15.8	3	10
3/4	100	11.2	12.7	38	26.7	14	16	51	16	27.7	28.2	20.9	3	11
1	110	12.7	14.3	49	33.4	16	17	54	17	34.5	34.9	26.6	3	13
1 1/4	115	14.3	15.9	59	42.2	19	21	56	21	43.2	43.7	35.1	5	14
1 1/2	125	15.9	17.5	65	48.3	21	22	60	22	49.5	50.0	40.9	6	16
2	150	17.5	19.1	78	60.3	24	25	62	25	61.9	62.5	52.5	8	17
2 1/2	180	20.7	22.3	90	73.0	27	29	68	29	74.6	75.4	62.7	8	19
3	190	22.3	23.9	108	88.9	29	30	68	30	90.7	91.4	77.9	10	21
3 1/2	215	22.3	23.9	122	101.6	30	32	70	32	103.4	104.1	90.1	10	. . .
4	230	22.3	23.9	135	114.3	32	33	75	33	116.1	116.8	102.3	11	. . .
5	255	22.3	23.9	164	141.3	35	36	87	36	143.8	144.4	128.2	11	. . .
6	280	23.9	25.4	192	168.3	38	40	87	40	170.7	171.4	154.1	13	. . .
8	345	27.0	28.6	246	219.1	43	44	100	44	221.5	222.2	202.7	13	. . .
10	405	28.6	30.2	305	273.0	48	49	100	49	276.2	277.4	254.6	13	. . .
12	485	30.2	31.8	365	323.8	54	56	113	56	327.0	328.2	304.8	13	. . .
14	535	33.4	35.0	400	355.6	56	79	125	57	359.2	360.2	Note (8)	13	. . .
16	595	35.0	36.6	457	406.4	62	87	125	64	410.5	411.2	Note (8)	13	. . .
18	635	38.1	39.7	505	457.0	67	97	138	68	461.8	462.3	Note (8)	13	. . .
20	700	41.3	42.9	559	508.0	71	103	143	73	513.1	514.4	Note (8)	13	. . .
24	815	46.1	47.7	663	610.0	81	111	151	83	616.0	616.0	Note (8)	13	. . .

Table 8 Dimensions of Class 150 Flanges (Cont'd)

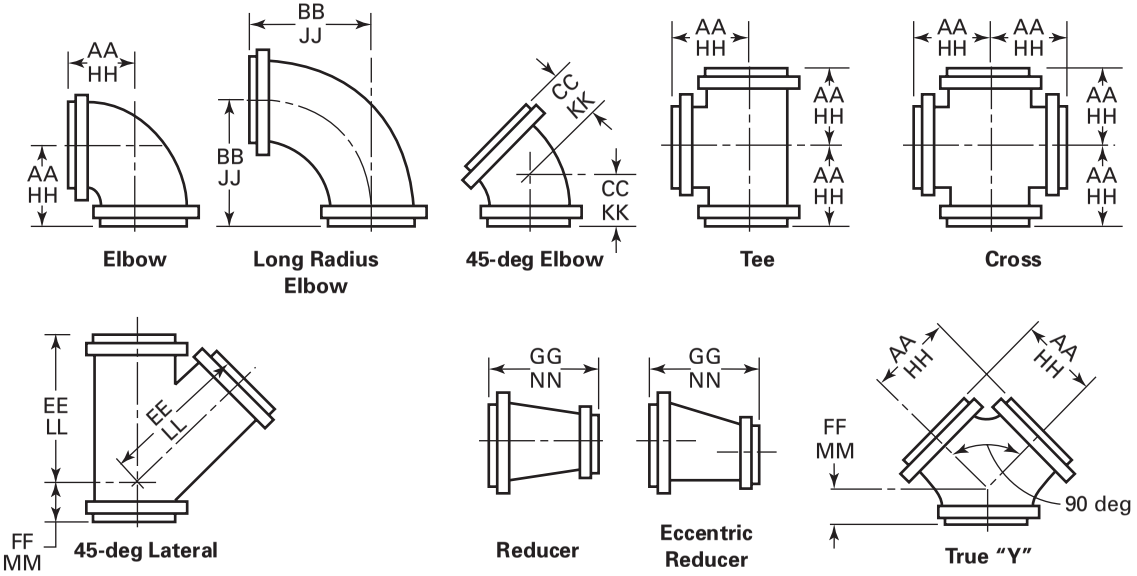
GENERAL NOTES:

(a) Dimensions of Table 8 are in millimeters. For dimensions in inches, refer to Table II-8 of Mandatory Appendix II.
(b) For tolerance, see section 7.
(c) For facings, see para. 6.4.
(d) For flange bolt holes, see para. 6.5 and Table 7.
(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 large end of 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) The minimum thickness of these loose flanges, in sizes NPS $3\frac{1}{2}$ and smaller, is slightly greater than the thickness of flanges on fittings, Table 9, which are reinforced by being cast integral with the body of the fitting.
(3) These flanges may be supplied with a flat face. The flat face may be either the full t_f dimension of thickness plus 2 mm or the t_f dimension thickness without the raised face height. See para 6.3.2 for additional restrictions.
(4) The flange dimensions illustrated are for regularly furnished 2-mm raised face (except lapped); for requirements of other facings, see Fig. 7.
(5) For welding end bevel (see para. 6.7).
(6) For thread of threaded flanges, see para. 6.9.
(7) Dimensions in Column 13 correspond to the inside diameters of pipe as given in ASME B36.10M for standard wall pipe. Thickness of standard wall is the same as Schedule 40 in sizes NPS 10 and smaller. Tolerances in para. 7.5.2 apply. These bore sizes are furnished unless otherwise specified by the Purchaser.
(8) To be specified by the Purchaser.

Table 9 Dimensions of Class 150 Flanged Fittings

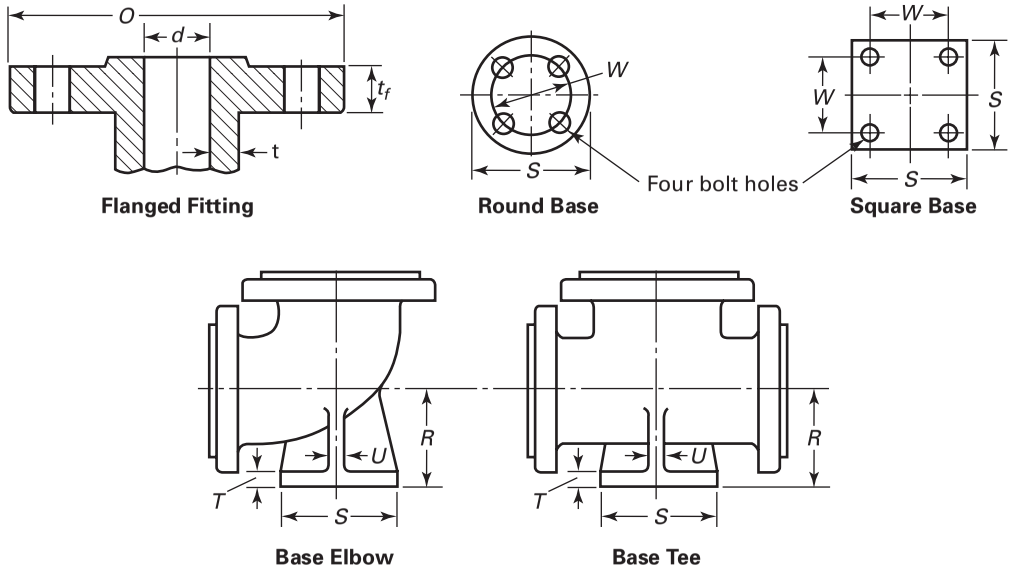


1	2	3	4	5	6	7	8	9	10	11	12
					2-mm Raised Face [Note (4)]						
Nominal Pipe Size, NPS	Outside Diameter of Flange, *O*	Minimum Thickness of Flange, t_f [Notes (1)–(3)]	Minimum Wall Thickness of Fitting, t_m	Inside diameter of Fitting, *d*	Center-to-Contact Surface of Raised Face Elbow, Tee, Cross, and True "Y," AA	Center-to-Contact Surface of Raised Face Long Radius Elbow, BB	Center-to-Contact Surface of Raised Face 45-deg Elbow, CC	Long Center-to-Contact Surface of Raised Face Lateral, EE	Short Center-to-Contact Surface of Raised Face Lateral and True "Y," FF	Contact Surface-to-Contact Surface of Raised Face Reducer, GG [Note (5)]	Ring Joint [Note (4)] Center-to-End Elbow, Tee, Cross, and True "Y," HH [Note (6)]
1/2	90	8.0	2.8	13	...	...	...	...	...	...	...
3/4	100	8.9	3.2	19	...	...	...	...	...	...	...
1	110	9.6	4.0	25	89	127	44	146	44	114	95
1 1/4	115	11.2	4.8	32	95	140	51	159	44	114	102
1 1/2	125	12.7	4.8	38	102	152	57	178	51	114	108
2	150	14.3	5.6	51	114	165	64	203	64	127	121
2 1/2	180	15.9	5.6	64	127	178	76	241	64	140	133
3	190	17.5	5.6	76	140	197	76	254	76	152	146
3 1/2	215	19.1	6.4	89	152	216	89	292	76	165	159
4	230	22.3	6.4	102	165	229	102	305	76	178	171

Table 9 Dimensions of Class 150 Flanged Fittings (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12
					2-mm Raised Face [Note (4)]						
Nominal Pipe Size, NPS	Outside Diameter of Flange, *O*	Minimum Thickness of Flange, t_f [Notes (1)–(3)]	Minimum Wall Thickness of Fitting, t_m	Inside diameter of Fitting, *d*	Center-to-Contact Surface of Raised Face Elbow, Tee, Cross, and True "Y," AA	Center-to-Contact Surface of Raised Face Long Radius Elbow, BB	Center-to-Contact Surface of Raised Face 45-deg Elbow, CC	Long Center-to-Contact Surface of Raised Face Lateral, EE	Short Center-to-Contact Surface of Raised Face Lateral and True "Y," FF	Contact Surface-to-Contact Surface of Raised Face Reducer, GG [Note (5)]	Ring Joint [Note (4)] Center-to-End Elbow, Tee, Cross, and True "Y," HH [Note (6)]
5	255	22.3	7.1	127	190	260	114	343	89	203	197
6	280	23.9	7.1	152	203	292	127	368	89	229	210
8	345	27.0	7.9	203	229	356	140	444	114	279	235
10	405	28.6	8.7	254	279	419	165	521	127	305	286
12	485	30.2	9.5	305	305	483	190	622	140	356	311
14	535	33.4	10.3	337	356	546	190	686	152	406	362
16	595	35.0	11.1	387	381	610	203	762	165	457	387
18	635	38.1	11.9	438	419	673	216	813	178	483	425
20	700	41.3	12.7	489	457	737	241	889	203	508	464
24	815	46.1	14.5	591	559	864	279	1029	229	610	565

Table 9 Dimensions of Class 150 Flanged Fittings (Cont'd)



13	14	15	16	17	18	19	20	21	22	23	1
Ring Joint [Note (4)]								Base Drilling [Note (11)]			
Center-to-End Long Radius Elbow, JJ [Note (6)]	Center-to-End 45-deg Elbow, KK [Note (6)]	Long Center-to-End Lateral, LL [Note (6)]	Short Center-to-End Lateral And True "Y," MM [Note (6)]	End-to-End Reducer, NN [Notes (5), (6)]	Center-to-Base, *R* [Notes (7)–(9)]	Diameter of Round Base or Width of Square Base, *S* [Note (7)]	Thickness of Base, *T* [Notes (7)–(10)]	Thickness of Ribs, *U* [Note (7)]	Bolt Circle or Bolt Spacing, *W*	Diameter of Drilled Holes	Nominal Pipe Size, NPS
...	...	...	...	...	...	...	...	...	...	...	1/2
...	...	...	...	...	...	...	...	...	...	...	3/4
133	51	152	51	...	...	...	...	...	...	...	1
146	57	165	51	...	...	...	...	...	...	...	1 1/4
159	64	184	57	...	...	...	...	...	...	...	1 1/2
171	70	210	70	...	105	117	13	13	88.9	5/8	2
184	83	248	70	...	114	117	13	13	88.9	5/8	2 1/2
203	83	260	70	...	124	127	14	14	98.4	5/8	3
222	95	298	83	...	133	127	14	14	98.4	5/8	3 1/2
235	108	311	83	...	140	152	16	16	120.6	3/4	4

Table 9 Dimensions of Class 150 Flanged Fittings (Cont'd)

13	14	15	16	17	18	19	20	21	22	23	1
		Ring Joint [Note (4)]						Base Drilling [Note (11)]			
Center-to-End Long Radius Elbow, JJ [Note (6)]	Center-to-End 45-deg Elbow, KK [Note (6)]	Long Center-to-End Lateral, LL [Note (6)]	Short Center-to-End Lateral And True "Y," MM [Note (6)]	End-to-End Reducer, NN [Notes (5), (6)]	Center-to-Base, R [Notes (7)–(9)]	Diameter of Round Base or Width of Square Base, S [Note (7)]	Thickness of Base, T [Notes (7)–(10)]	Thickness of Ribs, U [Note (7)]	Bolt Circle or Bolt Spacing, W	Diameter of Drilled Holes	Nominal Pipe Size, NPS
267	121	349	95	...	159	178	17	17	139.7	3/4	5
298	133	375	95	...	178	178	17	17	139.7	3/4	6
362	146	451	121	...	213	229	24	24	190.5	3/4	8
425	171	527	133	...	248	229	24	24	190.5	3/4	10
489	197	629	146	...	286	279	25	25	241.3	7/8	12
552	197	692	159	...	318	279	25	25	241.3	7/8	14
616	210	768	171	...	349	279	25	25	241.3	7/8	16
679	222	819	184	...	381	343	29	29	298.4	7/8	18
743	248	895	210	...	406	343	29	29	298.4	7/8	20
870	286	1035	235	...	470	343	29	29	298.4	7/8	24

Table 9 Dimensions of Class 150 Flanged Fittings (Cont'd)

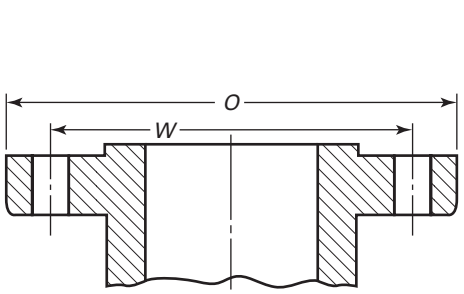
GENERAL NOTES:

(a) Dimensions of Table 9 are in millimeters. For dimensions in inch units, refer to Mandatory Appendix II, Table II-9.
(b) For tolerances, see section 7.
(c) For facings, see para. 6.4.
(d) For flange bolt holes, see para. 6.5 and Table 8.
(e) For spot facing, see para. 6.6.
(f) For intersecting centerlines, center-to-contact surface, and center-to-end dimensions of side outlet fittings, see para. 6.2.4.
(g) For center-to-contact surface and center-to-end dimensions of special degree elbows, see para. 6.2.5.
(h) For reinforcement of certain fittings, see para. 6.1.
(i) For drains, see para. 6.12.

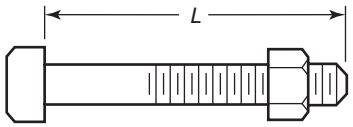
NOTES:

(1) The thickness of flange minimum dimensions for loose flanges, Table 9 sizes NPS $3\frac{1}{2}$ and smaller, are slightly heavier than for flanges on these fittings, which are reinforced by being cast integral with the body of fitting.
(2) These fittings may be supplied with a flat face flange. The flat face may be either the full t_f dimension thickness plus 2 mm or the t_f dimension thickness without the raised face height. See para. 6.3.2 for additional restrictions.
(3) The thickness of the flange dimension illustrated is for regularly furnished 2-mm raised face (except lapped); for thickness requirements of other facings, see Fig. 7.
(4) For center-to-contact surface and center-to-end dimensioins of reducing fittings, see para. 6.2.3.
(5) For contact surface-to-contact surface and end-to-end dimensions of reducers and eccentric reducers, see para. 6.2.3.
(6) These dimensions apply to straight sizes only (see paras. 6.2.3 and 6.4.2.2). For center-to-end dimensions of reducing fittings or end-to-end dimensions of reducers, use center-to-contact surface or contact surface-to-contact surface dimensions of 2 mm raised face (flange edge) for largest opening, and add the proper height to provide for ring joint groove applying to each flange. See Table 5 for ring joint facing dimensions.
(7) The base dimensions apply to all straight and reducing sizes.
(8) For reducing fittings, the size and center-to-face dimension of base are determined by the size of the largest opening of fittings. In the case of reducing base elbows, orders shall specify whether the base shall be opposite the larger or smaller opening.
(9) Bases shall be plain faced unless otherwise specified, and the center-to-base dimension R shall be the finished dimension.
(10) Bases may be cast integral or attached as weldments at the option of the manufacturer.
(11) The bases of these fittings are intended for support in compression and are not to be used for anchors or supports in tension or shear.

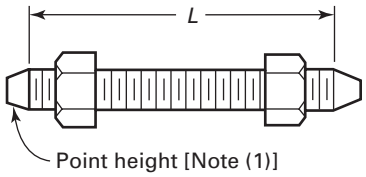
Table 10 Templates for Drilling Class 300 Pipe Flanges and Flanged Fittings



Flange



Machine Bolt With Nuts



Stud Bolt With Nuts

1	2	3	4	5	6	7	8	9
		Drilling [Notes (2), (3)]				Length of Bolts, *L* [Notes (1), (4)]		
						Stud Bolts [Note (1)]		Machine Bolts
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.	2-mm Raised Face	Ring Joint	2-mm Raised Face
1/2	95	66.7	5/8	4	1/2	65	75	55
3/4	115	82.6	3/4	4	5/8	75	90	65
1	125	88.9	3/4	4	5/8	75	90	65
1 1/4	135	98.4	3/4	4	5/8	85	95	70
1 1/2	155	114.3	7/8	4	3/4	90	100	75
2	165	127.0	3/4	8	5/8	90	100	75
2 1/2	190	149.2	7/8	8	3/4	100	115	85
3	210	168.3	7/8	8	3/4	110	120	90
3 1/2	230	184.2	7/8	8	3/4	110	125	95
4	255	200.0	7/8	8	3/4	115	125	95
5	280	235.0	7/8	8	3/4	120	135	110
6	320	269.9	7/8	12	3/4	120	140	110
8	380	330.2	1	12	7/8	140	150	120
10	445	387.4	1 1/8	16	1	160	170	140
12	520	450.8	1 1/4	16	1 1/8	170	185	145
14	585	514.4	1 1/4	20	1 1/8	180	190	160
16	650	571.5	1 3/8	20	1 1/4	190	205	165
18	710	628.6	1 3/8	24	1 1/4	195	210	170
20	775	685.8	1 3/8	24	1 1/4	205	220	185
24	915	812.8	1 5/8	24	1 1/2	230	255	205

GENERAL NOTES:

(a) Dimensions of Table 10 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-10.

(b) For other dimensions, see Tables 11 and 12.

NOTES:

(1) Length of 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 11 Dimensions of Class 300 Flanges

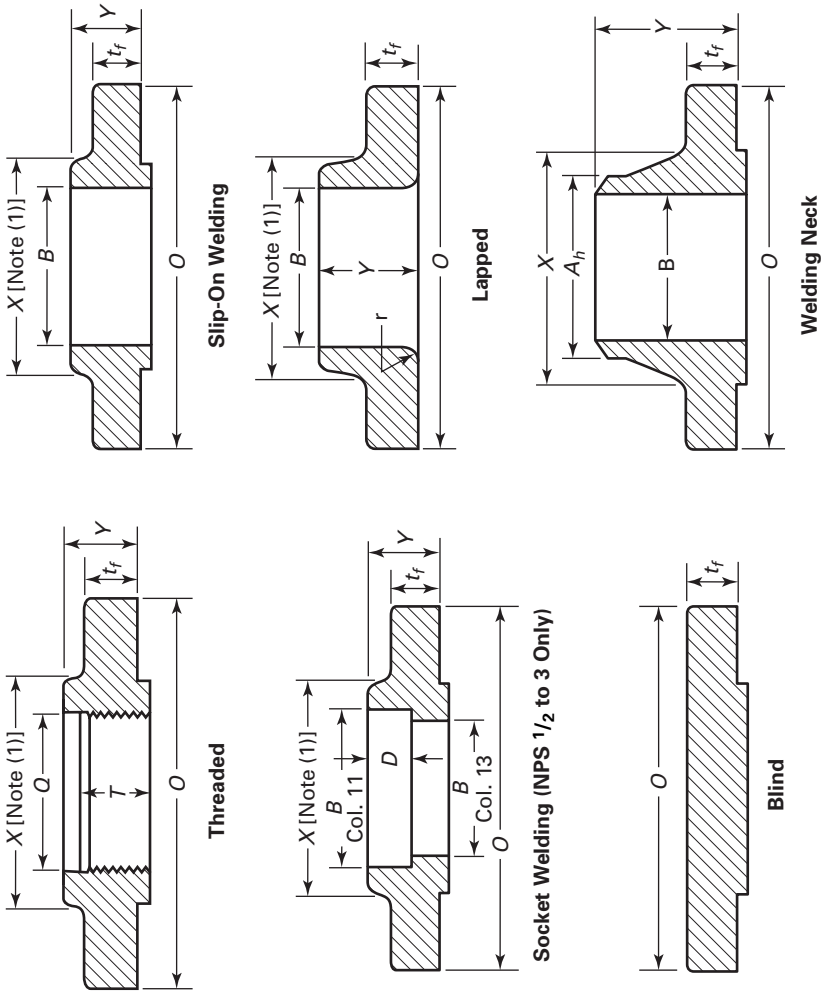


Table 11 Dimensions of Class 300 Flanges (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						Length Through Hub				Bore					
Nominal Pipe Size, NPS	Outside Diameter of Flange, *O*	Minimum Thickness of Flange, t_f [Notes (2), (3)]	Minimum Thickness Lap Joint, t_f	Diameter of Hub, *X*	Hub Diameter Beginning of Chamfer Welding, Neck, A_h [Note (4)]	Threaded/ Slip-On/ Socket Welding, *Y*	Lapped, *Y*	Welding Neck, *Y*	Minimum Thread Length Threaded, *T* [Note (5)]	Minimum Slip-On/ Socket Welding, *B*	Minimum Lapped, *B*	Welding Neck/ Socket Welding, *B* [Note (6)]	Corner Radius of Bore of Lapped Flange and Pipe, *r*	Minimum Counter-bore Threaded Flange, *Q*	Depth of Socket, *D*
1/2	95	12.7	14.3	38	21.3	21	22	51	16	22.2	22.9	15.8	3	23.6	10
3/4	115	14.3	15.9	48	26.7	24	25	56	16	27.7	28.2	20.9	3	29.0	11
1	125	15.9	17.5	54	33.4	25	27	60	18	34.5	34.9	26.6	3	35.8	13
1 1/4	135	17.5	19.1	64	42.2	25	27	64	21	43.2	43.7	35.1	5	44.4	14
1 1/2	155	19.1	20.7	70	48.3	29	30	67	23	49.5	50.0	40.9	6	50.3	16
2	165	20.7	22.3	84	60.3	32	33	68	29	61.9	62.5	52.5	8	63.5	17
2 1/2	190	23.9	25.4	100	73.0	37	38	75	32	74.6	75.4	62.7	8	76.2	19
3	210	27.0	28.6	117	88.9	41	43	78	32	90.7	91.4	77.9	10	92.2	21
3 1/2	230	28.6	30.2	133	101.6	43	44	79	37	103.4	104.1	90.1	10	104.9	. . .
4	255	30.2	31.8	146	114.3	46	48	84	37	116.1	116.8	102.3	11	117.6	. . .
5	280	33.4	35.0	178	141.3	49	51	97	43	143.8	144.4	128.2	11	144.4	. . .
6	320	35.0	36.6	206	168.3	51	52	97	47	170.7	171.4	154.1	13	171.4	. . .
8	380	39.7	41.3	260	219.1	60	62	110	51	221.5	222.2	202.7	13	222.2	. . .
10	445	46.1	47.7	321	273.0	65	95	116	56	276.2	277.4	254.6	13	276.2	. . .
12	520	49.3	50.8	375	323.8	71	102	129	61	327.0	328.2	304.8	13	328.6	. . .
14	585	52.4	54.0	425	355.6	75	111	141	64	359.2	360.2	Note (7)	13	360.4	. . .
16	650	55.6	57.2	483	406.4	81	121	144	69	410.5	411.2	Note (7)	13	411.2	. . .
18	710	58.8	60.4	533	457.0	87	130	157	70	461.8	462.3	Note (7)	13	462.0	. . .
20	775	62.0	63.5	587	508.0	94	140	160	74	513.1	514.4	Note (7)	13	512.8	. . .
24	915	68.3	69.9	702	610.0	105	152	167	83	616.0	616.0	Note (7)	13	614.4	. . .

Table 11 Dimensions of Class 300 Flanges (Cont'd)

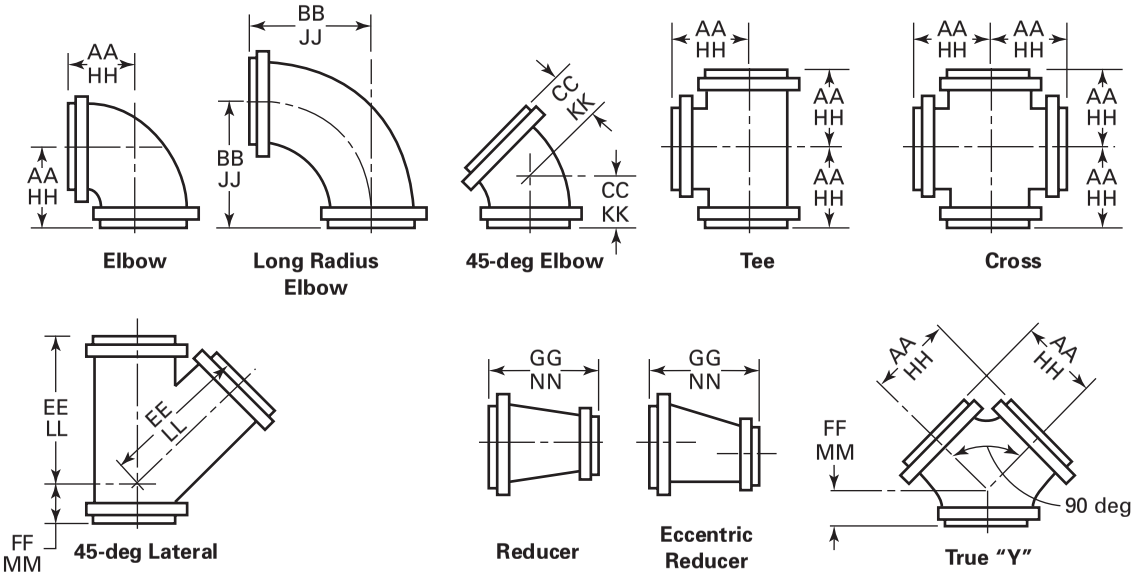
GENERAL NOTES:

(a) Dimensions of Table 11 are in millimeters. For dimensions in inch units, refer to Mandatory Appendix II, Table II-11.
(b) For tolerances, see section 7.
(c) For facings, see para. 6.4.
(d) For flange bolt holes, see para. 6.5 and Table 10.
(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) These flanges may be supplied with a flat face. The flat face may be either the full t_f dimension thickness plus 2-mm or the t_f dimension thickness without the raised face height. See para. 6.3.2 for additional restrictions.
(3) The flange dimensions illustrated are for regularly furnished 2-mm raised face (except lapped); for requirements of other facings, see Fig. 7.
(4) For welding end bevel, see para. 6.7.
(5) For thread of threaded flanges, see para. 6.9.
(6) Dimensions in Column 13 correspond to the inside diameters of pipe as given in ASME B36.10M for standard wall pipe. Standard wall dimensions are the same as Schedule 40 in sizes NPS 10 and smaller. Tolerances in para. 7.5.2 apply. These bore sizes are furnished unless otherwise specified by the purchaser.
(7) To be specified by the Purchaser.

Table 12 Dimensions of Class 300 Flanged Fittings

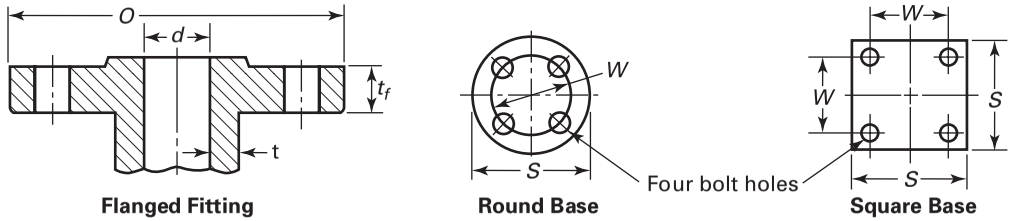


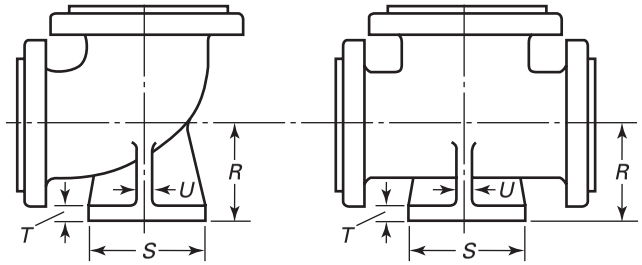
1	2	3	4	5	6	7	8	9	10	11	12
					2-mm Raised Face (Flange Edge) [Note (4)]						
Nominal Pipe Size, NPS	Outside Diameter of Flange, *O*	Minimum Thickness of Flange, t_f [Notes (1)–(3)]	Minimum Wall Thickness of Fitting, t_m	Inside Diameter of Fitting, *d*	Center-to-Contact Surface of Raised Face Elbow, Tee, Cross, and True "Y," AA	Center-to-Contact Surface of Raised Face Long Radius Elbow, BB	Center-to-Contact Surface of Raised Face 45-deg Elbow, CC	Long Center-to-Contact Surface of Raised Face Lateral, EE	Short Center-to-Contact Surface of Raised Face Lateral and True "Y," FF	Contact Surface-to-Contact Surface of Raised Face Reducer, GG [Note (5)]	Ring Joint [Note (2)] Center-to-End Elbow, Tee, Cross, and True "Y," HH [Note (4)]
1	125	15.9	4.8	25	102	127	57	165	51	114	108
$1\frac{1}{4}$	135	17.5	4.8	32	108	140	64	184	57	114	114
$1\frac{1}{2}$	155	19.1	4.8	38	114	152	70	216	64	114	121
2	165	20.7	6.4	51	127	165	76	229	64	127	135
$2\frac{1}{2}$	190	23.9	6.4	64	140	178	89	267	64	140	148
3	210	27.0	7.1	76	152	197	89	279	76	152	160
$3\frac{1}{2}$	230	28.6	7.4	89	165	216	102	318	76	165	173
4	255	30.2	7.9	102	178	229	114	343	76	178	186

Table 12 Dimensions of Class 300 Flanged Fittings (Cont'd)

1	2	3	4	5	6	7	8	9	10	11	12
					2-mm Raised Face (Flange Edge) [Note (4)]						
Nominal Pipe Size, NPS	Outside Diameter of Flange, *O*	Minimum Thickness of Flange, t_f [Notes (1)–(3)]	Minimum Wall Thickness of Fitting, t_m	Inside Diameter of Fitting, *d*	Center-to-Contact Surface of Raised Face Elbow, Tee, Cross, and True "Y," AA	Center-to-Contact Surface of Raised Face Long Radius Elbow, BB	Center-to-Contact Surface of Raised Face 45-deg Elbow, CC	Long Center-to-Contact Surface of Raised Face Lateral, EE	Short Center-to-Contact Surface of Raised Face Lateral and True "Y," FF	Contact Surface-to-Contact Surface of Raised Face Reducer, GG [Note (5)]	Ring Joint [Note (2)] Center-to-End Elbow, Tee, Cross, and True "Y," HH [Note (4)]
5	280	33.4	9.5	127	203	260	127	381	89	203	211
6	320	35.0	9.5	152	216	292	140	445	102	229	224
8	380	39.7	11.1	203	254	356	152	521	127	279	262
10	445	46.1	12.7	254	292	419	178	610	140	305	300
12	520	49.3	14.3	305	330	483	203	698	152	356	338
14	585	52.4	15.9	337	381	546	216	787	165	406	389
16	650	55.6	17.5	387	419	610	241	876	190	457	427
18	710	58.8	19.0	432	457	673	254	952	203	483	465
20	775	62.0	20.6	483	495	737	267	1029	216	508	505
24	915	68.3	23.8	584	572	864	305	1206	254	610	583

Table 12 Dimensions of Class 300 Flanged Fittings (Cont'd)





13	14	15	16	17	18	19	20	21	22	23	1
Ring Joint [Note (4)]								Base Drilling [Note (11)]			
Center-to-End Long Radius Elbow, JJ [Note (6)]	Center-to-End 45-deg Elbow, KK [Note (6)]	Long Center-to-End Lateral, LL [Note (6)]	Short Center-to-End Lateral and True "Y," MM [Note (6)]	End-to-End Reducer, NN [Notes (4), (6)]	Center-to-Base, *R* [Notes (7)–(9)]	Diameter of Round Base or Width of Square Base, *S* Note (7)]	Thickness of Base, *T* [Notes (7)–(10)]	Thickness of Ribs, *U* [Note (7)]	Bolt Circle or Bolt Spacing, *W*	Diameter of Drilled Holes	Nominal Pipe Size, NPS
133	64	171	57	...	...	...	...	...	...	...	1
146	70	191	64	...	...	...	...	...	...	...	1¼
159	76	222	70	...	...	...	...	...	...	...	1½
173	84	237	71	...	114	133	19	13	98.4	¾	2
186	97	275	71	...	121	133	19	13	98.4	¾	2½
205	97	287	84	...	133	156	21	16	114.3	⅞	3
224	110	325	84	...	143	156	21	16	114.3	⅞	3½
237	124	351	84	...	152	165	22	16	127.0	¾	4
268	135	389	97	...	171	190	25	19	149.2	⅞	5
300	148	452	110	...	190	190	25	19	149.2	⅞	6
364	160	529	135	...	229	254	32	22	200.0	⅞	8
427	186	618	148	...	267	254	32	22	200.0	⅞	10
491	211	706	160	...	305	318	36	25	269.9	⅞	12

Table 12 Dimensions of Class 300 Flanged Fittings (Cont'd)

13	14	15	16	17	18	19	20	21	22	23	1
Ring Joint [Note (5)]								Base Drilling [Note (11)]			
Center-to-End Long Radius Elbow, JJ [Note (6)]	Center-to-End 45-deg Elbow, KK [Note (6)]	Long Center-to-End Lateral, LL [Note (6)]	Short Center-to-End Lateral and True "Y," MM [Note (6)]	End-to-End Reducer, NN [Notes (4), (6)]	Center-to-Base, *R* [Notes (7)–(9)]	Diameter of Round Base or Width of Square Base, *S* [Note (7)]	Thickness of Base, *T* [Notes (7)–(10)]	Thickness of Ribs, *U* [Note (7)]	Bolt Circle or Bolt Spacing, *W*	Diameter of Drilled Holes	Nominal Pipe Size, NPS
554	224	795	173	...	343	318	36	25	269.9	7/8	14
618	249	884	198	...	375	318	36	29	269.9	7/8	16
681	262	960	211	...	413	381	41	29	330.2	1	18
746	276	1038	225	...	454	381	41	32	330.2	1	20
875	316	1218	285	...	527	444	48	32	387.4	1 1/8	24

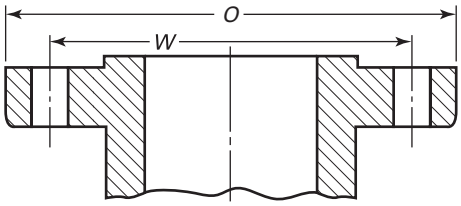
GENERAL NOTES:

(a) Dimensions of Table 12 are in millimeters. For dimensions in inch units, refer to Mandatory Appendix II, Table II-12.
(b) For tolerances, see section 7.
(c) For facings, see para. 6.4.
(d) For flange bolt holes, see para. 6.5 and Table 8.
(e) For spot facing, see para. 6.6
(f) For intersecting centerlines, center-to-contact surface, and center-to-end dimensions of side outlet fittings, see para. 6.2.4.
(g) For center-to-contact surface and center-to-end dimensions of special degree elbows, see para. 6.2.5.
(h) For reinforcement of certain fittings, see para. 6.1.1.
(i) For drains, see para. 6.12.

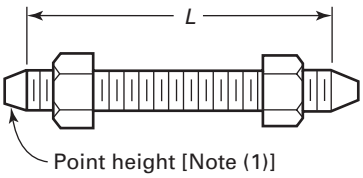
NOTES:

(1) These fittings may be supplied with a flat face flange. The flat face may be either the full t_f dimension thickness plus 2 mm or the t_f dimension thickness without the raised face height. See para. 6.3.2 for additional restrictions.
(2) The thickness of the flange dimension illustrated is for regularly furnished 2-mm raised face (except lapped); for thickness requirements of other facings, see Fig. 7.
(3) The thickness of flange minimum dimensions for loose flanges, Table 9, size NPS 3 1/2 and smaller, are slightly heavier than for flanges on these fittings that are reinforced by being cast integral with the body of fitting.
(4) For contact surface-to-contact surface and end-to-end dimensions of reducers and eccentric reducers, see para. 6.2.3.
(5) For center-to-contact surface and center-to-end dimensions of reducing fittings, see para. 6.2.3.
(6) These dimensions apply to straight sizes only (see paras. 6.2.3 and 6.4.2.2). For center-to-end dimensions of reducing fittings or end-to-end dimensions of reducers, use center-to-contact surface or contact surface-to-contact surface dimensions of 2-mm raised face (flange edge) for the largest opening, and add the proper height to provide for the ring joint groove applying to each flange. See Table 5 for ring joint facing dimensions.
(7) The base dimensions apply to all straight and reducing sizes.
(8) For reducing fittings, the size and center-to-face dimension of base are determined by the size of the largest opening of fittings. In the case of reducing base elbows, orders shall specify whether the base shall be opposite the larger or smaller opening.
(9) Bases shall be plain faced unless otherwise specified, and the center-to-base dimension *R* shall be the finished dimension.
(10) Bases may be cast integral or attached as weldments at the option of the manufacturer.
(11) The bases of these fittings are intended for support in compression and are not to be used for anchors or supports in tension or shear.

Table 13 Templates for Drilling Class 400 Pipe Flanges



Flange



Stud Bolt With Nuts

1	2	3	4	5	6	7	8	9
							Length of Bolts, *L* [Notes (1), (4)]	
		Drilling [Notes (2), (3)]						
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.	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 3 1/2	Use Class 600 dimensions in these sizes							
4	255	200.0	1	8	7/8	140	135	140
5	280	235.0	1	8	7/8	145	135	145
6	320	269.9	1	12	7/8	150	145	150
8	380	330.0	1 1/8	12	1	170	165	170
10	445	387.4	1 1/4	16	1 1/8	190	185	190
12	520	450.8	1 3/8	16	1 1/4	205	195	205
14	585	514.4	1 3/8	20	1 1/4	210	205	210
16	650	571.5	1 1/2	20	1 3/8	220	215	220
18	710	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
24	915	812.8	1 7/8	24	1 3/4	265	260	280

GENERAL NOTES:

(a) Dimensions of Table 13 are in millimeters, except for the diameter of bolts and bolt holes, which are in inch units. For dimensions in inch units, refer to Mandatory Appendix II, Table II-13.

(b) For other dimensions, see Table 14.

NOTES:

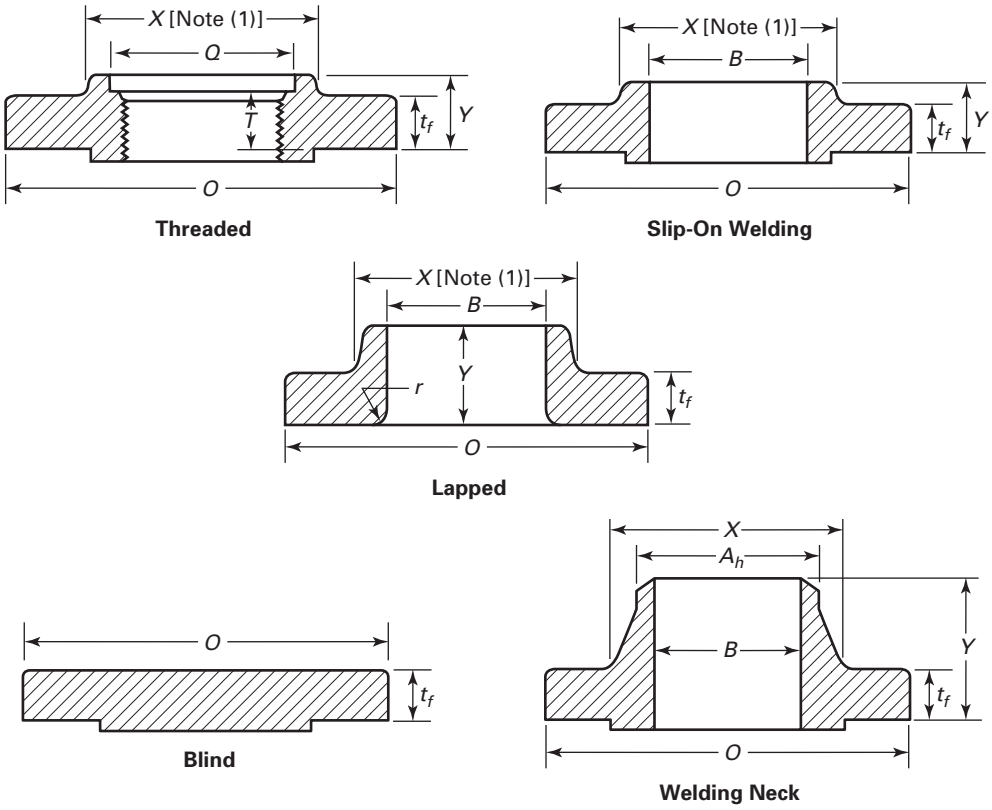
(1) The length of the stud bolt does not include the height of the points. See para. 6.10.2.

(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).

Table 14 Dimensions of Class 400 Flanges



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*		
½ ¾ 1 1¼ 1½ 2 2½ 3 3½	Use Class 600 dimensions in these sizes [Note (4)]												
4	255	35.0	146	114.3	51	51	89	37	116.1	116.8	Note (5)	11	117.6
5	280	38.1	178	141.3	54	54	102	43	143.8	144.5	Note (5)	11	144.4
6	320	41.3	206	168.3	57	57	103	46	170.7	171.4	Note (5)	13	171.4
8	380	47.7	260	219.1	68	68	117	51	221.5	222.2	Note (5)	13	222.2
10	445	54.0	321	273.0	73	102	124	56	276.2	277.4	Note (5)	13	276.2
12	520	57.2	375	323.8	79	108	137	61	327.0	328.2	Note (5)	13	328.6
14	585	60.4	425	355.6	84	117	149	64	359.2	360.2	Note (5)	13	360.4
16	650	63.5	483	406.4	94	127	152	69	410.5	411.2	Note (5)	13	411.2
18	710	66.7	533	457.0	98	137	165	70	461.8	462.3	Note (5)	13	462.0
20	775	69.9	587	508.0	102	146	168	74	513.1	514.4	Note (5)	13	512.8
24	915	76.2	702	610.0	114	159	175	83	616.0	616.0	Note (5)	13	614.4

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

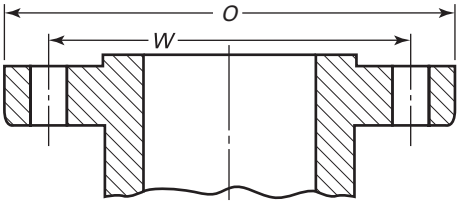
GENERAL NOTES:

(a) Dimensions of Table 14 are in millimeters, except for the diameter of bolts and bolt holes, which are in inch units. For dimensions in inch units, refer to Mandatory Appendix II, Table II-7.
(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.

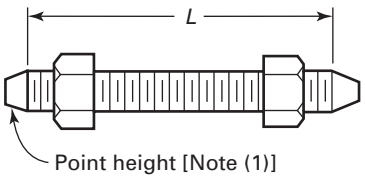
NOTES:

(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) Socket welding flanges may be provided in NPS $\frac{1}{2}$ through NPS $2\frac{1}{2}$, using Class 600 dimensions.
(5) To be specified by the Purchaser.

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



Flange



Stud Bolt With Nuts

1	2	3	4	5	6	7	8	9
		Drilling [Notes (2), (3)]				Length of Bolts, *L* [Notes (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.	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
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:

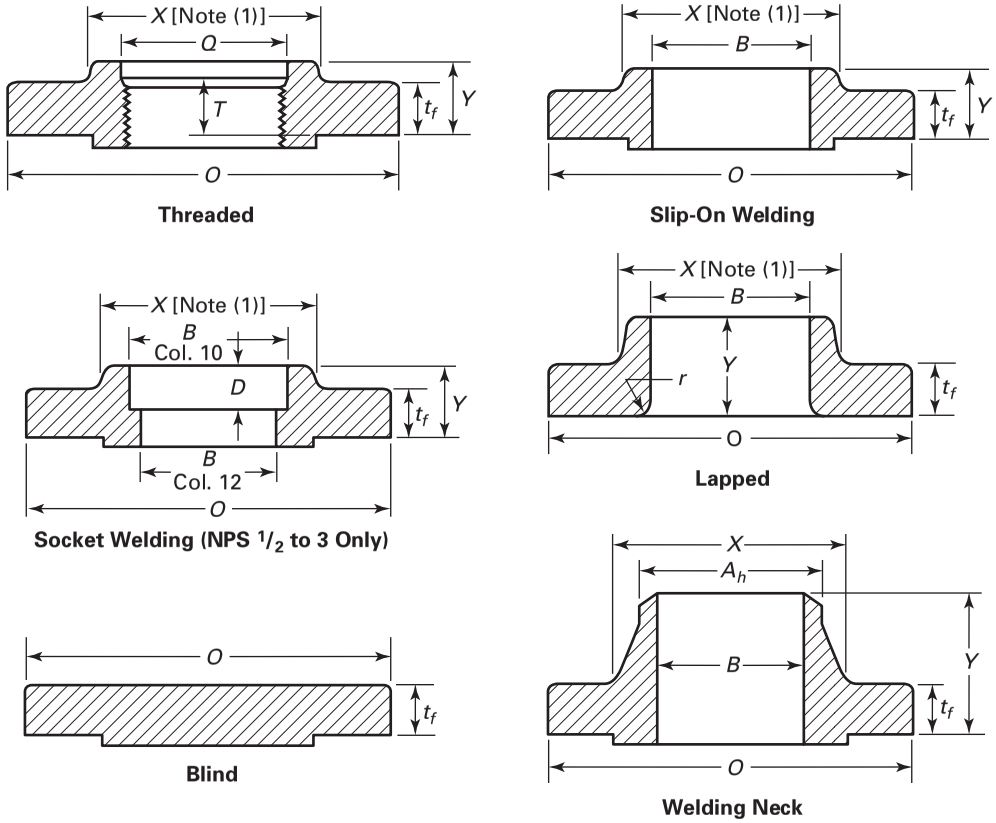
(1) The length of the stud bolt does not include the height of the points (see para 6.10.2).

(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).

Table 16 Dimensions of Class 600 Flanges



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Length Through Hub				Bore					
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 [Note (2)]	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*	Welding Neck/ Socket Welding, *B*	Corner Bore Radius of Lapped 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

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Length Through Hub				Bore					
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 [Note (2)]	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*	Welding Neck/ Socket Welding, *B*	Corner Bore Radius of Lapped Flange and Pipe, *r*	Minimum Counterbore Threaded Flange, *Q*	Depth of Socket, *D*
2	165	25.4	84	60.3	37	37	73	29	61.9	62.5	Note (4)	8	63.5	17
2½	190	28.6	100	73.0	41	41	79	32	74.6	75.4	Note (4)	8	76.2	19
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	. . .
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, except for the diameter of the bolts and bolt holes, which are in inch units. 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:

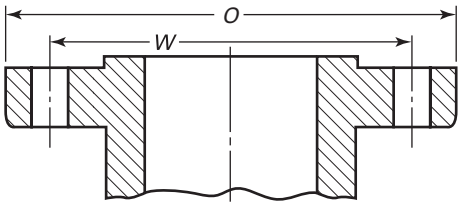
(1) This dimension is for the large end of the hub, which may be straight or tapered. Taper shall not exceed 7 deg on threaded, slip-on, socket-welding, and lapped flanges. This dimension is defined as the diameter at the intersection between the hub taper and back face of the flange.

(2) For welding end bevel, see para. 6.7.

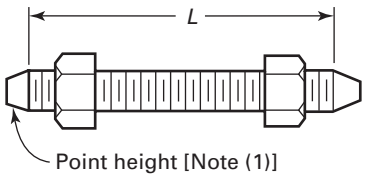
(3) For thread of threaded flanges, see para. 6.9.

(4) To be specified by the Purchaser.

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



Flange



Stud Bolt With Nuts

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 3/4 1 1 1/4 1 1/2 2 2 1/2	Use Class 1500 dimensions in these sizes							
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

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

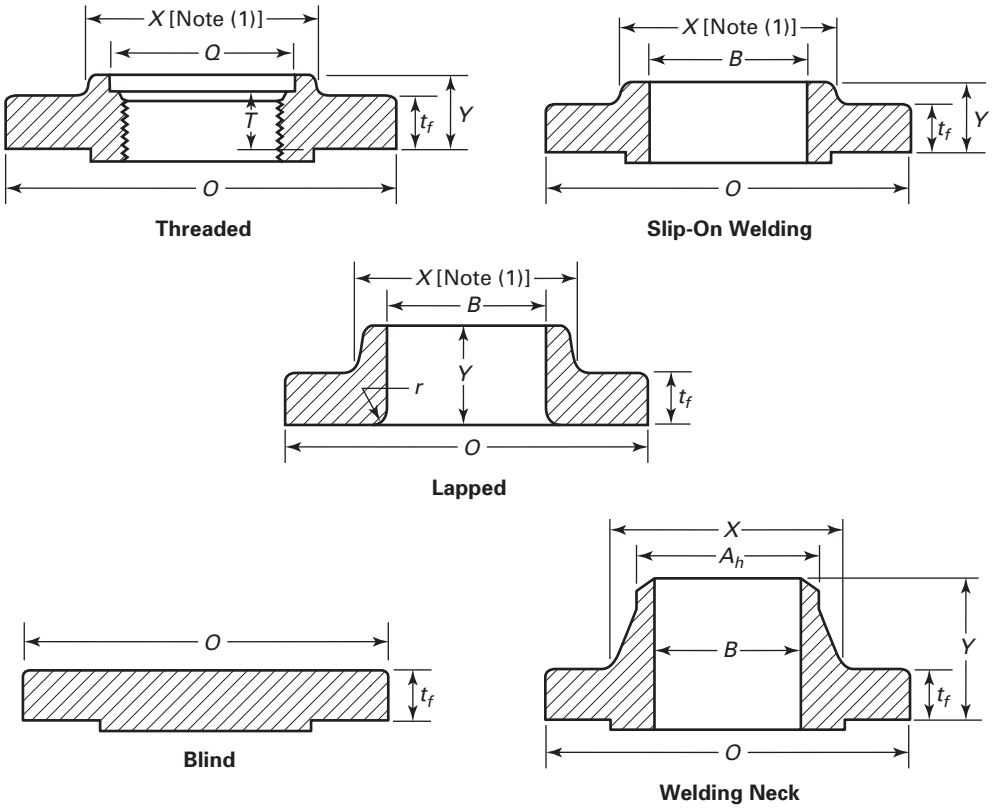


Table 18 Dimensions of Class 900 Flanges (Cont'd)

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*		
$\frac{1}{2}$ $\frac{3}{4}$ 1 $1\frac{1}{4}$ $1\frac{1}{2}$ 2 $2\frac{1}{2}$	Use Class 1500 dimensions in these sizes [Note (4)]												
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
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

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

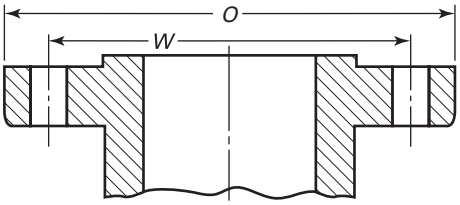
GENERAL NOTES:

(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 manufacturer's option.
(h) For reducing welding neck flanges, see para. 6.8.

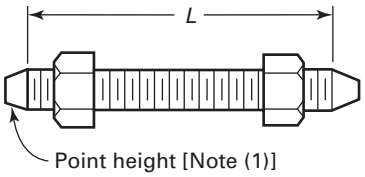
NOTES:

(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) 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.

Table 19 Templates for Drilling Class 1500 Pipe Flanges



Flange



Stud Bolt With Nuts

1	2	3	4	5	6	7	8	9
		Drilling [Notes (2), (3)]				Length of Bolts, *L* [Notes (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.	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:

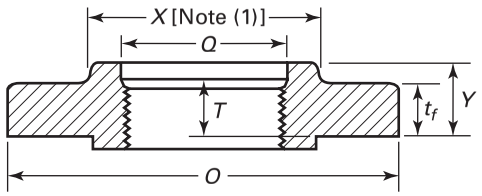
(1) The length of the stud bolt does not include the height of the points (see para. 6.10.2).

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

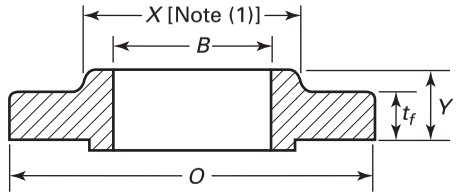
(3) For spot facing, see para. 6.6.

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

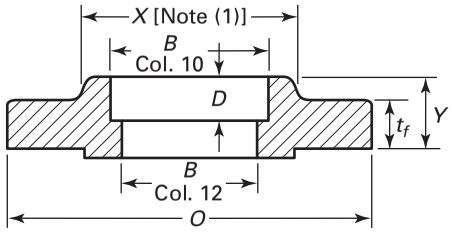
Table 20 Dimensions of Class 1500 Flanges



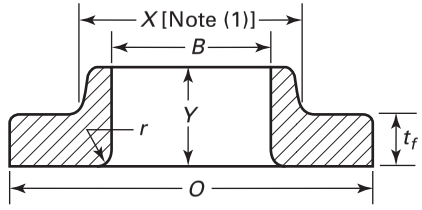
Threaded (NPS 1/2 to 2 1/2 Only)



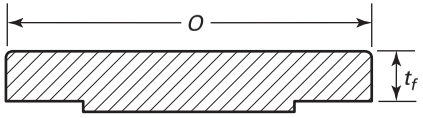
Slip-On Welding (NPS 1/2 to 2 1/2 Only)



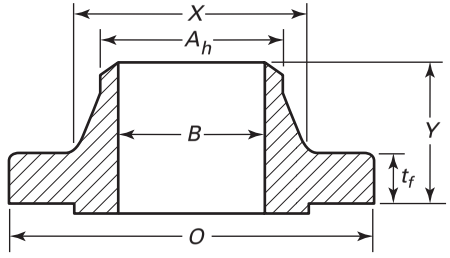
Socket Welding (NPS 1/2 to 2 1/2 Only)



Lapped



Blind



Welding Neck

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Length Through Hub				Bore					
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 [Note (2)]	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*	Welding Neck/ Socket Welding, *B*	Corner Bore Radius of Lapped Flange and Pipe, *r*	Minimum Counterbore Threaded Flange, *Q*	Depth of Socket, *D*
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

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Length Through Hub				Bore					
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 [Note (2)]	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*	Welding Neck/ Socket Welding, *B*	Corner Bore Radius of Lapped Flange and Pipe, *r*	Minimum Counterbore Threaded Flange, *Q*	Depth of Socket, *D*
1½	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
2½	245	41.3	124	73.0	64	64	105	48	74.6	75.4	Note (4)	8	76.2	19
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	...	...

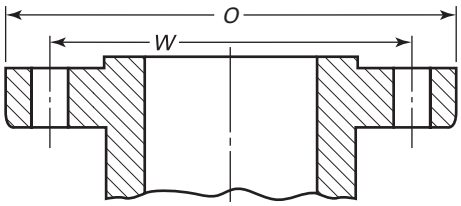
GENERAL NOTES:

(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.

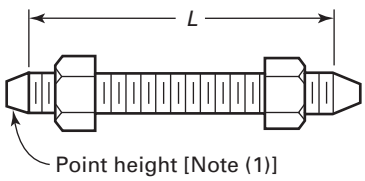
NOTES:

(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



Flange



Stud Bolt With Nuts

1	2	3	4	5	6	7	8	9
		Drilling [Notes (2), (3)]				Length of Bolts, *L* [Notes (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.	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

GENERAL NOTES:

(a) Dimensions of Table 21 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-21.

(b) For other dimensions, see Table 22.

NOTES:

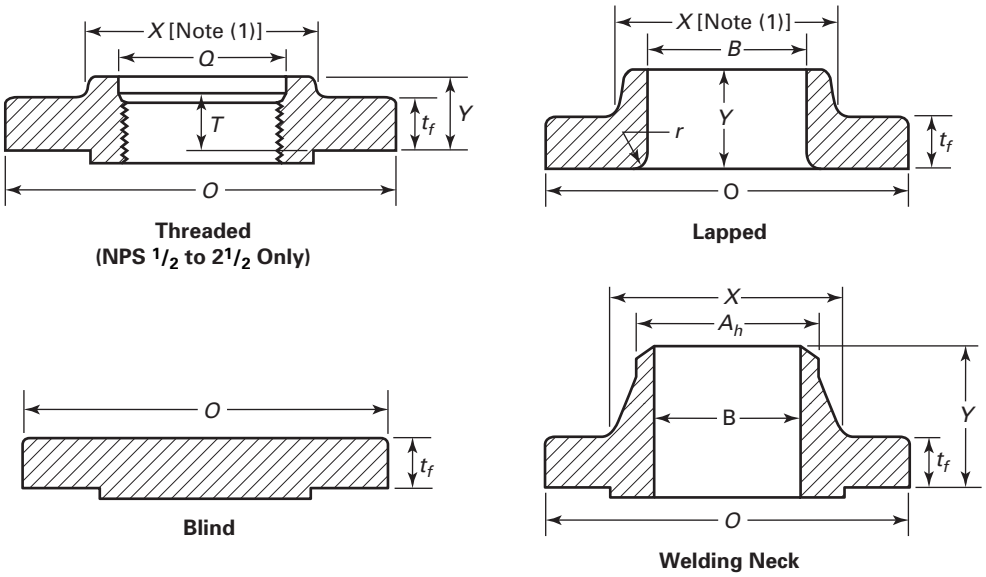
(1) The length of the stud bolt does not include the height of the points (see para. 6.10.2).

(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	6	7	8	9	10	11	12	13
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, *Y*	Lapped, *Y*	Welding Neck, *Y*		Min. Lapped, *B*	Welding Neck, *B*		
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	...

Table 22 Dimensions of Class 2500 Flanges (Cont'd)

GENERAL NOTES:

(a) Dimensions of Table 22 are in millimeters, except for the diameter of the 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, 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.