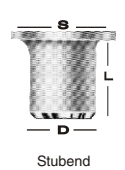
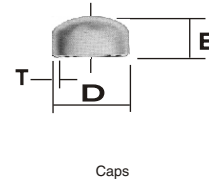
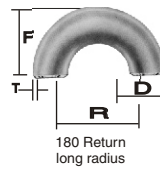
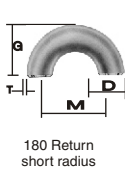
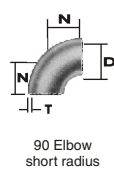
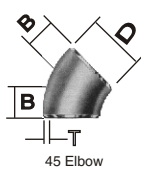
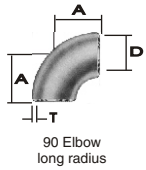


BUTT WELDING PIPE FITTING DIMENSIONAL STANDARD
ANSI B-16.9, B-16.28 & MS SS P43



Nominal Pipe Size		Outside Diameter	Center to Face			Back to Face				Center to Center			Length 'L' MS SS P43
Inch.	mm	D	A	B	N	E	F	G	R	M	S	L	L
1/2	15	21.3	38.00	16.0	—	25.0	48.0	—	76.0	—	35.0	50.8	76.2
3/4	20	26.7	29.00	11.0	—	25.0	43.0	—	57.0	—	43.0	50.8	76.2
1	25	33.4	38.00	22.0	25.0	38.0	56.0	41.0	76.0	51.0	51.0	50.8	101.6
1 1/4	32	42.2	48.00	25.0	32.0	38.0	70.0	52.0	95.0	64.0	64.0	50.8	101.6
1 1/2	40	48.3	57.15	29.0	38.0	38.0	83.0	62.0	114.0	76.0	73.0	50.8	101.6
2	50	60.3	76.00	35.0	51.0	38.0	106.0	81.0	152.0	102.0	93.0	63.5	152.4
2 1/2	65	73	95.25	44.0	64.0	38.0	132.0	100.0	191.0	127.0	105.0	63.5	152.4
3	80	88.9	114.30	51.0	76.0	51.0	159.0	121.0	229.0	152.0	127.0	63.5	152.4
3 1/2	90	101.6	133.35	57.0	89.0	64.0	184.0	140.0	267.0	178.0	140.0	76.2	152.4
4	100	114.3	152.0	63.0	102.0	64.0	210.0	159.0	305.0	203.0	157.0	76.2	152.4
5	125	141.3	190.0	79.0	127.0	76.0	262.0	197.0	381.0	254.0	186.0	76.2	203.2
6	150	168.3	229.0	95.0	152.0	89.0	313.0	237.0	457.0	305.0	216.0	88.9	203.2
8	200	219.1	305.0	127.0	203.0	102.0	414.0	313.0	610.0	406.0	270.0	101.6	203.2
10	250	273.1	381.0	159.0	254.0	127.0	515.0	391.0	762.0	508.0	324.0	127	254
12	300	323.9	457.0	190.0	303.0	152.0	619.0	467.0	914.0	610.0	381.0	152.4	254
14	350	355.6	533.0	222.0	356.0	165.0	711.0	533.0	1067.0	711.0	413.0	152.4	305.0
16	400	406.4	610.0	254.0	406.0	178.0	813.0	610.0	1219.0	813.0	470.0	152.4	305.0
18	450	457.2	686.0	286.0	457.0	203.0	914.0	686.0	1372.0	914.0	533.0	152.4	305.0
20	500	508	762.0	318.0	508.0	229.0	1016.0	762.0	1524.0	1016.0	584.0	152.4	305.0
22	550	559	838.0	343.0	559.0	254.0	1118.0	838.0	1676.0	1118.0	614.4	152.4	305.0
24	600	610	914.0	381.0	610.0	267.0	1219.0	914.0	1829.0	1219.0	692.0	152.4	305.0

COMMONLY USED AISI GRADES - CHEMICAL COMPOSITION %

Grade	C (Max.)	Si (Max.)	Mn (Max.)	P (Max.)	S (Max.)	Ni	Cr	Others
TP 301	0.150	0.75	2.00	0.045	0.030	06 ~ 08.0	16.0 ~ 18.0	-
TP 304	0.080	0.75	2.00	0.045	0.030	08 ~ 10.5	18.0 ~ 20.0	-
TP 304L	0.030	0.75	2.00	0.045	0.030	08.0 ~ 12.0	18.0 ~ 20.0	-
TP 309S	0.080	0.75	2.00	0.045	0.030	12.0 ~ 15.0	22.0 ~ 24.0	-
TP 310S	0.080	1.50	2.00	0.045	0.030	19.0 ~ 22.0	24.0 ~ 26.0	-
TP 316	0.080	1.50	2.00	0.045	0.030	10.0 ~ 14.0	16.0 ~ 18.0	Mo:2. ~ 03.0
TP 316L	0.030	0.75	2.00	0.045	0.030	10.0 ~ 14.0	16.0 ~ 18.0	Mo:2. ~ 03.0
TP 317	0.080	0.75	2.00	0.045	0.030	11.0 ~ 15.0	18.0 ~ 20.0	Mo:3. ~ 04.0
TP 321	0.080	0.75	2.00	0.045	0.030	9.0 ~ 12.0	17.0 ~ 19.0	Ti: 5x (C+N) ~ 0.7
TP 409L	0.030	1.00	1.00	0.045	0.030	< 0.50	10.50 ~ 11.75	Ti: 6x C ~ 0.75
TP 410	0.150	1.00	1.00	0.040	0.030	< 0.75	11.50 ~ 13.50	-
TP 430	0.120	1.00	1.00	0.040	0.030	< 0.75	16.00 ~ 18.00	-

EQUIVALENT SPECIFICATIONS

USA AISI	Italy UNI	Germany DIN 17440	France AFNOR	Japan JIS	Sweden SIS	UNS	British BSI
301	X 12 CrNi 177	1.4310	Z 12 CN 17-8	SUS 301	14 23 31	S 30100	304 S21
304	X 5 CrNi 18 10	1.4301	Z 6 CN 18-09	SUS 304	14 23 33	S 30400	304 S15
304L	X 2 CrNi 18 11	1.4306	Z 2 CN 18-10	SUS 304L	14 23 52	S 30403	304 S11
316	X 5 CrNi Mo.1712 2	1.4401	Z 6 CND 17-11	SUS 316	14 23 47	SS 31600	316 S31
316	X 5 CrNi Mo.1712 3	1.4436	Z 6 CND 17-12	SUS 316	14 23 43	-	316 S33
316L	X 2 CrNi Mo.1713 2	1.4404	Z 2 CND 17-12	SUS 316L	14 23 48	S 31603	316 S11
316L	X 2 CrNi Mo.1814 3	1.4435	Z 2 CND 17-13	-	14 23 53	-	316 S13
310S	X 12 CrNi 2521	1.4845	Z 12 CN 25 -20	SUS 310S	14 23 61	S 31008	-
321	X 6 CrNiTi 18 9	1.4878	Z 6 CNT 18-12	SUS 321	14 23 37	S 32100	321 S31
409	X 6 CrTi 12	1.4512	Z 5 CT 12	SUS 409	-	S 40900	409 S17
410	X 10 Cr 13	1.4006	Z 12 C 13	SUS 410	14 23 02	S 41000	410 S21
430	X 6 Cr 17	1.4016	Z 8 C 17	SUS 430	14 23 20	S 43000	430 S17

WEIGHT OF STAINLESS STEEL SHEETS / PLATES

Thickness in mm	Weight Kg/m ²	Weight Kg/ft.	Thickness in mm	Weight Kg/m ²	Weight Kg/ft.
0.18	1.44	0.134	1.75	14.00	1.301
0.20	1.60	0.149	2.00	16.00	1.487
0.22	1.76	0.164	2.25	18.00	1.673
0.24	1.92	0.178	2.50	20.00	1.859
0.27	2.16	0.201	2.75	22.00	2.045
0.28	2.24	0.208	3.00	24.00	2.231
0.32	2.56	0.238	3.25	26.00	2.417
0.38	3.04	0.282	3.50	28.00	2.603
0.44	3.52	0.327	3.75	30.00	2.788
0.50	4.00	0.372	4.00	32.00	2.788
0.56	4.48	0.416	4.25	34.00	3.160
0.63	5.04	0.468	4.50	36.00	3.346
0.75	6.00	0.558	5.00	40.00	3.718
0.88	7.04	0.654	5.50	44.00	4.090
1.00	8.00	0.744	6.00	48.00	4.462
1.13	9.04	0.840	6.50	52.00	4.833
1.25	10.00	0.929	7.00	56.00	5.205
1.38	11.04	1.026	7.50	60.00	5.577
1.50	12.00	1.115	8.00	64.00	5.949

WEIGHTS OF ROUND, SQUARE & HEXAGON BAR - (in kg. per meter)

Size	Round	Square	Hexagon	Size	Round	Square	Size	Round	Square
5	0.154	0.196	0.170	57	20.03	25.51	145	129.63	165.05
6	0.222	0.283	0.245	58	20.74	26.41	150	138.72	176.63
7	0.302	0.385	0.333	59	21.46	27.33	155	148.12	188.60
8	0.395	0.502	0.435	60	22.20	28.26	160	157.83	200.96
9	0.499	0.636	0.551	61	22.94	29.21	165	167.85	213.72
10	0.617	0.785	0.680	62	23.70	30.18	170	178.18	226.87
11	0.746	0.950	0.823	63	24.47	31.16	175	188.81	240.41
12	0.888	1.130	0.979	64	25.25	32.15	180	199.76	254.34
13	1.042	1.327	1.149	65	26.05	33.17	185	211.01	268.67
14	1.208	1.539	1.332	66	26.86	34.20	190	222.57	283.39
15	1.387	1.766	1.530	67	27.68	35.24	195	234.44	298.50
16	1.578	2.010	1.740	68	28.51	36.30	200	246.61	314.00
17	1.782	2.269	1.965	69	29.35	37.37	205	259.10	329.90
18	1.998	2.543	2.203	70	30.21	38.47	210	271.89	346.19
19	2.226	2.834	2.454	71	31.08	39.57	215	284.99	362.87
20	2.466	3.140	2.719	72	31.96	40.69	220	298.40	379.94
21	2.719	3.462	2.866	73	32.86	41.83	225	312.12	397.41
22	2.984	3.799	3.290	74	33.76	42.99	230	326.13	415.27
23	3.261	4.153	3.596	75	34.68	44.16	235	340.48	433.52
24	3.551	4.522	3.916	76	35.61	45.34	240	355.13	452.16
25	3.853	4.906	4.249	77	36.56	46.54	245	370.08	471.20
26	4.168	5.307	4.596	78	37.51	47.76	250	385.34	490.63
27	4.495	5.723	4.956	79	38.48	48.99	255	400.90	510.45
28	4.834	6.154	5.330	80	39.46	50.24	260	416.78	530.66
29	5.185	6.602	5.717	81	40.45	51.50	265	432.96	551.27
30	5.549	7.065	6.118	82	41.46	52.78	270	449.46	572.27
31	5.925	7.544	6.533	83	42.47	54.08	275	466.26	593.66
32	6.313	8.038	6.961	84	43.50	55.39	280	483.37	615.44
33	6.714	8.549	7.403	85	44.55	56.72	285	500.78	637.62
34	7.127	9.075	7.859	86	45.60	58.06	290	518.51	660.19
35	7.553	9.616	8.328	87	46.67	59.42	295	536.54	683.15
36	7.990	10.174	8.810	88	47.75	60.79	300	554.88	706.50
37	8.440	10.747	9.307	89	48.84	62.18	310	592.49	754.39
38	8.903	11.335	9.817	90	49.94	63.59	320	631.33	803.84
39	9.378	11.940	10.340	91	51.06	65.01	330	671.41	854.87
40	9.865	12.560	10.877	92	52.18	66.44	340	712.72	907.46
41	10.364	13.196	11.428	93	53.32	67.90	350	755.26	961.63
42	10.876	13.847	11.992	94	54.48	69.36	360	799.03	1017.36
43	11.400	14.515	12.570	95	55.64	70.85	370	844.04	1074.67
44	11.936	15.198	13.161	96	56.82	72.35	380	890.28	1133.54
45	12.485	15.896	13.766	97	58.01	73.86	390	937.75	1193.99
46	13.046	16.611	14.385	98	59.21	75.39	400	986.46	1256.00
47	13.619	17.341	15.017	99	60.43	76.94	410	1036.40	1319.59
48	14.205	18.086	15.663	100	61.65	78.50	420	1087.57	1384.74
49	14.803	18.848	16.322	105	67.97	86.55	430	1139.98	1451.47
50	15.413	19.625	16.996	110	74.60	94.99	440	1193.62	1519.76
51	16.04	20.42	17.682	115	81.54	103.82	450	1248.49	1589.63
52	16.67	21.23	18.382	120	89.78	113.04	460	1304.59	1661.06
53	17.32	22.05	19.096	125	96.33	122.66	470	1361.93	1734.07
54	17.98	22.89	19.823	130	104.19	132.67	480	1420.50	1808.64
55	18.65	23.75	20.564	135	112.36	143.07	490	1480.31	1884.79
56	19.34	24.62	21.319	140	120.84	153.86	500	1541.34	1962.50

STAINLESS STEEL PIPE DIMENSION AS PER ASTM & 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	-	-

Formula - Pipe Weight Kg / Mtr. ● OD - Thick x Thick x 0.0248 = Kg Per Mtr.

WEIGHT & THICKNESS OF S.S GAUGE PIPES

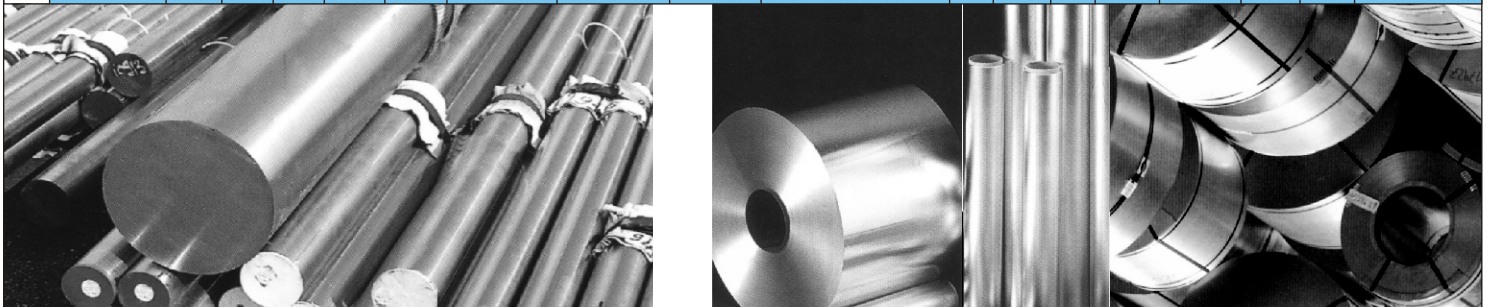
DIMENSION		10G (3.25)	12G (2.64)	14G (2.03)	16G (1.62)	18G (1.21)	20G (0.91)	22G (0.71)
Size inches	OD IN MM	(0.128")	(0.104")	(0.080")	(0.064")	(0.048")	(0.036")	(0.028")
		WALL THICKNESS						
1/4"	6/35	0.075	0.070	0.065	0.058	0.046	0.037	0.030
5/16"	7.93	0.114	0.105	0.089	0.079	0.060	0.048	0.038
3/8"	9.52	0.152	0.135	0.113	0.097	0.080	0.058	0.046
1/2"	12.7	0.226	0.200	0.157	0.134	0.105	0.079	0.063
3/4"	19.05	0.386	0.326	0.256	0.215	0.161	0.124	0.097
1"	25.4	0.541	0.450	0.351	0.294	0.218	0.057	0.131
1 1/4"	31.750	0.696	0.580	0.448	0.575	0.275	0.200	0.162
1 1/2"	38.1	0.851	0.700	0.542	0.452	0.332	0.250	0.196
1 3/4"	44.45	1.020	0.832	0.646	0.530	0.390	0.294	0.230
2"	50.8	1.161	0.960	0.733	0.607	0.447	0.336	0.263
2 1/4"	57.15	1.315	1.085	0.828	0.687	0.504	-	-
2 1/2"	63.5	1.472	1.210	0.924	0.792	0.562	-	-
2 3/4"	69.85	1.630	1.338	1.022	0.847	0.619	-	-
3"	76.2	1.782	1.460	1.115	0.924	0.676	-	-
3 1/2"	88.9	1.092	1.718	1.306	1.082	0.791	-	-
4"	101.6	2.403	1.971	1.497	1.239	0.905	-	-
4 1/2"	114.3	2.713	2.224	1.608	1.397	1.020	-	-
5"	127.0	3.023	2.466	1.879	1.584	1.134	-	-
5 1/2"	139.7	3.336	2.730	2.070	1.713	1.250	-	-
6"	152.4	3.654	2.983	2.264	1.875	1.364	-	-
6 1/2"	165.1	3.975	3.256	2.452	2.028	1.478	-	-

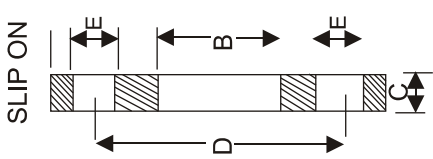
CARBON STEEL SEAMLESS PIPE DIMENSION & WEIGHT - KG. PER MTR. (ANSI B 36.10)

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	inch	mm	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.	
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	1¼	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	1½	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	2½	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	3½	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													
A 106 Gr B ()																													
We also supply pipes API - 5L - Gr B ()																													
A 333 Gr 6 ()																													
A 335 P 5 ()																													

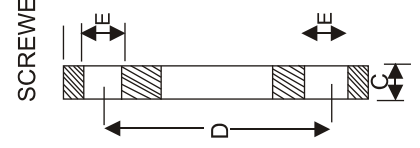
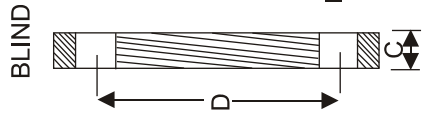
STAINLESS STEEL SHEETS PLATES CHEMICAL COMPOSITION & PHYSICAL PROPERTIES

Grade	Chemical Composition										Tensile Test					Hardness Test		Bend Test	
	ASTM A240	C max	Si max	Mn max	P max	S max	Ni	Cr	Mo	Others	Tensile Strength min		Yield Strength min		Elongation	HB max	H _B max	Degree Inside Radius	
											ksi	kg/mm ²	ksi	kg/mm ²	min%				
Austenitic Grade	TP302	0.15	0.75	2.00	0.045	0.030	8.00/10.00	17.00/19.00	-	N _≤ 0.10	75	(53)	30	(21)	40	202	92	NR	NR
	TP304	0.08	0.75	2.00	0.045	0.030	8.00/10.50	18.00/20.00	-	N _≤ 0.10	75	(53)	30	(21)	40	202	92	NR	NR
	TP304L	0.035	0.75	2.00	0.045	0.030	8.00/12.00	18.00/20.00	-	N _≤ 0.10	70	(49)	25	(18)	40	183	88	NR	NR
	TP309S	0.08	0.75	2.00	0.045	0.030	12.00/15.00	22.00/24.00	-	-	75	(53)	30	(21)	40	217	95	NR	NR
	TP310S	0.08	0.75	2.00	0.045	0.030	19.00/22.00	24.00/26.00	-	-	75	(53)	30	(21)	40	217	95	NR	NR
	TP316	0.08	0.75	2.00	0.045	0.030	10.00/14.00	16.00/18.00	2.00/3.00	N _≤ 0.10	75	(53)	30	(21)	40	217	95	NR	NR
	TP316L	0.035	0.75	2.00	0.045	0.030	10.00/14.00	16.00/18.00	2.00/3.00	N _≤ 0.10	70	(49)	25	(18)	40	217	95	NR	NR
	TP316Ti	0.08	0.75	2.00	0.045	0.030	10.00/14.00	16.00/18.00	2.00/3.00	N _≤ 0.10 Ti5X(C+N)Min/0.70	75	-	30	-	40	217	95	NR	NR
	TP317	0.08	0.75	2.00	0.045	0.030	11.00/15.00	18.00/20.00	3.00/4.00	N _≤ 0.10	75	(53)	30	(21)	35	217	95	NR	NR
	TP317L	0.035	0.75	2.00	0.045	0.030	11.00/15.00	18.00/20.00	3.00/4.00	N _≤ 0.10	75	(53)	30	(21)	40	217	95	NR	NR
	TP321	0.08	0.75	2.00	0.045	0.030	9.00/12.00	17.00/19.00	-	N _≤ 0.10 Ti5X(C+N)/0.70	75	(53)	30	(21)	40	217	95	NR	NR
	Tp347	0.08	0.75	2.00	0.045	0.030	9.00/13.00	17.00/19.00	-	Cb+Ta 10XC/1.10	75	(53)	30	(21)	40	202	92	NR	NR
	Tp430	0.12	1.00	1.00	0.040	0.030	0.75	16.00/18.00	-	-	65	(46)	30	(21)	22	183	88	180° T/2 for T<3/8" T for T>3/8"≤1"	
	TP410	0.15	1.00	1.00	0.040	0.030	0.75	11.50/13.50	-	-	65	(46)	30	(21)	20	217	95	180° T/2 for T<3/8" T for T>3/8"≤1"	
TP410S	0.08	1.00	1.00	0.040	0.030	0.60	11.50/13.50	-	-	60	(42)	30	(21)	22	183	88	180° T/2 for T<3/8" T for T>3/8"≤1"		





BS 10 Pipes



BS 10 Pipes

N.B. Size	Table	Dia of Flange A	Bore of Slip-on B	Thickness of Flange C	Pitch circle Dia D	Dia of Bolt Holes E	No. of Bolts
1/2"	D	3 3/4	0.88	3/16	2 5/8	9/16	4
	E	3 3/4	0.88	1/4	2 5/8	9/16	4
	F	3 3/4	0.88	3/8	2 7/8	9/16	4
	H	4 1/2	0.88	1/2	3 1/4	11/16	4
3/4"	D	4	1.09	3/16	2 7/8	9/16	4
	E	4	1.09	1/4	2 7/8	9/16	4
	F	4	1.09	3/8	2 7/8	9/16	4
	H	4 1/2	1.09	1/2	3 1/4	11/16	4
1"	D	4 1/2	1.36	3/16	3 1/4	9/16	4
	E	4 1/2	1.36	9/32	3 1/4	9/16	4
	F	4 3/4	1.36	3/8	3 7/16	11/16	4
	H	4 3/4	1.36	9/16	3 7/16	11/16	4
1 1/4"	D	4 3/4	1.70	1/4	3 7/16	9/16	4
	E	4 3/4	1.70	5/16	3 7/16	9/16	4
	F	5 1/4	1.70	1/2	3 7/8	11/16	4
	H	5 1/4	1.70	11/16	3 7/8	11/16	4
1 1/2"	D	5 1/4	1.95	1/4	3 7/8	9/16	4
	E	5 1/4	1.95	11/32	3 7/8	9/16	4
	F	5 1/2	1.95	1/2	4 1/8	11/16	4
	H	5 1/2	1.95	11/16	4 1/8	11/16	4
2"	D	6	2.44	5/16	4 1/2	11/16	4
	E	6	2.44	3/8	4 1/2	11/16	4
	F	6 1/2	2.44	5/8	5	11/16	4
	H	6 1/2	2.44	3/4	5	11/16	4
2 1/2"	D	6 1/2	2.94	5/16	5	11/16	4
	E	6 1/2	2.94	13/32	5	11/16	4
	F	7 1/4	2.94	5/8	5 3/4	11/16	8
	H	7 1/4	2.94	3/4	5 3/4	11/16	8
3"	D	7 1/4	3.57	3/8	5 3/4	11/16	4
	E	7 1/4	3.57	7/16	5 3/4	11/18	4
	F	8	3.57	5/8	6 1/2	11/16	8
	H	8	3.57	7/8	6 1/2	11/16	8
3 1/2"	D	8	4.07	3/8	6 1/2	11/16	4
	E	8	4.07	15/32	6 1/2	11/16	8
	F	8 1/2	4.07	3/4	7	11/16	8
	H	8 1/2	4.07	7/8	7	11/16	8
4"	D	8 1/2	4.57	3/8	7	11/16	4
	E	8 1/2	4.57	1/2	7	11/16	8
	F	9	4.57	3/4	7 1/2	11/16	8
	H	9	4.57	1	7 1/2	11/16	8
5"	D	10	5.56	1/2	8 1/4	11/16	8
	E	10	5.66	9/16	8 1/4	11/16	8
	F	11	5.66	7/8	9 1/4	7/8	8
	H	11	5.66	1 1/8	9 1/4	7/8	8

N.B. Size	Table	Dia of Flange A	Bore of Slip-on B	Thickness of Flange C	Pitch circle Dia D	Dia of Bolt Holes E	No. of Bolts
6"	D	11	6.72	1/2	9 1/4	11/16	8
	E	11	6.72	11/16	9 1/4	7/8	8
	F	12	6.72	7/8	10 1/4	7/8	12
	H	12	6.72	1 1/8	10 1/4	7/8	12
8"	D	13 1/4	8.72	1/2	11 1/2	11/16	8
	E	13 1/4	8.72	3/4	11 1/2	7/8	8
	F	14 1/4	8.72	1	12 3/4	7/8	12
	H	14 1/2	8.72	1 1/4	1 1/4	12 3/4	12
10"	D	16	10.88	5/8	14	7/8	8
	E	16	10.88	7/8	14	7/8	12
	F	17	10.88	1 1/8	15	1	12
	H	17	10.88	1 3/8	15	1	12
12"	D	18	12.88	3/4	16	7/8	12
	E	18	12.88	1	16	1	12
	F	19 1/4	12.88	1 1/4	17 1/4	1	16
	H	19 1/4	12.88	1 5/8	17 1/4	1	16
14"	D	20 3/4	14.14	7/8	18 1/2	1	12
	E	20 3/4	14.14	1 1/8	18 1/2	1	12
	F	21 3/4	14.14	1 3/4	19 1/2	1 1/8	16
	H	21 3/4	14.14	1 7/8	19 1/2	1 1/8	16
16"	D	22 3/4	16.16	7/8	20 1/2	1	12
	E	22 3/4	16.16	1 1/4	20 1/2	1	12
	F	24	16.16	1 5/8	21 3/4	1 1/8	20
	H	26 1/2	18.18	2 3/4	24	1 1/4	20
18"	D	25 1/4	18.18	1	23	1	12
	E	25 1/4	18.18	1 3/8	23	1	16
	F	26 1/2	18.18	1 3/4	24	1 1/4	20
	H	26 1/4	18.18	2 3/8	24	1 1/4	20
20"	D	27 3/4	20.20	1 1/8	25 1/4	1	16
	E	27 3/4	20.20	1 1/2	25 1/4	1	16
	F	29	20.20	2	26 1/2	1 1/4	24
	H	29	20.20	2 5/8	26 1/2	1 1/4	24
22"	D	30	22.22	1 1/8	27 1/2	1 1/8	16
	E	30	22.22	1 3/4	27 1/2	1 1/8	16
	F	31	22.22	2 1/8	28 1/2	1 1/4	24
	H	31	22.22	2 3/8	28 1/2	1 1/4	24
24"	D	32 1/2	24.25	1 1/4	29 3/4	1 1/8	16
	E	32 1/2	24.25	1 7/8	29 3/4	1 1/4	16
	F	33 1/2	24.25	2 1/4	30 3/4	1 3/8	24
	H	33 1/2	24.25	3	30 3/4	1 3/8	24

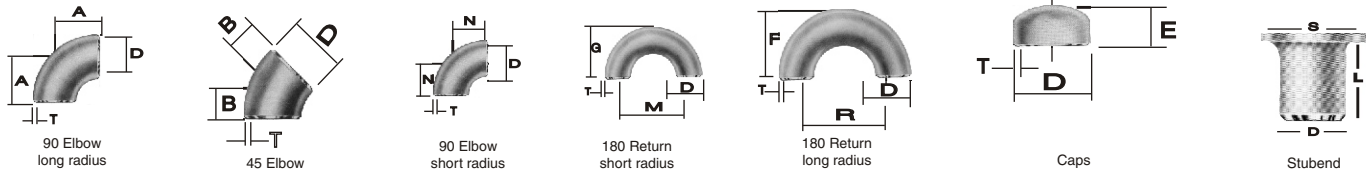
ASTM SPECIFICATION & TOLERANCE FOR TUBING & PIPING

Specification	Allowable Outside Diameter Variation in mm			Allowable Wall Thickness Variation		Exact Length Tolerance in mm		Testing
	Nominal Diameter	Over	Under	%Over	%Under	Over	Under	
ASTM-A213 Seamless Boiler Superheater and Heat Exchanger Tubes	Under 25.4	.1016	.1016	+20	-0	3.175	0	Flattening Test Tension Test Flare Test Hardness Test 100% Hydrostatic test Refer to ASTM A-450
	25.4-38.1 incl	.1524	.1524	+22	-0	3.175	0	
	38.1-50.8 excl	.2032	.2032	+22	-0	3.176	0	
	50.8-63.5 excl	.254	.254	+2	-0	4.46	0	
	63.5-76.2 excl	.3048	.3048	+22	-0	4.76	0	
76.2-101.6 incl	.381	.381	+22	-0	4.76	0		
ASTM-A249 Welded Boiler Superheater, Heat Exchanger And Condenser Tubes	Under 25.4	.1016	.1016	+10	-10	3.175	0	Tension Test Flattening Test Flange Test Reverse Bend Test Hardness Test 100% Hydrostatic Test Refer to ASTM A-450
	25.4-38.1 incl	.1524	.1524	+10	-10	3.175	0	
	38.1-50.8 Excl	.2032	.2032	+10	-10	3.175	0	
	50.0-63.5 excl	.254	.254	+10	-10	4.762	0	
	63.5-76.2 excl	.3848	.3048	+10	-10	4.762	0	
76.2-101.6 incl	.381	.381	+10	-10	4.762	0		
				Minimum Wall tubes + 18% 0 available On request				
ASTM-A269 Seamless & Welded Tubing for General Service	Untp 12.7	.13	.13	+15	-15	3.2	0	Flare Test (Seamless Only) Flange Test (Welded Only) Hardness Test Reverse Flattening Test (Welded only) 100% Hydrostatic Test Refer to ASTM-A269
	12.7-38.1 excl	.13	.13	+10	-10	3.2	0	
	38.1-88.9 excl	.25	.25	+10	-10	4.8	0	
	88.9-139.7 excl	.38	.38	+10	-10	4.8	0	
139.7-203.2 excl	.76	.76	+10	-10	4.8	0		
ASTM-A270 Seamless & Welded Sanitary Tubing	25.4	.05	.20	+10.0	-10.0	3.2	0	Reverse flattening Test 100% Hydrostatic Test External' polish on all tubes Refer to ASTM A-270
	38.1	.05	.20	+10.0	-10.0	3.2	0	
	50.8	.05	.28	+10.0	-10.0	3.2	0	
	60.5	.05	.28	+10.0	-10.0	3.2	0	
	76.2	.08	.30	+10.0	-10.0	3.2	0	
101.6	.08	.38	+10.0	-10.0	4.8	0		
ASTM-A312 Seemless & Welded pipe	3.175-38.1 incl	.4	.79	Minimum Wall		6.4	0	Tension Test Flattening Test 100% Hydrostatic Test Refer to ASTM A-530
	38.1-1016 incl	.79	.79	12.5% under		6.4	0	
	101.6-203.2 imcl	1.59	.79	nominal wall Specified		6.4	0	
						(Normally Random Lengths ordered)		
ASTM A-358 Welded pipe	219.08-750mm or 0.01 inch	+0.5%		-0.3		6.0		Refer to ASTM A-530

DIMENSIONS AND WEIGHTS OF STEEL TUBES N ACCORDANCE WITH IS 1239 : 1964 METRIC UNITS

Nominal Bore			Outside Diameters of Black Tube				Thickness			Weight per mtr. of Black Tube			Ordinary Socket	
			Light		Medium & Heavy					Pain Ends				
Approximate Outside Diam.			Max.	Min.	Max.	Min.	Light	Medium	Heavy	Light	Medium	Heavy	Approx. Outside Diam.	Min. Length
in	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg	kg	mm	mm
1/8	6	10.2	10.1	9.7	10.6	9.8	1.8	2.0	2.65	0.378	0.410	0.493	15	17
1/4	8	13.5	13.6	13.2	14.0	13.2	1.8	2.35	2.9	0.52/2	0.659	0.762	19	25
3/8	10	17.2	17.1	16.7	17.5	16.7	1.8	2.35	2.9	0.68/8	0.850	1.03	21.3	26
1/2	15	21.3	21.4	21.0	21.8	21.0	2.0	2.65	3.25	0.96	1.21	1.44	26.9	34
3/4	20	26.9	26.9	26.9	26.4	27.4	26.5	2.35	2.65	3.25	1.41	1.57	1.89	33.7
1	25	33.7	33.8	33.2	34.2	33.3	2.65	3.25	4.05	2.01	2.42	2.95	42.6	43
1 1/4	32	42.4	42.5	41.9	42.9	42.0	2.65	3.25	4.05	2.57	3.11	3.81	51	48
1 1/2	40	48.3	48.4	47.8	48.8	42.9	2.9	3.25	4.05	3.27	3.59	4.41	57	48
2	50	60.3	60.2	59.6	60.8	59.7	2.9	3.26	4.5	4.14	5.07	6.17	70	56
2 1/2	65	76.1	76.0	75.2	76.6	75.3	3.25	3.65	4.5	5.80	6.49	7.92	88.9	65
3	80	88.9	88.7	87.9	89.5	88.0	3.25	.05	4.50	6.81	8.43	10.10	101.6	71
3 1/2	90	101.6	101.2	100.3	102.1	100.4	3.65	4.05	4.85	8.76	9.70	11.90	114.3	75
4	100	114.3	113.9	113.0	115.0	113.1	3.65	4.5	5.4	9.90	12.10	14.50	127	83
5	125	139.7	-	-	140.8	138.5	-	4.85	5.4	-	16.60	17.90	159	92
6	150	165.1	-	-	166.5	163.9	-	4.85	5.4	-	19.70	21.20	177.8	92

BUTT WELDING PIPE FITTING DIMENSIONAL STANDARD ANSI B-16.9, B-16.28 & MS SS P43



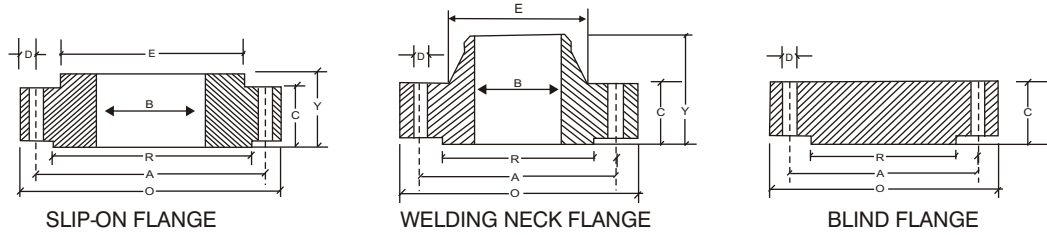
Nominal Pipe Size		Outside Diameter	Center to Face			Back to Face				Center to Center			Length 'L' MS SS P43
Inch.	mm	D	A	B	N	E	F	G	R	M	S	L	L
1/2	15	21.3	38.00	16.0	—	25.0	48.0	—	76.0	—	35.0	50.8	76.2
3/4	20	26.7	29.00	11.0	—	25.0	43.0	—	57.0	—	43.0	50.8	76.2
1	25	33.4	38.00	22.0	25.0	38.0	56.0	41.0	76.0	51.0	51.0	50.8	101.6
1 1/4	32	42.2	48.00	25.0	32.0	38.0	70.0	52.0	95.0	64.0	64.0	50.8	101.6
1 1/2	40	48.3	57.15	29.0	38.0	38.0	83.0	62.0	114.0	76.0	73.0	50.8	101.6
2	50	60.3	76.00	35.0	51.0	38.0	106.0	81.0	152.0	102.0	93.0	63.5	152.4
2 1/2	65	73	95.25	44.0	64.0	38.0	132.0	100.0	191.0	127.0	105.0	63.5	152.4
3	80	88.9	114.30	51.0	76.0	51.0	159.0	121.0	229.0	152.0	127.0	63.5	152.4
3 1/2	90	101.6	133.35	57.0	89.0	64.0	184.0	140.0	267.0	178.0	140.0	76.2	152.4
4	100	114.3	152.0	63.0	102.0	64.0	210.0	159.0	305.0	203.0	157.0	76.2	152.4
5	125	141.3	190.0	79.0	127.0	76.0	262.0	197.0	381.0	254.0	186.0	76.2	203.2
6	150	168.3	229.0	95.0	152.0	89.0	313.0	237.0	457.0	305.0	216.0	88.9	203.2
8	200	219.1	305.0	127.0	203.0	102.0	414.0	313.0	610.0	406.0	270.0	101.6	203.2
10	250	273.1	381.0	159.0	254.0	127.0	515.0	391.0	762.0	508.0	324.0	127	254
12	300	323.9	457.0	190.0	303.0	152.0	619.0	467.0	914.0	610.0	381.0	152.4	254
14	350	355.6	533.0	222.0	356.0	165.0	711.0	533.0	1067.0	711.0	413.0	152.4	305.0
16	400	406.4	610.0	254.0	406.0	178.0	813.0	610.0	1219.0	813.0	470.0	152.4	305.0
18	450	457.2	686.0	286.0	457.0	203.0	914.0	686.0	1372.0	914.0	533.0	152.4	305.0
20	500	508	762.0	318.0	508.0	229.0	1016.0	762.0	1524.0	1016.0	584.0	152.4	305.0
22	550	559	838.0	343.0	559.0	254.0	1118.0	838.0	1676.0	1118.0	614.4	152.4	305.0
24	600	610	914.0	381.0	610.0	267.0	1219.0	914.0	1829.0	1219.0	692.0	152.4	305.0

DIMENSIONAL TOLERANCES

Threaded, Socket-Welding, Slip-on, Lap Joint and Blind		
Outside Diameter	When O.D. is 24" or less	$\pm 1/16"$ (16mm)
Diameter	When O.D. is Over 24"	$\pm 1/8"$ (3.2mm)
Inside Diameter	Threaded	Within limits on boring guage
	Socket-Welding, Slip-on and Lap joint	10" & Smaller $+ 1/32"$ (0.8mm) - 0" 12" & Larger $+ 1/16"$ (1.6mm) - 0"
Outside Diameter of Hub	12" and Smaller	$+ 1/32"$ (0.8mm) - $1/16"$ (1.6mm)
	14" and Larger	$\pm 1/8"$ (3.2mm)
Diameter of Contact Face	1/16" Raised Face	$\pm 1/32"$ (0.8mm)
	1/4" Raised Face Tongue & Groove Male, Female	$\pm 1/64"$ (0.4mm)
Diameter of Counterbore	Same as for Inside Diameter	
Drilling	Bolt Circle	$\pm 1/16"$ (1.6mm)
	Bolt hole Spacing	$\pm 1/32"$ (0.8mm)
	Eccentricity of Both Circle with Respect to Facing	21/2" & Smaller $1/32"$ (0.8mm) max 3" & Larger $1/16"$ (1.6mm) max
	Eccentricity of Both Circle with Respect to Bore	$1/32"$ (0.8mm) max
	Eccentricity of Facing with Respect to Bore	$1/32"$ (0.8mm) max
Thickness	18" and Smaller	$+ 1/8"$ (3.2mm) - 0"
	20" and Larger	$+ 3/16"$ (4.8mm) - 0"
Length Thru Hub	10" and Smaller	$\pm 1/16"$ (1.6mm)
	12" and Larger	$\pm 1/8"$ (3.2mm)

Welding Neck		
Outside Diameter	When O.D. is 24" or less	$\pm 1/6"$ (16mm)
Diameter	When O.D. is over 24"	$\pm 1/18"$ (3.2mm)
Inside Diameter	10" and Smaller	$+ 1/32"$ (0.8mm)
	12" thru 18"	$+ 1/16"$ (1.6mm)
	20" and Larger	$+ 1/8"$ (3.2mm) - $1/16"$ (1.6mm)
Diameter of Contact Face	1/16" Raised Face	$+ 1/32"$ (0.8mm)
	1/4" Raised Face Tongue & Groove Male, Female	$+ 1/64"$ (0.4mm)
Diameter of Hub at Base	When Hub Base is 24" or Smaller	$= 1/16"$ (1.6mm)
	When Hub Base is Over 24"	- $1/8"$ (3.2mm)
Diameter of Hub at Point of Welding	5" and Smaller	$+ 3/32"$ (2.4mm) - $1/32"$ (0.8mm)
	6" and Larger	$+ 5/32"$ (4.0mm) - $1/32"$ (0.8mm)
Drilling	Bolt Circle	$+ 1/16"$ (1.6mm)
	Bolt hole spacing	$+ 1/32"$ (0.8mm)
	Eccentricity of Bolt Circle with Respect to Facing	21/2" & Smaller $1/32"$ (0.8mm) max 3" & Larger $1/16"$ (1.6mm) max
	Eccentricity of Bolt Circle with Respect to Bore	$1/32"$ (0.8mm) max
	Eccentricity of Facing with Respect to Bore	$1/32"$ (0.8mm) max
	Eccentricity of Facing with Respect to Bore	$1/32"$ (0.8mm) max
Thickness	18" and Smaller	$+ 1/8"$ (3.2mm)-0"
	20" and Larger	$+ 3/16"$ (4.8mm)-0"
Length Thru Hub	10" and Smaller	$+ 1/16"$ (1.6mm)
	12" and Larger	$+ 1/8"$ (3.2mm)

FORGED FLANGES TO ANSI B 16.5 (ASA 150 / 300 LBS)



150 LBS

Nominal Pipe Size (MM) (INCH.)		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 of Bore		Dia of R/F R	Depth of Socket F
								S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B		
15	1/2	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
20	3/4	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
25	1	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
32	1 1/4	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
40	1 1/2	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
50	2	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
65	2 1/2	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
80	3	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
100	4	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
125	5	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
150	6	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
200	8	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
250	10	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
300	12	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
350	14	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
400	16	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
450	18	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
500	20	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
600	24	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

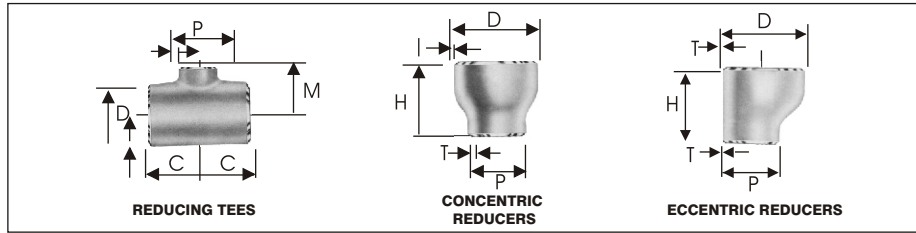
300 LBS

Nominal Pipe Size (MM) (INCH.)		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 of Bore		Dia of R/F R	Depth of Socket F
								S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B		
15	1/2	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
20	3/4	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
25	1	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
32	1 1/4	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
40	1 1/2	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
50	2	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
65	2 1/2	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
80	3	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
100	4	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
125	5	279.4	234.9	22.2	8	34.9	177.8	50.8	98.4	50.8	143.8	144.5	185.7	-
150	6	317.5	269.9	22.2	12	36.5	206.4	52.4	98.4	52.4	170.7	171.4	215.9	-
200	8	381.0	330.2	25.4	12	41.3	260.3	61.9	111.1	61.9	221.5	222.2	269.9	-
250	10	444.5	387.3	28.6	16	47.6	320.7	66.7	117.5	95.2	276.3	277.4	323.8	-
300	12	520.7	450.8	31.7	16	50.8	374.6	73.0	130.2	101.6	327.1	328.2	381.0	-
350	14	584.2	514.3	31.7	20	54.0	425.4	76.2	142.9	111.1	359.1	360.2	412.7	-
400	16	647.7	571.5	34.9	20	57.2	482.6	82.5	146.0	120.6	410.5	411.2	469.9	-
450	18	711.2	628.5	34.9	24	60.3	533.4	88.9	158.7	130.2	461.8	462.3	533.4	-
500	20	774.7	685.8	34.9	24	63.5	587.4	95.2	161.9	139.7	513.1	514.3	584.2	-
600	24	914.4	812.8	41.3	24	69.8	701.7	106.4	168.3	152.4	615.9	615.9	692.1	-

All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with (1.6) Raised Face, which is included in "Thickness(C)" and "Length through Hub(Y)"

• 600, 900, 1500, 2500 class flange are also available on request.

BUTT - WELDING PIPE FITTINGS ANSI B 16.9 AND B 16.28

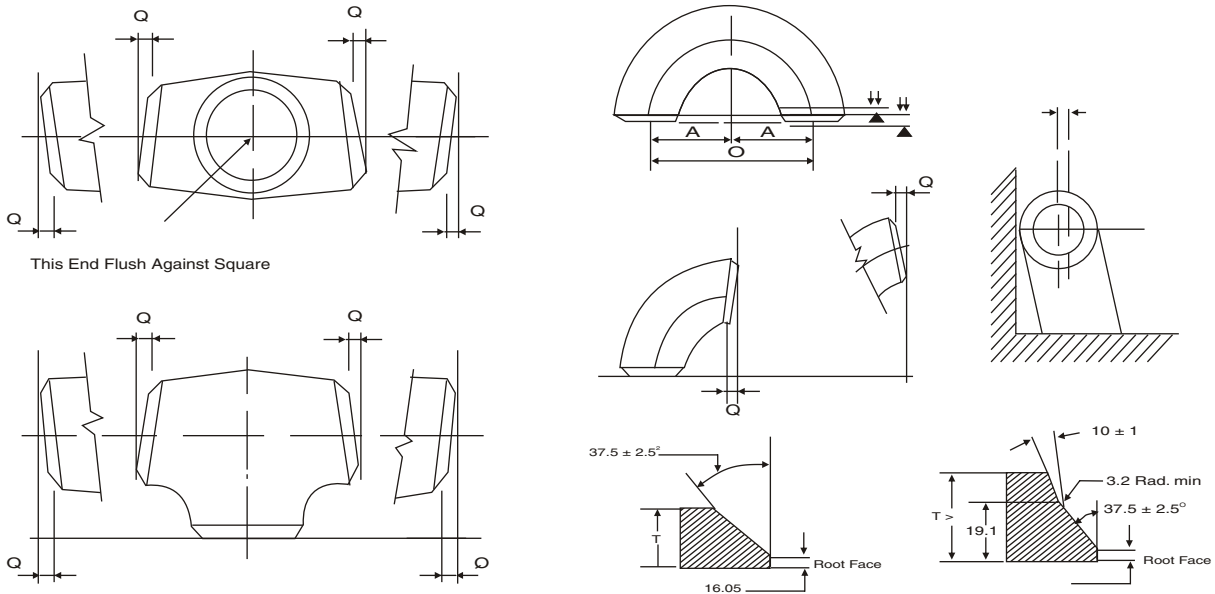


11/4 x 1	32 x 25	42.2	33.4	48	48	51	
11/4 x 3/4	32 x 20	42.2	26.7	48	48	51	
11/4 x 1/2	32 x 15	42.2	21.3	48	48	51	
11/2 x 11/2	40 x 32	48.3	42.2	57	57	64	
11/2 x 1	40 x 25	48.3	33.4	57	57	64	
11/2 x 3/4	40 x 20	48.3	26.7	57	57	64	
11/2 x 1/2	40 x 15	48.3	21.3	57	57	64	
2 x 11/2	50 x 40	60.3	48.2	64	60	76	
2 x 11/4	50 x 32	60.3	42.2	64	57	76	
2 x 1	50 x 25	60.3	33.4	64	51	76	
2 x 3/4	50 x 20	60.3	26.7	64	44	76	
21/2 x 2	65 x 50	73.0	60.3	76	70	89	
21/2 x 11/2	65 x 40	73.0	48.3	76	67	89	
21/2 x 11/4	65 x 32	73.0	42.2	76	64	89	
21/2 x 1	65 x 25	73.0	33.4	76	57	89	
3 x 21/2	80 x 65	88.9	73.0	86	83	89	
3 x 2	80 x 50	88.9	60.3	86	76	89	
3 x 11/2	80 x 40	88.9	48.3	86	73	89	
3 x 11/4	80 x 32	88.9	42.2	86	70	89	
4 x 31/2	100 x 90	114.3	101.6	105	102	102	
4 x 3	100 x 80	114.3	88.9	105	98	102	
4 x 21/2	100 x 65	114.3	73.0	105	95	102	
4 x 2	100 x 50	114.3	60.3	105	89	102	
4 x 11/2	100 x 40	114.3	48.3	105	86	102	
5 x 4	125 x 100	141.3	114.3	124	117	127	
5 x 31/2	125 x 90	141.3	101.6	124	114	127	
5 x 3	125 x 80	141.3	88.9	124	111	127	
5 x 21/2	125 x 65	141.3	73.0	124	108	127	
5 x 2	125 x 50	141.3	60.3	124	105	127	
6 x 5	150 x 125	168.3	141.3	143	137	140	
6 x 4	150 x 100	168.3	114.3	143	130	140	
6 x 31/2	150 x 90	168.3	101.6	143	127	140	
6 x 3	150 x 80	168.3	88.9	143	124	140	
6 x 21/2	150 x 65	168.3	73.0	143	121	140	

Nominal Pipe Size		Outside Diameter		Center to End		Length
Inch.	mm	D	P	C	M	H
8 x 6	200 x 150	219.1	168.3	178	168	152
8 x 5	200 x 125	219.1	141.3	178	162	152
8 x 4	200 x 100	219.1	114.3	178	156	152
8 x 31/2	200 x 90	219.1	101.6	178	152	152
10 x 8	250 x 200	273.1	219.1	216	203	178
10 x 6	250 x 150	273.1	168.1	216	194	178
10 x 5	250 x 125	273.1	141.3	216	191	178
10 x 4	250 x 100	273.1	114.3	216	184	178
12 x 10	300 x 250	323.9	273.1	254	241	203
12 x 8	300 x 200	323.9	219.1	254	229	203
12 x 6	300 x 150	323.9	168.3	254	219	203
12 x 5	300 x 125	323.9	141.3	254	216	203
14 x 12	350 x 300	355.6	323.9	279	270	330
14 x 10	350 x 250	355.6	273.1	279	257	330
14 x 8	350 x 200	355.6	219.1	279	248	330
14 x 6	350 x 150	355.6	168.3	279	238	330
16 x 14	400 x 350	406.4	355.6	305	305	356
16 x 12	400 x 300	406.4	323.9	305	295	356
16 x 10	400 x 250	406.4	273.1	305	283	356
16 x 8	400 x 200	406.4	219.1	305	273	356
16 x 6	400 x 150	406.4	168.3	305	264	-
18 x 16	450 x 400	457.0	406.4	343	330	381
18 x 14	450 x 350	457.0	355.6	343	330	381
18 x 12	450 x 300	457.0	323.9	343	321	381
18 x 10	450 x 250	457.0	273.1	343	308	381
18 x 8	450 x 200	457.0	219.1	343	298	-
20 x 18	500 x 450	508.0	457.0	381	368	508
20 x 16	500 x 400	508.0	406.4	381	356	508
20 x 14	500 x 350	508.0	355.6	381	356	508
20 x 12	500 x 300	508.0	323.9	381	346	508
20 x 10	500 x 250	508.0	273.1	381	333	-
20 x 8	500 x 200	508.0	219.1	381	324	-
24 x 22	600 x 550	610.0	559.0	432	432	508
24 x 20	600 x 500	610.0	508.0	432	432	508
24 x 18	600 x 450	610.0	457.0	432	419	508
24 x 16	600 x 400	610.0	406.4	432	406	508
24 x 14	600 x 350	610.0	355.6	432	406	-
24 x 12	600 x 300	610.0	323.9	432	397	-
24 x 10	600 x 250	610.0	273.1	432	384	-

DIMENSIONAL TOLERANCES AS PER ANSI B 16.9 / B 16.28 / MSS SP -43 BUTT WELD FITTING

ALL FITTINGS				90°/60°/45° /30° ELBOWS & TEES		REDUCERS		180° RETURNS				CAPS		ANGULARITY TOLERANCE							
Nominal Pipe Size Inch/mm	Outside Diameter at Level		Inside Dia meter	Wall Thickness at End		Centre to End		Overall Length Dimensions		Centre to End		Back to Face Dimensions	Alignment of End Dimensions		Overall length		Nominal Pipe Size	Off Angle Inch/mm		Off Plane	
	D		T	A,B,C,M				H		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	MSS SP43	B16.9	
1/2" TO 2 1/2" 15 TO 65	±1.0		±0.8			FROM 1/2"TO10" 15TO250	FROM 3/4"	FROM 1/2"TO10" 15TO250	FROM 1/2"TO8" 15TO200							±4	±3.17	1/2" TO 4" 15 TO 100	1		1
3" TO 3 1/2" 80 TO 90		±0.79																5" TO 8" 125 TO 200	2		4
4" 100	+2 -1		±1.6			±2	±1.59	±2	±1.59	±7	±6.35	±7	±6.35	±1.0	±0.79			10" TO 12" 250 TO 300	3		5
5" TO 6" 125 TO 150	+3 -1	+1.59														±7	±6.35	14" TO 16" 350 TO 400	3	16" TO 24"	7
8" 200	±2	-0.79		Not Less Than	Not Less Than													18" TO 24" 450 TO 600	4	400 TO 600 1.6	10
10" TO 18" 250 TO 450	+4 -3	+2.38 -0.79	±3.2	87.5% Nominal Thk.	87.5% Nominal Thk.	FROM 12"TO30" ±3	±2.38	FROM 12"TO30" ±3	10"TO24" +2.38									26" TO 30" 650 TO 750	5	26" TO 36" 650 TO	10
20" TO 24" 500 TO 600	+6 -5	3.17 0.79				300 TO 750		300 TO 750	250 TO 600	±10"	±9.53			±2.0"	±1.59			32" TO 42" 800 TO 1050	5	900 2.4	13
26" TO 30" 650 TO 750	+7 -5		±4.8													±10		44" TO 48" 1100 TO 1200	5	38" TO 48"	20
32" TO 48" 800 TO 1200	+7 -5					±5												42" TO 48" 1050 TO 1200	±5	950 TO 1200 3.2	±20

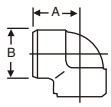


1. Out of round is the sum of absolute values of plus and minus tolerance.
2. The inside diameter at ends and the nominal wall thickness are to be specified by the purchaser.
3. Out of roundness tolerances shall be the difference between the Max. dia measured on any radial cross-section.
4. All dimensions are in millimeters except nominal pipe sizes which are in inches.

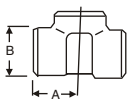
WELDING BEVEL STANDARDS ANSI B 16.25

FORGED SCREWED FITTING TO ANSI B-16.11 3000/6000 LBS. THREADED TO ASA B 2.1

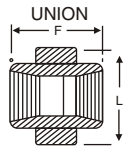
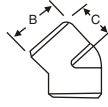
90° ELBOWS



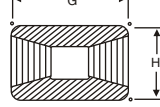
TEE



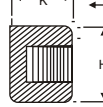
45° ELBOW



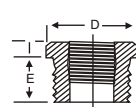
COUPLING



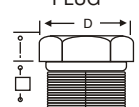
PIPE CAP



BUSHING



HEX HEAD PLUG



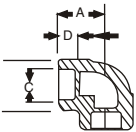
(DIMENSIONS IN MM)

HALF COUPLING = G/2

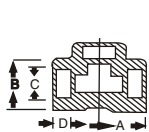
NOM BORE	PIPE O.D.	3000 LBS						COMMON FACTORS						6000 LBS					
		A	B	C	G	H	K	D	E	F	I	J	L	A	B	C	G	H	K
1/8"	10.3	21	22	17	32	16	19	11	10	40	-	6	-	25	25	19	32	22	-
1/4"	13.7	25	25	19	35	19	25	16	11	43	3	6	32	29	33	22	35	25	27
3/8"	17.2	29	33	22	38	22	25	17.5	13	48	4	8	38	33	38	25	38	32	27
1/2"	21.3	33	38	25	48	29	32	22	15	51	5	8	46	38	46	29	48	38	33
3/4"	26.7	38	46	29	51	35	37	27	16	57	6	10	51	44	56	33	51	44	38
1"	33.4	44	56	33	60	44	41	35	19	64	6	10	60	51	62	35	60	57	43
1 1/4"	42.2	51	62	35	67	57	44	44.5	21	70	7	14	72	60	75	43	67	64	46
1 1/2"	48.3	60	75	43	79	64	44	51	21	79	8	16	80	64	84	44	79	76	48
2"	60.3	64	84	45	86	76	48	63.5	22	88	9	17	94	83	102	52	86	92	51
2 1/2"	73.02	83	102	52	92	92	60	76	27	118	10	21	122	95	121	64	92	108	64
3"	89.0	95	121	64	108	108	65	89	29	121	10	65	140	106	146	79	108	127	68
4"	114.5	114	152	79	121	140	68	117.5	32	150	13	25	180	114	152	79	121	159	75

SOCKET WELD FITTING TO ANSI B-16.11

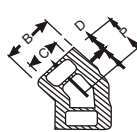
90° ELBOWS



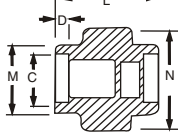
TEE



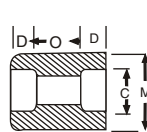
45° ELBOW



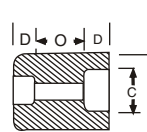
UNION



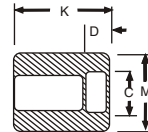
COUPLING



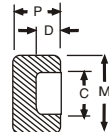
REDUCER



HALF COUPLING



COUPLING



CAP

NOM BORE	PIPE O.D.	3000 LBS.									COMMON FACTORS				6000 LBS.				
		A max.	B max.	K	J	L	M	N	P	Q	C min.	D min.	O min.	O max.	A	B	M	K	N
1/8"	10.3	22	18.5	26	16	40	17.3	32	17.5	10	10.7	10	5	8	22	22	20	25	46
1/4"	13.7	22	22	26	18	43	21.2	32	17.5	10	14.1	10	5	8	27	25	24	25	51
3/8"	17.2	25	25	26	19	48	25.4	36	19	10	17.6	10	3	9	27	28	28	26	60
1/2"	21.3	27	32	30	21	51	31	43	22	10	21.7	10	6	13	31	34	34	31	72
3/4"	26.7	34	38	36	24	57	37	50	25	13	27	13	6	13	37	42	41	35	80
1"	33.4	37	46	40	25	64	45.2	60	27	13	33.8	13	9	17	42	50	50	40	94
1 1/4"	42.2	42	56	40	29	70	55	70	30	13	42.6	13	9	17	47	59	58	41	100
1 1/2"	48.3	47	62	40	30	79	61.4	78	32	13	48.7	13	9	17	53	67	66	43	122
2"	60.3	56	75	52	37	89	75	95	38	13	61.2	16	15	23	59	84	83	55	
2 1/2"	73.02	60	92	52	48	114	91.3	125	38	16	73.8	16	14	24		102		56	
3"	89.00	76	110	52	51	127	108.8	140	44	16	89.8	16	14	24		121		58	
4"	114.50	88	137	58		150	136.9		48	19	115.5	19	14	24		152		64	

DIMENSIONS AND OTHERS SPECIFICATIONS AS PER CUSTOMERS REQUIREMENTS ARE AVAILABLE ON REQUEST