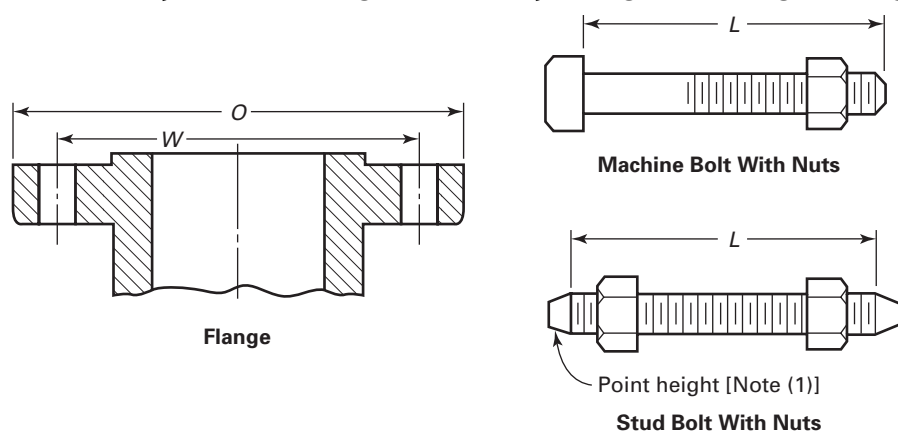


**Table 7 Templates for Drilling Class 150 Pipe Flanges and Flanged Fittings**

Nominal Pipe Size, NPS	Outside Diameter of Flange, <i>O</i>	Drilling [Notes (2), (3)]				Length of Bolts, <i>L</i> [Notes (1), (4)]		
		Diameter of Bolt Circle, <i>W</i>	Diameter of Bolt Holes, in.	Number of Bolts	Stud Bolts [Note (1)]		Machine Bolts	
					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

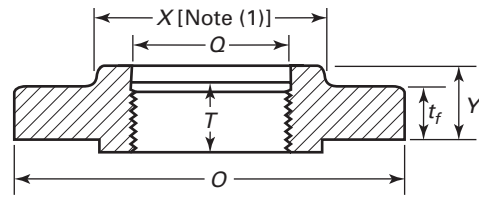
**GENERAL NOTES:**

- (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.

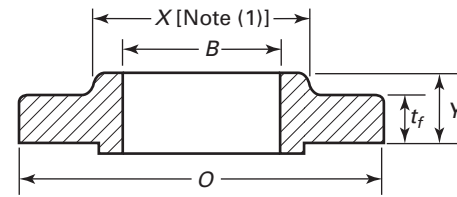
**NOTES:**

- (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).

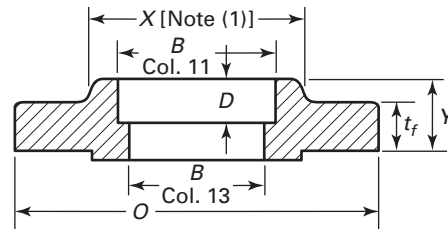
**Table 8 Dimensions of Class 150 Flanges**



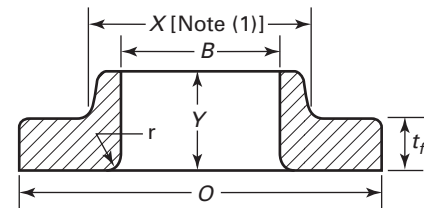
**Threaded**



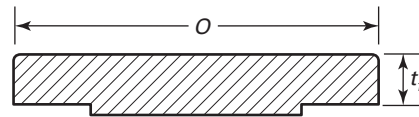
**Slip-On Welding**



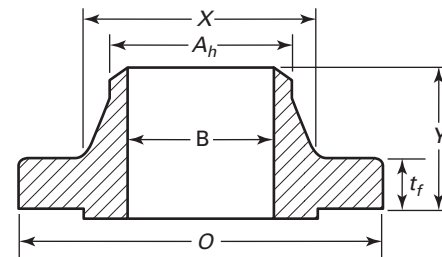
**Socket Welding (NPS 1/2 to 3 Only)**



**Lapped**



**Blind**



**Welding Neck**

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Nominal Pipe Size, NPS	Outside Diameter of Flange, <i>O</i>	Minimum Thickness of Flange, <i>t<sub>f</sub></i> [Notes (2)-(4)]	Minimum Thickness Lap Joint, <i>t<sub>f</sub></i>	Diameter of Hub, <i>X</i>	Hub Diameter Beginning of Chamfer Welding Neck, <i>A<sub>h</sub></i> [Note (5)]	Length Through Hub			Minimum Thread Length Threaded, <i>T</i> [Note (6)]	Bore		Welding Neck/ Socket Welding, <i>B</i> [Note (7)]	Corner Bore Radius of Lapped Flange and Pipe, <i>r</i>	Depth of Socket, <i>D</i>
						Threaded/ Slip-on/ Socket Welding, <i>Y</i>	Lapped, <i>Y</i>	Welding Neck, <i>Y</i>		Minimum Slip-on/ Socket Welding, <i>B</i>	Minimum Lapped, <i>B</i>			
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	...

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

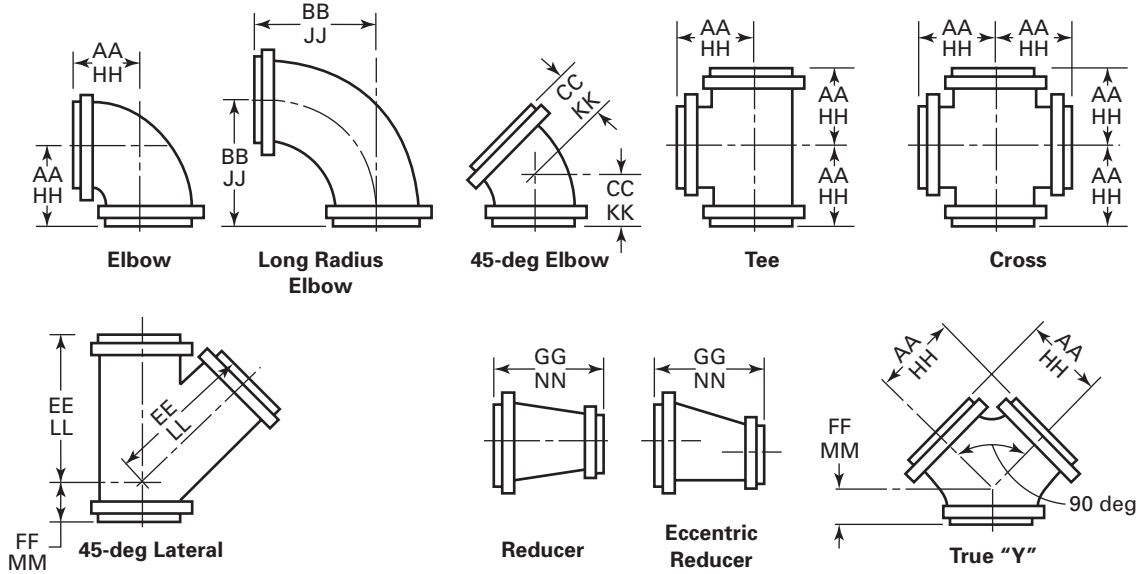
## GENERAL NOTES:

- (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 3½ 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,"	Center-to-Contact Surface of Raised Face Long Radius Elbow,	Center-to-Contact Surface of Raised Face 45-deg Elbow,	Long Center-to-Contact Surface of Raised Face Lateral,	Short Center-to-Contact Surface of Raised Face Lateral and True "Y,"	Contact Surface-to-Contact Surface of Raised Face Reducer, GG	Ring Joint [Note (4)] Center-to-End Elbow, Tee, Cross, and True "Y," HH
					AA	BB	CC	EE	FF	[Note (5)]	[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