



KALIKUND STEEL & ENGG. CO.

Stainless Steel, Carbon Steel, Alloys Steel & High Nickel Alloy

◆ Buttweld Fittings ◆ High Pressure Forged Fittings ◆ Branch Outlets ◆ Flanges

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Kalikund Steel Engg. Co. has earned an outstanding reputation as a Quality & cost efficient manufacturer for Butt-weld pipe Fittings, High pressure forged Socketweld & Threaded Fittings, Flanges & Branch Outlets, Today with our Strong fundamentals in manufacturing, marketing, customer care and backed by 20 years of hardcore experience & expertise, we are in position to cater to any demand in any part of the world.

OUR MISSION :

Our Mission is to Provide best quality products at most competitive prices & deliver it before the stipulated delivery time.

IN HOUSE FACILITIES :

Kalikund Steel Engg. Co. has state of the art manufacturing facility at Umbergaon in Gujarat State & have sophisticated equipments like Belt Drop Forging hammers, Hydraulic Presses, bending, pressing, welding, gauging, handling, hydraulic pressure testing, Heat treatment , CNC lathe, VMC drill, various conventional lathes and small equipments to produce products conforming to many National & International Standards like IS, ASTM, ASME, DIN, BS, ASA, MSS, JIS, GOST, etc

Manufacturing Facilities:



Some Special Grades Material We Deal in :

Carbon & Alloy Steel :

A234 WPB, WPL6, LF2, WPHY-42-46-52-65-70 Etc

Stainless Steel :

304/304L, 316/316L, 310S, 317L, 321, 347 etc

High Nickel alloys :

Duplex, Super Duplex, Monel, Inconel, Hastelloy, Titanium etc.

Third Party Inspection:

We can supply materials with Third Party Inspection Agencies like :



DNV



BUREAU VERITAS



ABS



PDIL



MECON



TCE



HEG Ltd.
H&G



LLOYD'S REGISTER

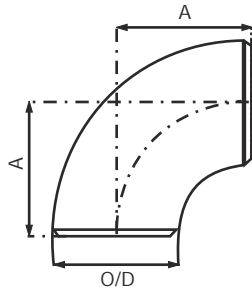


BAXCOUNSEL

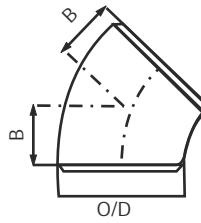


SGS

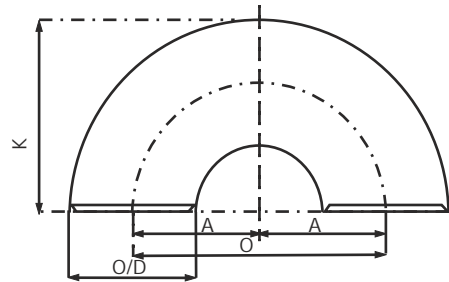
LR ELBOW & LR RETURN / U BEND



90° LR ELBOW



45° LR ELBOW



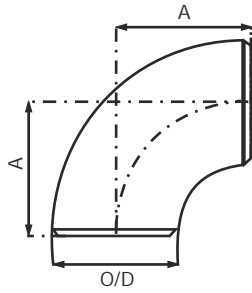
180° LR RETURN / U BEND

B16.9

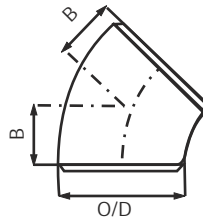
Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Dimension A	Dimension B	Center to Center O	Back to Face K
1/2"	21.3	38	16	76	48
3/4"	26.7	38	19	76	51
1"	33.4	38	22	76	56
1.1/4"	42.2	48	25	95	70
1.1/2"	48.3	57	29	114	83
2"	60.3	76	35	152	106
2.1/2"	73.0	95	44	190	132
3"	88.9	114	51	229	159
3.1/2"	101.6	133	57	267	184
4"	114.3	152	64	305	210
5"	141.3	190	79	381	262
6"	168.3	229	95	457	313
8"	219.1	305	127	610	414
10"	273.0	381	159	762	518
12"	323.8	457	190	914	619
14"	355.6	533	222	1067	711
16"	406.4	610	254	1219	813
18"	457.0	686	286	1372	914
20"	508.0	762	318	1524	1016
22"	559.0	838	343	1676	1118
24"	610.0	914	381	1829	1219
26"	660.0	991	406	.....	.....
28"	711.0	1067	438	.....	.....
30"	762.0	1143	470	.....	.....
32"	813.0	1219	502	.....	.....
34"	864.0	1295	533	.....	.....
36"	914.0	1372	565	.....	.....

Note : All Dimensions are in millimeters (mm)
Dimension for 40" and above on request.

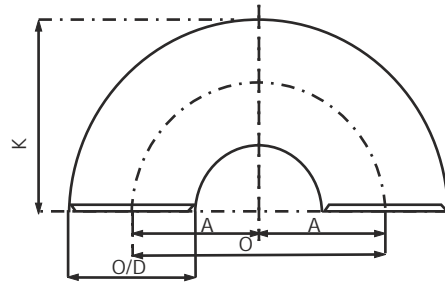
SR ELBOW & SR RETURN BEND



90° SR ELBOW



45°SR ELBOW



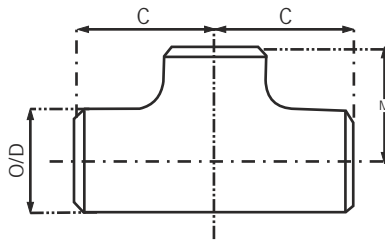
180° SR RETURN BEND

B16.9 / B16.28

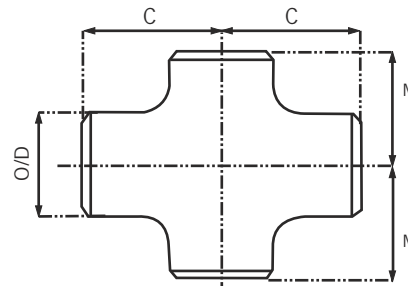
Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Dimension A	Dimension B	Center to Center O	Back to Face K
1/2"	21.3	.....	.....	.....	.....
3/4"	26.7	.....	.....	.....	.....
1"	33.4	25	....	51	41
1.1/4"	42.2	32	....	64	52
1.1/2"	48.3	38	....	76	62
2"	60.3	51	...	102	81
2.1/2"	73.0	64	....	127	100
3"	88.9	76	31.6	152	121
3.1/2"	101.6	89	36.8	178	140
4"	114.3	102	42.1	203	159
5"	141.3	127	52.6	254	197
6"	168.3	152	63.4	305	237
8"	219.1	203	84.2	406	313
10"	273.0	254	105.2	508	391
12"	323.8	305	126.3	610	467
14"	355.6	356	147.3	711	533
16"	406.4	406	168.3	813	610
18"	457.0	457	189.4	914	686
20"	508.0	508	210.4	1016	762
22"	559.0	559	231.5	1118	838
24"	610.0	610	252.5	1219	914

Note : All Dimensions are in millimeters (mm)

EQUAL TEE & CROSS



EQUAL TEE



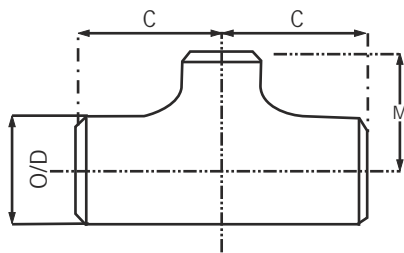
CROSS

B16.9

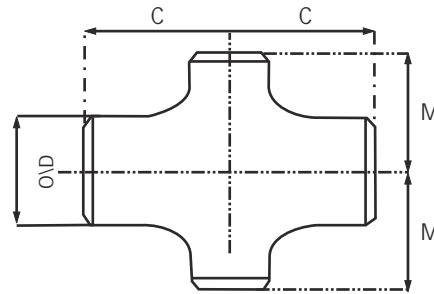
Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Run 'C'	Outlet 'M'
1/2"	21.3	25	25
3/4"	26.7	29	29
1"	33.4	38	38
1.1/4"	42.2	48	48
1.1/2"	48.3	57	57
2"	60.3	64	64
2.1/2"	73.0	76	76
3"	88.9	86	86
3.1/2"	101.6	95	95
4"	114.3	105	105
5"	141.3	124	124
6"	168.3	143	143
8"	219.1	178	178
10"	273.0	216	216
12"	323.8	254	254
14"	355.6	279	279
16"	406.4	305	305
18"	457.0	343	343
20"	508.0	381	381
22"	559.0	419	419
24"	610.0	432	432
26"	660.0	495	495
28"	711.0	521	521
30"	762.0	559	559
32"	813.0	597	597
34"	864.0	635	635
36"	914.0	673	673

Note : All Dimensions are in millimeters (mm)
Dimension for 40" and above on request.

UNEQUAL TEE & UNEQUAL CROSS



UNEQUAL TEE



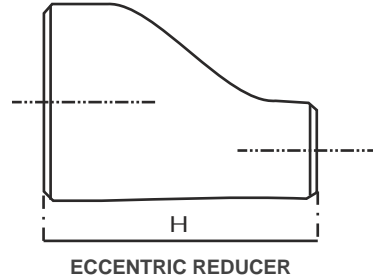
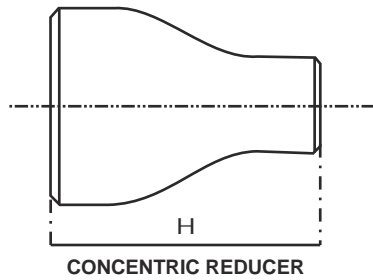
CROSS UNEQUAL

B16.9

Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		Center - to - Center		Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		Center - to - Center	
	Run	Outlet	Run 'C'	Outlet 'M'		Run	Outlet	Run 'C'	Outlet 'M'
1/2" x 3/8"	21.3	17.3	25	25	10" x 8"	273.0	219.1	216	203
1/2" x 1/4"	21.3	13.7	25	25	10" x 6"	273.0	168.3	216	194
					10" x 5"	273.0	141.3	216	191
3/4" x 1/2"	26.7	21.3	29	29	10" x 4"	273.0	114.3	216	184
3/4" x 3/8"	26.7	17.3	29	29					
					12" x 10"	323.8	273.0	254	241
1" x 3/4"	33.4	26.7	38	38	12" x 8"	323.8	219.1	254	229
1" x 1/2"	33.4	21.3	38	38	12" x 6"	323.8	168.3	254	219
					12" x 5"	323.8	141.3	254	216
1.1/4" x 1"	42.2	33.4	48	48	14" x 12"	355.6	323.8	279	270
1.1/4" x 3/4"	42.2	26.7	48	48	14" x 10"	355.6	273.0	279	257
1.1/4" x 1/2"	42.2	21.3	48	48	14" x 8"	355.6	219.1	279	248
					14" x 6"	355.6	168.3	279	238
1.1/2" x 1.1/4"	48.3	42.2	57	57					
1.1/2" x 1"	48.3	33.4	57	57	16" x 14"	406.4	355.6	305	305
1.1/2" x 3/4"	48.3	26.7	57	57	16" x 12"	406.4	323.8	305	295
1.1/2" x 1/2"	48.3	21.3	57	57	16" x 10"	406.4	273.0	305	283
					16" x 8"	406.4	219.1	305	273
2" x 1.1/2"	60.3	48.3	64	60	16" x 6"	406.4	168.3	305	264
2" x 1.1/4"	60.3	42.2	64	57					
2" x 1"	60.3	33.4	64	51	18" x 16"	457.0	406.4	343	330
2" x 3/4"	60.3	26.7	64	44	18" x 14"	457.0	355.6	343	330
					18" x 12"	457.0	323.8	343	321
2.1/2" x 2"	73.0	60.3	76	70	18" x 10"	457.0	273.0	343	308
2.1/2" x 1.1/2"	73.0	48.3	76	67	18" x 8"	457.0	219.1	343	298
2.1/2" x 1.1/4"	73.0	42.2	76	64					
2.1/2" x 1"	73.0	33.4	76	57	20" x 18"	508.0	457.0	381	368
					20" x 16"	508.0	406.4	381	356
3" x 2.1/2"	88.9	73.0	86	83	20" x 14"	508.0	355.6	381	356
3" x 2"	88.9	60.3	86	76	20" x 12"	508.0	323.8	381	346
3" x 1.1/2"	88.9	48.3	86	73	20" x 10"	508.0	273.0	381	333
3" x 1.1/4"	88.9	42.2	86	70	20" x 8"	508.0	219.1	381	324
3.1/2" x 3"	101.6	88.9	95	92	22" x 20"	559.0	508.0	419	406
3.1/2" x 2.1/2"	101.6	73.0	95	89	22" x 18"	559.0	457.0	419	394
3.1/2" x 2"	101.6	60.3	95	83	22" x 16"	559.0	406.4	419	381
3.1/2" x 1.1/2"	101.6	48.3	95	79	22" x 14"	559.0	355.6	419	381
					22" x 12"	559.0	323.8	419	371
4" x 3.1/2"	114.3	101.6	105	102	22" x 10"	559.0	273.0	419	359
4" x 3"	114.3	88.9	105	98					
4" x 2.1/2"	114.3	73.0	105	95	24" x 22"	610.0	559.0	432	432
4" x 2"	114.3	60.3	105	89	24" x 20"	610.0	508.0	432	432
4" x 1.1/2"	114.3	48.3	105	86	24" x 18"	610.0	457.0	432	419
					24" x 16"	610.0	406.4	432	406
5" x 4"	141.3	114.3	124	117	24" x 14"	610.0	355.6	432	406
5" x 3.1/2"	141.3	101.6	124	114	24" x 12"	610.0	323.8	432	397
5" x 3"	141.3	88.9	124	111	24" x 10"	610.0	273.0	432	384
5" x 2.1/2"	141.3	73.0	124	108					
5" x 2"	141.3	60.3	124	105	26" x 24"	660.0	610.0	495	483
					26" x 22"	660.0	559.0	495	470
6" x 5"	168.3	141.3	143	137	26" x 20"	660.0	508.0	495	457
6" x 4"	168.3	114.3	143	130	26" x 18"	660.0	457.0	495	444
6" x 3.1/2"	168.3	101.6	143	127	26" x 16"	660.0	406.4	495	432
6" x 3"	168.3	88.9	143	124	26" x 14"	660.0	355.6	495	432
6" x 2.1/2"	168.3	73.0	143	121	26" x 12"	660.0	323.8	495	422
8" x 6"	219.1	168.3	178	168	28" x 26"	711.0	660.0	521	521
8" x 5"	219.1	141.3	178	162	28" x 24"	711.0	610.0	521	508
8" x 4"	219.1	114.3	178	156	28" x 22"	711.0	559.0	521	495
8" x 3.1/2"	219.1	101.6	178	152	28" x 20"	711.0	508.0	521	483

Note : All Dimensions are in millimeters (mm)
Dimension for 30" and above on request.

REDUCER : CONCENTRIC & ECCENTRIC

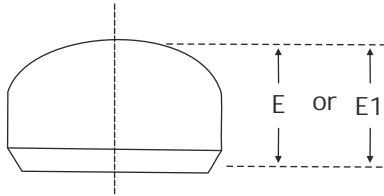


B16.9

Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		End-to-End H	Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		End-to-End H
	Run	Outlet			Run	Outlet	
3/4" x 1/2" 3/4" x 3/8"	26.7 26.7	21.3 17.3	38 38	12" x 10" 12" x 8" 12" x 6" 12" x 5"	323.8 323.8 323.8 323.8	273.0 219.1 168.3 141.3	203 203 203 203
1" x 3/4" 1" x 1/2"	33.4 33.4	26.7 21.3	51 51	14" x 12" 14" x 10" 14" x 8" 14" x 6"	355.6 355.6 355.6 355.6	323.8 273.0 219.1 168.3	330 330 330 330
1.1/4" x 1" 1.1/4" x 3/4" 1.1/4" x 1/2"	42.2 42.2 42.2	33.4 26.7 21.3	51 51 51	16" x 14" 16" x 12" 16" x 10" 16" x 8"	406.4 406.4 406.4 406.4	355.6 323.8 273.0 219.1	356 356 356 356
1.1/2" x 1.1/4" 1.1/2" x 1" 1.1/2" x 3/4" 1.1/2" x 1/2"	48.3 48.3 48.3 46.3	42.2 33.4 26.7 21.3	64 64 64 64	18" x 16" 18" x 14" 18" x 12" 18" x 10"	457.0 457.0 457.0 457.0	406.4 356.6 323.8 273.0	381 381 381 381
2" x 1.1/2" 2" x 1.1/4" 2" x 1" 2" x 3/4"	60.3 60.3 60.3 60.3	48.3 42.2 33.4 26.7	76 76 76 76	20" x 18" 20" x 16" 20" x 14" 20" x 12"	508.0 508.0 508.0 508.0	457.0 406.4 355.6 323.8	508 508 508 508
2.1/2" x 2" 2.1/2" x 1.1/2" 2.1/2" x 1.1/4" 2.1/2" x 1"	73.0 73.0 73.0 73.0	60.3 48.3 42.2 33.4	89 89 89 89	22" x 20" 22" x 18" 22" x 16" 22" x 14"	559.0 559.0 559.0 559.0	508.0 457.0 406.4 355.6	508 508 508 508
3" x 2.1/2" 3" x 2" 3" x 1.1/2" 3" x 1.1/4"	88.9 88.9 88.9 88.9	73.0 60.3 48.3 42.2	89 89 89 89	24" x 22" 24" x 20" 24" x 18" 24" x 16"	610.0 610.0 610.0 610.0	559.0 508.0 457.0 406.4	508 508 508 508
3.1/2" x 3" 3.1/2" x 2.1/2" 3.1/2" x 2" 3.1/2" x 1.1/2"	101.6 101.6 101.6 101.6	88.9 73.0 60.3 48.3	102 102 102 102	26" x 24" 26" x 22" 26" x 20" 26" x 18" 26" x 16"	660.0 660.0 660.0 660.0 660.0	610.0 559.0 508.0 457.0 406.4	610 610 610 610 610
4" x 3.1/2" 4" x 3" 4" x 2.1/2" 4" x 2" 4" x 1.1/2"	114.3 114.3 114.3 114.3 114.3	101.6 88.9 73.0 60.3 48.3	102 102 102 102 102	28" x 26" 28" x 24" 28" x 20" 28" x 18"	711.0 711.0 711.0 711.0	660.0 610.0 508.0 457.0	610 610 610 610
5" x 4" 5" x 3.1/2" 5" x 3" 5" x 2.1/2" 5" x 2"	141.3 141.3 141.3 141.3 141.3	114.3 101.6 88.9 73.0 60.3	127 127 127 127 127	30" x 28" 30" x 26" 30" x 24" 30" x 20"	762.0 762.0 762.0 762.0	711.0 660.0 610.0 508.0	610 610 610 610
6" x 5" 6" x 4" 6" x 3.1/2" 6" x 3" 6" x 2.1/2"	168.3 168.3 168.3 168.3 168.3	141.3 114.3 101.6 88.9 73.0	140 140 140 140 140	32" x 30" 32" x 28" 32" x 26" 32" x 24"	813.0 813.0 813.0 813.0	762.0 711.0 660.0 610.0	610 610 610 610
8" x 6" 8" x 5" 8" x 4" 8" x 3.1/2"	219.1 219.1 219.1 219.1	168.3 141.3 114.3 101.6	152 152 152 152	34" x 32" 34" x 30" 34" x 26" 34" x 24"	864.0 864.0 864.0 864.0	813.0 762.0 660.0 610.0	610 610 610 610
10" x 8" 10" x 6" 10" x 5" 10" x 4"	273.0 273.0 273.0 273.0	219.1 168.3 141.3 114.3	178 178 178 178				

Note : All Dimensions are in millimeters (mm)
Dimension for 36" and above on request.

CAPS



B16.9

Nominal Pipe Size (NPS)	Outside Diameter at Bevel	Length (1)	Limiting Wall Thickness for Length E	Length (2)
	D	E		E1
1/2	0.84	1.00	0.18	1.00
3/4	1.05	1.00	1.15	1.00
1	1.32	1.50	0.18	1.50
1 1/4	1.66	1.50	0.19	1.50
1 1/2	1.90	1.50	0.20	1.50
2	2.38	1.50	0.22	1.75
2 1/2	2.88	1.50	0.28	2.00
3	3.50	2.00	0.30	2.50
3 1/2	4.00	2.50	0.32	3.00
4	4.50	2.50	0.34	3.00
5	5.56	3.00	0.38	3.50
6	6.62	3.50	0.43	4.00
8	8.62	4.00	0.50	5.00
10	10.75	5.00	0.50	6.00
12	12.75	6.00	0.50	7.00
14	14.00	6.50	0.50	7.50
16	16.00	7.00	0.50	8.00
18	18.00	8.00	0.50	9.00
20	20.00	9.00	0.50	10.00
22	22.00	10.00	0.50	10.00
24	24.00	10.50	0.50	12.00
26	26.00	10.50	...	...
28	28.00	10.50	...	...
30	30.00	10.50	...	...
32	32.00	10.50	...	...
34	34.00	10.50	...	...
36	36.00	10.50	...	...
38	38.00	12.00	...	...
40	40.00	12.00	...	...
42	42.00	12.00	...	...
44	44.00	13.50	...	...
46	46.00	13.50	...	...
48	48.00	13.50	...	...

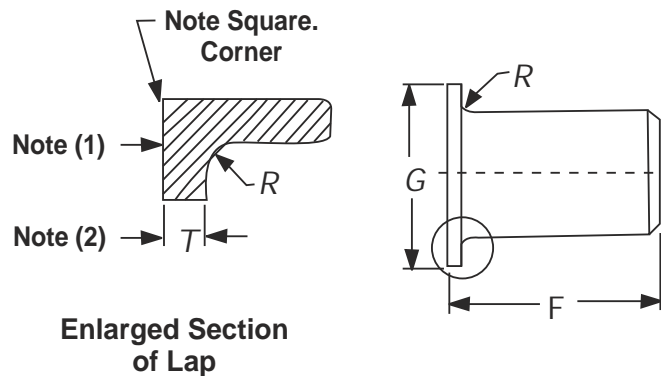
GENERAL NOTE :

- (a) Dimensions are in inches.
- (b) The shape of these caps shall be ellipsoidal and shall conform to the shape requirements as given in the ASME Boiler and Pressure Vessel Code

NOTES :

- (1) Length E applies for thickness not exceeding that given in column "Limiting Wall Thickness for Length E".
- (2) Length E1 applies for thickness greater than that given in column "Limiting Wall Thickness" for NPS 24 and smaller. For NPS 26 and larger, length E1 shall be by agreement between manufacturer and purchaser.

LAP-JOINT STUB ENDS B16.9



Nominal Pipe Size NPS	Outside Diameter of Barrel		long pattern length (F) notes(3)(4)	Short pattern length (F) notes(3)(4)	Radius of Fillet R Note(5)	Diameter of Lap (G) Note (6)
	Max	Min				
1/2"	0.896	0.809	3	2	0.12	1.38
3/4"	1.106	1.019	3	2	0.12	1.69
1"	1.376	1.284	4	2	0.12	2
1 1/4"	1.716	1.629	4	2	0.19	2.5
1 1/2"	1.965	1.869	4	2	0.25	2.88
2"	2.456	2.344	6	2.5	0.31	3.62
2 1/2"	2.966	2.844	6	2.5	0.31	4.12
3"	3.596	3.469	6	2.5	0.38	5
3 1/2"	4.096	3.969	6	3	0.38	5.5
4"	4.593	4.469	6	3	0.44	6.19
5"	5.683	5.532	6	3	0.44	7.3
6"	6.743	6.594	8	3.5	0.5	8.5
8"	8.743	8.594	8	4	0.5	10.62
10"	10.913	10.719	8	5	0.5	12.75
12"	12.913	12.719	10	6	0.5	15
14"	14.17	13.969	10	6	0.5	16.25
16"	16.18	15.969	12	6	0.5	18.5
18"	18.19	17.969	12	6	0.5	21
20"	20.24	19.969	12	6	0.5	23
22"	22.24	21.969	12	6	0.5	25.25
24"	24.24	23.969	12	6	0.5	27.25

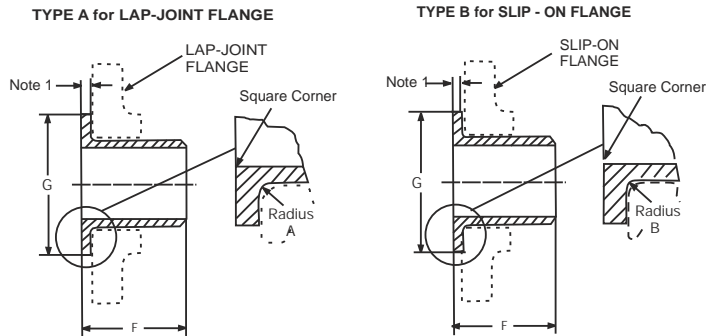
GENERAL NOTES:

- All dimensions are in inches.
- For Tolerance see B/W Fitting tolerances chart
- Service conditions and joint construction often dictate stub end length requirements. Therefore, the purchaser must specify long or short patten fitting when ordering.

NOTES:

- Gasket face finish shall be in accordance with ASME B16.5 for raised face flanges.
- The lap thickness T shall not be less than nominal pipe wall thickness (see B/W Fitting tolerances chart)
- When short pattern stub ends are used with larger flanges in classes 300 and 600, with most sizes in classes 900 and higher, and when long pattern stub ends are used with larger flanges in classes 1500 and 2500, It may be necessary to increase the length of the stub ends in order to avoid covering the weld with the flange. Such increases in length shall be matter of agreement between the Manufacturer and purchaser.
- When special facings such as tongue and groove, male and female, etc., are employed, additional lap thickness must be provided and such additional thickness shall be in addition to (not included in) the basic length F.
- These dimensions conform to the radius established for lap joint flanges in ASME B16.5.
- This dimension conforms to standard machined facings shown in ASME B16.5. The back face of the lap shall be machined to conform to the surface on which it seats. Where ring joint facings are to be applied, use dimension K as given in ASME B16.5.

LAP-JOINT STUB ENDS MSS SP 43



MSS SP 43

Nominal Pipe Size	Outside Diameter at Bevel	Out side Diameter of lap G	Stub Ends		
			Length F*	Radius* of Fillet	
				A - nominal and max	B (max)
1/2	0.84	1.38	2	0.12	0.03
3/4	1.05	1.69	2	0.12	0.03
1	1.32	2	2	0.12	0.03
1 1/4	1.66	2.5	2	0.19	0.03
1 1/2	1.9	2.88	2	0.25	0.03
2	2.38	3.63	2.5	0.31	0.03
2 1/2	2.88	4.13	2.5	0.31	0.03
3	3.5	5	2.5	0.38	0.03
3 1/2	4	5.5	3	0.38	0.03
4	4.5	6.19	3	0.44	0.03
5	5.56	7.31	3	0.44	0.06
6	6.63	8.5	3.5	0.5	0.06
8	8.63	10.62	4	0.5	0.06
10	10.75	12.75	4	0.5	0.06
12	12.75	15	6	0.5	0.06
14	14	16.25	6	0.5	0.06
16	16	18.5	6	0.5	0.06
18	18	21	6	0.5	0.06
20	20	23	6	0.5	0.06
24	24	27.25	6	0.5	0.06

All Dimension are in Inches

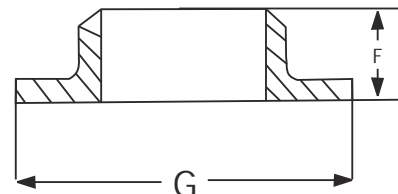
* These lengths and radii for use with Schedule 40S or thinner pipe.

Note 1. The minimum lap thickness shall not be less than nominal pipe wall thickness.

Note 2. Contact faces of stub ends shall have a modified spiral or concentric serration.

PRESSED STUBENDS / WELDING COLLARS

NOMINAL BORE (INCH)	OUTSIDE DIAMETER AT BEVEL	OUT SIDE DIAMETER OF LAP G	HEIGHT 'F'
1/2	0.84	1.38	0.31
3/4	1.05	1.69	0.31
1	1.32	2	0.39
1 1/4	1.66	2.5	0.47
1 1/2	1.9	2.88	0.47
2	2.38	3.63	0.62
2 1/2	2.88	4.13	0.62
3	3.5	5	0.70
3 1/2	4	5.5	0.78
4	4.5	6.19	0.78
5	5.56	7.31	0.98
6	6.63	8.5	0.98
8	8.63	10.62	1.18
10	10.75	12.75	1.37
12	12.75	15	1.57



NOTE : 1) All Dimension are in Inches

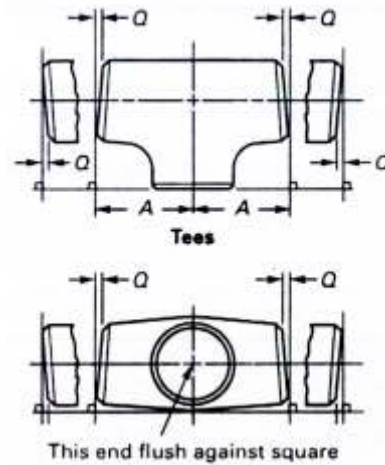
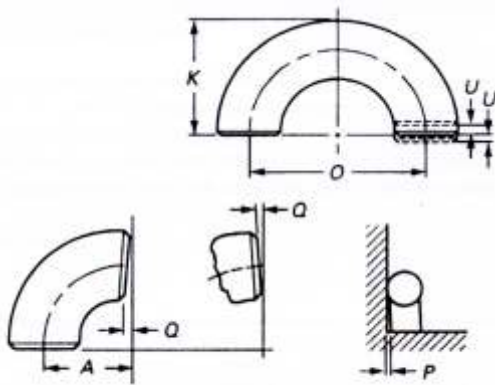
2) Thk as per Sch10S/40S etc.

3) Also can be manufactured in DIN Standard or as per your drawings

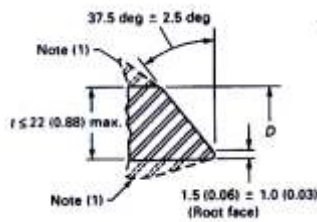
DIMENSIONAL TOLERANCE OF PIPE FITTING ANSI B16.9 / B16.28 / MSS SP - 43

ALL FITTINGS				90°/60°/45° 30° ELBOWS & TEES		REDUCERS & STUBEND		180° RETURNS				CAPS		ANGULARITY TOLERANCE						
Nominal Pipe size INCH/MM	Outside Diameter at Bevel		Inside Dia Meter	Wall Thickness at End		Center to End		Overall Length Dimension		Center to End		Back to Face Dimension		Alignment of End Dimensions		Overall Length		Nominal Pipe Size	Off Angel Inch/mm	Off Plane
	D			T		A,B,C,M		H, F		O		K		U		E			Q	P
	(1) B16.9	MSS SP43	(2) B16.9	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43		B16.9	B16.9
1/2" - 2 1/2" 15 - 65	+1.6 -0.8		+0.8			FROM 1/2" TO 18 15 TO 600	FROM 3/4"	FROM 1/2" - 24" 15 - 600	FROM 1/2" - 8" 15 - 200							±3	±3.17	1/2" - 4" 15 - 100	±1	±2
3" - 3 1/2" 80 - 90	±1.6	±0.80																5" - 8" 125 - 200	±2	±4
4" 100																		±1.6	10" - 12" 250 - 300	±3
5" - 6" 125 - 150	+2.4 -1.6	+1.60 -0.80	±3.2	Not Less Than 87.5% Nominal Thk	Not Less Than 87.5% Nominal Thk													14" - 16" 350 - 400	±3	±7
8" 200																		18" - 24" 450 - 600	±4	±10
10" - 18" 250 - 450	+4 -3.2	+2.38 -0.80				±2.40		±2.38										26" - 30" 650 - 750	±5	±10
20" - 24" 500 - 600	+6.4 -4.8	+3.17 -0.79	±4.8							±10	±10							32" - 42" 800 - 1050	±5	±13
26" - 30" 650 - 750	+6.4 -4.8	+4.8																±3		
32" - 48" 800 - 1200	+6.4 -4.8					±5												42" - 48" 1050 - 1200	±5	±20

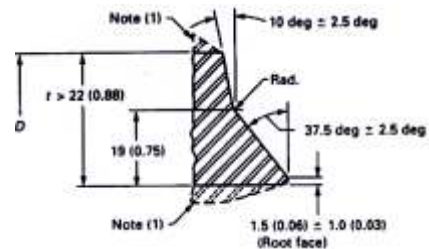
Tolerances



Welding Bevels and Root Face



(a) Plain Bevel



(b) Compound Bevel

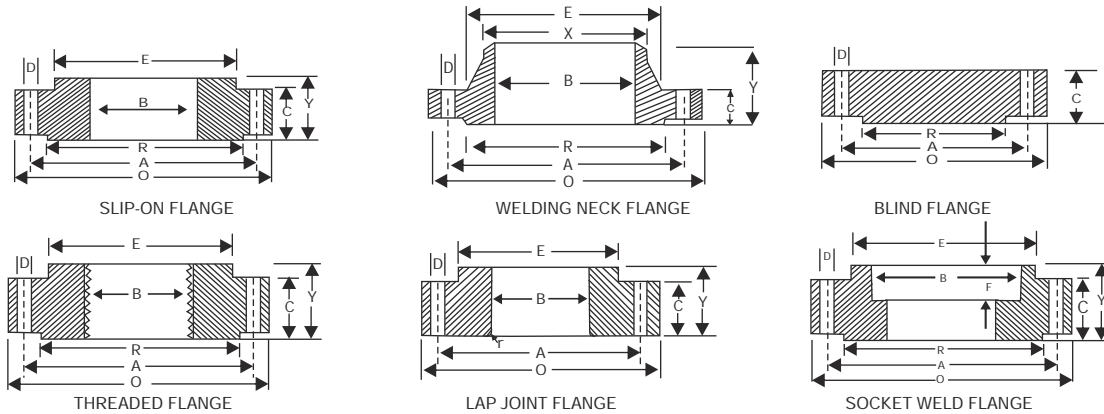
Nominal Wall Thickness

Less than x (Note (2)) x to 22 (0.88), inclusive
More than 22 (0.88)

End Preparation

Cut Square or Slightly Chamfer, at manufacturer's option (not illustrated) Plain as in illustration
(a) above Compound bevel as in illustration (b) above

FLANGES CLASS 150 & 300



DIMENSIONS OF CLASS 150 FLANGES AS PER B16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. Of Bolt Holes D	No. Of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	88.9	60.3	15.9	4	11.1	30.2	15.9	47.6	15.9	22.3	22.9	34.9	9.5	21.33
20	98.4	69.8	15.9	4	12.7	38.1	15.9	52.4	15.9	27.7	28.2	42.9	11.1	26.67
25	107.9	79.4	15.9	4	14.3	49.2	17.5	55.6	17.5	34.5	35.0	50.8	12.7	33.40
32	117.5	88.9	15.9	4	15.9	58.7	20.6	57.1	20.6	43.2	43.7	63.5	14.3	42.16
40	127.0	98.4	15.9	4	17.5	65.1	22.2	61.9	22.2	49.5	50.0	73.0	15.9	48.26
50	152.4	120.6	19.0	4	19.0	77.8	25.4	63.5	25.4	62.0	62.5	92.1	17.5	60.31
65	177.8	139.7	19.0	4	22.2	90.5	28.6	69.8	28.6	74.7	75.4	104.8	19.0	73.02
80	190.5	152.4	19.0	4	23.8	107.9	30.2	69.8	30.2	90.7	91.4	127.0	20.6	88.90
100	228.6	190.5	19.0	8	23.8	134.9	33.3	76.2	33.3	116.1	116.8	157.2	23.8	114.30
125	254.0	215.9	22.2	8	23.8	163.5	36.5	88.9	36.5	143.8	144.5	185.7	23.8	141.30
150	279.4	241.3	22.2	8	25.4	192.1	39.7	88.9	39.7	170.7	171.4	215.9	27.0	168.27
200	342.9	298.4	22.2	8	28.6	246.1	44.4	101.6	44.4	221.5	222.2	269.9	31.7	219.07
250	406.4	361.9	25.4	12	30.2	304.8	49.2	101.6	49.2	276.3	277.4	323.8	33.3	273.05
300	482.6	431.8	25.4	12	31.8	365.1	55.6	114.3	55.6	327.1	328.2	381.0	39.7	323.85
350	533.4	476.2	28.6	12	34.9	400.0	57.1	127.0	79.4	359.1	360.2	412.7	41.3	355.60
400	596.9	539.7	28.6	16	36.5	457.2	63.5	127.0	87.3	410.5	411.2	469.9	44.4	406.40
450	635.0	577.8	31.7	16	39.7	504.8	68.3	139.7	96.8	461.8	462.3	533.4	49.2	457.20
500	698.5	635.0	31.7	20	42.9	558.8	73.0	144.5	103.2	513.1	514.3	584.2	54.0	508.00
600	812.8	749.3	34.9	20	47.6	663.6	82.5	152.4	111.1	615.9	615.9	692.1	63.5	609.60

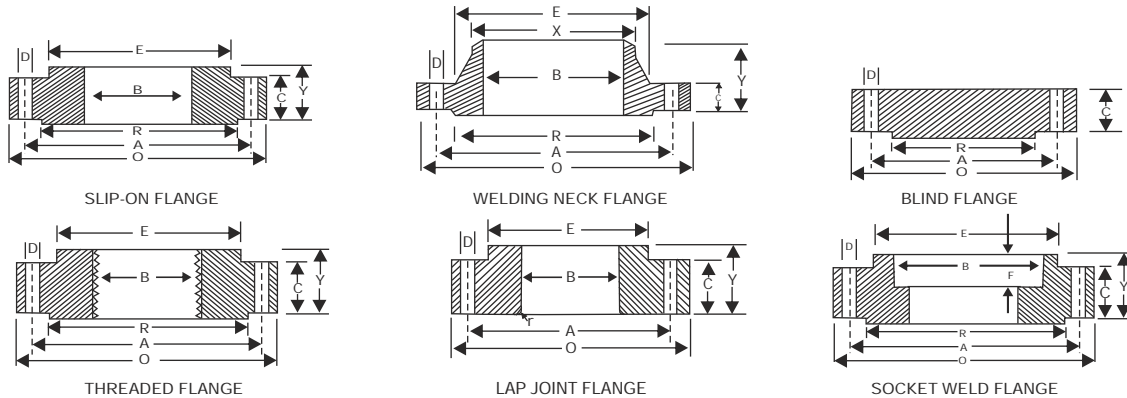
DIMENSIONS OF CLASS 300 FLANGES AS PER B16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. Of Bolt Holes D	No. Of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	95.2	66.7	15.9	4	14.3	38.1	22.2	52.4	22.2	22.3	22.9	34.9	9.5	21.33
20	117.5	82.5	19.0	4	15.9	47.6	25.4	57.1	25.4	27.7	28.2	42.9	11.1	26.67
25	123.8	88.9	19.0	4	17.5	54.0	27.0	61.9	27.0	34.5	35.0	50.8	12.7	33.40
32	133.3	98.4	19.0	4	19.0	63.5	27.0	65.1	27.0	43.2	43.7	63.5	14.3	42.16
40	155.6	114.3	22.2	4	20.6	69.8	30.2	68.3	30.2	49.5	50.0	73.0	15.9	48.26
50	165.1	127.0	19.0	8	22.2	84.1	33.3	69.8	33.3	62.0	62.5	92.1	17.5	60.31
65	190.5	149.2	22.2	8	25.4	100.0	38.1	76.2	38.1	74.7	75.4	104.8	19.0	73.02
80	209.5	168.3	22.2	8	28.6	117.5	42.9	79.4	42.9	90.7	91.4	127.0	20.6	88.90
100	254.0	200.0	22.2	8	31.8	146.0	47.6	85.7	47.6	116.1	116.8	157.2	23.8	114.30
125	279.4	234.9	22.2	8	34.9	177.8	50.8	98.4	50.8	143.8	144.5	185.7	-	141.30
150	317.5	269.9	22.2	12	36.5	206.4	52.4	98.4	52.4	170.7	171.4	215.9	-	168.27
200	381.0	330.2	25.4	12	41.3	260.3	61.9	111.1	61.9	221.5	222.2	269.9	-	219.07
250	444.5	387.3	28.6	16	47.6	320.7	66.7	117.5	95.2	276.3	277.4	323.8	-	273.05
300	520.7	450.8	31.7	16	50.8	374.6	73.0	130.2	101.6	327.1	328.2	381.0	-	323.85
350	584.2	514.3	31.7	20	54.0	425.4	76.2	142.9	111.1	359.1	360.2	412.7	-	355.60
400	647.7	571.5	34.9	20	57.2	482.6	82.5	146.0	120.6	410.5	411.2	469.9	-	406.40
450	711.2	628.5	34.9	24	60.3	533.4	88.9	158.7	130.2	461.8	462.3	533.4	-	457.20
500	774.7	685.8	34.9	24	63.5	587.4	95.2	161.9	139.7	513.1	514.3	584.2	-	508.00
600	914.4	812.8	41.3	24	69.8	701.7	106.4	168.3	152.4	615.9	615.9	692.1	-	609.60

Metric values are direct conversion from Inches table of B16.5

Flanges except Lap Joint will be furnished with (1.6 mm) raised face, Which is included in "Thickness" (C) and Length Through Hub (Y).

FLANGES CLASS 600 & 900



DIMENSIONS OF CLASS 600 FLANGES AS PER B 16.5

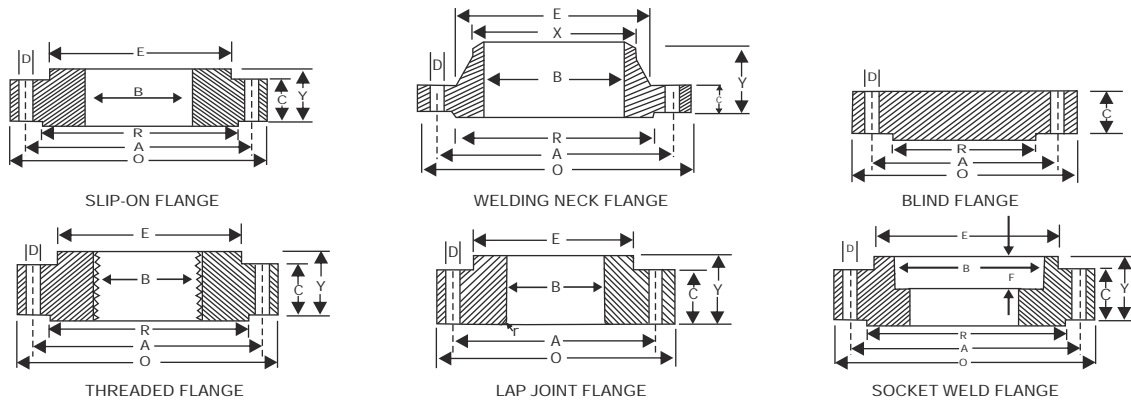
Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
							Y	Y	Y	B	B			
15	95.2	66.7	15.9	4	14.3	38.1	22.2	52.4	22.3	22.3	22.8	34.9	9.5	21.33
20	117.5	82.5	19.0	4	15.9	47.6	25.4	57.1	25.4	27.7	28.1	42.9	11.1	26.67
25	123.8	88.9	19.0	4	17.5	54.0	27.0	61.9	26.9	34.5	35.0	50.8	12.7	33.40
32	133.3	98.4	19.0	4	20.6	63.5	28.6	66.7	28.4	43.2	43.6	63.5	14.2	42.16
40	155.6	114.3	22.2	4	22.2	69.8	31.7	69.8	31.7	49.5	50.0	73.0	15.8	48.26
50	165.1	127.0	19.0	8	25.4	84.1	36.5	73.0	36.5	62.0	62.4	92.1	17.4	60.31
65	190.5	149.2	22.2	8	28.6	100.0	41.3	79.4	41.1	74.7	75.4	104.8	19.0	73.02
80	209.5	168.3	22.2	8	31.8	117.5	46.0	82.5	45.9	90.7	91.4	127.0	-	88.90
100	273.0	215.9	25.4	8	38.1	152.4	54.0	101.6	53.8	116.1	116.8	157.1	-	114.30
125	330.2	266.7	28.6	8	44.4	188.9	60.3	114.3	60.4	143.8	141.5	185.7	-	141.30
150	355.6	292.1	28.6	12	47.6	222.2	66.7	117.5	66.5	170.7	171.4	215.9	-	168.27
200	419.1	349.2	31.7	12	55.6	273.0	76.2	133.3	76.2	221.5	222.2	269.9	-	219.07
250	508.0	431.8	34.9	16	63.5	342.9	85.7	152.4	111.2	276.3	277.3	323.8	-	273.05
300	558.8	488.9	34.9	20	66.7	400.0	92.1	155.6	117.3	327.1	328.1	381.0	-	323.85
350	603.2	527.0	38.1	20	69.9	431.8	93.7	165.1	127.0	359.1	360.1	412.7	-	355.60
400	685.8	603.2	41.3	20	76.2	495.3	106.4	177.8	139.7	410.5	411.2	469.9	-	406.40
450	742.9	654.0	44.4	20	82.6	546.1	117.5	184.1	152.4	461.8	462.2	533.4	-	457.20
500	812.8	723.9	44.4	24	88.9	609.6	127.0	190.5	165.1	513.1	514.3	584.2	-	508.00
600	939.8	838.2	50.8	24	101.6	717.5	139.7	203.2	184.1	615.9	615.9	692.1	-	609.60

DIMENSIONS OF CLASS 900 FLANGES AS PER B 16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
							Y	Y	Y	B	B			
15	120.6	82.5	22.2	4	22.2	38.1	31.7	60.3	31.7	22.3	22.8	34.9	9.5	21.33
20	130.2	88.9	22.2	4	25.4	44.4	34.9	69.8	35.0	27.7	28.1	42.9	11.1	26.67
25	149.2	101.6	25.4	4	28.6	52.4	41.3	73.0	41.1	34.5	35.0	50.8	12.7	33.40
32	158.7	111.1	25.4	4	28.6	63.5	41.3	73.0	41.1	43.2	43.6	63.5	14.2	42.16
40	177.8	123.8	28.6	4	31.8	69.8	44.4	82.5	44.4	49.5	50.0	73.0	15.8	48.26
50	215.9	165.1	25.4	8	38.1	104.8	57.1	101.6	57.1	62.0	62.4	92.1	17.4	60.31
65	244.5	190.5	28.6	8	41.3	123.8	63.5	104.8	63.5	74.7	75.4	104.8	19.0	73.02
80	241.3	190.5	25.4	8	38.1	127.0	53.9	101.6	53.8	90.7	91.4	127.0	-	88.90
100	292.1	234.9	31.7	8	44.4	158.7	69.8	114.3	69.8	116.0	116.8	157.1	-	114.30
125	349.2	279.4	35.0	8	50.8	190.5	79.3	127.0	79.2	143.7	114.5	185.7	-	141.30
150	381.0	317.5	31.7	12	55.6	234.9	85.8	139.7	85.8	170.6	171.4	215.9	-	168.27
200	469.9	393.7	38.1	12	63.5	298.4	101.6	162.0	114.3	221.4	222.2	269.9	-	219.07
250	546.1	469.9	38.1	16	69.8	368.3	107.9	184.1	127.0	276.3	277.3	323.8	-	273.05
300	609.6	533.4	38.1	20	79.3	419.1	117.4	200.0	142.7	327.1	328.1	381.0	-	323.85

Metric values are direct conversion from Inches table of B16.5
RF Thickness 6.3 mm Extra to be provided (Except Lap Joint Flange & FF Flanges).

FLANGES CLASS 1500 & 2500



DIMENSIONS OF CLASS 1500 FLANGES AS PER B16.5

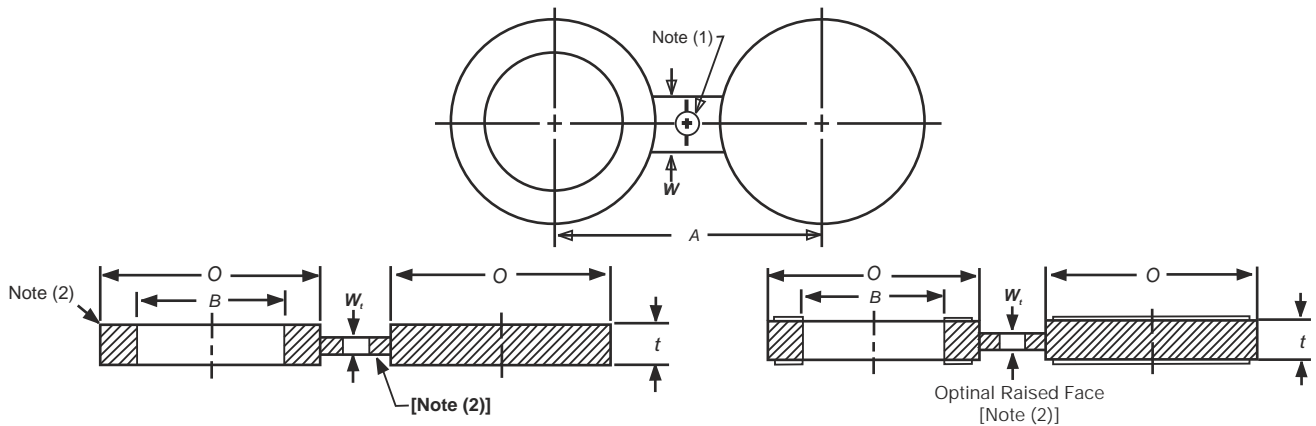
Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. Of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	120.6	82.5	22.2	4	22.2	38.1	31.7	60.3	31.7	22.3	22.8	34.9	9.5	21.33
20	130.2	88.9	22.2	4	25.4	44.4	34.9	69.8	34.9	27.7	28.1	42.9	11.1	26.67
25	149.2	101.6	25.4	4	28.6	52.4	41.3	73.0	41.3	34.5	35.0	50.8	12.7	33.40
32	158.7	111.1	25.4	4	28.6	63.5	41.3	73.0	41.3	43.2	43.6	63.5	14.2	42.16
40	177.8	123.8	28.6	4	31.8	69.8	44.4	82.5	44.4	49.5	50.0	73.0	15.8	48.26
50	215.9	165.1	25.4	8	38.1	104.8	57.1	101.6	57.1	62.0	62.0	92.1	17.4	60.31
65	244.5	190.5	28.6	8	41.3	123.8	63.5	104.8	63.5	74.7	75.4	104.8	19.0	73.02
80	266.7	203.2	31.7	8	47.6	133.3	73.0	117.5	73.0	90.7	91.4	127.0	-	88.90
100	311.1	241.3	34.9	8	54.0	161.9	90.5	123.0	90.4	116.1	116.8	157.2	-	114.30
125	374.6	292.1	41.3	8	73.0	196.8	104.8	155.6	104.8	143.8	144.5	185.7	-	141.30
150	393.7	317.5	38.1	12	82.6	228.6	119.1	171.4	119.1	170.7	171.4	215.9	-	168.27
200	482.6	393.7	44.4	12	92.1	292.1	142.9	212.7	142.8	221.5	222.2	269.9	-	219.07
250	584.2	482.6	50.8	12	107.9	368.3	158.7	254.0	177.8	276.3	277.3	323.8	-	273.05
300	673.1	571.5	54.0	16	123.8	450.8	181.0	285.5	218.9	327.1	328.1	381.0	-	323.85

DIMENSIONS OF CLASS 2500 FLANGES AS PER B16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. Of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	133.3	88.9	22.2	4	30.2	42.9	39.7	73.0	39.7	22.3	22.3	34.9	-	21.33
20	139.7	95.2	22.2	4	31.7	50.8	42.9	79.4	42.9	27.7	27.7	42.9	-	26.67
25	158.7	107.9	25.4	4	34.9	57.1	47.7	88.9	47.7	34.5	34.5	50.8	-	33.40
32	184.1	130.2	28.6	4	38.1	73.0	52.4	95.2	52.4	43.2	43.2	63.5	-	42.16
40	203.2	146.0	31.7	4	44.4	79.4	60.3	111.1	60.3	49.5	49.5	73.0	-	48.26
50	234.9	171.4	28.6	8	50.8	95.2	69.8	127.0	69.8	62.4	62.0	92.1	-	60.31
65	266.7	196.8	31.7	8	57.1	114.3	79.4	142.9	79.4	74.7	74.7	104.8	-	73.02
80	304.8	228.6	34.9	8	66.7	133.3	92.1	168.3	92.1	90.7	90.7	127.0	-	88.90
100	355.6	273.0	41.3	8	76.2	165.1	107.9	190.5	107.9	116.1	116.1	157.2	-	114.30
125	419.1	323.8	47.6	8	92.1	203.2	130.0	228.6	130.0	143.8	143.8	185.7	-	141.30
150	482.6	368.3	54.0	8	107.9	234.9	152.4	273.0	152.4	170.7	170.7	215.9	-	168.27
200	552.4	438.1	54.0	12	127.0	304.8	177.8	317.5	177.8	221.5	221.5	269.9	-	219.07
250	673.1	539.7	66.7	12	165.1	374.6	228.6	419.1	228.6	276.3	276.3	323.8	-	273.05
300	762.0	619.1	73.0	12	184.1	441.3	254.0	463.5	254.0	327.1	327.1	381.0	-	323.85

Metric values are direct conversion from Inches table of B16.5
RF Thickness 6.3 mm Extra to be provided (Except Lap Joint Flange & FF Flanges).

SPECTACLE BLANKS / FIGURE 8 / SPACER & BLANKS (B16.48)



CLASS 150					
NPS	Inside Diameter B	Outside Diameter O	Centerline Dimension A	Thickness t	Web Width W
1/2	0.62	1.75	2.38	0.12	1.50
3/4	0.82	2.12	2.75	0.12	1.50
1	1.05	2.50	3.12	0.12	1.50
1 1/4	1.66	2.88	3.50	0.25	1.50
1 1/2	1.90	3.25	3.88	0.25	1.50
2	2.38	4.00	4.75	0.25	2.00
2 1/2	2.88	4.75	5.50	0.25	2.00
3	3.50	5.25	6.00	0.25	2.50
3 1/2	4.00	6.25	7.00	0.38	2.50
4	4.50	6.75	7.50	0.38	2.50
5	5.56	7.62	8.50	0.38	3.00
6	6.62	8.62	9.50	0.50	3.00
8	8.62	10.88	11.75	0.50	3.00
10	10.75	13.25	14.25	0.62	4.00
12	12.75	16.00	17.00	0.75	4.00
14	14.00	17.62	18.75	0.75	4.25
16	16.00	20.12	21.25	0.88	4.25
18	18.00	21.50	22.75	1.00	4.50
20	20.00	23.75	25.00	1.12	4.75
24	24.00	28.12	29.50	1.25	5.50

CLASS 300					
NPS	Inside Diameter B	Outside Diameter O	Centerline Dimension A	Thickness t	Web Width W
1/2	0.62	2.00	2.62	0.25	1.50
3/4	0.82	2.50	3.25	0.25	1.50
1	1.05	2.75	3.50	0.25	1.50
1 1/4	1.66	3.12	3.88	0.25	1.50
1 1/2	1.90	3.62	4.50	0.25	1.50
2	2.38	4.25	5.00	0.38	2.00
2 1/2	2.88	5.00	5.88	0.38	2.00
3	3.50	5.75	6.62	0.38	2.50
3 1/2	4.00	6.38	7.25	0.50	2.50
4	4.50	7.00	7.88	0.50	2.50
5	5.56	8.38	9.25	0.62	3.00
6	6.62	9.75	10.62	0.62	3.00
8	8.62	12.00	13.00	0.88	3.00
10	10.75	14.12	15.25	1.00	4.00
12	12.75	16.50	17.75	1.12	4.00
14	14.00	19.00	20.25	1.25	4.25
16	16.00	21.12	22.50	1.50	4.25
18	18.00	23.38	24.75	1.62	4.50
20	20.00	25.62	27.00	1.75	4.75
24	24.00	30.38	32.00	2.00	5.50

CLASS 600					
NPS	Inside Diameter B	Outside Diameter O	Centerline Dimension A	Thickness t	Web Width W
1/2	0.62	2.00	2.62	0.25	1.50
3/4	0.82	2.50	3.25	0.25	1.50
1	1.05	2.75	3.50	0.25	2.25
1 1/4	1.44	3.12	3.88	0.38	2.25
1 1/2	1.68	3.62	4.50	0.38	2.62
2	2.16	4.25	5.00	0.38	2.25
2 1/2	2.64	5.00	5.88	0.50	2.62
3	3.26	5.75	6.62	0.50	2.62
3 1/2	3.76	6.25	7.25	0.62	3.00
4	4.26	7.50	8.50	0.62	3.00
5	5.30	9.38	10.50	0.75	3.38
6	6.36	10.38	11.50	0.88	3.38
8	8.33	12.50	13.75	1.12	3.75
10	10.42	15.62	17.00	1.38	4.12
12	12.39	17.88	19.25	1.62	4.12
14	13.62	19.25	20.75	1.75	4.50
16	15.62	22.12	23.75	2.00	4.88
18	17.62	24.00	25.75	2.12	5.25
20	19.56	26.75	28.50	2.50	5.25
24	23.50	31.00	33.00	2.88	6.00

CLASS 900					
NPS	Inside Diameter B	Outside Diameter O	Centerline Dimension A	Thickness t	Web Width W
1/2	0.62	2.38	3.25	0.25	1.50
3/4	0.82	2.62	3.50	0.25	1.62
1	1.05	3.00	4.00	0.25	2.25
1 1/4	1.44	3.38	4.38	0.38	2.25
1 1/2	1.68	3.75	4.88	0.38	2.62
2	2.16	5.50	6.50	0.50	2.25
2 1/2	2.64	6.38	7.50	0.50	2.62
3	3.26	6.50	7.50	0.62	2.62
4	4.26	8.00	9.25	0.75	3.00
5	5.30	9.62	11.00	0.88	3.38
6	6.36	11.25	12.50	1.00	3.38
8	8.33	14.00	15.50	1.38	3.75
10	10.42	17.00	18.50	1.62	4.12
12	12.39	19.50	21.00	1.88	4.12
14	13.62	20.38	22.00	2.12	4.50
16	15.62	22.50	24.25	2.38	4.88
18	17.62	25.00	27.00	2.62	5.25
20	19.56	27.38	29.50	2.88	5.25
24	23.50	32.88	35.50	3.50	6.00

- NOTES:** 1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole and located such that it will not interfere with bolting between two flanges.
 2) Optional raised face to be mentioned by purchaser.
 3) The handle or web (tie bar) may be integral or attached to the line blank or spacer.
 4) The thickness of the web (or tie bar) dimension, Wt, shall be as determined as it shall be capable of supporting the weight of the blank or spacer in all orientations without permanent deformation of web.

Dimension of other Classes & RTJ Flanges on request



Flanges Types & Specifications

ASME/ANSI B16.5	:	Welding Neck Flange, Slipon Flanges, Blind Flange, High Hub Blind Flange, Socket Weld Flange, Lap Joint Flange, Threaded Flange, Ring Type Joint Flange
Pressure Class	:	150, 300, 400, 600, 900, 1500, 2500
ASME/ANSI B16.47	:	Welding Neck Flange, Blind Flange (Series A&B)
Pressure Class	:	75, 150, 300, 400, 600, 900
ASME/ANSI B16.36	:	(ORIFICE FLANGES) WELDING NECK FLANGE, SLIPON FLANGE, THREADED FLANGE)
Pressure Class	:	300, 400, 600, 900, 1500, 2500
BS 4504 SEC 3.1	:	Welding Flange (111/134), Hubbed Slipon Flange (112), Hubbed Threaded Flange (113), Lapped Pipe End Flange (133), Plate Flange (101), Loose Plate Flange (102), Loose Plate with Weld-neck Flange (104), Blank Flange (105)
Pressure Class	:	Pn2.5 to Pn 100
Din Flanges	:	DIN2527, DIN2566, DIN2573, DIN2576, DIN2641, DIN2642, DIN2655, DIN2656, DIN2627, DIN2628, DIN2629, DIN2631, DIN2632, DIN2633, DIN2634, DIN2635, DIN2636, DIN2637, DIN2638, Dn2673
Pressure Class	:	PN 6 to PN 100
ANFOR NFE 29-230	:	Plate Flange (01), loose Plate Flange (02, 03, 04), Blind Flange (05) Welding Neck flange (11), Hubbed Slip on Flange (12), Screwed Flange (13), Hubbed Socket Welding Flange (14), Loose Hubbed Flange (15) Integral Flange (21)
Pressure Class	:	Iso-Pn 2.5 to Pn 40
Pr EN 1092-1 Flanges	:	Plate Flange (01), Loose Plate Flange (02, 04), Blind Flange (05) Welding Neck flange (11), Hubbed Slip on Flange (12), Screwed Flange (13), Integral Flange (21)
Pressure Class	:	Pn2.5 to Pn 100
BS TABLE FLANGES	:	Slipon & Blind
Type	:	D, E, F, H etc.

All the above Dimensions are Available on request.

SOCKET WELDING FITTINGS

B16.11

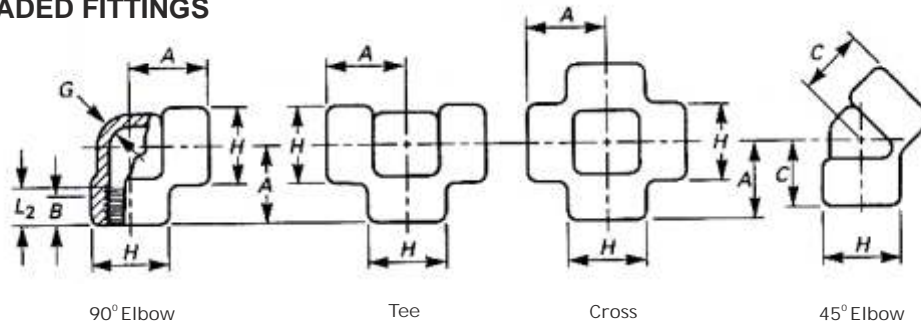
Nom. Pipe Size	Socket Bore Dia. (2)	Bore Diameter of Fittings (2)	Socket Wall Thickness (1)			Body Wall G			Depth of Socket J			Center to Bottom of Socket - A			Laying Lengths		Tolerances ±		End Wall Thickness K _{min}		
			Class Designation			Class Designation			Class Designation			Class Designation			Couplings E	Half Couplings F	A	E	F	Class Designation	
			3000	6000	9000	3000	6000	9000	3000	6000	9000	3000	6000	9000						3000	6000
			Ave	Min.	Ave	Min.	Ave	Min.	Min.	Min.	Min.	Min.	Min.	Min.	Min.	Min.	Min.	Min.	Min.	Min.	Min.
1/8	0.440 0.420	0.299 0.239	0.189 0.126	0.125	0.156	0.135	0.095	0.124	0.38	0.44	0.44	0.31	0.31	0.25	0.62	0.03	0.06	0.03	0.19	0.25	
																					0.149
1/4	0.575 0.555	0.394 0.334	0.280 0.220	0.149	0.130	0.181	0.158	0.119	0.145	0.38	0.44	0.53	0.31	0.31	0.25	0.62	0.06	0.12	0.06	0.19	0.25
3/8	0.710 0.690	0.523 0.463	0.389 0.329	0.184	0.161	0.235	0.204	0.147	0.188	0.38	0.62	0.75	1.00	0.44	0.50	0.62	0.06	0.12	0.06	0.25	0.38
1/2	0.875 0.855	0.652 0.592	0.494 0.434	0.224	0.196	0.312	0.273	0.179	0.250	0.50	0.88	1.06	1.25	0.56	0.69	0.81	0.08	0.16	0.08	0.25	0.38
3/4	1.085 1.065	0.854 0.794	0.642 0.464	0.239	0.208	0.312	0.273	0.191	0.250	0.50	1.06	1.25	1.38	0.69	0.81	0.88	0.08	0.16	0.08	0.25	0.38
1	1.350 1.330	1.094 1.019	0.845 0.569	0.250	0.218	0.351	0.307	0.200	0.281	0.50	1.25	1.50	1.50	0.81	1.00	1.00	0.08	0.16	0.08	0.25	0.38
1 1/4	1.695 1.675	1.410 1.190	0.926 0.866	0.273	0.238	0.418	0.478	0.191	0.250	0.50	1.06	1.25	1.38	0.81	1.00	1.00	0.08	0.16	0.08	0.25	0.38
1 1/2	1.935 1.915	1.640 1.368	1.130 1.070	0.307	0.276	0.477	0.545	0.218	0.344	0.62	1.50	1.62	2.12	1.00	1.12	1.12	0.08	0.16	0.08	0.25	0.38
2	2.426 2.406	2.097 2.037	1.533 1.473	0.345	0.302	0.545	0.62	0.344	0.436	0.62	1.50	1.62	2.12	1.00	1.12	1.12	0.08	0.16	0.08	0.25	0.38
2 1/2	2.931 2.906	2.529 2.409	1.812 1.742	0.375	0.327	0.62	0.75	0.75	0.75	0.75	1.69	1.75	2.25	1.25	1.38	1.38	0.10	0.20	0.10	0.25	0.38
3	3.560 3.535	3.128 3.008	2.250 2.180	0.421	0.368	0.75	0.88	0.88	0.88	0.88	2.62	2.75	3.66	2.62	2.75	2.75	0.10	0.20	0.10	0.25	0.38
4	4.570 4.545	4.086 3.966	3.366 3.246	0.421	0.368	0.88	1.12	1.12	1.12	1.12	3.66	3.96	5.12	3.96	4.21	4.21	0.10	0.20	0.10	0.25	0.38

General Note : Dimensions are in inches

Note :

- (1) Average of socket wall Thickness around periphery shall be no less than listed. The minimum value are permitted in localized areas
- (2) Upper and lower values for each size are the respective maximum and minimum dimensions.

FORGED THREADED FITTINGS



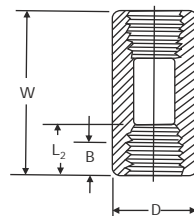
B16.11

Nominal Pipe Size	Center to End Elbows, Tees, Crosses A			Center to End 45° Elbow C			Outside Diameter of Bend H			Minimum Wall Thickness G			Length of Thread Min (1)	
	2000	3000	6000	2000	3000	6000	2000	3000	6000	2000	3000	6000	B	L ₂
1/8	0.81	0.81	0.97	0.69	0.69	0.75	0.88	0.88	1.00	0.125	0.125	0.250	0.25	0.2639
1/4	0.81	0.97	1.12	0.69	0.75	0.88	0.88	1.00	1.31	0.125	0.130	0.260	0.32	0.4018
3/8	0.97	1.12	1.31	0.75	0.88	1.00	1.00	1.31	1.50	0.125	0.138	0.275	0.36	0.4078
1/2	1.12	1.31	1.50	0.88	1.00	1.12	1.31	1.50	1.81	0.125	0.161	0.321	0.43	0.5337
3/4	1.31	1.50	1.75	1.00	1.12	1.31	1.50	1.81	2.19	0.125	0.170	0.336	0.50	0.5457
1	1.50	1.75	2.00	1.12	1.31	1.38	1.81	2.19	2.44	0.145	0.196	0.391	0.58	0.6828
1 1/4	1.75	2.00	2.38	1.31	1.38	1.69	2.19	2.44	2.97	0.153	0.208	0.417	0.67	0.7068
1 1/2	2.00	2.38	2.50	1.38	1.69	1.72	2.44	2.97	3.31	0.158	0.219	0.436	0.70	0.7235
2	2.38	2.50	3.25	1.69	1.72	2.06	2.97	3.31	4.00	0.168	0.281	0.476	0.75	0.7565
2 1/2	3.00	3.25	3.75	2.06	2.06	2.50	3.62	4.00	4.75	0.221	0.301	0.602	0.93	1.138
3	3.38	3.75	4.19	2.50	2.50	3.12	4.31	4.75	5.75	0.236	0.348	0.655	1.02	1.200
4	4.19	4.50	4.50	3.12	3.12	3.12	5.75	6.00	6.00	0.258	0.440	0.735	1.09	1.300

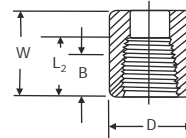
General Note : Dimensions are in inches

Note : 1) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L₂ (effective length of external thread) required by American National Standard for Pipe Threads (ANSI/ASME B1.20.1).

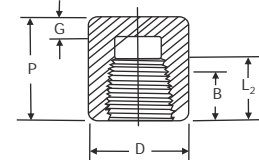
COUPLINGS & CAPS



Coupling



Half-Coupling



Cap

B16.11

Nominal Pipe Size	End to End Couplings W	End to End Caps P		Outside Diameter D		End Wall Thickness G Min.		Length of Thread Min (2)	
	3000 & 6000	3000	6000	3000	6000	3000	6000	B	L ₂
1/8	1.25	0.75	1.06	0.62	0.88	0.19	0.25	0.25	0.2639
1/4	1.38	1.00	1.06	0.75	1.00	0.19	0.25	0.32	0.4018
3/8	1.50	1.00	1.06	0.88	1.25	0.19	0.25	0.36	0.4078
1/2	1.88	1.25	1.31	1.12	1.50	0.25	0.31	0.43	0.5337
3/4	2.00	1.44	1.50	1.38	1.75	0.25	0.31	0.50	0.5457
1	2.38	1.62	1.69	1.75	2.25	0.38	0.44	0.58	0.6828
1 1/4	2.62	1.75	1.81	2.25	2.50	0.38	0.44	0.67	0.7068
1 1/2	3.12	1.75	1.88	2.50	3.00	0.44	0.50	0.70	0.7235
2	3.38	1.88	2.00	3.00	3.62	0.50	0.62	0.75	0.7565
2 1/2	3.62	2.38	2.50	3.62	4.25	0.62	0.75	0.93	1.138
3	4.25	2.56	2.6	4.25	5.00	0.75	0.88	1.02	1.200
4	4.75	2.69	2.94	5.50	6.25	0.88	1.12	1.09	1.300

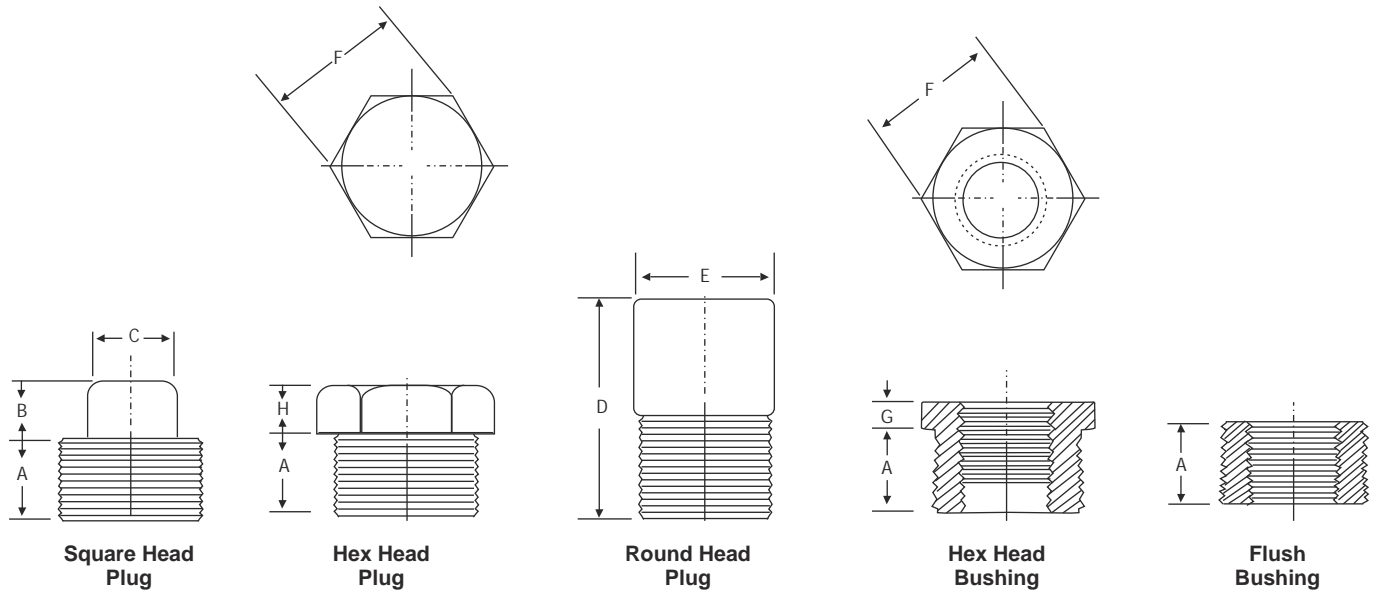
General Note : Dimensions are in inches

Note : 1) Class 2000 and NPS 1/8 Class 6000 couplings, half couplings, and caps are not included in this Standard.

2) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat Crests) shall not be less than L₂ (effective length of external thread) required by American National Standard for pipe Threads (ANSI/ASME B1.20.1)

DIMENSIONS OF STREET ELBOW & WELDING BOSS ON REQUEST

PLUGS AND BUSHINGS



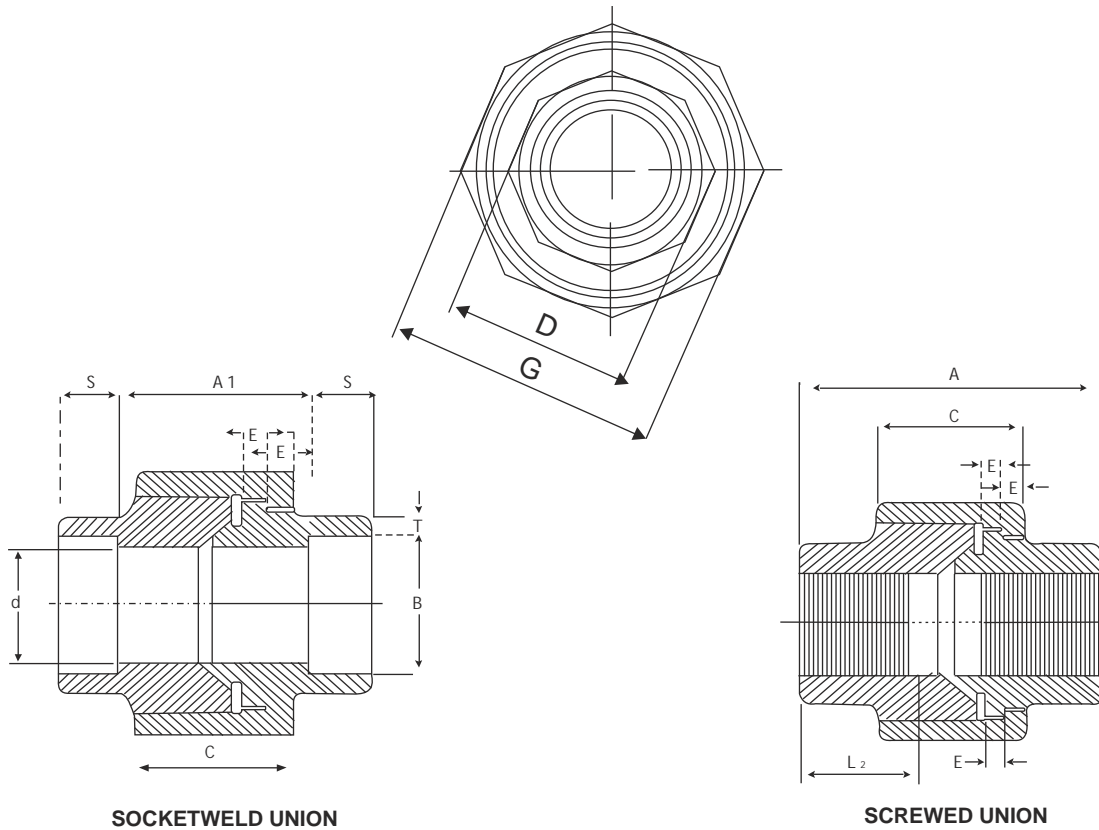
B16.11

Nominal Pipe Size	Length (Minimum) A	Plugs Square Head		Plugs Round Head		Hex Plugs & Bushings		
		Height of Square (Minimum) B	Width Flats (Minimum) C	Nominal Diameter of Head E	Length (Minimum) D	Width Flats (Nominal) F	Hex Height (Min.)	
							Bushing G	Plug H
1/8	0.38	0.25	0.28	0.41	1.38	0.44	—	0.25
1/4	0.44	0.25	0.38	0.53	1.62	0.62	0.12	0.25
3/8	0.50	0.31	0.44	0.69	1.62	0.69	0.16	0.31
1/2	0.56	0.38	0.56	0.84	1.75	0.88	0.19	0.31
3/4	0.62	0.44	0.62	1.06	1.75	1.06	0.22	0.38
1	0.75	0.50	0.81	1.31	2.00	1.38	0.25	0.38
1 1/4	0.81	0.56	0.94	1.69	2.00	1.75	0.28	0.56
1 1/2	0.81	0.62	1.12	1.91	2.00	2.00	0.31	0.62
2	0.88	0.69	1.31	2.38	2.50	2.50	0.34	0.69
2 1/2	1.06	0.75	1.50	2.88	2.75	3.00	0.38	0.75
3	1.12	0.81	1.69	3.50	2.75	3.50	0.41	0.81
4	1.25	1.00	2.50	4.50	3.00	4.62	0.50	1.00

General Note : Dimensions are in inches

Note : 1) Cautionary Note Regarding Hex Head Bushings. Hex Head Bushings of one-size reduction not be used in services wherein they might be subject to harmful loads and forces other than internal pressures.

SOCKETWELD & SCREWED UNION



SOCKETWELD UNION

SCREWED UNION

BS 3799

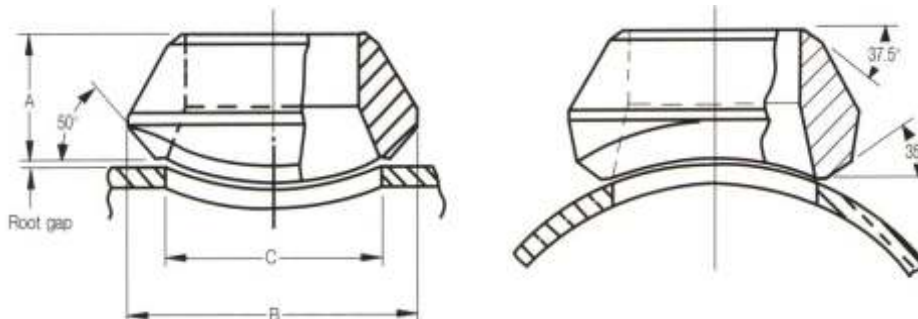
Nominal Size		3000 lbs.									Depth of Socket (min) S	Socket wall thickness (min) T
		End to End A	Width Union nut (min.) G	Height of Union nut (min.) C	Width A/F of ends (min.) D	Thickness of shoulder (min.) E	Length of thread (min.) L ₂	Distance between bottoms of Socket (min) A1	Bore diameter of Sockets (Min) B	Bore diameter of Union d		
Inches	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1/8	(6)	40	32	16	17	3.2	6.70	17	10.7	6.8	10	3.2
1/4	(8)	43	32	18	19	3.2	10.21	17	14.1	9.2	10	3.3
3/8	(10)	48	36	19	22	3.2	10.36	17	17.6	12.5	10	3.5
1/2	(15)	51	43	21	30	4.0	13.56	18	21.8	15.5	10	4.1
3/4	(20)	57	50	24	36	4.8	13.86	20	27.4	21.0	13	4.3
1	(25)	64	60	25	41	4.8	17.34	26	34.1	26.5	13	5.0
1 1/4	(32)	70	70	29	50	5.6	17.93	28	42.9	35.0	13	5.3
1 1/2	(40)	79	78	30	60	5.6	18.38	30	49.0	40.5	13	5.6
2	(50)	89	95	37	70	6.4	19.22	36	61.0	52.0	16	6.1
2 1/2	(65)	118	125	48	85	9.6	28.89	57	73.8	62.0	16	7.7
3	(80)	121	140	51	100	12.7	30.48	70	89.7	78.0	16	8.3

All Dimensions are in millimeters (mm)

NOTE : Other external forms of nut & ends are permissible provided the minimum dimensions shown in this table are maintained.
Bore diameter of Sockets corresponds to schedule 40 pipe, subject to tolerance.

Welding Outlet

STD(Sch40), XS(Sch 80)

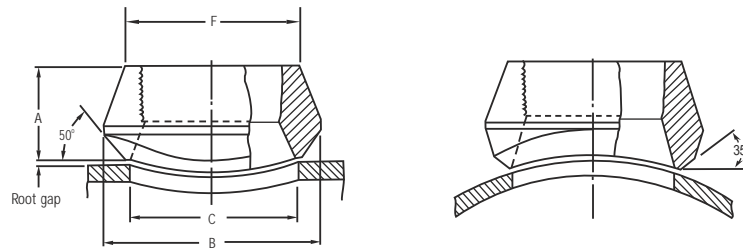


MSS SP 97

Outlet Size	A		B		C	
	STD	XS	STD	XS	STD	XS
1/2	19.1	19.1	34.9	34.9	23.8	23.8
3/4	22.2	22.2	44.5	44.5	30.2	30.2
1	27.0	27.0	54.0	54.0	36.5	36.5
1 1/4	31.8	31.8	65.1	65.1	44.5	44.5
1 1/2	33.3	33.3	73.0	73.0	50.8	50.8
2	38.1	38.1	88.9	88.9	65.1	65.1
2 1/2	41.3	41.3	103.2	103.2	76.2	76.2
3	44.5	44.5	122.2	122.2	93.7	93.7
4	50.8	50.8	152.4	152.4	120.7	120.7
5	57.2	57.2	179.4	179.4	141.3	141.3
6	60.3	77.8	215.9	225.4	169.9	169.9
8	69.9	98.5	263.5	292.1	220.7	220.7
10	77.8	93.7	322.3	323.9	274.7	265.1
12	85.7	103.2	377.8	379.4	325.4	317.5
14	88.9	100.0	409.6	431.8	357.2	350.8
16	93.7	106.4	463.6	466.7	408.0	403.2
18	96.8	111.1	520.7	523.9	458.8	455.6
20	101.6	119.1	571.5	582.6	508.0	509.6
24	115.9	139.7	689.0	708.0	614.4	638.2
26	119.1	146.1	738.2	765.2	666.8	692.2

All Dimensions are in millimeters (mm)

Socketweld Outlet 3000# 6000#



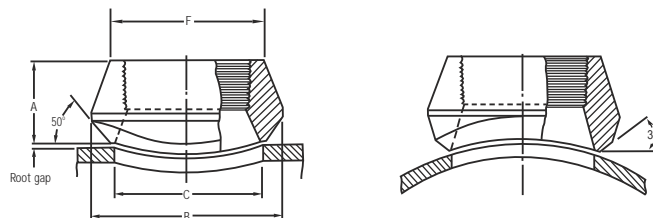
MSS SP 97

Outlet Size	A		B		C	
	3000#	6000#	3000#	6000#	3000#	6000#
1/2	25.4	31.8	34.9	44.5	23.8	19.1
3/4	27.0	36.5	44.5	50.8	30.2	25.4
1	33.3	39.7	54.0	61.9	36.5	33.3
1 1/4	33.3	41.3	65.1	69.9	44.5	38.1
1 1/2	34.9	42.9	73.0	82.6	50.8	49.2
2	38.1	58.7	88.9	103.2	65.1	58.7
2 1/2	46.0	-	103.2	-	76.2	-
3	50.8	-	122.2	-	93.7	-
4	57.2	-	152.4	-	120.7	-

All Dimensions are in millimeters (mm)

Threaded Outlet

3000# 6000#

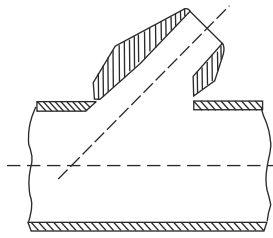


MSS SP 97

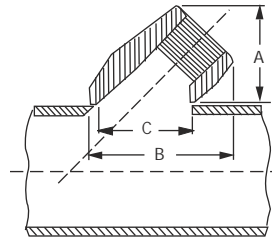
Outlet Size	A		B		C	
	3000#	6000#	3000#	6000#	3000#	6000#
1/2	25.4	31.8	34.9	44.5	23.8	19.1
3/4	27.0	36.5	44.5	50.8	30.2	25.4
1	33.3	39.7	54.0	61.9	36.5	33.3
1 1/4	33.3	41.3	65.1	69.9	44.5	38.1
1 1/2	34.9	42.9	73.0	82.6	50.8	49.2
2	38.1	52.4	88.9	103.2	65.1	69.9
2 1/2	46.0	-	103.2	-	76.2	-
3	50.8	-	122.2	-	93.7	-
4	57.2	-	152.4	-	120.7	-

All Dimensions are in millimeters (mm)

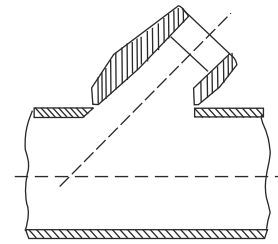
LATERAL OUTLET



BUTT - WELD



THREADED



SOCKET - WELD

MSS SP 97

Nominal Run Pipe Size Inches	Outlet Size Inches	DIMENSIONS					
		3000 # Threaded and Socket Weld Std. and XS Butt-Weld			6000# Threaded and Socket Weld Sch. 160 and XXS Butt Weld		
		A	B	C	A	B	C
2 ^{1/2} - 1 ^{1/4} 12 - 3	1/4	1 ^{9/16}	2 ^{5/16}	1 ^{7/16}	1 ^{9/16}	2 ^{5/16}	1 ^{7/16}
2 ^{1/2} - 1 ^{1/4} 12 - 3	3/8	1 ^{9/16}	2 ^{5/16}	1 ^{7/16}	1 ^{9/16}	2 ^{5/16}	1 ^{7/16}
2 ^{1/2} - 1 ^{1/4} 12 - 3	1/2	1 ^{9/16}	2 ^{5/16}	1 ^{7/16}			
1 ^{1/2} - 1 ^{1/4} 5 - 2 12 - 6	1/2				1 ^{13/16}	2 ^{3/4}	1 ^{3/4}
1 ^{1/2} - 1 ^{1/4} 5 - 2 12 - 6	3/4	1 ^{13/16}	2 ^{3/4}	1 ^{3/4}			
2 ^{1/2} - 2 5 - 3 12 - 6	3/4				2 ^{1/8}	3 ^{1/4}	2 ^{1/8}
2 ^{1/2} - 2 5 - 3 12 - 6	1	2 ^{1/8}	3 ^{1/4}	2 ^{1/8}	2 ^{1/2}	3 ^{13/16}	2 ^{5/8}
2 ^{1/2} - 2 5 - 3 12 - 6	1 ^{1/4}	2 ^{1/2}	3 ^{13/16}	2 ^{5/8}	2 ^{3/4}	4 ^{1/4}	3
2 ^{1/2} - 2 5 - 3 12 - 6	1 ^{1/2}	2 ^{3/4}	4 ^{1/4}	3			
5 - 4 8 - 6 12 - 10	1 ^{1/2}				3 ^{3/8}	5 ^{3/8}	4 ^{1/8}
5 - 4 8 - 6 12 - 10	2	3 ^{3/8}	5 ^{3/8}	4 ^{1/8}			
ORDER TO SPECIFIC RUN PIPE SIZE	** 2 ^{1/2}	3 ^{1/8}	5 ^{1/4}	4 ^{3/16}			
	** 3	3 ^{13/16}	6 ^{1/4}	4 ^{15/16}			
	** 4	4 ^{3/4}	7 ^{7/8}	6 ^{7/16}			
	** 6	6 ^{1/2}	10 ^{11/16}	9			
	** 8	8	14 ^{1/4}	12 ^{5/16}			
	** 10	10	10 ^{11/16}	15 ^{3/8}			
** 12	11 ^{3/8}	11 ^{9/16}	18 ^{3/8}				

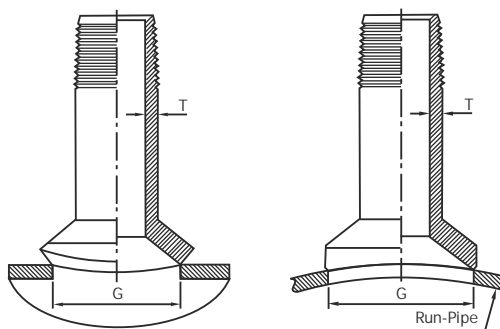
All Dimensions are in Inches

NIPPLE OUTLETS

(in millimeters)

Run-Pipe Size	Outlet Size	Wall-T	G	Unit Weight (kg)
36-3/4	1/2	7.3	23.9	0.36
36-1	3/4	7.9	30.2	0.56
36-1 1/4	1	8.9	36.6	0.84
36-1 1/2	1 1/4	9.7	44.5	1.22
36-2	1 1/2	10.2	50.8	2.00
36-2 1/2	2	11.2	65.0	3.12

All Dimensions are in millimeters (mm)



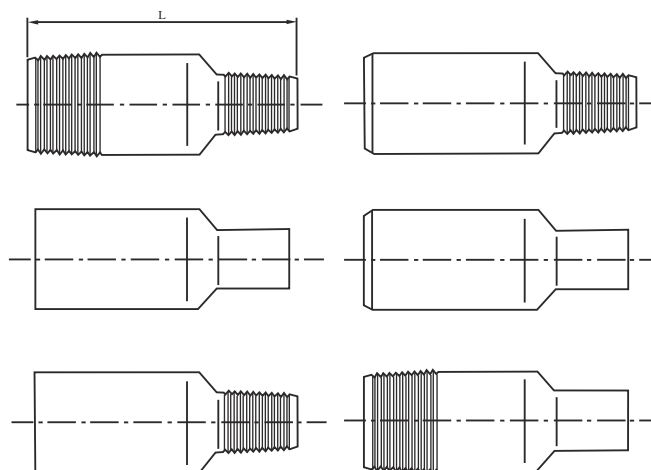
MSS SP- 97

Swaged Nipple

(in millimeters)

Large end Size	Small and Size	Length-L
1/2	3/8-1/8	70
3/4	1/2-1/8	76
1	3/4-1/8	89
1 1/4	1-1/8	102
1 1/2	1 1/4-1/8	114
2	1 1/2-1/8	165
2 1/2	2-1/8	178
3	2 1/2-1/8	203
3 1/2	3-1/8	203
4	3 1/2-1/8	229

All Dimensions are in millimeters (mm)



MSS SP- 95 / BS 3799

TBE Threaded both end

PBE Plain both end

PLE/TSE Plain large end-Threaded small end

BLE/TSE Beveled large end - Threaded small end

BLE/PSE Beveled large end - Plain small end

TLE/PSE Threaded large end-Plain small end

Dimensions of Elbow Outlet & Swept Outlet on Request

STAINLESS STEEL PIPE DIMENSION & WEIGHT-KG. PER MTR. (ANSI B36.19)

Nominal Bore		Outside Diameter	Schedule 5S		Schedule 10S		Schedule 40S		Schedule 80S		Schedule 160S		Schedule XXS	
mm	INCH	mm	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)
3	1/8	10.3	1.24	0.276	1.24	0.28	1.73	0.37	2.41	0.47	-	-	-	-
6	1/4	13.7	1.24	0.390	1.65	0.49	2.24	0.631	3.02	0.80	-	-	-	-
10	3/8	17.1	1.24	0.490	1.65	0.63	2.31	0.845	3.20	1.10	-	-	-	-
15	1/2	21.3	1.65	0.800	2.11	1.00	2.77	1.27	3.75	1.62	4.75	1.94	7.47	2.55
20	3/4	26.7	1.65	1.03	2.11	1.28	2.87	1.68	3.91	2.20	5.54	2.89	7.82	3.63
25	1	33.4	1.65	1.30	2.77	2.09	3.38	2.50	4.55	3.24	6.35	4.24	9.09	5.45
32	1 1/4	42.2	1.65	1.65	2.77	2.70	3.56	3.38	4.85	4.47	6.35	5.61	9.70	7.77
40	1 1/2	48.3	1.65	1.91	2.77	3.11	3.68	4.05	5.08	5.41	7.14	7.25	10.16	9.54
50	2	60.3	1.65	2.40	2.77	3.93	3.91	5.44	5.54	7.48	8.74	11.1	11.07	13.44
65	2 1/2	73.0	2.11	3.69	3.05	5.26	5.16	8.63	7.01	11.4	9.53	14.9	14.2	20.39
80	3	88.9	2.11	4.51	3.05	6.45	5.49	11.30	7.62	15.2	11.1	21.3	15.24	27.65
100	4	114.3	2.11	5.84	3.05	8.36	6.02	16.07	8.56	22.3	13.49	33.54	17.12	41.03
125	5	141.3	2.77	9.47	3.40	11.57	6.55	21.8	9.53	31.97	15.88	49.11	19.05	57.43
150	6	168.3	2.77	11.32	3.40	13.84	7.11	28.3	10.97	42.7	18.2	67.56	21.95	79.22
200	8	219.1	2.77	14.79	3.76	19.96	8.18	42.6	12.7	64.6	23.0	111.2	22.23	107.8
250	10	273.1	3.40	22.63	4.19	27.78	9.27	60.5	12.7	96.0	28.6	172.4	25.40	155.15
300	12	323.9	3.96	31.25	4.57	36.00	9.52	73.88	12.7	132.0	33.32	238.76	25.40	186.97
350	14	355.6	3.96	34.36	4.78	41.3	11.13	94.59	19.05	158.08	35.71	281.70	-	-
400	16	406.4	4.19	41.56	4.78	47.29	12.7	123.30	21.41	203.33	40.46	365.11	-	-
450	18	457.2	4.19	46.80	4.78	53.42	14.27	155.80	23.8	254.36	45.71	466.40	-	-
500	20	508.0	4.78	59.25	5.54	68.71	15.09	183.42	26.19	311.2	49.99	564.68	-	-
600	24	609.6	5.54	82.47	6.35	94.45	17.48	255.41	30.96	442.08	59.54	808.22	-	-

CARBON STEEL SEAMLESS PIPE DIMENSION & WEIGHT - KG. PER MTR. (ANSI B 36.10)

Nominal Pipe size	O/D	Schedule 10		Schedule 20		Schedule 30		Schedule STD		Schedule 40		Schedule 60		Schedule Extra Strong (XS)		Schedule 80		Schedule 100		Schedule 120		Schedule 140		Schedule 160		Schedule Double Extra Strong (XXS)				
		mm	kg/m	mm	kg/m	mm	kg/m	wall	wt.	wall	wt.	wall	wt.	wall	wt.	wall	wt.	wall	wt.	wall	wt.	wall	wt.	wall	wt.	wall	wt.	wall	wt.	
3	1/8	10.3						1.73	0.37	1.73	0.37			2.41	0.47	2.41	0.47													
6	1/4	13.7						2.24	0.63	2.24	0.63			3.02	0.80	3.02	0.80													
10	3/8	17.1						2.31	0.84	2.31	0.84			3.20	1.10	3.20	1.10													
15	1/2	21.3						2.77	1.27	2.77	1.27			3.73	1.62	3.73	1.62								4.78	1.95	7.5	2.55		
20	3/4	26.7						2.87	1.69	2.87	1.69			3.91	2.20	3.91	2.20								5.6	2.90	7.82	3.64		
25	1	33.4						3.38	2.50	3.38	2.50			4.55	3.24	4.55	3.24								6.35	4.24	9.1	5.45		
32	1 1/4	42.2						3.56	3.39	3.56	3.39			4.85	4.47	4.85	4.47								6.35	5.61	9.7	7.77		
40	1 1/2	48.3						3.68	4.05	3.68	4.05			5.08	5.41	5.08	5.41								7.14	7.25	10.2	9.56		
50	2	60.3						3.91	5.44	3.91	5.44			5.54	7.48	5.54	7.48								8.74	11.11	11.07	13.4		
65	2 1/2	73.0						5.16	8.63	5.16	8.63			7.01	11.41	7.01	11.41								9.53	14.92	14.0	20.4		
80	3	88.9						5.49	11.3	5.49	11.3			7.62	15.27	7.62	15.3								11.13	21.35	15.24	27.7		
90	3 1/2	101.6						5.74	13.57	5.74	13.57			8.08	18.63	8.08	18.63								-	-	16.2	34.1		
100	4	114.3						6.02	16.07	6.02	16.07			8.56	22.3	8.56	22.3				11.13	28.32			13.5	33.5	17.12	41.03		
125	5	141.3						6.55	21.77	6.55	21.77			9.53	30.9	9.53	30.9				12.7	40.2			15.9	49.11	19.0	57.4		
150	6	168.3						7.11	28.26	7.11	28.26			10.97	42.5	10.97	42.5				14.3	54.2			18.3	67.5	21.95	79.22		
200	8	219.1			6.35	33.3	7.0	36.8	8.18	42.5	8.18	42.55	10.31	53.10	12.7	64.6	12.7	64.5	15.1	75.92	18.3	90.4	20.6	100.9	23.0	111.27	22.23	108.0		
250	10	273.0			6.35	41.7	7.8	51.3	9.27	60.3	9.27	60.31	12.70	81.50	12.7	81.5	15.1	96.0	18.3	114.7	21.44	133.0	25.4	155	28.6	172.3	25.4	155.0		
300	12	323.9			6.35	49.7	8.4	65.2	9.53	73.8	10.31	79.73	14.30	109.0	12.7	97.4	17.5	132.0	21.4	160.0	25.4	187.0	28.6	208	33.3	238.7	25.4	187.0		
350	14	355.6	6.35	54.6	7.92	67.9	9.53	81.3	9.53	81.3	11.13	94.55	15.10	126.4	12.7	107.4	19.0	158.0	23.8	195.0	27.8	224.0	31.8	253.5	35.7	281.7				
400	16	406.4	6.35	62.6	7.92	77.9	9.53	93.3	9.53	93.3	12.7	123.3	16.70	160.0	12.7	123.3	21.44	203.5	26.2	245.5	30.9	286.6	36.53	333	40.5	365.4				
450	18	457.0	6.35	70.5	7.92	87.7	11.13	122.4	9.53	105.0	14.27	156.0	19.05	206.0	12.7	139.0	23.8	254.6	29.36	309.6	34.9	363.6	39.7	408.3	45.2	459.4				
500	20	508.0	6.35	78.5	9.53	117.2	12.7	155.1	9.53	117.2	15.09	183.4	20.62	248.5	12.7	155.1	26.2	311.2	32.54	381.5	38.1	441.5	44.4	508	50.0	564.8				
550	22	559.0	6.35	86.5	9.53	129.0	12.7	171.0	9.53	129.0			22.20	294.0	12.7	171.0	28.6	373.8	34.9	451.4	41.3	527.0	47.6	600	54.0	672.0				
600	24	610.0	6.35	94.5	9.53	141.0	14.3	209.7	9.53	141.0	17.48	255.4	24.61	355.0	12.7	187.0	30.96	442.08	38.89	547.7	46.0	640.0	52.4	720.15	59.5	808.22				
650	26	660.0	7.92	127.0	12.7	203.0			9.53	153.0					12.7	202.7														
700	28	711.0	7.92	137.4	12.7	218.7	15.88	271.2	9.53	165.0					12.7	218.7														
750	30	762.0	7.92	147.3	12.7	234.6	15.88	292.18	9.53	176.8					12.7	234.7														
800	32	813.0	7.92	157.0	12.7	250.6	15.88	312.0	9.53	188.2	17.48	342.9			12.7	250.6														
850	34	864.0	7.92	167.0	12.7	266.6	15.88	332.1	9.53	200.3	17.48	364.9			12.7	266.6														
900	36	914.4	7.92	176.9	12.7	282.3	15.88	351.7	9.53	212.5	19.05	420.4			12.7	282.2														



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