4. API & ANSI Flanges, Studded Crosses and Tees

Section 4. API and ANSI Flanges, Studded Crosses and Tees

Section 4a API 6A TYPE 6B, 6BX Flanges and Studded Crosses and Tees

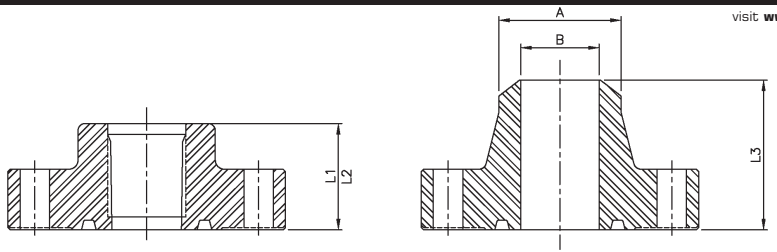
Flanges and Studded Blocks are designed and manufactured in accordance with the following specifications:-

API 6A	Specification for Wellhead and Christmas Tree Equipment.
ANSI B31.3	Chemical Plant and Petroleum Refinery Piping.
ASME VIII	Boiler and Pressure Vessel Code.
MSS-SP-55	Quality Standards for Steel Castings for Valves, Flanges and Fittings and other Piping Components.
NACE MR-01-75	Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment.

Flanges are available as Weld Neck, Integral, Blinds, Target & Test Blinds for use with the following pressure ratings:-

MAX. WORKING PRESSURE	2,000 PSI	3,000 PSI	5,000 PSI	10,000 PSI	15,000 PSI	20,000 PSI
TEST PRESSURE	3,000 PSI	4,500 PSI	7,500 PSI	15,000 PSI	22,500 PSI	30,000 PSI
PRODUCT SPECIFICATION LEVELS	1,2,3 & 4	1,2,3 & 4	1,2,3 & 4	1,2,3 & 4	1,2,3 & 4	1,2,3 & 4
API TEMPERATURE RATING	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)	K (-60 DEG C) TO Y (+345 DEG C)
INTEGRAL, BLIND, TARGET BLIND & TEST FLANGES AND STUDDED BLOCKS						
Min.YIELD Min.TENSILE MATERIAL	60,000 PSI 85,000 PSI API 60K	60,000 PSI 85,000 PSI API 60K	60,000 PSI 85,000 PSI API 60K	60,000 PSI 85,000 PSI API 60K	75,000 PSI 95,000 PSI API 75K	75,000 PSI 95,000 PSI API 75K
WELD NECK FLANGES						
Min.YIELD Min.TENSILE MATERIAL	45,000 PSI 70,000 PSI API 45K	45,000 PSI 70,000 PSI API 45K	45,000 PSI 70,000 PSI API 45K	60,000 PSI 85,000 PSI API 60K	75,000 PSI 95,000 PSI API 75K	75,000 PSI 95,000 PSI API 75K

GENERAL NOTES: Please contact RBV Energy for any special material or dimensional requirements.
Max. working pressures stated are suitable for temperatures up to 121˚C.
De-rating of max. working pressure will occur as the operating temperature increases above 121˚C.



Threaded Flange

Weld Neck Line Pipe Flange

Table 4a.1 Hub and Bore Dimensions

Nominal Size and Bore of Flange	Hub Length Threaded Line-Pipe Flange	Hub Length Threaded Casing Flange	Hub Length Welding Neck Line-Pipe Flange	Neck Diameter Welding Neck Line-Pipe Flange	Tolerance	Maximum Bore of Welding Neck Flange
	L_1	L_2	$L_{3\pm0.06}$	A	A	B
2 1/16	1.75	—	3.19	2.38	+0.09/-0.03	2.10
2 9/16	1.94	—	3.44	2.88	+0.09/-0.03	2.50
3 1/8	2.12	—	3.56	3.50	+0.09/-0.03	3.10
4 1/16	2.44	3.50	4.31	4.50	+0.09/-0.03	4.06
5 1/8	2.69	4.00	4.81	5.56	+0.09/-0.08	4.84
7 1/16	2.94	4.50	4.94	6.63	+0.16/-0.03	5.79
9	3.31	5.00	5.56	8.63	+0.16/-0.03	7.84
11	3.69	5.25	6.31	10.75	+0.16/-0.03	9.78
13 5/8	3.94	3.94	—	—	—	—
16 3/4	4.50	4.50	—	—	—	—
21 1/4	5.38	5.38	—	—	—	—

GENERAL NOTE: Dimensions are in inches

Section 4a. Type 6B Flanges for 2000 psi Rated Working Pressure

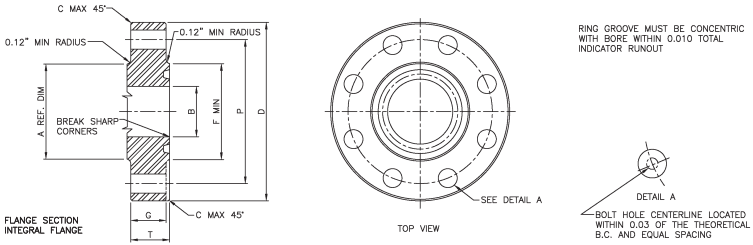
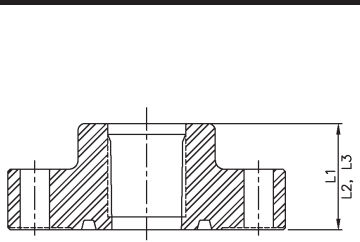


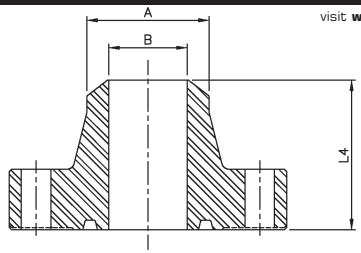
Table 4a.2 Hub and Bore Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Basic Thickness of Flange	Diameter of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Length of Bolts	Ring number, R or RX
	B	D	D	C	F	T	G	A	P						
2 1/16	2.09	6.50	±0.06	0.12	4.25	1.31	1.00	3.31	5.00	8	5/8	0.75	+.06	4.50	23
2 9/16	2.59	7.50	±0.06	0.12	5.00	1.44	1.12	3.94	5.88	8	3/4	0.88	+.06	5.00	26
3 1/8	3.22	8.25	±0.06	0.12	5.75	1.56	1.25	4.62	6.62	8	3/4	0.88	+.06	5.25	31
4 1/16	4.28	10.75	±0.06	0.12	6.88	1.81	1.50	6.00	8.50	8	7/8	1.00	+.06	6.00	37
5 1/8	5.16	13.00	±0.06	0.12	8.25	2.06	1.75	7.44	10.50	8	1	1.12	+.06	6.75	41
7 1/16	7.16	14.00	±0.12	0.25	9.50	2.19	1.88	8.75	11.50	12	1	1.12	+.06	7.00	45
9	9.03	16.50	±0.12	0.25	11.88	2.50	2.19	10.75	13.75	12	1 1/8	1.25	+.06	8.00	49
11	11.03	20.00	±0.12	0.25	14.00	2.81	2.50	13.50	17.00	16	1 1/4	1.38	+.06	8.75	53
13 5/8	13.66	22.00	±0.12	0.25	16.25	2.94	2.62	15.75	19.25	20	1 1/4	1.38	+.06	9.00	57
16 3/4	16.78	27.00	±0.12	0.25	20.00	3.31	3.00	19.50	23.75	20	1 1/2	1.62	+.09	10.25	65
21 1/4	21.28	32.00	±0.12	0.25	25.00	3.88	3.50	24.00	28.50	24	1 5/8	1.75	+.09	11.75	73

GENERAL NOTES: Dimensions are in inches.
Minimum Bolt Hole Tolerance is - 0.02″



Threaded Flange



Weld Neck Line Pipe Flange

Table 4a.3 Hub and Bore Dimensions

Nominal Size and Bore of Flange	Hub Length Threaded Line-Pipe Flange	Hub Length Threaded Casing Flange	Hub Length Tubing Flange	Hub Length Welding Neck Line-Pipe Flange	Neck Diameter Welding Neck Line-Pipe Flange	Tolerance	Maximum Bore of Welding Neck Flange
	L1	L2	L3	L4±0.06	A	A	B
2 1/16	2.56	—	2.56	4.31	2.38	+0.09/-0.03	1.97
2 9/16	2.81	—	2.81	4.44	2.88	+0.09/-0.03	2.35
3 1/8	2.44	—	2.94	4.31	3.50	+0.09/-0.03	2.93
4 1/16	3.06	3.50	3.50	4.81	4.50	+0.09/-0.03	3.86
5 1/8	3.44	4.00	—	5.31	5.56	+0.09/-0.03	4.84
7 1/16	3.69	4.50	—	5.81	6.63	+0.016/-0.03	5.79
9	4.31	5.00	—	6.69	8.63	+0.016/-0.03	7.47
11	4.56	5.25	—	7.56	10.75	+0.016/-0.03	9.34
13 5/8	4.94	4.94	—	—	—	—	—
16 3/4	5.06	5.69	—	—	—	—	—
20 3/4	6.75	6.75	—	—	—	—	—

GENERAL NOTE: Dimensions are in inches.

Section 4a. Type 6B Flanges for 3000 psi Rated Working Pressure

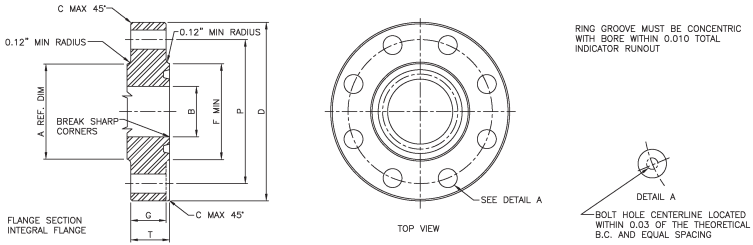
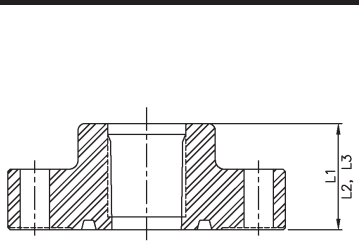


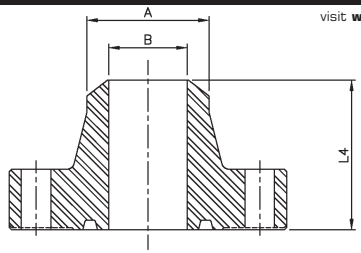
Table 4a.4 Hub and Bore Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Basic Thickness of Flange	Diameter of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Length of Stud Bolts	Ring number, R or RX
	B	D	D	C	F	T	G	A	P						
2 1/16	2.09	8.50	±0.06	0.12	4.88	1.81	1.50	4.12	6.50	8	7/8	1.00	+.06	6.00	24
2 9/16	2.59	9.62	±0.06	0.12	5.38	1.94	1.62	4.88	7.50	8	1	1.12	+.06	6.50	27
3 1/8	3.22	9.50	±0.06	0.12	6.12	1.81	1.50	5.00	7.50	8	7/8	1.00	+.06	6.00	31
4 1/16	4.28	11.50	±0.06	0.12	7.12	2.06	1.75	6.25	9.25	8	1 1/8	1.25	+.06	7.00	37
5 1/8	5.16	13.75	±0.06	0.12	8.50	2.31	2.00	7.50	11.00	8	1 1/4	1.38	+.06	7.75	41
7 1/16	7.16	15.00	±0.12	0.25	9.50	2.50	2.19	9.25	12.50	12	1 1/8	1.25	+.06	8.00	45
9	9.03	18.50	±0.12	0.25	12.12	2.81	2.50	11.75	15.50	12	1 3/8	1.50	+.06	9.00	49
11	11.03	21.50	±0.12	0.25	14.25	3.06	2.75	14.50	18.50	16	1 3/8	1.50	+.06	9.50	53
13 5/8	13.66	24.00	±0.12	0.25	16.50	3.44	3.12	16.50	21.00	20	1 3/8	1.50	+.06	10.25	57
16 3/4	16.78	27.75	±0.12	0.25	20.62	3.94	3.50	20.00	24.25	20	1 5/8	1.75	+.09	11.75	66
20 3/4	20.78	33.75	±0.12	0.25	25.50	4.75	4.25	24.50	29.50	20	2	2.12	+.09	14.50	74

GENERAL NOTES: **Dimensions are in inches.**
Minimum Bolt Hole Tolerance is - 0.02″



Threaded Flange



Weld Neck Line Pipe Flange

Table 4a.5 Hub and Bore Dimensions

Nominal Size and Bore of Flange	Hub Length Threaded Line-Pipe Flange	Hub Length Threaded Casing Flange	Hub Length Tubing Flange	Hub Length Welding Neck Line-Pipe Flange	Neck Diameter Welding Neck Line-Pipe Flange	Tolerance	Maximum Bore of Welding Neck Flange
	L1	L2	L3	L4±0.06	A	A	B
2 1/16	2.56	—	2.56	4.31	2.38	+0.09/-0.03	1.72
2 9/16	2.81	—	2.81	4.44	2.88	+0.09/-0.03	2.16
3 1/8	3.19	—	3.19	4.94	3.50	+0.09/-0.03	2.65
4 1/16	3.88	3.88	3.88	5.19	4.50	+0.09/-0.03	3.47
5 1/8	4.44	4.44	—	6.44	5.56	+0.09/-0.03	4.34
7 1/16	5.06	5.06	—	7.13	6.63	+0.016/-0.03	5.22
9	6.06	6.06	—	8.81	8.63	+0.016/-0.03	6.84
11	6.69	6.69	—	10.44	10.75	+0.016/-0.03	8.53

GENERAL NOTE: Dimensions are in inches.

Section 4a. Type 6B Flanges for 5000 psi Rated Working Pressure

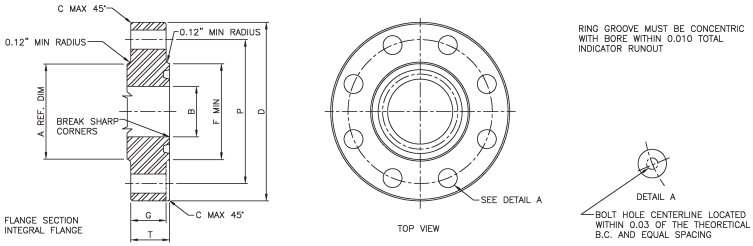


Table 4a.6 Hub and Bore Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Basic Thickness of Flange	Diameter of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Length of Stud Bolts	Ring number, R or RX
	B	D	D	C	F	T	G	A	P						
2 1/16	2.09	8.50	±0.06	0.12	4.88	1.81	1.50	4.12	6.50	8	7/8	1.00	+.06	6.00	24
2 9/16	2.59	9.62	±0.06	0.12	5.38	1.94	1.62	4.88	7.50	8	1	1.12	+.06	6.50	27
3 1/8	3.22	10.50	±0.06	0.12	6.62	2.19	1.88	5.25	8.00	8	1 1/8	1.25	+.06	7.25	35
4 1/16	4.28	12.25	±0.06	0.12	7.62	2.44	2.12	6.38	9.50	8	1 1/4	1.38	+.06	8.00	39
5 1/8	5.16	14.75	±0.06	0.12	9.00	3.19	2.88	7.75	11.50	8	1 1/2	1.62	+.06	10.00	44
7 1/16	7.16	15.50	±0.12	0.25	9.75	3.62	3.25	9.00	12.50	12	1 3/8	1.50	+.06	10.75	46
9	9.03	19.00	±0.12	0.25	12.50	4.06	3.62	11.50	15.50	12	1 5/8	1.75	+.09	12.00	50
11	11.03	23.00	±0.12	0.25	14.63	4.69	4.25	14.50	19.00	12	1 7/8	2.00	+.09	13.75	54

GENERAL NOTES: Dimensions are in inches.
Minimum Bolt Hole Tolerance is - 0.02″

Section 4a. Type 6BX Integral Flanges for 2000, 3000, 5000 and 10,000 psi Rated Working Pressure

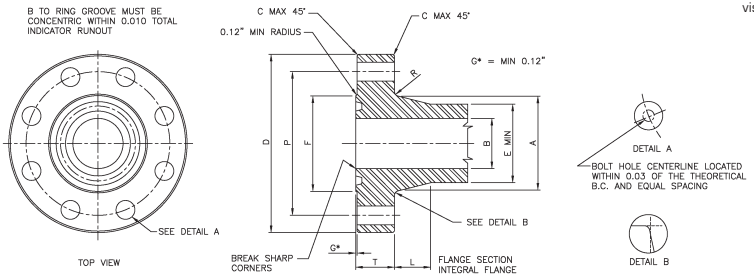


Table 4a.7 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
2000 psi																	
26¾	26.78	41.00	±0.12	0.25	31.69	4.97	32.91	29.25	7.31	0.62	37.50	20	1¾	1.88	+.09	13.75	167
30	30.03	44.19	±0.12	0.25	35.75	5.28	36.69	32.80	7.75	0.62	40.94	32	1⅝	1.75	+.09	14.25	303
3000 psi																	
26¾	26.78	43.38	±0.12	0.25	32.75	6.34	34.25	30.56	7.31	0.62	39.38	24	2	2.12	+.09	17.00	168
30	30.03	46.68	±0.12	0.25	36.31	6.58	38.19	34.30	7.75	0.62	42.94	32	1⅞	2.00	+.09	17.75	303
5000 psi																	
13⅜	13.66	26.50	±0.12	0.25	18.00	4.44	18.94	16.69	4.50	0.62	23.25	16	1⅝	1.75	+.09	12.50	160
16¾	16.78	30.38	±0.12	0.25	21.06	5.13	21.88	20.75	3.00	0.75	26.62	16	1⅞	2.00	+.09	14.50	162
18¾	18.78	35.62	±0.12	0.25	24.69	6.53	26.56	23.56	6.00	0.62	31.62	20	2	2.12	+.09	17.50	163
21¼	21.28	39.00	±0.12	0.25	27.62	7.12	29.88	26.75	6.50	0.69	34.88	24	2	2.12	+.09	18.75	165

GENERAL NOTES: Dimensions are in inches.
Minimum Bolt Hole Tolerance is - 0.02″

Table 4a.7 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
10000 psi																	
1 13/16	1.84	7.38	±0.06	0.12	4.12	1.66	3.50	2.56	1.91	0.38	5.75	8	3/4	0.88	+.06	5.00	151
2 1/16	2.09	7.88	±0.06	0.12	4.38	1.73	3.94	2.94	2.03	0.38	6.25	8	3/4	0.88	+.06	5.20	152
2 9/16	2.59	9.12	±0.06	0.12	5.19	2.02	4.75	3.62	2.25	0.38	7.25	8	7/8	1.00	+.06	6.00	153
3 1/16	3.09	10.62	±0.06	0.12	6.00	2.30	5.59	4.34	2.50	0.38	8.50	8	1	1.12	+.06	6.75	154
4 1/16	4.09	12.44	±0.06	0.12	7.28	2.77	7.19	5.75	2.88	0.38	10.19	8	1 1/8	1.25	+.06	8.00	155
5 1/8	5.16	14.06	±0.06	0.12	8.69	3.12	8.81	7.19	3.19	0.38	11.81	12	1 1/8	1.25	+.06	8.75	169
7 1/16	7.09	18.88	±0.12	0.25	11.88	4.06	11.88	10.00	3.75	0.62	15.88	12	1 1/2	1.62	+.09	11.25	156
9	9.03	21.75	±0.12	0.25	14.12	4.88	14.75	12.88	3.69	0.62	18.75	16	1 1/2	1.62	+.09	13.00	157
11	11.03	25.75	±0.12	0.25	16.88	5.56	17.75	15.75	4.06	0.62	22.25	16	1 3/4	1.88	+.09	15.00	158
13 5/8	13.66	30.25	±0.12	0.25	20.38	6.62	21.75	19.50	4.50	0.62	26.50	20	1 7/8	2.00	+.09	17.25	159
16 3/4	16.78	34.31	±0.12	0.25	22.69	6.62	25.81	23.69	3.00	0.75	30.56	24	1 7/8	2.00	+.09	17.50	162
18 3/4	18.78	40.94	±0.12	0.25	27.44	8.78	29.62	26.56	6.12	0.62	36.44	24	2 1/4	2.38	+.09	22.50	164
21 1/4	21.28	45.00	±0.12	0.25	30.75	9.50	33.38	30.00	6.50	0.81	40.25	24	2 1/2	2.62	+.09	24.50	166

GENERAL NOTES: **Dimensions are in inches.**
Minimum Bolt Hole Tolerance is - 0.02″

Section 4a. Type 6BX Integral Flanges for 15,000 and 20,000 psi Rated Working Pressure

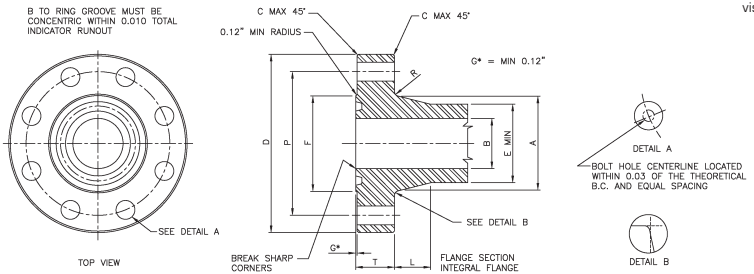


Table 4a.8 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
15000 psi																	
1 13/16	1.84	8.19	±0.06	0.12	4.19	1.78	3.84	2.81	1.88	0.38	6.31	8	7/8	1.00	+.06	5.50	151
2 1/16	2.09	8.75	±0.06	0.12	4.50	2.00	4.38	3.25	2.12	0.38	6.88	8	7/8	1.00	+.06	6.00	152
2 9/16	2.59	10.00	±0.06	0.12	5.25	2.25	5.06	3.94	2.25	0.38	7.88	8	1	1.12	+.06	6.75	153
3 1/16	3.09	11.31	±0.06	0.12	6.06	2.53	6.06	4.81	2.50	0.38	9.06	8	1 1/8	1.25	+.06	7.50	154
4 1/16	4.09	14.19	±0.06	0.12	7.62	3.09	7.69	6.25	2.88	0.38	11.44	8	1 3/8	1.50	+.06	9.25	155
5 1/8	5.16	16.50	±0.06	0.12	8.88	3.88	9.62	7.88	3.22	0.62	13.50	12	1 1/2	1.62	+.09	11.50	169
7 1/16	7.09	19.88	±0.12	0.25	12.00	4.69	12.81	10.88	2.62	0.62	16.88	16	1 1/2	1.62	+.09	12.75	156
9	9.03	25.50	±0.12	0.25	15.00	5.75	17.00	13.75	4.88	0.62	21.75	16	1 7/8	2.00	+.09	15.75	157
11	11.03	32.00	±0.12	0.25	17.88	7.38	23.00	16.81	9.28	0.62	28.00	20	2	2.12	+.09	19.25	158
13 5/8	13.66	34.88	±0.12	0.25	21.31	8.06	23.44	20.81	4.50	1.00	30.38	20	2 1/4	2.38	+.09	21.25	159
18 3/4	18.78	45.75	±0.12	0.25	28.44	10.06	32.00	28.75	6.12	1.00	40.00	20	3	3.12	+.12	26.75	164

GENERAL NOTES: Dimensions are in inches. Minimum Bolt Hole Tolerance is - 0.02″

Table 4a.8 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
20000 psi																	
1 13/16	1.84	10.12	±0.06	0.12	4.62	2.50	5.25	4.31	1.94	0.38	8.00	8	1	1.12	+.06	7.50	151
2 1/16	2.09	11.31	±0.06	0.12	5.19	2.81	6.06	5.00	2.06	0.38	9.06	8	1 1/8	1.25	+.06	8.25	152
2 9/16	2.59	12.81	±0.06	0.12	5.94	3.12	6.81	5.69	2.31	0.38	10.31	8	1 1/4	1.38	+.06	9.25	153
3 1/16	3.09	14.06	±0.06	0.12	6.75	3.38	7.56	6.31	2.50	0.38	11.31	8	1 3/8	1.50	+.06	10.00	154
4 1/16	4.09	17.56	±0.06	0.12	8.62	4.19	9.56	8.12	2.88	0.38	14.06	8	1 3/4	1.88	+.09	12.25	155
7 1/16	7.09	25.81	±0.12	0.25	13.88	6.50	15.19	13.31	3.81	0.62	21.81	16	2	2.12	+.09	17.50	156
9	9.03	31.69	±0.12	0.25	17.38	8.06	18.94	16.88	4.25	1.00	27.00	16	2 1/2	2.62	+.09	22.38	157
11	11.03	34.75	±0.12	0.25	19.88	8.81	22.31	20.00	4.06	1.00	29.50	16	2 3/4	2.88	+.09	23.75	158
13 5/8	13.66	45.75	±0.12	0.25	24.19	11.50	27.31	24.75	5.25	1.00	40.00	20	3	3.12	+.12	30.00	159

GENERAL NOTES: Dimensions are in inches.
Minimum Bolt Hole Tolerance is - 0.02″

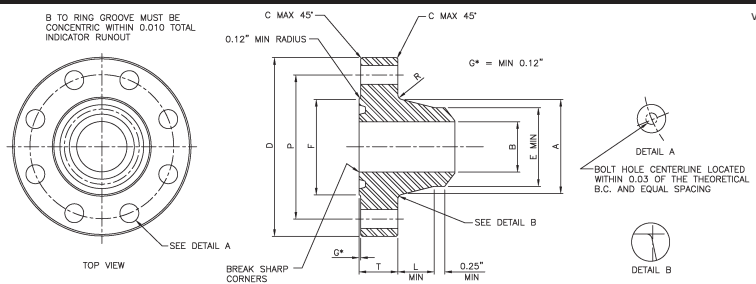


Table 4a.9 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
10000 psi																	
1 13/16	1.84	7.38	±0.06	0.12	4.12	1.66	3.50	2.56	1.91	0.38	5.75	8	¾	.88	+.06	5.00	151
2 1/16	2.09	7.88	±0.06	0.12	4.38	1.73	3.94	2.94	2.03	0.38	6.25	8	¾	.88	+.06	5.25	152
2 9/16	2.59	9.12	±0.06	0.12	5.19	2.02	4.75	3.62	2.25	0.38	7.25	8	⅞	1.00	+.06	6.00	153
3 1/16	3.09	10.62	±0.06	0.12	6.00	2.30	5.59	4.34	2.50	0.38	8.50	8	1	1.12	+.06	6.75	154
4 1/16	4.09	12.44	±0.06	0.12	7.28	2.77	7.19	5.75	2.88	0.38	10.19	8	1 ⅛	1.25	+.06	8.00	155
5 ⅛	5.16	14.06	±0.06	0.12	8.69	3.13	8.81	7.19	3.19	0.38	11.81	12	1 ⅛	1.25	+.06	8.75	169
7 1/16	7.09	18.88	±0.12	0.25	11.88	4.06	11.88	10.00	3.75	0.62	15.88	12	1 ½	1.62	+.09	11.25	156
9	9.03	21.75	±0.12	0.25	14.12	4.88	14.75	12.88	3.69	0.62	18.75	16	1 ½	1.62	+.09	13.00	157
11	11.03	25.75	±0.12	0.25	16.88	5.56	17.75	15.75	4.06	0.62	22.25	16	1 ¾	1.88	+.09	15.00	158
13 5/8	13.66	30.25	±0.12	0.25	20.38	6.62	21.75	19.50	4.50	0.62	26.50	20	1 ⅞	2.00	+.09	17.25	159
16 ¾	16.78	34.31	±0.12	0.25	22.69	6.62	25.81	23.69	3.00	0.75	30.56	24	1 ⅞	2.00	+.09	17.50	162

GENERAL NOTES: Dimensions are in inches. Minimum Bolt Hole Tolerance is - 0.02″

Table 4a.9 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
15000 psi																	
1 13/16	1.84	8.19	±0.06	0.12	4.19	1.78	3.84	2.81	1.88	0.38	6.31	8	7/8	1.00	+.06	5.50	151
2 1/16	2.09	8.75	±0.06	0.12	4.50	2.00	4.38	3.25	2.12	0.38	6.88	8	7/8	1.00	+.06	6.00	152
2 9/16	2.59	10.00	±0.06	0.12	5.25	2.25	5.06	3.94	2.25	0.38	7.88	8	1	1.12	+.06	6.75	153
3 1/16	3.09	11.31	±0.06	0.12	6.06	2.53	6.06	4.81	2.50	0.38	9.06	8	1 1/8	1.25	+.06	7.50	154
4 1/16	4.09	14.19	±0.06	0.12	7.62	3.09	7.69	6.25	2.88	0.38	11.44	8	1 3/8	1.50	+.06	9.25	155
5 1/8	5.16	16.50	±0.06	0.12	8.88	3.88	9.62	7.88	3.22	0.62	13.50	12	1 1/2	1.62	+.09	11.50	169
7 1/16	7.09	19.88	±0.12	0.25	12.00	4.69	12.81	10.88	3.62	0.62	16.88	16	1 1/2	1.62	+.09	12.75	156
20000 psi																	
1 13/16	1.84	10.12	±0.06	0.12	4.62	2.50	5.25	4.31	1.94	0.38	8.00	8	1	1.12	+.06	7.50	151
2 1/16	2.09	11.31	±0.06	0.12	5.19	2.81	6.06	5.00	2.06	0.38	9.06	8	1 1/8	1.25	+.06	8.25	152
2 9/16	2.59	12.81	±0.06	0.12	5.94	3.12	6.81	5.69	2.31	0.38	10.31	8	1 1/4	1.38	+.06	9.25	153
3 1/16	3.09	14.06	±0.06	0.12	6.75	3.38	7.56	6.31	2.50	0.38	11.31	8	1 3/8	1.50	+.06	10.00	154
4 1/16	4.09	17.56	±0.06	0.12	8.62	4.19	9.56	8.12	2.88	0.38	14.06	8	1 3/4	1.88	+.09	12.25	155
7 1/16	7.09	25.81	±0.12	0.25	13.88	6.50	15.19	13.31	3.81	0.62	21.81	16	2	2.12	+.09	17.50	156

GENERAL NOTES: Dimensions are in inches.
Minimum Bolt Hole Tolerance is - 0.02″

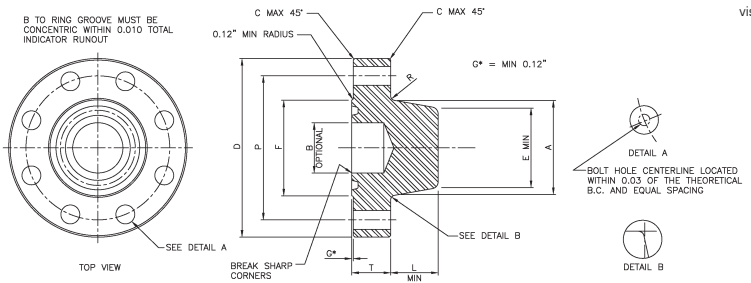


Table 4a.10 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore (optional)	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
10000 psi																	
1 13/16	1.84	7.38	±0.06	0.12	4.12	1.66	3.50	2.56	1.91	0.38	5.75	8	3/4	.88	+.06	5.00	151
2 1/16	2.09	7.88	±0.06	0.12	4.38	1.73	3.94	2.94	2.03	0.38	6.25	8	3/4	.88	+.06	5.25	152
2 9/16	2.59	9.12	±0.06	0.12	5.19	2.02	4.75	3.62	2.25	0.38	7.25	8	7/8	1.00	+.06	6.00	153
3 1/16	3.09	10.62	±0.06	0.12	6.00	2.30	5.59	4.34	2.50	0.38	8.50	8	1	1.12	+.06	6.75	154
4 1/16	4.09	12.44	±0.06	0.12	7.28	2.77	7.19	5.75	2.88	0.38	10.19	8	1 1/8	1.25	+.06	8.00	155
15000 psi																	
1 13/16	1.84	8.19	±0.06	0.12	4.19	1.78	3.84	2.81	1.88	0.38	6.31	8	7/8	1.00	+.06	5.50	151
2 1/16	2.09	8.75	±0.06	0.12	4.50	2.00	4.38	3.25	2.12	0.38	6.88	8	7/8	1.00	+.06	6.00	152
2 9/16	2.59	10.00	±0.06	0.12	5.25	2.25	5.06	3.94	2.25	0.38	7.88	8	1	1.12	+.06	6.75	153
3 1/16	3.09	11.31	±0.06	0.12	6.06	2.53	6.06	4.81	2.50	0.38	9.06	8	1 1/8	1.25	+.06	7.50	154
4 1/16	4.09	14.19	±0.06	0.12	7.62	3.09	7.69	6.25	2.88	0.38	11.44	8	1 3/8	1.50	+.06	9.25	155

GENERAL NOTES: Dimensions are in inches. Minimum Bolt Hole Tolerance is - 0.02″

Table 4a.10 Hub and Flange Dimensions

Nominal Size and Bore of Flange	Maximum Bore (optional)	Outside Diameter of Flange	Tolerance	Maximum Chamfer	Diameter of Raised Face	Total Thickness of Flange	Large Diameter of Hub	Small Diameter of Hub	Length of Hub	Radius of Hub	Diameter of Bolt Circle	Number of Bolts	Diameter of Bolts	Diameter of Bolt Holes	Bolt Hole Tolerance (see note)	Minimum Length of Stud Bolts	Ring Number
	B	D	D	C	F	T	A	E	L	R	P						BX
								20000 psi									
1 13/16	1.84	10.12	±0.06	0.12	4.62	2.50	5.25	4.31	1.94	0.38	8.00	8	1	1.12	+.06	7.50	151
2 1/16	2.09	11.31	±0.06	0.12	5.19	2.81	6.06	5.00	2.06	0.38	9.06	8	1 1/8	1.25	+.06	8.25	152
2 9/16	2.59	12.81	±0.06	0.12	5.94	3.12	6.81	5.69	2.31	0.38	10.31	8	1 1/4	1.38	+.06	9.25	153
3 1/16	3.09	14.06	±0.06	0.12	6.75	3.38	7.56	6.31	2.50	0.38	11.31	8	1 3/8	1.50	+.06	10.00	154
4 1/16	4.09	17.56	±0.06	0.12	8.62	4.19	9.56	8.12	2.88	0.38	14.06	8	1 3/4	1.88	+.09	12.25	155

GENERAL NOTES: **Dimensions are in inches.**
Minimum Bolt Hole Tolerance is - 0.02″

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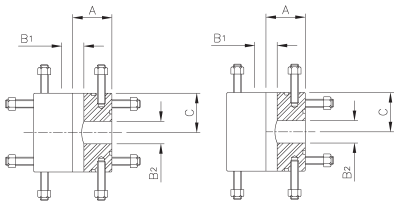

Table 4a.11 API Studded Cross and Tee

Rated Working Pressure (psi)	Nominal Size and Bore		Centre to Face. Vertical Run C	Centre to Face Horizontal Run A
	Vertical B1	Horizontal B2		
	(inches) +.03,-0	(inches) +.03,-0	(inches) ±.03	(inches) ±.03
2,000	2 1/16	2 1/16	3.50	3.50
	2 9/16	2 1/16	3.50	4.00
	2 9/16	2 9/16	4.50	4.50
	3 1/8	2 1/16	3.50	4.50
	3 1/8	2 9/16	4.50	4.50
	3 1/8	3 1/8	4.50	4.50
	4 1/16	2 1/16	4.50	5.50
	4 1/16	2 9/16	4.50	5.50
	4 1/16	3 1/8	4.50	5.50
	4 1/16	4 1/16	5.50	5.50
3,000	3 1/8	2 1/16	4.50	5.00
	3 1/8	2 9/16	5.00	5.00
	3 1/8	3 1/8	5.00	5.00
	4 1/16	2 1/16	4.50	6.12
	4 1/16	2 9/16	5.00	6.12
	4 1/16	3 1/8	5.00	6.12
	4 1/16	4 1/16	6.12	6.12
5,000	2 1/16	2 1/16	4.50	4.50
	2 9/16	2 1/16	4.50	5.00
	2 9/16	2 9/16	5.00	5.00
	3 1/8	2 1/16	4.50	5.50
	3 1/8	2 9/16	5.50	5.50
	3 1/8	3 1/8	5.50	5.50
	4 1/16	2 1/16	4.50	6.50
	4 1/16	2 9/16	5.00	6.50
	4 1/16	3 1/8	5.50	6.50
	4 1/16	4 1/16	6.50	6.50
10,000	1 13/16	1 13/16	4.38	4.38
	2 1/16	1 13/16	4.38	4.38
	2 1/16	2 1/16	4.38	4.38
	2 9/16	1 13/16	4.50	5.12
	2 9/16	2 1/16	4.50	5.12
	2 9/16	2 9/16	5.12	5.12
	3 1/16	1 13/16	4.50	5.88
	3 1/16	2 1/16	4.50	5.88
	3 1/16	2 9/16	5.12	5.88
	3 1/16	3 1/16	5.88	5.88
	4 1/16	1 13/16	4.50	6.88
	4 1/16	2 9/16	4.50	6.88
	4 1/16	2 9/16	5.12	6.88
	4 1/16	3 1/16	5.88	6.88
	4 1/16	4 1/16	6.88	6.88
15,000	1 13/16	1 13/16	5.00	5.00
	2 1/16	1 13/16	5.00	5.00
15,000	2 1/16	2 1/16	5.00	5.00
	2 9/16	1 13/16	5.50	5.50
	2 9/16	2 1/16	5.50	5.50
	2 9/16	2 9/16	5.50	5.50
	3 1/16	1 13/16	6.31	6.31
	3 1/16	2 1/16	6.31	6.31
	3 1/16	2 9/16	6.31	6.31
	3 1/16	3 1/16	6.31	6.31
	4 1/16	1 13/16	7.62	7.62
	4 1/16	2 1/16	7.62	7.62
	4 1/16	2 9/16	7.62	7.62
	4 1/16	3 1/16	7.62	7.62
	4 1/16	4 1/16	7.62	7.62
20,000	1 13/16	1 13/16	6.47	6.47
	2 1/16	1 13/16	6.47	6.47
	2 1/16	2 1/16	6.47	6.47
	2 9/16	1 13/16	7.28	7.28
	2 9/16	2 1/16	7.28	7.28
	2 9/16	2 9/16	7.28	7.28
	3 1/16	1 13/16	7.97	7.97
	3 1/16	2 1/16	7.97	7.97
	3 1/16	2 9/16	7.97	7.97
	3 1/16	3 1/16	7.97	7.97
	4 1/16	1 13/16	9.91	9.91
	4 1/16	2 1/16	9.91	9.91
	4 1/16	2 9/16	9.91	9.91
	4 1/16	3 1/16	9.91	9.91
	4 1/16	4 1/16	9.91	9.91

GENERAL NOTE: Dimensions are in inches.

Section 4b. ANSI B16.5 Flanges

Flanges are designed in accordance with the following specifications:-

ANSI B16.5	Pipe Flanges and Flanged Fittings
ANSI B31.3	Chemical Plant and Petroleum Refinery Piping.
ASME VIII	Boiler and Pressure Vessel Code.
MSS-SP-55	Quality Standards for Steel Castings for Valves, Flanges and Fittings and other Piping Components.
NACE MR-01-75	Sulphide Stress Cracking Resistant Metallic Materials for Oilfield Equipment.

Flanges are available as Weld Neck, Integral, Blinds, Target & Test Blinds for use with the following pressure ratings:-

RATING	150lb	300lb	400lb	600lb	900lb	1,500lb	2,500lb
MAX. WORKING PRESSURE	285 PSI	740 PSI	990 PSI	1480 PSI	2220 PSI	3705 PSI	6170 PSI
TEST PRESSURE	450 PSI	1125 PSI	1500 PSI	2225 PSI	3350 PSI	5575 PSI	9275 PSI
OPERATING TEMPERATURE RANGE	-28 TO +540 DEG C	-28 TO +540 DEG C	-28 TO +540 DEG C	-28 TO +540 DEG C	-28 TO +540 DEG C	-28 TO +540 DEG C	-28 TO +540 DEG C

GENERAL NOTES: **Please contact RBV Energy for any special materials or threaded, slip on or lapped flange dimensions.**
Max. working pressures stated are based upon carbon steel material group 1.1 @ 38°C in accordance with ANSI B16.5.
De-rating of max. working pressure will occur as the operating temperature increases above 38°C.

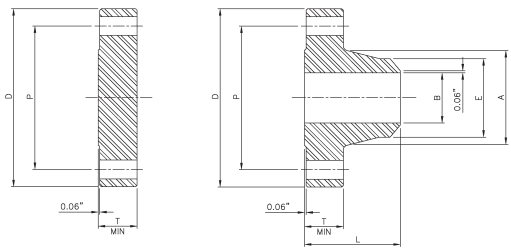

Table 4b.1 Class 150 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
½	3.50	0.44	1.19	0.84	1.88	0.62	2.38	0.62	4	½	2.25	…
¾	3.88	0.50	1.50	1.05	2.06	0.82	2.75	0.62	4	½	2.50	…
1	4.25	0.56	1.94	1.32	2.19	1.05	3.12	0.62	4	½	2.50	3.00
1¼	4.62	0.62	2.31	1.66	2.25	1.38	3.50	0.62	4	½	2.75	3.25
1½	5.00	0.69	2.56	1.90	2.44	1.61	3.88	0.62	4	½	2.75	3.25
2	6.00	0.75	3.06	2.38	2.50	2.07	4.75	0.75	4	⅝	3.25	3.75
2½	7.00	0.88	3.56	2.88	2.75	2.47	5.50	0.75	4	⅝	3.50	4.00
3	7.50	0.94	4.25	3.50	2.75	3.07	6.00	0.75	4	⅝	3.50	4.00
3½	8.50	0.94	4.81	4.00	2.81	3.55	7.00	0.75	8	⅝	3.50	4.00
4	9.00	0.94	5.31	4.50	3.00	4.03	7.50	0.75	8	⅝	3.50	4.00

GENERAL NOTE: Dimensions are in inches.

Table 4b.1 Class 150 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
5	10.00	0.94	6.44	5.56	3.50	5.05	8.50	0.88	8	¾	3.75	4.25
6	11.00	1.00	7.56	6.63	3.50	6.07	9.50	0.88	8	¾	4.00	4.50
8	13.50	1.12	9.69	8.63	4.00	7.98	11.75	0.88	8	¾	4.25	4.75
10	16.00	1.19	12.00	10.75	4.00	10.02	14.25	1.00	12	⅞	4.50	5.00
12	19.00	1.25	14.38	12.75	4.50	12.00	17.00	1.00	12	⅞	4.75	5.25
14	21.00	1.38	15.75	14.00	5.00		18.75	1.12	12	1	5.25	5.75
16	23.50	1.44	18.00	16.00	5.00	To be specified by purchaser	21.25	1.12	16	1	5.25	5.75
18	25.00	1.56	19.88	18.00	5.50		22.75	1.25	16	1⅛	5.75	6.25
20	27.50	1.69	22.00	20.00	5.69		25.00	1.25	20	1⅛	6.25	6.75
24	32.00	1.88	26.12	24.00	6.00		29.50	1.38	20	1¼	6.75	7.25

GENERAL NOTE: Dimensions are in inches.

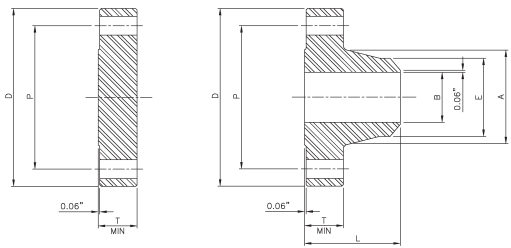

Table 4b.2 Class 300 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
½	3.75	0.56	1.50	0.84	2.06	0.62	2.62	0.62	4	½	2.50	3.00
¾	4.62	0.62	1.88	1.05	2.25	0.82	3.25	0.75	4	⅝	3.00	3.50
1	4.88	0.69	2.12	1.32	2.44	1.05	3.50	0.75	4	⅝	3.00	3.50
1¼	5.25	0.75	2.50	1.66	2.56	1.38	3.88	0.75	4	⅝	3.25	3.75
1½	6.12	0.81	2.75	1.90	2.69	1.61	4.50	0.88	4	¾	3.50	4.00
2	6.50	0.88	3.31	2.38	2.75	2.07	5.00	0.75	8	⅝	3.50	4.00
2½	7.50	1.00	3.94	2.88	3.00	2.47	5.88	0.88	8	¾	4.00	4.50
3	8.25	1.12	4.62	3.50	3.12	3.07	6.62	0.88	8	¾	4.25	4.75
3½	9.00	1.19	5.25	4.00	3.19	3.55	7.25	0.88	8	¾	4.25	5.00
4	10.00	1.25	5.75	4.50	3.38	4.03	7.88	0.88	8	¾	4.50	5.00

GENERAL NOTE: Dimensions are in inches.

Table 4b.2 Class 300 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
5	11.00	1.38	7.00	5.56	3.88	5.05	9.25	0.88	8	¾	4.75	5.25
6	12.50	1.44	8.12	6.63	3.88	6.07	10.62	0.88	12	¾	4.75	5.50
8	15.00	1.62	10.25	8.63	4.38	7.98	13.00	1.00	12	⅞	5.50	6.00
10	17.50	1.88	12.62	10.75	4.62	10.02	15.25	1.12	16	1	6.25	6.75
12	20.50	2.00	14.75	12.75	5.12	12.00	17.75	1.25	16	1⅛	6.75	7.25
14	23.00	2.12	16.75	14.00	5.62	12.00	20.25	1.25	20	1⅛	7.00	7.50
16	25.50	2.25	19.00	16.00	5.75	To be specified by purchaser	22.50	1.38	20	1¼	7.50	8.00
18	28.00	2.38	21.00	18.00	6.25		24.75	1.38	24	1¼	7.75	8.25
20	30.50	2.50	23.12	20.00	6.38		27.00	1.38	24	1¼	8.00	8.75
24	36.00	2.75	27.62	24.00	6.62		32.00	1.62	24	1¼	9.00	10.00

GENERAL NOTE: Dimensions are in inches.

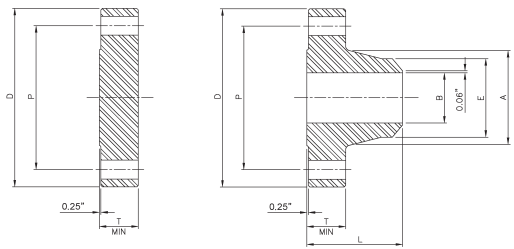

Table 4b.3 Class 400 Flanges

Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Length Through Hub: Welding Neck 'L'	Bore: Welding Neck 'B'	Drilling: Diameter of Bolt Circle 'P'	Drilling: Diameter of Bolt Holes	Drilling: Number of Bolts	Drilling: Diameter of Bolts	Length of Bolts: Stud Bolts: 0.06 in. Raised Face	Length of Bolts: Stud Bolts: Ring Joint
½												
¾												
1¼												
1½												
2												
2½												
3												
3½												

Use Class 600 dimensions in these sizes

GENERAL NOTE: Dimensions are in inches.

Table 4b.3 Class 400 Flanges

Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Length Through Hub: Welding Neck 'L'	Bore: Welding Neck 'B'	Drilling: Diameter of Bolt Circle 'P'	Drilling: Diameter of Bolt Holes	Drilling: Number of Bolts	Drilling: Diameter of Bolts	Length of Bolts: Stud Bolts: 0.06 in. Raised Face	Length of Bolts: Stud Bolts: Ring Joint
4	10.00	1.38	5.75	4.50	3.50	To be specified by purchaser	7.88	1.00	8	⅞	5.50	5.50
5	11.00	1.50	7.00	5.56	4.00		9.25	1.00	8	⅞	5.75	5.75
6	12.50	1.62	8.12	6.63	4.06		10.62	1.00	12	⅞	6.00	6.00
8	15.00	1.88	10.25	8.63	4.62		13.00	1.12	12	1	6.75	6.75
10	17.50	2.12	12.62	10.75	4.88		15.25	1.25	16	1⅛	7.50	7.50
12	20.50	2.25	14.75	12.75	5.38		17.75	1.38	16	1¼	8.00	8.00
14	23.00	2.38	16.75	14.00	5.88		20.25	1.38	20	1¼	8.25	8.25
16	25.50	2.50	19.00	16.00	6.00		22.50	1.50	20	1⅜	8.75	8.75
18	28.00	2.62	21.00	18.00	6.50		24.75	1.50	24	1⅜	9.00	9.00
20	30.50	2.75	23.12	20.00	6.62		27.00	1.62	24	1½	9.50	9.75
24	36.00	3.00	27.62	24.00	6.88		32.00	1.88	24	1¾	10.50	11.00

GENERAL NOTE: Dimensions are in inches.

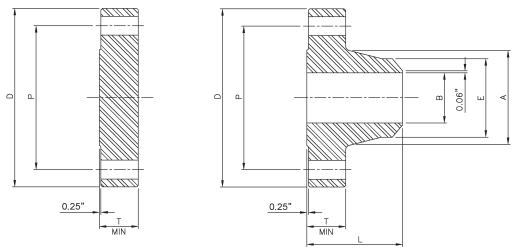

Table 4b.4 Class 600 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
½	3.75	0.56	1.50	0.84	2.06	To be specified by purchaser	2.62	0.62	4	½	3.00	3.00
¾	4.62	0.62	1.88	1.05	2.25		3.25	0.75	4	⅝	3.50	3.50
1	4.88	0.69	2.12	1.32	2.44		3.50	0.75	4	⅝	3.50	3.50
1¼	5.25	0.81	2.50	1.66	2.62		3.88	0.75	4	⅝	3.75	3.75
1½	6.12	0.88	2.75	1.90	2.75		4.50	0.88	4	¾	4.25	4.25
2	6.50	1.00	3.31	2.38	2.88		5.00	0.75	8	⅝	4.25	4.25
2½	7.50	1.12	3.94	2.88	3.12		5.88	0.88	8	¾	4.75	4.75
3	8.25	1.25	4.62	3.50	3.25		6.62	0.88	8	¾	5.00	5.00
3½	9.00	1.38	5.25	4.00	3.38		7.25	1.00	8	⅞	5.50	5.50
4	10.75	1.50	6.00	4.50	4.00		8.50	1.00	8	⅞	5.75	5.75

GENERAL NOTE: Dimensions are in inches.

Table 4b.4 Class 600 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
5	13.00	1.75	7.44	5.56	4.50	To be specified by purchaser	10.50	1.12	8	1	6.50	6.50
6	14.00	1.88	8.75	6.63	4.62		11.50	1.12	12	1	6.75	6.75
8	16.50	2.19	10.75	8.63	5.25		13.75	1.25	12	1⅛	7.50	7.75
10	20.00	2.50	13.50	10.75	6.00		17.00	1.38	16	1¼	8.50	8.50
12	22.00	2.62	15.75	12.75	6.12		19.25	1.38	20	1¼	8.75	8.75
14	23.75	2.75	17.00	14.00	6.50		20.75	1.50	20	1⅜	9.25	9.25
16	27.00	3.00	19.50	16.00	7.00		23.75	1.62	20	1½	10.00	10.00
18	29.25	3.25	21.50	18.00	7.25		25.75	1.75	20	1⅝	10.75	10.75
20	32.00	3.50	24.00	20.00	7.50		28.50	1.75	24	1⅝	11.25	11.50
24	37.00	4.00	28.25	24.00	8.00		33.00	2.00	24	1⅞	13.00	13.25

GENERAL NOTE: Dimensions are in inches.

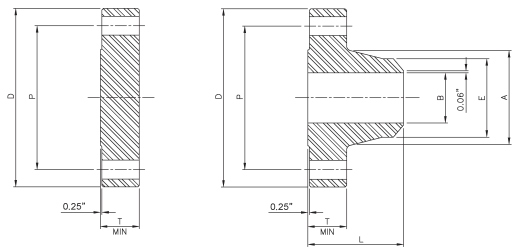

Table 4b.5 Class 900 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
½												
¾												
1												
1¼						Use Class 1500 dimensions in these sizes						
1½												
2												
2½												
3	9.50	1.50	5.00	3.50	4.00	To be specified by purchaser	7.50	1.00	8	⅞	5.75	5.75
4	11.50	1.75	6.25	4.50	4.50		9.25	1.25	8	1⅛	6.75	6.75

GENERAL NOTE: Dimensions are in inches.

Table 4b.5 Class 900 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
5	13.75	2.00	7.50	5.56	5.00	To be specified by purchaser	11.00	1.38	8	1¼	7.50	7.50
6	15.00	2.19	9.25	6.63	5.50		12.50	1.25	12	1⅛	7.50	7.75
8	18.50	2.50	11.75	8.63	6.38		15.50	1.50	12	1⅜	8.75	8.75
10	21.50	2.75	14.50	10.75	7.25		18.50	1.50	16	1⅜	9.25	9.25
12	24.00	3.12	16.50	12.75	7.88		21.00	1.50	20	1⅜	10.00	10.00
14	25.25	3.38	17.75	14.00	8.38		22.00	1.62	20	1½	10.75	11.00
16	27.75	3.50	20.00	16.00	8.50		24.25	1.75	20	1⅝	11.25	11.50
18	31.00	4.00	22.25	18.00	9.00		27.00	2.00	20	1⅞	12.75	13.25
20	33.75	4.25	24.50	20.00	9.75		29.50	2.12	20	2	13.75	14.25
24	41.00	5.50	29.50	24.00	11.50		35.50	2.62	20	2½	17.25	18.00

GENERAL NOTE: Dimensions are in inches.

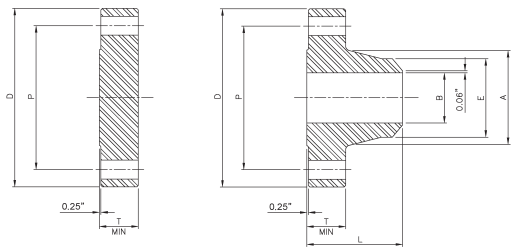

Table 4b.6 Class 1500 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
½	4.75	0.88	1.50	0.84	2.38	To be specified by purchaser	3.25	0.88	4	¾	4.25	4.25
¾	5.12	1.00	1.75	1.05	2.75		3.50	0.88	4	¾	4.50	4.50
1	5.88	1.12	2.06	1.32	2.88		4.00	1.00	4	⅞	5.00	5.00
1¼	6.25	1.12	2.50	1.66	2.88		4.38	1.00	4	⅞	5.00	5.00
1½	7.00	1.25	2.75	1.90	3.25		4.88	1.12	4	1	5.50	5.50
2	8.50	1.50	4.12	2.38	4.00		6.50	1.00	8	⅞	5.75	5.75
2½	9.62	1.62	4.88	2.88	4.12		7.50	1.12	8	1	6.25	6.25
3	10.50	1.88	5.25	3.50	4.62		8.00	1.25	8	1⅛	7.00	7.00
4	12.25	2.12	6.38	4.50	4.88		9.50	1.38	8	1¼	7.75	7.75

GENERAL NOTE: Dimensions are in inches.

Table 4b.6 Class 1500 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
5	14.75	2.88	7.75	5.56	6.12	To be specified by purchaser	11.50	1.62	8	1½	9.75	9.75
6	15.50	3.25	9.00	6.63	6.75		12.50	1.50	12	1⅜	10.25	10.50
8	19.00	3.62	11.50	8.63	8.38		15.50	1.75	12	1⅝	11.50	12.75
10	23.00	4.25	14.50	10.75	10.00		19.00	2.00	12	1⅞	13.25	13.50
12	26.50	4.88	17.75	12.75	11.12		22.50	2.12	16	2	14.75	15.25
14	29.50	5.25	19.50	14.00	11.75		25.00	2.38	16	2¼	16.00	16.75
16	32.50	5.75	21.75	16.00	12.25		27.75	2.62	16	2½	17.50	18.50
18	36.00	6.38	23.50	18.00	12.88		30.50	2.88	16	2¾	19.50	20.75
20	38.75	7.00	25.25	20.00	14.00		32.75	3.12	16	3	21.25	22.25
24	46.00	8.00	30.00	24.00	16.00		39.00	3.62	16	3½	24.25	25.50

GENERAL NOTE: Dimensions are in inches.

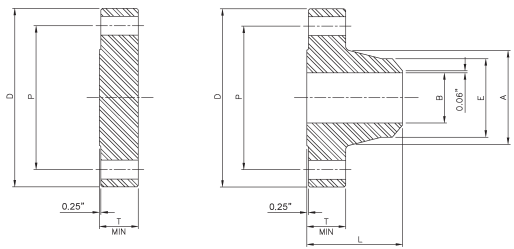

Table 4b.7 Class 2500 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
½	5.25	1.19	1.69	0.84	2.88	To be specified by purchaser	3.50	0.88	4	¾	4.75	4.75
¾	5.50	1.25	2.00	1.05	3.12		3.75	0.88	4	¾	5.00	5.00
1	6.25	1.38	2.25	1.32	3.50		4.25	1.00	4	⅞	5.50	5.50
1¼	7.25	1.50	2.88	1.66	3.75		5.12	1.12	4	1	6.00	6.00
1½	8.00	1.75	3.12	1.90	4.38		5.75	1.25	4	1⅛	6.75	6.75
2	9.25	2.00	3.75	2.38	5.00		6.75	1.12	8	1	7.00	7.00
2½	10.50	2.25	4.50	2.88	5.62		7.75	1.25	8	1⅛	7.75	8.00
3	12.00	2.62	5.25	3.50	6.62		9.00	1.38	8	1¼	8.75	9.00
4	14.00	3.00	6.50	4.50	7.50		10.75	1.62	8	1½	10.00	10.25

GENERAL NOTE: Dimensions are in inches.

Table 4b.7 Class 2500 Flanges

					Length Through Hub	Bore	Drilling				Length of Bolts	
											Stud Bolts	
Nominal Pipe Size	Outside Diameter of Flange 'D'	Thickness of Flange Min. 'T'	Diameter of Hub 'A'	Hub Diameter Beginning of Chamfer Welding Neck 'E'	Welding Neck 'L'	Welding Neck 'B'	Diameter of Bolt Circle 'P'	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	0.06 in. Raised Face	Ring Joint
5	16.50	3.62	8.00	5.56	9.00	To be specified by purchaser	12.75	1.88	8	1¾	11.75	12.25
6	19.00	4.25	9.25	6.63	10.75		14.50	2.12	8	2	13.50	14.00
8	21.75	5.00	12.00	8.63	12.50		17.25	2.12	12	2	15.00	15.50
10	26.50	6.50	14.75	10.75	16.50		21.25	2.62	12	2½	19.25	20.00
12	30.00	7.25	17.38	12.75	18.25		24.38	2.88	12	2¾	21.25	22.00

GENERAL NOTE: Dimensions are in inches.