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CANGZHOU
HUAYE

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HUAYE 

CANGZHOU HUAYE

METAL PRODUCTS
CO.,LTD.

HUAYE Company Introduction

沧州华业金属制品有限公司始建于2004年，为专业生产碳钢焊接管件及法兰的中外合资企业。占地17000平方米，公司座落于“中国管件之都”河北省孟村县希望新区内。距天津港150公里，天津国际机场160公里，北京国际机场260公里，地理位置优越，交通便利。公司主要生产各种规格型号的美标、日标、德标弯头，三通，异径管，管帽及法兰等系列产品，年产量达10000吨。

公司自创建以来始终坚持以高起点，高标准为宗旨，以质取胜为原则，产品畅销全国各地并大量出口到东南亚、中东、南美、非洲、欧洲、北美等几十个国家和地区。

Established in 2004, Cangzhou Huaye Metal Products Co., Ltd as one of sino-singapore cooperated enterprise, specialized in manufacturing carbon steel butt-welded pipe fitting and carbon steel flanges.

Covers an area of 17000 square meter, and over 10000 tons annual output of carbon steel butt-welded pipe fitting and carbon steel flanges.

Our main products carbonsteel butt-welded pipe fitting such as elbows, tees, reducers, bends and caps, etc as per ANSI B16.9 ASTM A234 WPB standard, and JIS 2311 and DIN 2605 etc standard. Carbon steel flanges contain forge steel and cast steel, conform to ANSI B16.5, BS, DIN, EN and JIS standards. We have established the quality management system conforming to ISO 9001, and have got the certificate of conformity of quality system certification.

As an entirely export-oriented pipe fittings and flanges manufacturer, We provide about 100% of the turnover for Europe and other countries such as southeast and middle east and have acquired good reputations among the clients all over the world. With excellent quality, provide the best quality and highly service is our purpose.

◎ CANGZHOU HUAYE METAL PRODUCTS CO., LTD. ◎



CANGZHOU HUAYE
METAL PRODUCTS CO., LTD.

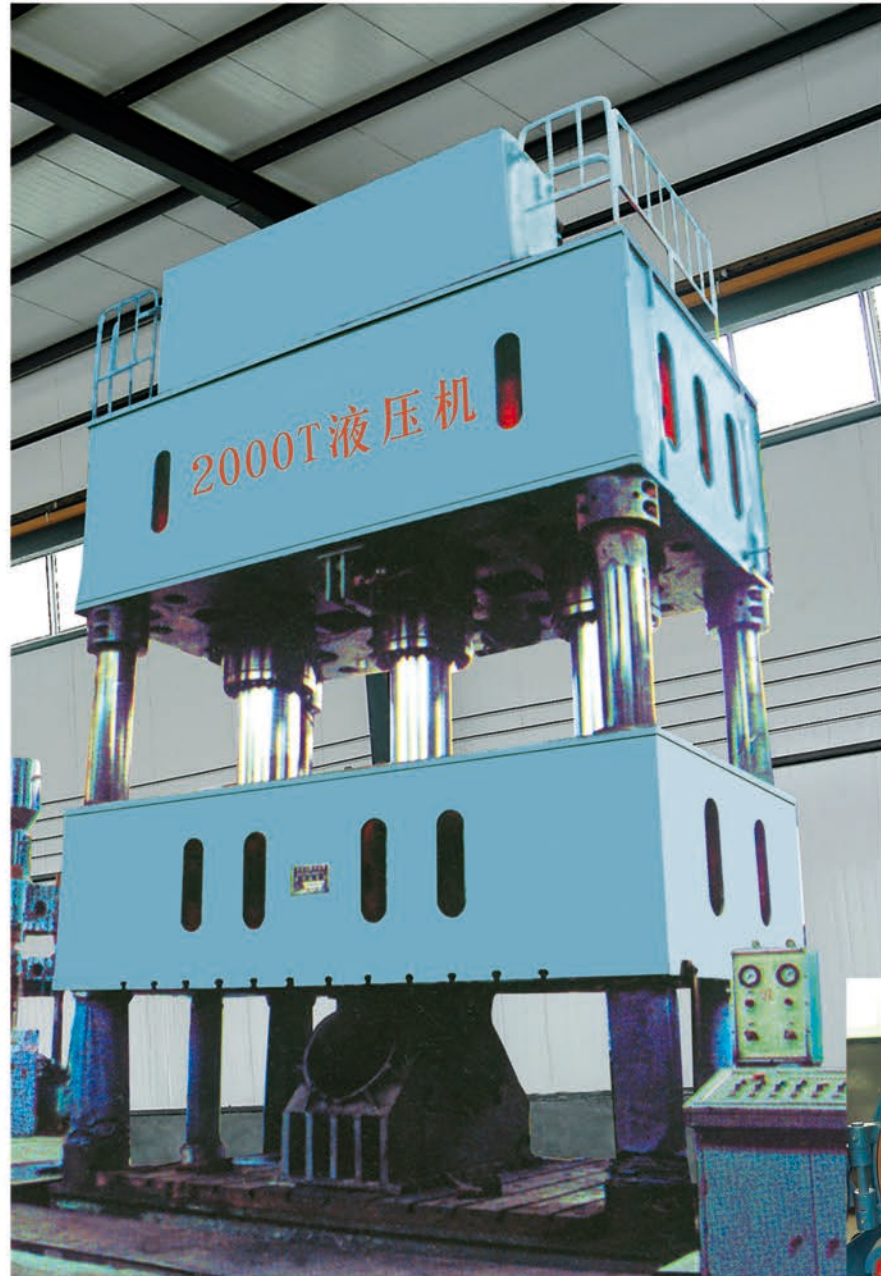
CANGZHOU HUAYE
QUALIFICATION PAPER >>



Open up market with perfect products win customers with honesty & sincerity.

CANGZHOU HUAYE
PRODUCTION EQUIPMENT

CANGZHOU HUAYE
PRODUCTION EQUIPMENT



▲ Hydraulic pressure machine of 2000,000 kilograms that can be used to elbow with a maximum 2600mm caliber



▲ Annealing furnace



▲ Intermediate-frequency extruding machine



▲ Polishing mahine



▲ Cutter



▲ Sloping-machines of high-pressure pipe fittings

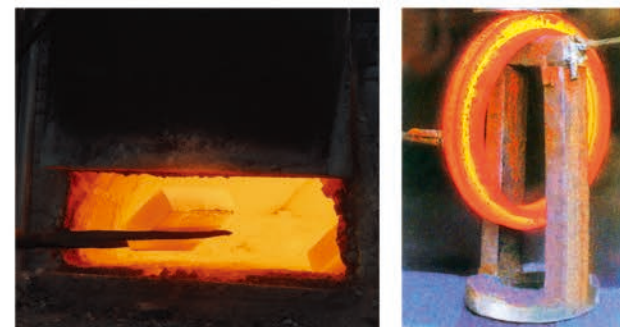


▲ Bend simmering

CANGZHOU HUAYE PRODUCTION EQUIPMENT



▲ Large vertical vehicle



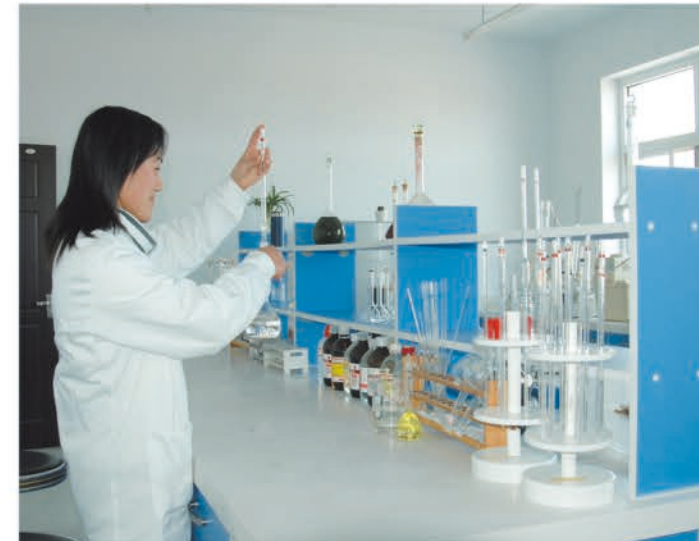
▲ air hammer



▲ Cutter

CANGZHOU HUAYE METAL PRODUCTS CO.,LTD.

CANGZHOU HUAYE DETECTING EQUIPMENT



▲ Physical and chemical testing



▲ tensile test



▲ Spectrum detecting



▲ Metallurgical analyzing



▲ Electronic spectrometer



▲ Ultrasonic detecting



▲ Thickness measurement



▲ X-ray detecting

CANGZHOU HUAYE
PRODUCTS SERIES >>



CANGZHOU HUAYE
PRODUCTS SERIES >>



CANGZHOU HUAYE

APPLICATION AREA



APPLICATION :

Petrochemical industry/power/chemical industry/light industry/metallurgy/ship-building/urban construction.

CANGZHOU HUAYE

METAL PRODUCTS CO.,LTD.

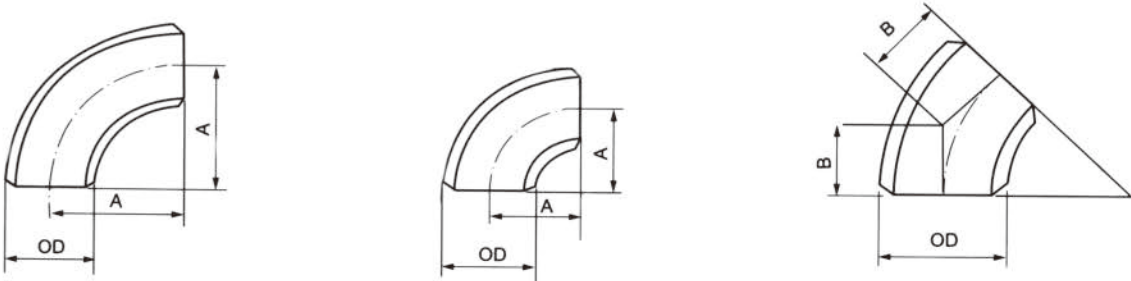
ASME-ASTM A234 WBP B16.9

DELSTE

Nominal Pipe Size(NPS)		Outside Diameter		Nominal Wall Thickness									
				Sch5s		Sch10s		Sch40s		Sch80s		Sch5	
A	B	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN
8	1/4	13.7	0.540	-	-	1.65	0.065	2.24	0.088	3.02	0.119	-	-
10	3/8	17.1	0.675	-	-	1.65	0.065	2.31	0.091	3.20	0.126	-	-
15	1/2	21.3	0.840	1.65	0.065	2.11	0.083	2.77	0.109	3.73	0.147	1.65	0.065
20	3/4	26.7	1.05	1.65	0.065	2.11	0.083	2.87	0.113	3.91	0.154	1.65	0.065
25	1	33.4	1.32	1.65	0.065	2.77	0.109	3.38	0.133	4.55	0.179	1.65	0.065
32	1 1/4	42.2	1.66	1.65	0.065	2.77	0.109	3.56	0.140	4.85	0.191	1.65	0.065
40	1 1/2	48.3	1.9	1.65	0.065	2.77	0.109	3.68	0.145	5.08	0.200	1.65	0.065
50	2	60.3	2.38	1.65	0.065	2.77	0.109	3.91	0.154	5.54	0.218	1.65	0.065
65	2 1/2	73.0	2.88	2.11	0.083	3.05	0.120	5.16	0.203	7.01	0.276	2.11	0.083
80	3	88.9	3.5	2.11	0.083	3.05	0.120	5.49	0.216	7.62	0.300	2.11	0.083
90	3 1/2	101.6	4	2.11	0.083	3.05	0.120	5.74	0.226	8.08	0.318	2.11	0.083
100	4	114.3	4.5	2.11	0.083	3.05	0.120	6.02	0.237	8.56	0.337	2.11	0.083
125	5	141.3	5.56	2.77	0.109	3.40	0.134	6.55	0.258	9.53	0.375	2.77	0.109
150	6	168.3	6.62	2.77	0.109	3.40	0.134	7.11	0.280	10.97	0.432	2.77	0.109
200	8	219.1	8.62	2.77	0.109	3.76	0.148	8.18	0.322	12.70	0.500	2.77	0.109
250	10	273.0	10.75	3.40	0.134	4.19	0.165	9.27	0.365	12.70	0.500	3.40	0.134
300	12	323.8	12.75	3.96	0.156	4.57	0.180	9.53	0.375	12.70	0.500	3.96	0.156
350	14	355.6	14	3.96	0.156	4.78	0.188	9.53	0.375	12.70	0.500	3.96	0.156
400	16	406.4	16	4.19	0.165	4.78	0.188	9.53	0.375	12.70	0.500	4.19	0.165
450	18	457	18	4.19	0.165	4.78	0.188	9.53	0.375	12.70	0.500	4.19	0.165
500	20	508	20	4.78	0.188	5.54	0.218	9.53	0.375	12.70	0.500	4.78	0.188
550	22	559	22	4.78	0.188	5.54	0.218	9.53	0.375	12.70	0.500	4.78	0.188
600	24	610	24	5.54	0.218	6.35	0.250	9.53	0.375	12.70	0.500	5.54	0.218
650	26	660	26	-	-	-	-	-	-	-	-	-	-
700	28	711	28	-	-	-	-	-	-	-	-	-	-
750	30	762	30	6.35	0.250	7.92	0.312	9.53	0.375	12.70	0.500	6.35	0.250
800	32	813	32	-	-	-	-	-	-	-	-	-	-
850	34	864	34	-	-	-	-	-	-	-	-	-	-
900	36	914	36	-	-	-	-	-	-	-	-	-	-
950	38	965	38	-	-	-	-	-	-	-	-	-	-
1000	40	1016	40	-	-	-	-	-	-	-	-	-	-
1050	42	1067	42	-	-	-	-	-	-	-	-	-	-
1100	44	1118	44	-	-	-	-	-	-	-	-	-	-
1150	46	1168	46	-	-	-	-	-	-	-	-	-	-
1200	48	1219	48	-	-	-	-	-	-	-	-	-	-

Nominal Pipe Size(NPS)		Outside Diameter		Nominal wall Thickness									
				Sch10		Sch20		Sch30		STD		Sch40	
A	B	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN
8	1/4	13.7	0.540	1.65	0.065	-	-	1.85	0.073	2.24	0.088	2.24	0.088
10	3/8	17.1	0.675	1.65	0.065	-	-	1.85	0.073	2.31	0.091	2.31	0.091
15	1/2	21.3	0.840	2.11	0.083	-	-	2.41	0.095	2.77	0.109	2.77	0.109
20	3/4	26.7	1.05	2.11	0.083	2.2	-	2.41	0.095	2.87	0.113	2.87	0.113
25	1	33.4	1.32	2.77	0.109	2.8	-	2.90	0.114	3.38	0.133	3.38	0.133
32	1 1/4	42.2	1.66	2.77	0.109	2.8	-	2.97	0.117	3.56	0.140	3.56	0.140
40	1 1/2	48.3	1.9	2.77	0.109	2.8	-	3.18	0.125	3.68	0.145	3.68	0.145
50	2	60.3	2.38	2.77	0.109	2.9	-	3.18	0.125	3.91	0.154	3.91	0.154
65	2 1/2	73.0	2.88	3.05	0.120	3.5	-	4.78	0.188	5.16	0.203	5.16	0.203
80	3	88.9	3.5	3.05	0.120	4.0	-	4.78	0.188	5.49	0.216	5.49	0.216
90	3 1/2	101.6	4	3.05	0.120	-	-	4.78	0.188	5.74	0.226	5.74	0.226
100	4	114.3	4.5	3.05	0.120	4.0	-	4.78	0.188	6.02	0.237	6.02	0.237
125	5	141.3	5.56	3.40	0.134	-	-	-	-	6.55	0.258	6.55	0.258
150	6	168.3	6.62	3.40	0.134	5.0	-	-	-	7.11	0.280	7.11	0.280
200	8	219.1	8.62	3.76	0.148	6.35	0.250	7.04	0.277	8.18	0.322	8.18	0.322
250	10	273.0	10.75	4.19	0.165	6.35	0.250	7.80	0.307	9.27	0.365	9.27	0.365
300	12	323.8	12.75	4.57	0.180	6.35	0.250	8.38	0.330	9.53	0.375	10.31	0.406
350	14	355.6	14	6.35	0.250	7.92	0.312	9.53	0.375	9.53	0.375	11.13	0.438
400	16	406.4	16	6.35	0.250	7.92	0.312	9.53	0.375	9.53	0.375	12.70	0.500
450	18	457	18	6.35	0.250	7.92	0.312	11.13	0.438	9.53	0.375	14.27	0.562
500	20	508	20	6.35	0.250	9.53	0.375	12.70	0.500	9.53	0.375	15.09	0.594
550	22	559	22	6.35	0.250	9.53	0.375	12.70	0.500	9.53	0.375	-	-
600	24	610	24	6.35	0.250	9.53	0.375	14.27	0.562	9.53	0.375	17.48	0.688
650	26	660	26	7.92	0.312	12.70	0.500	-	-	9.53	0.375	-	-
700	28	711	28	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	-	-
750	30	762	30	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	-	-
800	32	813	32	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	17.48	0.688
850	34	864	34	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	17.48	0.688
900	36	914	36	7.92	0.312	12.70	0.500	15.88	0.625	9.53	0.375	19.05	0.750
950	38	965	38	-	-	-	-	-	-	9.53	0.375	-	-
1000	40	1016	40	-	-	-	-	-	-	9.53	0.375	-	-
1050	42	1067	42	-	-	-	-	-	-	9.53	0.375	-	-
1100	44	1118	44	-	-	-	-	-	-	9.53	0.375	-	-
1150	46	1168	46	-	-	-	-	-	-	9.53	0.375	-	-
1200	48	1219	48	-	-	-	-	-	-	9.53	0.375	-	-

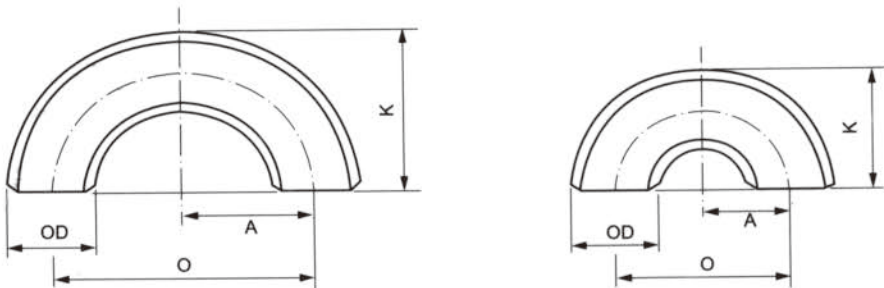
Wrought Steel Buttwelding Fittings(ASME)
 Long and Short Radius Elbows



ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at bevel OD		Center-to-End							
			90° Elbows A				45° Elbows B			
			Long Radius		Short Radius		Long Radius		Short Radius	
			IN	MM	IN	MM	IN	MM	IN	MM
1/2	0.84	21.3	1.5	38	-	-	0.62	16	-	-
3/4	1.05	26.7	1.12	29	-	-	0.44	11	-	-
1	1.32	33.4	1.5	38	1	25	0.88	22	0.41	10
1 1/4	1.66	42.2	1.88	48	1.25	32	1	25	0.52	13
1 1/2	1.9	48.3	2.25	57	1.5	38	1.12	29	0.62	16
2	2.38	60.3	3	76	2	51	1.38	35	0.83	21
2 1/2	2.88	73.0	3.75	95	2.5	64	1.75	44	1.04	26
3	3.5	88.9	4.5	114	3	76	2	51	1.24	32
3 1/2	4	101.6	5.25	133	3.5	89	2.25	57	1.45	37
4	4.5	114.3	6	152	4	102	2.5	64	1.66	42
5	5.56	141.3	7.5	190	5	127	3.12	79	2.07	53
6	6.62	168.3	9	229	6	152	3.75	95	2.50	63
8	8.62	219.1	12	305	8	203	5	127	3.31	84
10	10.75	273.0	15	381	10	254	6.25	159	4.14	105
12	12.75	323.8	18	457	12	305	7.5	190	4.97	126
14	14	355.6	21	533	14	356	8.75	222	5.80	147
16	16	406.4	24	610	16	406	10	254	6.63	168
18	18	457	27	686	18	457	11.25	286	7.46	189
20	20	508	30	762	20	508	12.5	318	8.28	210
22	22	559	33	838	22	559	13.5	343	9.11	232
24	24	610	36	914	24	610	15	381	9.94	253
26	26	660	39	991	26	660	16	405	10.77	274
28	28	711	42	1067	28	711	17.25	438	11.60	295
30	30	762	45	1143	30	762	18.5	470	12.43	316
32	32	813	48	1219	32	813	19.75	502	14.89	378
34	34	864	51	1295	34	864	21	533	14.08	358
36	36	914	54	1372	36	914	22.25	565	14.91	379
38	38	965	57	1448	38	965	23.62	600	15.74	400
40	40	1016	60	1524	40	1016	24.88	632	16.57	421
42	42	1067	63	1600	42	1067	26	660	17.40	442
44	44	1118	66	1676	44	1118	27.38	695	18.23	463
46	46	1168	69	1753	46	1168	28.62	727	19.05	484
48	48	1219	72	1829	48	1219	29.88	759	19.88	505

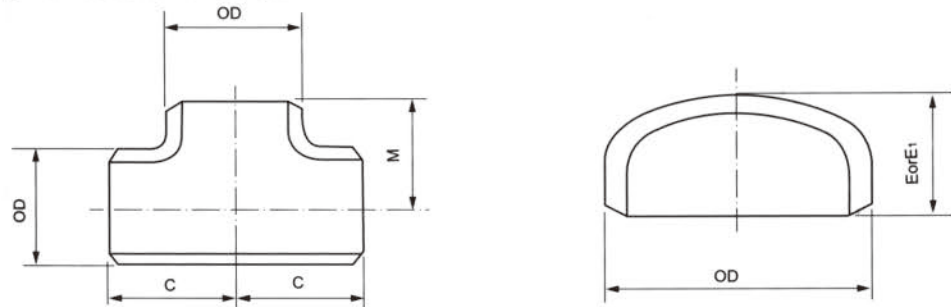
Wrought Steel Buttwelding Fittings(ASME)
 Long and Short Radius Returns



ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at bevel OD		Center-to-End				End-to-End			
			180 Returns O				180 Returns K			
			Long Radius		Short Radius		Long Radius		Short Radius	
			IN	MM	IN	MM	IN	MM	IN	MM
1/2	0.84	21.3	3	76	-	-	1.88	48	-	-
3/4	1.05	26.7	2.25	57	-	-	1.69	43	-	-
1	1.32	33.4	3	76	2	51	2.19	56	1.62	41
1 1/4	1.66	42.2	3.75	95	2.5	64	2.75	70	2.06	52
1 1/2	1.9	48.3	4.5	114	3	76	3.25	83	2.44	62
2	2.38	60.3	6	152	4	102	4.19	106	3.19	81
2 1/2	2.88	73.0	7.5	190	5	127	5.19	132	3.94	100
3	3.5	88.9	9	229	6	152	6.25	159	4.75	121
3 1/2	4	101.6	10.5	267	7	178	7.25	184	5.5	140
4	4.5	114.3	12	305	8	203	8.25	210	6.25	159
5	5.56	141.3	15	381	10	254	10.31	262	7.75	197
6	6.62	168.3	18	457	12	305	12.31	313	9.31	237
8	8.62	219.1	24	610	16	406	16.31	414	12.31	313
10	10.75	273.0	30	762	20	508	20.38	518	15.38	391
12	12.75	323.8	36	914	24	610	24.38	619	18.38	467
14	14	355.6	42	1067	28	711	28	711	21	533
16	16	406.4	48	1219	32	813	32	813	24	610
18	18	457	54	1372	36	914	36	914	27	686
20	20	508	60	1524	40	1016	40	1016	30	762
22	22	559	66	1676	44	1118	44	1118	33	838
24	24	610	72	1829	48	1219	48	1219	36	914

Wrought Steel Buttwelding Fittings(ASME)
Straight Tees and Caps

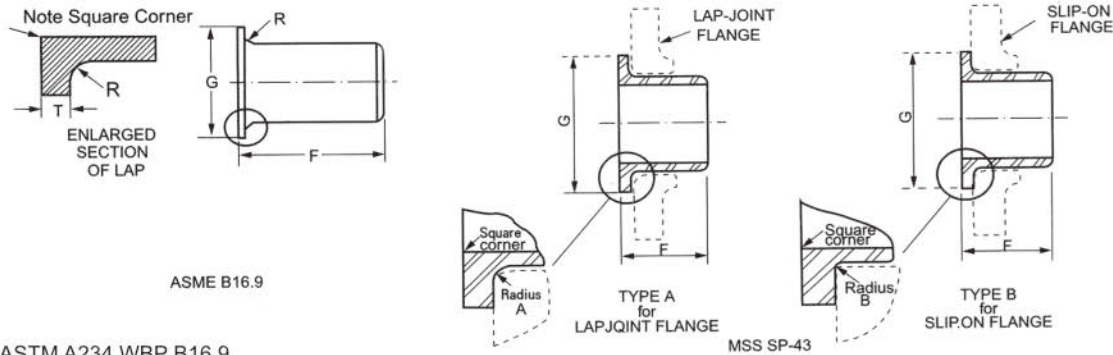


ASME-ASTM A234 WBP B16.9

Nominal pipe size (NPS)	Outside Diameter at bevel OD		Center-to-End				End-to-End					
			Straight Tees				Caps					
			C		M(1)		Length(2) E		Limiting Wall Thickness for Length "E"		Length(3) E ₁	
			IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
1/2	0.84	21.3	1	25	1	25	1	25	0.18	4.57	1	25
3/4	1.05	26.7	1.12	29	1.12	29	1	25	0.15	3.81	1	25
1	1.32	33.4	1.5	38	1.5	38	1.5	38	0.18	4.57	1.5	38
1 1/4	1.66	42.2	1.88	48	1.88	48	1.5	38	0.19	4.83	1.5	38
1 1/2	1.9	48.3	2.25	57	2.25	57	1.5	38	0.2	5.08	1.5	38
2	2.38	60.3	2.5	64	2.5	64	1.5	38	0.22	5.59	1.75	44
2 1/2	2.88	73.0	3	76	3	76	1.5	38	0.28	7.11	2	51
3	3.5	88.9	3.38	86	3.38	86	2	51	0.3	7.62	2.5	64
3 1/2	4	101.6	3.75	95	3.75	95	2.5	64	0.32	8.13	3	76
4	4.5	114.3	4.12	105	4.12	105	2.5	64	0.34	8.64	3	76
5	5.56	141.3	4.88	124	4.88	124	3	76	0.38	9.65	3.5	89
6	6.62	168.3	5.62	143	5.62	143	3.5	89	0.43	10.92	4	102
8	8.62	219.1	7	178	7	178	4	102	0.5	12.7	5	127
10	10.75	273.0	8.5	216	8.5	216	5	127	0.5	12.7	6	152
12	12.75	323.8	10	254	10	254	6	152	0.5	12.7	7	178
14	14	355.6	11	279	11	279	6.5	165	0.5	12.7	7.5	191
16	16	406.4	12	305	12	305	7	178	0.5	12.7	8	203
18	18	457.2	13.5	343	13.5	343	8	203	0.5	12.7	9	229
20	20	508	15	381	15	381	9	229	0.5	12.7	10	254
22	22	558.8	16.5	419	16.5	419	10	254	0.5	12.7	10	254
24	24	609.6	17	432	17	432	10.5	267	0.5	12.7	12	305
26	26	660.4	19.5	495	19.5	495	10.5	267	-	-	-	-
28	28	711.2	20.2	521	20.2	521	10.5	267	-	-	-	-
30	30	762	22	559	22	559	10.5	267	-	-	-	-
32	32	812.8	23.5	597	23.5	597	10.5	267	-	-	-	-
34	34	863.6	25	635	25	635	10.5	267	-	-	-	-
36	36	914.4	26.5	673	26.5	673	10.5	267	-	-	-	-
38	38	965.2	28	711	28	711	12	305	-	-	-	-
40	40	1016	29.5	749	29.5	749	12	305	-	-	-	-
42	42	1066.8	30	762	28	711	12	305	-	-	-	-
44	44	1117.6	32	813	30	762	13.5	343	-	-	-	-
46	46	1168.4	33.5	851	31.5	800	13.5	343	-	-	-	-
48	48	1219.2	35	889	33	838	13.5	343	-	-	-	-

- NOTES:
- (1) outlet dimension M for NPS 26 and larger is recommended but not required.
- (2) length E applies for thickness not exceeding that given in column " Limiting Wall Thickness for Length E
- (3) length E₁ applies for thickness greater than that given in column " Limiting Wall Thickness for Length E " lfor NPS24 and smaller.

Wrought Steel Buttwelding Fittings(ASME)
Lap Joint Stub Ends



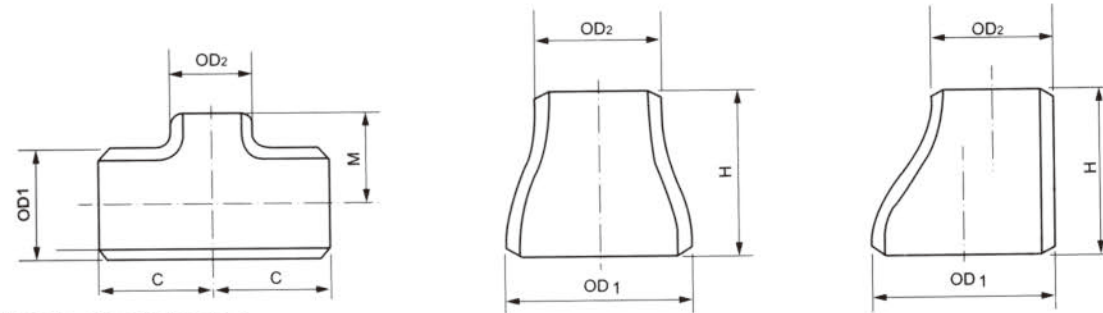
ASME B16.9

ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at bevel OD		Outside Diameter of barrel				Diameter of Lap G (Nominal & Max)	
			Max		Min			
	IN	MM	IN	MM	IN	MM	IN	MM
1/2	0.84	21.3	0.896	22.8	0.809	20.5	1.38	35
3/4	1.05	26.7	1.106	28.1	1.019	25.9	1.69	43
1	1.32	33.4	1.376	35	1.284	32.6	2	51
1¼	1.66	42.2	1.716	43.6	1.629	41.4	2.5	64
1½	1.9	48.3	1.965	49.9	1.869	47.5	2.88	73
2	2.38	60.3	2.456	62.4	2.344	59.5	3.62	92
2½	2.88	73.0	2.966	75.3	2.844	72.2	4.12	106
3	3.5	88.9	3.596	91.3	3.469	88.1	5	127
3½	4	101.6	4.096	104	3.969	100.8	5.5	140
4	4.5	114.3	4.593	116.7	4.469	113.5	6.19	157
5	5.56	141.3	5.683	144.3	5.532	140.5	7.31	185
6	6.62	168.3	6.743	171.3	6.594	167.5	8.5	218
8	8.62	219.1	8.743	222.1	8.594	218.3	10.62	270
10	10.75	273.0	10.913	277.2	10.719	272.3	12.75	324
12	12.75	323.8	12.913	328	12.719	323.1	15	381
14	14	355.6	14.17	359.9	13.969	354.8	16.25	413
16	16	406.4	16.18	411	15.969	405.6	18.5	470
18	18	457	18.19	462	17.969	456	21	533
20	20	508	20.24	514	19.969	507	23	584
22	22	559	22.24	565	21.969	558	25.25	641
24	24	610	24.24	616	23.969	609	27.25	692

Nominal pipe size(NPS)	Length F				Radius R			
	ASME Long		ASME Short & MSS		MSS Type A & ASME (Nominal & Max)		MSS Type B (Max)	
	IN	MM	IN	MM	IN	MM	IN	MM
1/2	3	76	2	51	0.12	3	0.03	0.8
3/4	3	76	2	51	0.12	3	0.03	0.8
1	4	102	2	51	0.12	3	0.03	0.8
1 1/4	4	102	2	51	0.19	5	0.03	0.8
1 1/2	4	102	2	51	0.25	6	0.03	0.8
2	6	152	2.5	64	0.31	8	0.03	0.8
2 1/2	6	152	2.5	64	0.31	8	0.03	0.8
3	6	152	2.5	64	0.38	10	0.03	0.8
3 1/2	6	152	3	76	0.38	10	0.03	0.8
4	6	152	3	76	0.44	11	0.03	0.8
5	8	203	3	76	0.44	11	0.06	1.5
6	8	203	3.5	89	0.5	13	0.06	1.5
8	8	203	4	102	0.5	13	0.06	1.5
10	10	254	5	127	0.5	13	0.06	1.5
12	10	254	6	152	0.5	13	0.06	1.5
14	12	305	6	152	0.5	13	0.06	1.5
16	12	305	6	152	0.5	13	0.06	1.5
18	12	305	6	152	0.5	13	0.06	1.5
20	12	305	6	152	0.5	13	0.06	1.5
22	12	305	6	152	0.5	13	0.06	1.5
24	12	305	6	152	0.5	13	0.06	1.5

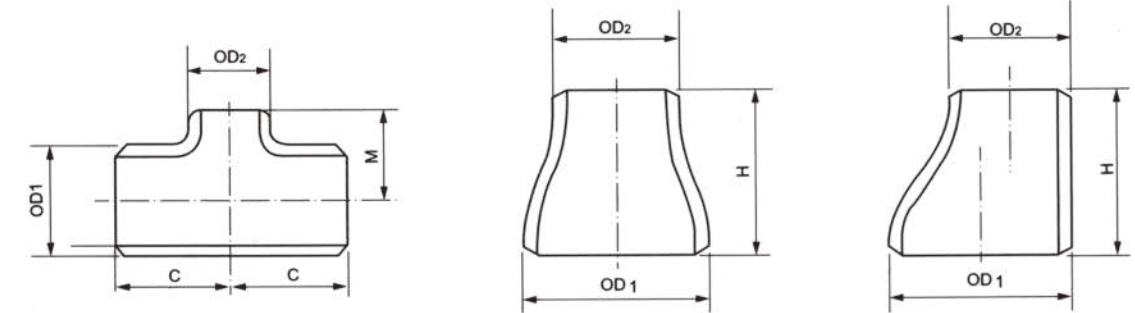
Wrought Steel Buttwelding Fittings(ASME)
Reducing Tees and Concentric & Eccentric Reducers



ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at Bevel				Center-to-End				End-to-End	
	OD1		OD2		C		M		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
$\frac{3}{4} \times \frac{1}{2}$	1.05	26.7	0.84	21.3	1.12	29	1.12	29	1.5	38
$1 \times \frac{3}{4}$	1.32	33.4	1.05	26.7	1.5	38	1.5	38	2	51
$1 \times \frac{1}{2}$	1.32	33.4	0.84	21.3	1.5	38	1.5	38	2	51
$1\frac{1}{4} \times 1$	1.66	42.2	1.32	33.4	1.88	48	1.88	48	2	51
$1\frac{1}{4} \times \frac{3}{4}$	1.66	42.2	1.05	26.7	1.88	48	1.88	48	2	51
$1\frac{1}{4} \times \frac{1}{2}$	1.66	42.2	0.84	21.3	1.88	48	1.88	48	2	51
$1\frac{1}{2} \times 1\frac{1}{4}$	1.9	48.3	1.66	42.2	2.25	57	2.25	57	2.5	64
$1\frac{1}{2} \times 1$	1.9	48.3	1.32	33.4	2.25	57	2.25	57	2.5	64
$1\frac{1}{2} \times \frac{3}{4}$	1.9	48.3	1.05	26.7	2.25	57	2.25	57	2.5	64
$1\frac{1}{2} \times \frac{1}{2}$	1.9	48.3	0.84	21.3	2.25	57	2.25	57	2.5	64
$2 \times 1\frac{1}{2}$	2.38	60.3	1.9	48.3	2.5	64	2.38	60	3	76
$2 \times 1\frac{1}{4}$	2.38	60.3	1.66	42.2	2.5	64	2.25	57	3	76
2×1	2.38	60.3	1.32	33.4	2.5	64	2	51	3	76
$2 \times \frac{3}{4}$	2.38	60.3	1.05	26.7	2.5	64	1.75	44	3	76
$2 \times \frac{1}{2}$	2.38	60.3	0.84	21.3	2.5	64	-	-	3	76
$2\frac{1}{2} \times 2$	2.88	73	2.38	60.3	3	76	2.75	70	3.5	89
$2\frac{1}{2} \times 1\frac{1}{2}$	2.88	73	1.9	48.3	3	76	2.62	67	3.5	89
$2\frac{1}{2} \times 1\frac{1}{4}$	2.88	73	1.66	42.2	3	76	2.5	64	3.5	89
$2\frac{1}{2} \times 1$	2.88	73	1.32	33.4	3	76	2.25	57	3.5	89
$2\frac{1}{2} \times \frac{3}{4}$	2.88	73	1.05	26.7	3	76	-	-	3.5	89
$2\frac{1}{2} \times \frac{1}{2}$	2.88	73	0.84	21.3	3	76	-	-	3.5	89
$3 \times 2\frac{1}{2}$	3.5	88.9	2.88	73	3.38	86	3.25	83	3.5	89
3×2	3.5	88.9	2.38	60.3	3.38	86	3	76	3.5	89
$3 \times 1\frac{1}{2}$	3.5	88.9	1.9	48.3	3.38	86	2.88	73	3.5	89
$3 \times 1\frac{1}{4}$	3.5	88.9	1.66	42.2	3.38	86	2.75	70	3.5	89
3×1	3.5	88.9	1.32	33.4	3.38	86	-	-	3.5	89
$3 \times \frac{3}{4}$	3.5	88.9	1.05	26.7	3.38	86	-	-	3.5	89
$3 \times \frac{1}{2}$	3.5	88.9	0.84	21.3	3.38	86	-	-	3.5	89
$3\frac{1}{2} \times 3$	4	101.6	3.5	88.9	3.75	95	3.62	92	4	102
$3\frac{1}{2} \times 2\frac{1}{2}$	4	101.6	2.88	73	3.75	95	3.5	89	4	102
$3\frac{1}{2} \times 2$	4	101.6	2.38	60.3	3.75	95	3.25	83	4	102
$3\frac{1}{2} \times 1\frac{1}{2}$	4	101.6	1.9	48.3	3.75	95	3.12	79	4	102
$3\frac{1}{2} \times 1\frac{1}{4}$	4	101.6	1.66	42.2	3.75	95	-	-	4	102
$4 \times 3\frac{1}{2}$	4.5	114.3	4	101.6	4.12	105	4	102	4	102
4×3	4.5	114.3	3.5	88.9	4.12	105	3.88	98	4	102
$4 \times 2\frac{1}{2}$	4.5	114.3	2.88	73	4.12	105	3.75	95	4	102
4×2	4.5	114.3	2.38	60.3	4.12	105	3.5	89	4	102
$4 \times 1\frac{1}{2}$	4.5	114.3	1.9	48.3	4.12	105	3.38	86	4	102
$4 \times 1\frac{1}{4}$	4.5	114.3	1.66	42.2	4.12	105	-	-	4	102
4×1	4.5	114.3	1.32	33.4	4.12	105	-	-	4	102

Wrought Steel Buttwelding Fittings(ASME)
Reducing Tees and Concentric & Eccentric Reducers



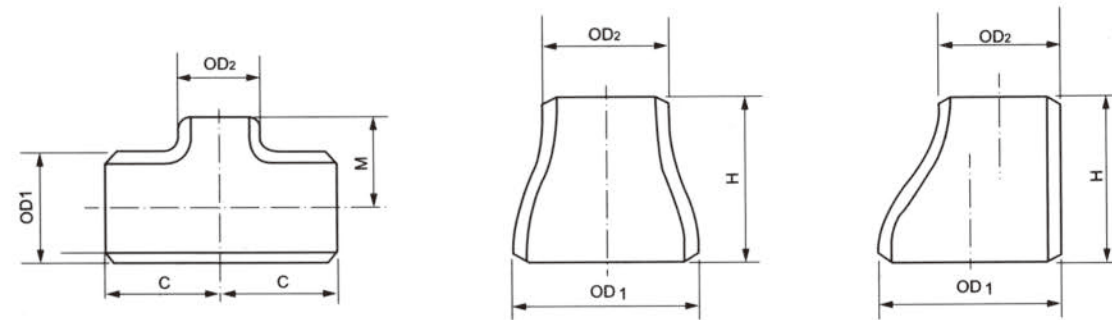
ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at Bevel				Center-to-End				End-to-End	
	OD1		OD2		C		M(1)		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
5×4	5.56	141.3	4.5	114.3	4.88	124	4.62	117	5	127
$5 \times 3\frac{1}{2}$	5.56	141.3	4	101.6	4.88	124	4.5	114	5	127
5×3	5.56	141.3	3.5	88.9	4.88	124	4.38	111	5	127
$5 \times 2\frac{1}{2}$	5.56	141.3	2.88	73	4.88	124	4.25	108	5	127
5×2	5.56	141.3	2.38	60.3	4.88	124	4.12	105	5	127
$5 \times 1\frac{1}{2}$	5.56	141.3	1.9	48.3	4.88	124	*	*	5	127
$5 \times 1\frac{1}{4}$	5.56	141.3	1.66	42.2	4.88	124	*	*	5	127
6×5	6.62	168.3	4.56	114.3	5.62	143	5.38	137	5.5	140
6×4	6.62	168.3	4.5	114.3	5.62	143	5.12	130	5.5	140
$6 \times 3\frac{1}{2}$	6.62	168.3	4	101.6	5.62	143	5	127	5.5	140
6×3	6.62	168.3	3.5	88.9	5.62	143	4.88	124	5.5	140
$6 \times 2\frac{1}{2}$	6.62	168.3	2.88	73	5.62	143	4.75	121	5.5	140
6×2	6.62	168.3	2.38	60.3	5.62	143	*	*	5.5	140
8×6	8.62	219.1	6.62	168.3	7	178	6.62	168	6	152
8×5	8.62	219.1	5.56	141.3	7	178	6.38	162	6	152
8×4	8.62	219.1	4.5	114.3	7	178	6.12	156	6	152
$8 \times 3\frac{1}{2}$	8.62	219.1	4	101.6	7	178	6	152	6	152
8×3	8.62	219.1	3.5	88.9	7	178	*	*	6	152
10×8	10.75	273	8.62	219.1	8.5	216	8	203	7	178
10×6	10.75	273	6.62	168.3	8.5	216	7.62	194	7	178
10×5	10.75	273	5.56	141.3	8.5	216	7.5	191	7	178
10×4	10.75	273	4.5	114.3	8.5	216	7.25	184	7	178
10×3	10.75	273	3.5	88.9	8.5	216	*	*	7	178
12×10	12.75	323.8	10.75	273	10	254	9.5	241	8	203
12×8	12.75	323.8	8.62	219.1	10	254	9	229	8	203
12×6	12.75	323.8	6.62	168.3	10	254	8.62	219	8	203
12×5	12.75	323.8	5.56	141.3	10	254	8.5	216	8	203
12×4	12.75	323.8	4.5	114.3	10	254	*	*	8	203
14×12	14	355.6	12.75	323.8	11	279	10.62	270	13	330
14×10	14	355.6	10.75	273	11	279	10.12	257	13	330
14×8	14	355.6	8.62	219.1	11	279	9.75	248	13	330
14×6	14	355.6	6.62	168.3	11	279	9.38	238	13	330
14×5	14	355.6	5.56	141.3	11	279	*	*	13	330
16×14	16	406.4	14	355.6	12	305	12	305	14	356
16×12	16	406.4	12.75	323.8	12	305	11.62	295	14	356
16×10	16	406.4	10.75	273	12	305	11.12	283	14	356
16×8	16	406.4	8.62	219.1	12	305	10.75	273	14	356
16×6	16	406.4	6.62	168.3	12	305	10.38	264	14	356
18×16	18	457	16	406.4	13.5	343	13	330	15	381

NOTE:

(1) Outlet dimensions M for run sizes NPS 14 and larger is recommended but not required.

Wrought Steel Buttwelding Fittings(ASME)
 Reducing Tees and Concentric & Eccentric Reducers

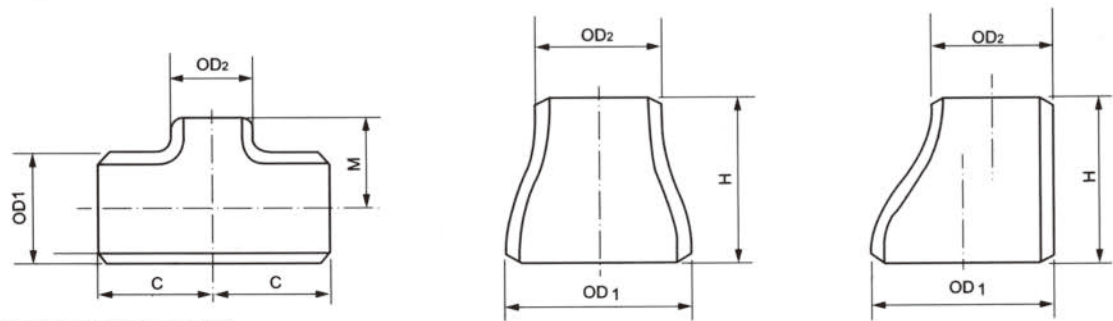


ASME-ASTM A234 WBP B16.9

Nominal pipe size (NPS)	Outside Diameter at Bevel				Center-to-End				End-to-End	
	OD1		OD2		C		M(1)		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
18×14	18	457	14	355.6	13.5	343	13	330	15	381
18×12	18	457	12.75	323.8	13.5	343	12.62	321	15	381
18×10	18	457	10.75	273	13.5	343	12.12	308	15	381
18×8	18	457	8.62	219.1	13.5	343	11.75	298	15	381
20×18	20	508	18	457.2	15	381	14.5	368	20	508
20×16	20	508	16	406.4	15	381	14	356	20	508
20×14	20	508	14	355.6	15	381	14	356	20	508
20×12	20	508	12.75	323.8	15	381	13.62	346	20	508
20×10	20	508	10.75	273	15	381	13.12	333	20	508
20×8	20	508	8.62	219.1	15	381	12.75	324	20	508
22×20	22	559	20	508	16.5	419	16	406	20	508
22×18	22	559	18	457.2	16.5	419	15.5	394	20	508
22×16	22	559	16	406.4	16.5	419	15	381	20	508
22×14	22	559	14	355.6	16.5	419	15	381	20	508
22×12	22	559	12.75	323.8	16.5	419	14.62	371	20	508
22×10	22	559	10.75	273	16.5	419	14.12	359	20	508
24×22	24	610	22	558.8	17	432	17	432	20	508
24×20	24	610	20	508	17	432	17	432	20	508
24×18	24	610	18	457.2	17	432	16.5	419	20	508
24×16	24	610	16	406.4	17	432	16	406	20	508
24×14	24	610	14	355.6	17	432	16	406	20	508
24×12	24	610	12.75	323.8	17	432	15.62	397	20	508
24×10	24	610	10.75	273	17	432	15.12	384	20	508
26×24	26	660	24	609.6	19.5	495	19	483	24	610
26×22	26	660	22	558.8	19.5	495	18.5	470	24	610
26×20	26	660	20	508	19.5	495	18	457	24	610
26×18	26	660	18	457.2	19.5	495	17.5	444	24	610
26×16	26	660	16	406.4	19.5	495	17	432	24	610
26×14	26	660	14	355.6	19.5	495	17	432	24	610
26×12	26	660	12.75	323.8	19.5	495	16.62	422	24	610
28×26	28	711	26	660.4	20.5	521	20.5	521	24	610
28×24	28	711	24	609.6	20.5	521	20	508	24	610
28×22	28	711	22	558.8	20.5	521	19.5	495	24	610
28×20	28	711	20	508	20.5	521	19	483	24	610
28×18	28	711	18	457.2	20.5	521	18.5	470	24	610
28×16	28	711	16	406.4	20.5	521	18	457	24	610
28×14	28	711	14	355.6	20.5	521	18	457	24	610
28×12	28	711	12.75	323.8	20.5	521	17.62	448	24	610
30×28	30	762	28	711.2	22	559	21.5	546	24	610

NOTE:
 (1) Outlet dimensions M for run sizes NPS 14 and larger is recommended but not required.

Wrought Steel Buttwelding Fittings(ASME)
 Reducing Tees and Concentric & Eccentric Reducers

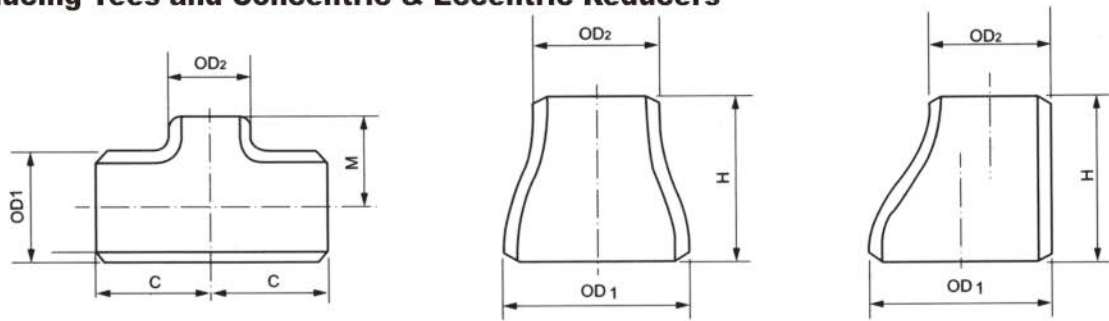


ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at Bevel				Center-to-End				End-to-End	
	OD1		OD2		C		M(1)		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
30×26	30	762	26	660.4	22	559	21.5	546	24	610
30×24	30	762	24	609.6	22	559	21	533	24	610
30×22	30	762	22	558.8	22	559	20.5	521	24	610
30×20	30	762	20	508	22	559	20	508	24	610
30×18	30	762	18	457.2	22	559	19.5	495	24	610
30×16	30	762	16	406.4	22	559	19	483	24	610
30×14	30	762	14	355.6	22	559	19	483	24	610
30×12	30	762	12.75	323.8	22	559	18.62	473	24	610
30×10	30	762	10.75	273	22	559	18.12	460	24	610
32×30	32	813	30	762	23.5	597	23	584	24	610
32×28	32	813	28	711.2	23.5	597	22.5	572	24	610
32×26	32	813	26	660.4	23.5	597	22.5	572	24	610
32×24	32	813	24	609.6	23.5	597	22	559	24	610
32×22	32	813	22	558.8	23.5	597	21.5	546	24	610
32×20	32	813	20	508	23.5	597	21	533	24	610
32×18	32	813	18	457.2	23.5	597	20.5	521	24	610
32×16	32	813	16	406.4	23.5	597	20	508	24	610
32×14	32	813	14	355.6	23.5	597	20	508	24	610
34×32	34	864	32	812.8	25	635	24.5	622	24	610
34×30	34	864	30	762	25	635	24	610	24	610
34×28	34	864	28	711.2	25	635	23.5	597	24	610
34×26	34	864	26	660.4	25	635	23.5	597	24	610
34×24	34	864	24	609.6	25	635	23	584	24	610
34×22	34	864	22	558.8	25	635	22.5	572	24	610
34×20	34	864	20	508	25	635	22	559	24	610
34×18	34	864	18	457.2	25	635	21.5	546	24	610
34×16	34	864	16	406.4	25	635	21	533	24	610
36×34	36	914	34	863.6	26.5	673	26	660	24	610
36×32	36	914	32	812.8	26.5	673	25.5	648	24	610
36×30	36	914	30	762	26.5	673	25	635	24	610
36×28	36	914	28	711.2	26.5	673	24.5	622	24	610
36×26	36	914	26	660.4	26.5	673	24.5	622	24	610
36×24	36	914	24	609.6	26.5	673	24	610	24	610
36×22	36	914	22	558.8	26.5	673	23.5	597	24	610
36×20	36	914	20	508	26.5	673	23	584	24	610
36×18	36	914	18	457.2	26.5	673	22.5	572	24	610
36×16	36	914	16	406.4	26.5	673	22	559	24	610
38×36	38	965	36	914.4	28	711	28	711	24	610
38×34	38	965	34	863.6	28	711	27.5	698	24	610

NOTE:
 (1) Outlet dimensions M for run sizes NPS 14 and larger is recommended but not required.

Wrought Steel Buttwelding Fittings(ASME)
Reducing Tees and Concentric & Eccentric Reducers

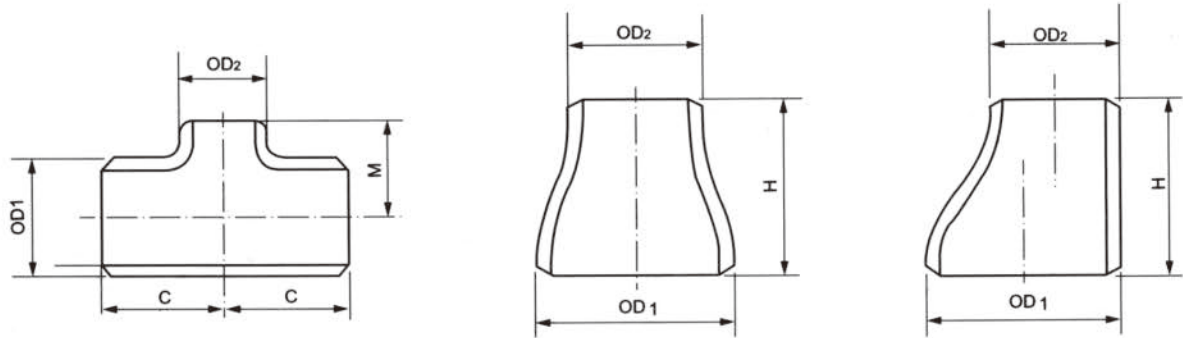


ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at Bevel				Center-to-End				End-to-End	
	OD1		OD2		C		M(1)		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
38×32	38	965	32	812.8	28	711	27	686	24	610
38×30	38	965	30	762	28	711	26.5	673	24	610
38×28	38	965	28	711.2	28	711	25.5	648	24	610
38×26	38	965	26	660.4	28	711	25.5	648	24	610
38×24	38	965	24	609.6	28	711	25	635	24	610
38×22	38	965	22	558.8	28	711	24.5	622	24	610
38×20	38	965	20	508	28	711	24	610	24	610
38×18	38	965	18	457.2	28	711	23.5	597	24	610
40×38	40	1016	38	965.2	29.5	749	29.5	749	24	610
40×36	40	1016	36	914.4	29.5	749	29	737	24	610
40×34	40	1016	34	863.6	29.5	749	28.5	724	24	610
40×32	40	1016	32	812.8	29.5	749	28	711	24	610
40×30	40	1016	30	762	29.5	749	27.5	698	24	610
40×28	40	1016	28	711.2	29.5	749	26.5	673	24	610
40×26	40	1016	26	660.4	29.5	749	26.5	673	24	610
40×24	40	1016	24	609.6	29.5	749	26	660	24	610
40×22	40	1016	22	558.8	29.5	749	25.5	648	24	610
40×20	40	1016	20	508	29.5	749	25	635	24	610
40×18	40	1016	18	457.2	29.5	749	24.5	622	24	610
42×40	42	1067	40	1016	30	762	28	711	24	610
42×38	42	1067	38	965.2	30	762	28	711	24	610
42×36	42	1067	36	914.4	30	762	28	711	24	610
42×34	42	1067	34	863.6	30	762	28	711	24	610
42×32	42	1067	32	812.8	30	762	28	711	24	610
42×30	42	1067	30	762	30	762	28	711	24	610
42×28	42	1067	28	711.2	30	762	27.5	698	24	610
42×26	42	1067	26	660.4	30	762	27.5	698	24	610
42×24	42	1067	24	609.6	30	762	26	660	24	610
42×22	42	1067	22	558.8	30	762	26	660	24	610
42×20	42	1067	20	508	30	762	26	660	24	610
42×18	42	1067	18	457.2	30	762	25.5	648	24	610
42×16	42	1067	16	406.4	30	762	25	635	24	610
44×42	44	1118	42	1066.8	32	813	30	762	24	610
44×40	44	1118	40	1016	32	813	29.5	749	24	610
44×38	44	1118	38	965.2	32	813	29	737	24	610
44×36	44	1118	36	914.4	32	813	28.5	724	24	610
44×34	44	1118	34	863.6	32	813	28.5	724	24	610
44×32	44	1118	32	812.8	32	813	28	711	24	610
44×30	44	1118	30	762	32	813	28	711	24	610

NOTE:
(1) Outlet dimensions M for run sizes NPS 14 and larger is recommended but not required.

Wrought Steel Buttwelding Fittings(ASME)
Reducing Tees and Concentric & Eccentric Reducers

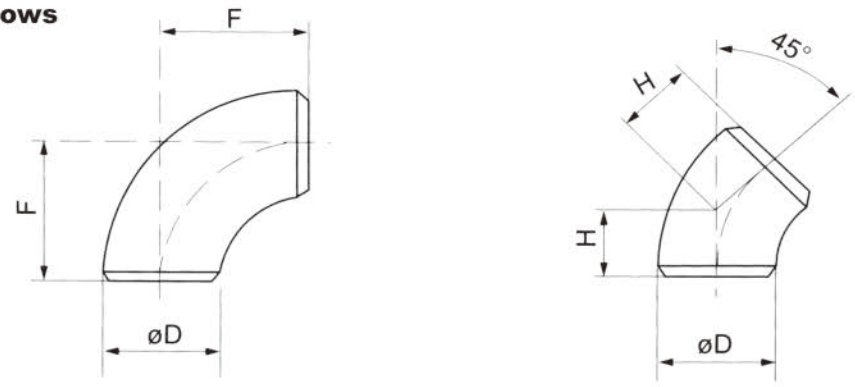


ASME-ASTM A234 WBP B16.9

Nominal pipe size(NPS)	Outside Diameter at Bevel				Center-to-End				End-to-End	
	OD1		OD2		C		M(1)		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
44×28	44	1118	28	711.2	32	813	27.5	698	24	610
44×26	44	1118	26	660.4	32	813	27.5	698	24	610
44×24	44	1118	24	609.6	32	813	27.5	698	24	610
44×22	44	1118	22	558.8	32	813	27	686	24	610
44×20	44	1118	20	508	32	813	27	686	24	610
46×44	46	1168	44	1117.6	33.5	851	31.5	800	28	711
46×42	46	1168	42	1066.8	33.5	851	31	787	28	711
46×40	46	1168	40	1016	33.5	851	30.5	775	28	711
46×38	46	1168	38	965.2	33.5	851	30	762	28	711
46×36	46	1168	36	914.4	33.5	851	30	762	28	711
46×34	46	1168	34	863.6	33.5	851	29.5	749	28	711
46×32	46	1168	32	812.8	33.5	851	29.5	749	28	711
46×30	46	1168	30	762	33.5	851	29	737	28	711
46×28	46	1168	28	711.2	33.5	851	29	737	28	711
46×26	46	1168	26	660.4	33.5	851	29	737	28	711
46×24	46	1168	24	609.6	33.5	851	28.5	724	28	711
46×22	46	1168	22	558.8	33.5	851	28.5	724	28	711
48×46	48	1219	46	1168.4	35	889	33	838	28	711
48×44	48	1219	44	1117.6	35	889	33	838	28	711
48×42	48	1219	42	1066.8	35	889	32	813	28	711
48×40	48	1219	40	1016	35	889	32	813	28	711
48×38	48	1219	38	965.2	35	889	32	813	28	711
48×36	48	1219	36	914.4	35	889	31	787	28	711
48×34	48	1219	34	863.6	35	889	31	787	28	711
48×32	48	1219	32	812.8	35	889	31	787	28	711
48×30	48	1219	30	762	35	889	30	762	28	711
48×28	48	1219	28	711.2	35	889	30	762	28	711
48×26	48	1219	26	660.4	35	889	30	762	28	711
48×24	48	1219	24	609.6	35	889	29	737	28	711
48×22	48	1219	22	558.8	35	889	29	737	28	711

NOTE:
(1) Outlet dimensions M for run sizes NPS 14 and larger is recommended but not required.

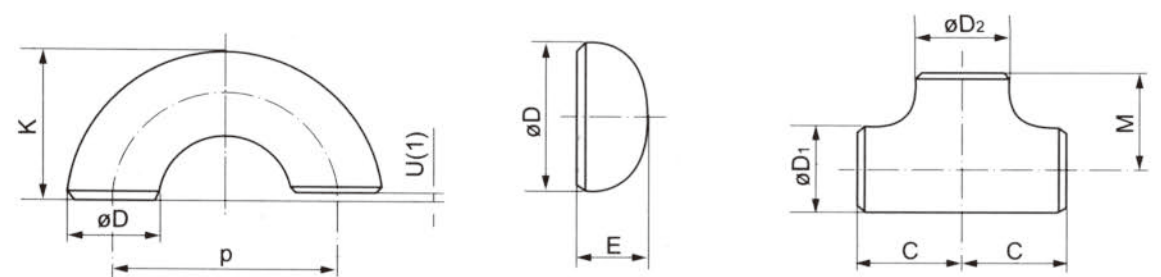
Steel Butt-Welding Pipe Fittings(JIS)
90° & 45° Elbows



JIS B2311 Unit:mm

Nominal pipe size(NPS)		Outside Diameter D	Center-to End		Center-to-End	
			90° Elbows(F)		45° Elbows(H)	
			Long	Short	Long	Short*
A	B					
15	1/2	21.7	38.1	-	15.8	-
20	3/4	27.2	38.1	-	15.8	-
25	1	34.0	38.1	25.4	15.8	10.5
32	1 1/2	42.7	47.6	31.8	19.7	13.2
40	1 1/4	48.6	57.2	38.1	23.7	15.8
50	2	60.5	76.2	50.8	31.6	21.0
65	2 1/2	76.3	95.3	63.5	39.5	26.3
80	3	89.1	114.3	76.2	47.3	31.6
90	3 1/2	101.6	133.4	88.9	55.3	36.8
100	4	114.3	152.4	101.6	63.1	42.1
125	5	139.8	190.5	127.0	78.9	52.6
150	6	165.2	228.6	152.4	94.7	63.1
200	8	216.3	304.8	203.2	126.3	84.2
250	10	267.4	381.0	254.0	157.8	105.2
300	12	318.5	457.2	304.8	189.4	126.3
350	14	355.6	533.4	355.6	220.9	147.3
400	16	406.4	609.6	406.4	252.5	168.4
450	18	457.2	685.8	457.2	284.1	189.4
500	20	508.0	762.0	508.0	315.6	210.4
550	22	558.8	838.2	558.8	347.2	231.5
600	24	609.6	914.4	609.6	378.7	252.5
650	26	660.4	990.6	660.4	410.3	273.6
700	28	711.2	1066.8	711.2	441.9	294.6
750	30	762.0	1143.0	762.0	473.4	315.7
800	32	812.8	1219.2	812.8	505.0	336.7
850	34	863.6	1295.4	863.6	536.6	357.7
900	36	914.4	1371.6	914.4	568.1	378.8
950	38	965.2	1447.8	965.2	599.7	399.8
1000	40	1016.0	1524.0	1016.0	631.2	420.9
1050	42	1066.8	1600.2	1066.8	662.8	441.9
1100	44	1117.6	1676.4	1117.6	694.4	463.0
1150	46	1168.4	1752.6	1168.4	725.9	484.0
2000	48	1219.2	1828.8	1219.2	757.5	505.1

Steel Butt-Welding Pipe Fittings(JIS)
180° Elbows,Caps,& Tees

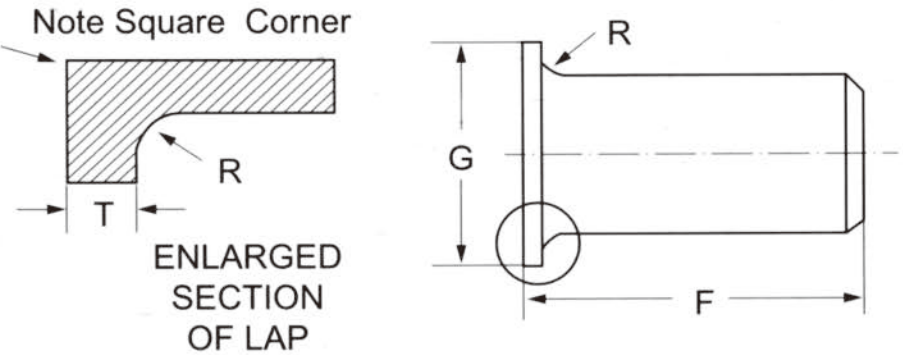


JIS B2311 Unit:mm

Nominal pipe size (NPS)		Outside Diameter D	Center to Center		End-to-End			Center-to-End	
			180° Elbows(P)		180° Elbows(K)		Caps	Tees	
			Long	Short	Long	Short	E(2)	C	M
A	B								
15	1/2	21.7	76.2	-	49.0	-	25.4	25.4	25.4
20	1/4	27.2	76.2	-	51.7	-	25.4	28.6	28.6
25	1	34.0	76.2	50.8	55.1	42.4	38.1	38.1	38.1
32	1 1/4	42.7	95.2	63.6	69.0	53.2	38.1	47.6	47.6
40	1 1/2	48.6	114.4	76.2	81.5	62.4	38.1	57.2	57.2
50	2	60.5	152.4	101.6	106.5	81.1	38.1	63.5	63.5
65	2 1/2	76.3	190.6	127.0	133.5	101.7	38.1	76.2	76.2
80	3	89.1	228.6	152.4	158.9	120.8	50.8	85.7	85.7
90	3 1/2	101.6	266.8	177.8	184.2	139.7	63.5	95.3	95.3
100	4	114.3	304.8	203.2	209.6	158.8	63.5	104.8	104.8
125	5	139.8	381.0	254.0	260.4	196.9	76.2	123.8	123.8
150	6	165.2	457.2	304.8	311.2	235.0	88.9	142.9	142.9
200	8	216.3	609.6	406.4	413.0	311.4	101.6	177.8	177.8
250	10	267.4	762.0	508.0	514.7	387.7	127.0	215.9	215.9
300	12	318.5	914.4	609.6	616.5	464.1	152.4	254.0	254.0
350	14	355.6	1066.8	711.2	711.2	533.4	165.1	279.4	279.4
400	16	406.4	1219.2	812.8	812.8	609.6	177.8	304.8	304.8
450	18	457.2	1371.6	914.4	914.4	685.8	203.2	342.9	342.9
500	20	508.0	1524.0	1016.0	1016.0	762.0	228.6	381.0	381.0
550	22	558.8	-	-	-	-	-	419.1	419.1
600	24	609.6	-	-	-	-	-	431.8	431.8
650	26	660.4	-	-	-	-	-	495.3	495.3
700	28	711.2	-	-	-	-	-	520.7	520.7
750	30	762.0	-	-	-	-	-	558.8	558.8
800	32	812.8	-	-	-	-	-	596.9	596.9
850	34	863.6	-	-	-	-	-	635.0	635.0
900	36	914.4	-	-	-	-	-	673.1	673.1
950	38	965.2	-	-	-	-	-	711.2	711.2
1000	40	1016.0	-	-	-	-	-	749.3	749.3
1050	42	1066.8	-	-	-	-	-	762.0	711.2
1100	44	1117.6	-	-	-	-	-	812.8	762.0
1150	46	1168.4	-	-	-	-	-	850.9	800.1
1200	48	1219.2	-	-	-	-	-	889.0	838.2

NOTE:
(1) For alignment of the end faces U see the table on page 38.
(2) Only SGP is applicable to the dimension E.

Steel Butt-Welding Pipe Fittings(JIS)
 Lap Joint Stub Ends



Unit:mm

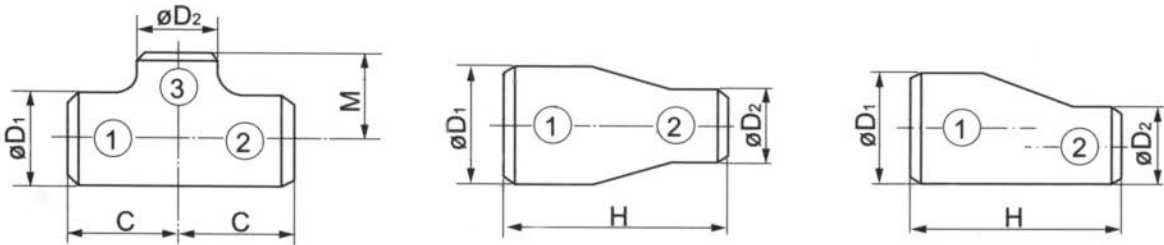
JIS B2220

JPI-7S-15

Unit:mm

Nominal pipe size (NPS)		Outside Diameter D	Diameter of Lap(G)			Length(F)		Radius of Fillet(R)	
			JIS		JPI	JIS	JPI	JIS	JPI
			5K	10K					
A	B								
15	1/2	21.7	44	51	35	30	50	3	3.2
20	1/4	27.2	49	56	43	30	50	3	3.2
25	1	34	59	67	51	50	50	3	3.2
32	1 ¹ / ₄	42.7	70	76	64	50	50	4	4.8
40	1 ¹ / ₂	48.6	75	81	73	50	50	4	6.4
50	2	60.5	85	96	92	50	65	4	7.9
65	2 ¹ / ₂	76.3	110	116	105	50	65	5	7.9
80	3	89.1	121	126	127	50	65	5	9.5
90	3 ¹ / ₂	-	-	-	-	-	-	-	-
100	4	114.3	141	151	157	50	75	5	11.1
125	5	139.8	176	182	186	50	75	6	11.1
150	6	165.2	206	212	216	50	90	6	12.7
200	8	216.3	252	262	270	65	100	6	12.7
250	10	267.4	317	324	324	65	125	6	12.7
300	12	318.5	360	368	381	65	150	8	12.7
350	14	355.6	403	413	-	150	-	8	-
400	16	406.4	463	475	-	150	-	8	-
450	18	457.2	523	530	-	150	-	8	-
500	20	508	573	585	-	150	-	8	-
550	22	558.8	630	640	-	150	-	8	-
600	24	609.6	680	690	-	150	-	8	-

Steel Butt-Welding Pipe Fittings(JIS)
 Reducing Tees and Concentric & Eccentric Reducers

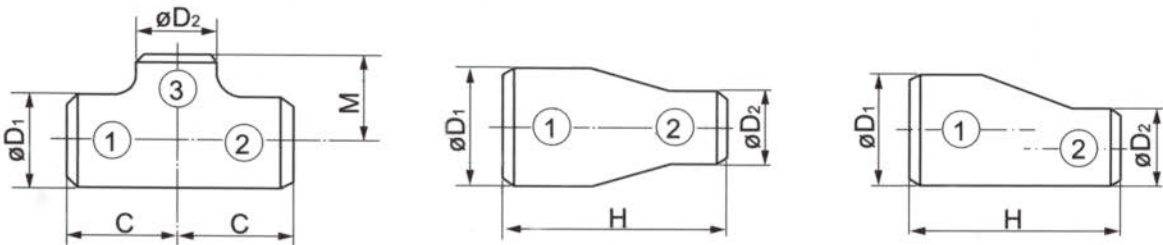


JIS B2311

Unit:mm

Nominal Pipe Size(NPS)		Outside Diameter		Reducing Tees		Reducers
A	B	D ₁	D ₂	Center-to-End		End-to-End
				C	M	H
20×15	3/4×1/2	27.2	21.7	28.6	28.6	38.1
25×20	1×3/4	34.0	27.2	38.1	38.1	50.8
25×15	1×1/2	34.0	21.7	38.1	38.1	50.8
32×25	1 1/4×1	42.7	34.0	47.6	47.6	50.8
32×20	1 1/4×3/4	42.7	27.2	47.6	47.6	50.8
32×15	1 1/4×1/2	42.7	21.7	47.6	47.6	50.8
40×32	1 1/2×1 1/4	48.6	42.7	57.2	57.2	63.5
40×25	1 1/2×1	48.6	34.0	57.2	57.2	63.5
40×20	1 1/2×3/4	48.6	27.2	57.2	57.2	63.5
40×15	1 1/2×1/2	48.6	21.7	57.2	57.2	63.5
50×40	2×1 1/2	60.5	48.6	63.5	60.3	76.2
50×32	2×1 1/4	60.5	42.7	63.5	57.2	76.2
50×25	2×1	60.5	34.0	63.5	50.8	76.2
50×20	2×3/4	60.5	27.2	63.5	44.5	76.2
50×15	2×1/2	60.5	21.7	63.5	*	76.2
65×50	2 1/2×2	76.3	60.5	76.2	69.9	88.9
65×40	2 1/2×1 1/2	76.3	48.6	76.2	66.7	88.9
65×32	2 1/2×1 1/4	76.3	42.7	76.2	63.5	88.9
65×25	2 1/2×1	76.3	34.0	76.2	57.2	88.9
65×20	2 1/2×3/4	76.3	27.2	76.2	*	88.9
65×15	2 1/2×1/2	76.3	21.7	76.2	*	88.9
80×65	3×2 1/2	89.1	76.3	85.7	82.6	88.9
80×50	3×2	89.1	60.5	85.7	76.2	88.9
80×40	3×1 1/2	89.1	48.6	85.7	73.0	88.9
80×32	3×1 1/4	89.1	42.7	85.7	69.9	88.9
80×25	3×1	89.1	34.0	85.7	*	88.9
80×20	3×3/4	89.1	27.2	85.7	*	88.9
80×15	3×1/2	89.1	21.7	85.7	*	88.9
90×80	3 1/2×3	101.6	89.1	95.3	92.1	101.6
90×65	3 1/2×2 1/2	101.6	76.3	95.3	88.9	101.6
90×50	3 1/2×2	101.6	60.5	95.3	82.9	101.6
90×40	3 1/2×1 1/2	101.6	48.6	95.3	79.4	101.6
90×32	3 1/2×1 1/4	101.6	42.7	95.3	*	101.6
100×90	4×3 1/2	114.3	101.6	104.8	101.6	101.6
100×80	4×3	114.3	89.1	104.8	98.4	101.6
100×65	4×2 1/2	114.3	76.3	104.8	95.3	101.6
100×50	4×2	114.3	60.5	104.8	88.9	101.6
100×40	4×1 1/2	114.3	48.6	104.8	85.7	101.6
100×32	4×1 1/4	114.3	42.7	104.8	*	101.6
100×25	4×1	114.3	34.0	104.8	*	101.6

Steel Butt-Welding Pipe Fittings(JIS)
 Reducing Tees and Concentric & Eccentric Reducers

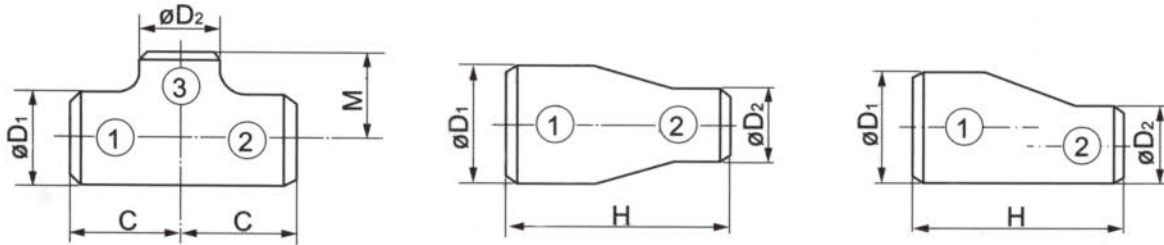


JIS B2311

Unit:mm

Nominal Pipe Size(NPS)		Outside Diameter		Reducing Tees		Reducers
				Center-to-End		End-to-End
A	B	D ₁	D ₂	C	M	H
125×100	5×4	139.8	114.3	123.8	117.5	127.0
125×90	5×3½	139.8	101.6	123.8	114.3	127.0
125×80	5×3	139.8	89.1	123.8	111.1	127.0
125×65	5×2½	139.8	76.3	123.8	108.0	127.0
125×50	5×2	139.8	60.5	123.8	104.8	127.0
125×40	5×1½	139.8	48.6	123.8	*	127.0
125×32	5×1¼	139.8	42.7	123.8	*	127.0
150×125	6×5	165.2	139.8	142.9	136.5	139.7
150×100	6×4	165.2	114.3	142.9	130.2	139.7
150×90	6×3½	165.2	101.6	142.9	127.0	139.7
150×80	6×3	165.2	89.1	142.9	123.8	139.7
150×65	6×2½	165.2	76.3	142.9	120.7	139.7
150×50	6×2	165.2	60.5	142.9	*	139.7
200×150	6×6	216.3	165.2	177.8	168.3	152.4
200×125	8×5	216.3	139.8	177.8	161.9	152.4
200×100	8×4	216.3	114.3	177.8	155.6	152.4
200×90	8×3½	216.3	101.6	177.8	152.4	152.4
200×80	8×3	216.3	89.1	177.8	152.4	152.4
250×200	10×8	267.4	216.3	215.9	203.2	177.8
250×150	10×6	267.4	165.2	215.9	193.7	177.8
250×125	10×5	267.4	139.8	215.9	190.5	177.8
250×100	10×4	267.4	114.3	215.9	184.2	177.8
250×80	10×3	267.4	89.1	215.9	*	177.8
300×250	12×10	318.5	267.4	254.0	241.3	203.2
300×200	12×8	318.5	216.3	254.0	228.6	203.2
300×150	12×6	318.5	165.2	254.0	29.1	203.2
300×125	12×5	318.5	139.8	254.0	215.9	203.2
300×100	12×4	318.5	114.3	254.0	*	203.2
350×300	14×12	355.6	318.5	279.4	269.9	330.2
350×250	14×10	355.6	267.4	279.4	257.2	330.2
350×200	14×8	355.6	216.3	279.4	247.7	330.2
350×150	14×6	355.6	165.2	279.4	238.1	330.2
350×125	14×5	355.6	139.8	279.4	*	330.2
400×350	16×14	406.4	355.6	304.8	304.8	355.6
400×300	16×12	406.4	318.5	304.8	295.3	355.6
400×250	16×10	406.4	267.4	304.8	282.6	355.6
400×200	16×8	406.4	216.3	304.8	273.1	355.6
400×150	16×6	406.4	165.2	304.8	263.5	355.6

Steel Butt-Welding Pipe Fittings(JIS)
 Reducing Tees and Concentric & Eccentric Reducers

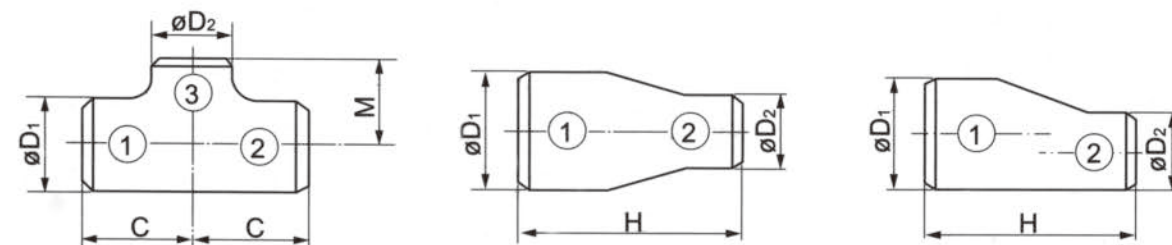


JIS B2311

Unit:mm

Nominal Pipe Size(NPS)		Outside Diameter		Reducing Tees		Reducer
				Center-to-End		End-to-End
A	B	D ₁	D ₂	C	M	H
450×400	18×16	457.2	406.4	342.9	330.2	381.0
450×350	18×14	457.2	355.6	342.9	330.2	381.0
450×300	18×12	457.2	318.5	342.9	320.7	381.0
450×250	18×10	457.2	267.4	342.9	308.0	381.0
450×200	18×8	457.2	216.3	342.9	298.0	381.0
500×450	20×18	508.0	457.2	381.0	368.3	508.0
500×400	20×16	508.0	406.4	381.0	355.6	508.0
500×350	20×14	508.0	355.6	381.0	355.6	508.0
500×300	20×12	508.0	318.5	381.0	346.1	508.0
500×250	20×10	508.0	267.4	381.0	333.4	508.0
500×200	20×8	508.0	216.3	381.0	523.9	508.0
550×500	22×20	558.8	508.0	419.1	406.4	508.0
550×450	22×18	558.8	457.2	419.1	393.7	508.0
550×400	22×16	558.8	406.4	419.1	381.0	508.0
550×350	22×14	558.8	355.6	419.1	381.0	508.0
600×550	24×22	609.6	558.8	431.8	431.8	508.0
600×500	24×20	609.6	508.0	431.8	431.8	508.0
600×450	24×18	609.6	457.2	431.8	419.1	508.0
600×400	24×16	609.6	406.4	431.8	406.4	508.0
600×350	24×14	609.6	355.6	431.8	406.4	508.0
600×300	24×12	609.6	318.5	431.8	397.0	508.0
650×600	26×24	660.4	609.6	495.3	482.6	609.6
650×550	26×22	660.4	558.8	495.3	469.9	609.6
650×500	26×20	660.4	508.0	495.3	457.2	609.6
650×450	26×18	660.4	457.2	495.3	440.0	609.6
700×650	28×26	711.2	660.4	520.7	520.7	609.6
700×600	28×24	711.2	609.6	520.7	508.0	609.6
700×550	28×22	711.2	558.8	520.7	495.3	609.6
700×500	28×20	711.2	508.0	520.7	483.0	609.6
750×700	30×28	762.0	711.2	558.8	546.1	609.6
750×650	30×26	762.0	660.4	558.8	546.1	609.6
750×600	30×24	762.0	609.4	558.8	533.4	609.6
750×550	30×22	762.0	558.8	558.8	520.7	609.6
800×750	32×30	812.8	762.0	596.9	584.2	609.6
800×700	32×28	812.8	711.2	596.9	571.5	609.6
800×650	32×26	812.8	660.4	596.9	571.5	609.6
800×600	32×24	812.8	609.6	596.9	559.0	609.6

Steel Butt-Welding Pipe Fittings(JIS)
Reducing Tees and Concentric & Eccentric Reducers

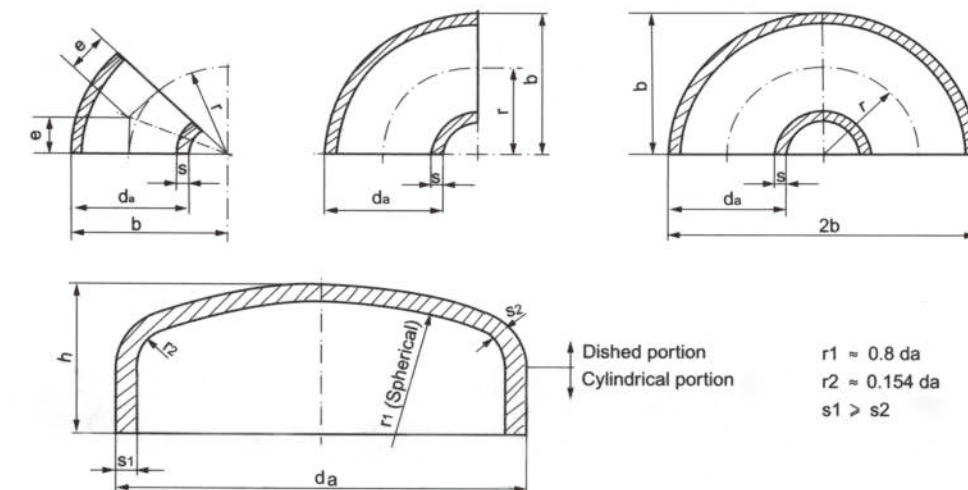


JIS B2311

Unit:mm

Nominal Pipe Size(NPS)		Outside Diameter		Reducing Tees		Reducers
				Center-to-End		End-to-End
A	B	D_1	D_2	C	M	H
850×800	34×32	863.6	812.8	635.0	622.3	609.6
850×750	34×30	863.6	762.0	635.0	609.6	609.6
850×700	34×28	863.6	711.2	635.0	596.9	609.6
850×650	34×26	863.6	660.4	635.0	596.9	609.6
900×850	36×34	914.4	863.6	673.1	660.4	609.6
900×800	36×32	914.4	812.8	673.1	647.7	609.6
900×750	36×30	914.4	762.0	673.1	635.0	609.6
900×700	36×28	914.4	711.2	673.1	622.3	609.6
950×900	38×36	965.2	914.4	711.2	711.2	609.6
950×850	38×34	965.2	863.6	711.2	698.5	609.6
950×800	38×32	965.2	812.8	711.2	685.8	609.6
950×750	38×30	965.2	762.0	711.2	673.0	609.6
1000×950	40×38	1016.0	965.2	749.3	749.3	609.6
1000×900	40×36	1016.0	914.4	749.3	736.6	609.6
1000×850	40×34	1016.0	863.6	749.3	723.9	609.6
1000×800	40×32	1016.0	812.8	749.3	711.2	609.6
1050×1000	42×40	1066.8	1016.0	762.0	711.2	609.6
1050×950	42×38	1066.8	965.2	762.0	711.2	609.6
1050×900	42×36	1066.8	914.4	762.0	711.2	609.6
1050×850	42×34	1066.8	863.6	762.0	711.2	609.6
1100×1050	44×42	1117.6	1066.8	812.8	762.0	609.6
1100×1000	44×40	1117.6	1016.0	812.8	749.3	609.6
1100×950	44×38	1117.6	965.2	812.8	736.6	609.6
1100×900	44×36	1117.6	914.4	812.8	723.9	609.6
1150×1100	46×44	1168.4	1117.6	850.9	811.1	711.2
1150×1050	46×42	1168.4	1066.8	850.9	787.4	711.2
1150×1000	46×40	1168.4	1016.0	850.9	774.7	711.2
1150×950	46×38	1168.4	965.2	850.9	762.0	711.2
1200×1150	48×46	1219.2	1168.4	889.0	838.2	711.2
1200×1100	48×44	1219.2	1117.6	889.0	838.2	711.2
1200×1050	48×42	1219.2	1066.8	889.0	812.8	711.2
1200×1000	48×40	1219.2	1016.0	889.0	812.8	711.2

Steel Butt-Welding Pipe Fittings(DIN)
Elbows, Bends, and Caps

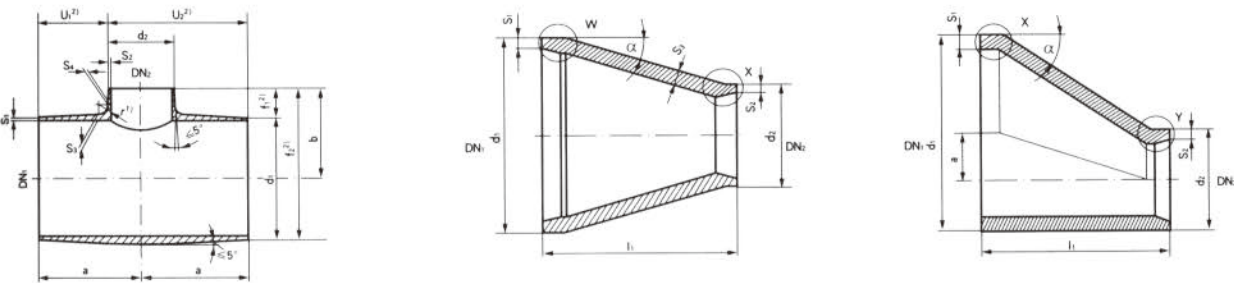


DIN 2605 DIN 2617

Unit:mm

Nominal Size DN	Outside Diameter da	Elbows and Bends						Caps h
		Type3--3D			Type5--5D			
		r	b	e	r	b	e	
15	21.3	28.0	38	12	42.5	53	18	25
20	26.9	29.0	43	12	57.5	71	24	25
25	33.7	38.0	56	16	72.5	90	30	38
32	42.4	48.0	69	20	92.5	114	38	38
40	48.3	57.0	82	24	107.5	132	45	38
50	60.3	76	106	32	135	165	56	38
65	76.1	95	133	39	175	213	73	38
80	88.9	114	159	47	205	250	85	51
100	114.3	152	210	63	270	327	112	64
125	139.7	190	260	79	330	400	137	76
150	168.3	229	313	95	390	474	162	89
200	219.1	305	414	126	510	620	211	102
250	273	381	518	158	650	787	269	127
300	323.9	457	619	189	775	937	321	152
350	355.6	533	711	221	850	1028	352	165
400	406.4	610	813	253	970	1173	402	178
450	457	686	914	284	1122	1350	465	203
500	508	762	1016	316	1245	1500	516	229
600	610	914	1219	379	1525	1830	632	267
700	711	1067	1422	442	1778	2133	737	267
800	813	1219	1626	505	2033	2439	842	267
900	914	1372	1829	568	2285	2742	947	267
1000	1016	1524	2032	631	2540	3048	1052	305
1200	1220	1830	2440	758	3050	3660	1263	343

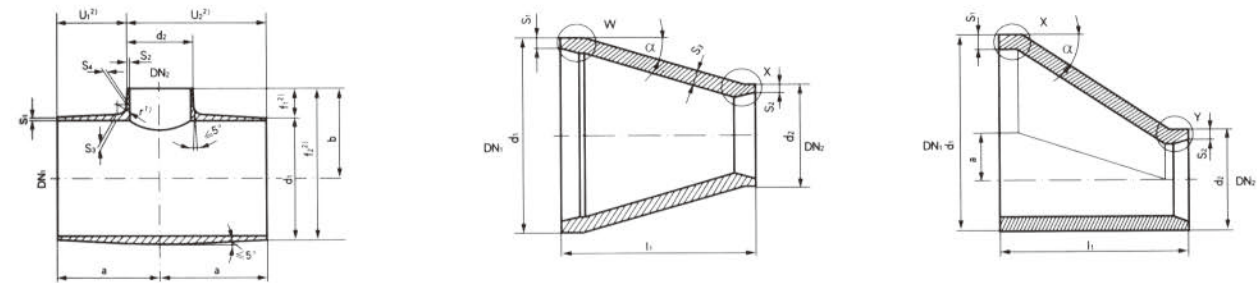
Steel Butt-welding Pipe Fittings(DIN)
Tees and Concentric & Eccentric Reducers



DIN 2615 DIN2616 Unit:mm

Nominal Size DN1	Outside Diameter d1	Nominal Size DN2	Outside Diameter d2	Tees		Reducers
				a	b	
15	21.3	15	21.3	25	25	38
20	26.9	20	26.9	29	29	38
20	26.9	15	21.3	29	29	38
25	33.7	25	33.7	38	38	50
25	33.7	20	26.9	38	38	50
25	33.7	15	21.3	38	38	50
32	42.4	32	42.4	48	48	50
32	42.4	25	33.7	48	48	50
32	42.4	20	26.9	48	48	50
32	42.4	15	21.3	48	48	50
40	48.3	40	48.3	57	57	64
40	48.3	32	42.4	57	57	64
40	48.3	25	33.7	57	57	64
40	48.3	20	26.9	57	57	64
50	60.3	50	60.3	64	64	76
50	60.3	40	48.3	64	60	76
50	60.3	32	42.4	64	57	76
50	60.3	25	33.7	64	51	76
50	60.3	20	26.9	64	44	76
65	76.1	65	76.1	76	76	90
65	76.1	50	60.3	76	70	90
65	76.1	40	48.3	76	67	90
65	76.1	32	42.4	76	64	90
65	76.1	25	33.7	76	57	90
80	88.9	80	88.9	86	86	90
80	88.9	65	76.1	86	83	90
80	88.9	50	60.3	86	76	90
80	88.9	40	48.3	86	73	90
80	88.9	32	42.4	86	70	90
100	114.3	100	114.3	105	105	100
100	114.3	80	88.9	105	98	100
100	114.3	65	76.1	105	95	100
100	114.3	50	60.3	105	89	100
100	114.3	40	48.3	105	86	100
125	139.7	125	139.7	124	124	127
125	139.7	100	114.3	124	117	127
125	139.7	80	88.9	124	111	127
125	139.7	65	76.1	124	108	127
125	139.7	50	60.3	124	105	127
150	168.3	150	168.3	143	143	140
150	168.3	125	139.7	143	137	140

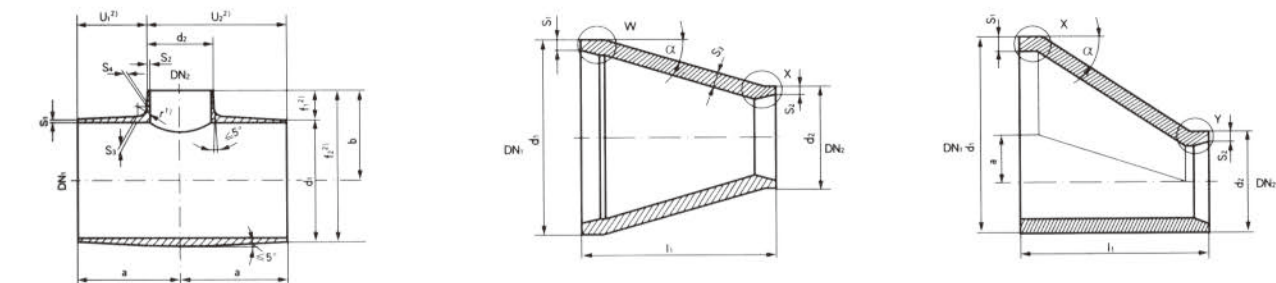
Steel Butt-welding Pipe Fittings (DIN)
Tees and Concentric & Eccentric Reducers



DIN 2615 DIN2616 Unit:mm

Nominal Size DN1	Outside Diameter d1	Nominal Size DN2	Outside Diameter d2	Tees		Reducers
				a	b	
150	168.3	100	114.3	143	130	140
150	168.3	80	88.9	143	124	140
150	168.3	65	76.1	143	121	140
200	219.1	200	219.1	178	178	152
200	219.1	150	168.3	178	168	152
200	219.1	125	139.7	178	162	152
200	219.1	100	114.3	178	156	152
200	219.1	80	88.9	178	152	152
250	273	250	273	216	216	178
250	273	200	219.1	216	203	178
250	273	150	168.3	216	194	178
250	273	125	139.7	216	191	178
250	273	100	114.3	216	184	178
300	323.9	300	323.9	254	254	203
300	323.9	250	273	254	241	203
300	323.9	200	219.1	254	229	203
300	323.9	150	168.3	254	219	203
300	323.9	125	139.7	254	216	203
350	355.6	350	355.6	279	279	330
350	355.6	300	323.9	279	270	330
350	355.6	250	273	279	257	330
350	355.6	200	219.1	279	248	330
350	355.6	150	168.3	279	238	330
400	406.4	400	406.4	305	305	355
400	406.4	350	355.6	305	305	355
400	406.4	300	323.9	305	295	355
400	406.4	250	273	305	283	355
400	406.4	200	219.1	305	273	355
400	406.4	150	168.3	305	264	355
450	457	450	457	343	343	381
450	457	400	406.4	343	330	381
450	457	350	355.6	343	330	381
450	457	300	323.9	343	321	381
450	457	250	273	343	308	381
450	457	200	219.1	343	298	381
500	508	500	508	381	381	508
500	508	450	457	381	368	508
500	508	400	406.4	381	356	508
500	508	350	355.6	381	356	508
500	508	300	323.9	381	346	508
500	508	250	273	381	333	508

Steel Butt-welding Pipe Fittings(DIN)
Tees and Concentric & Eccentric Reducers

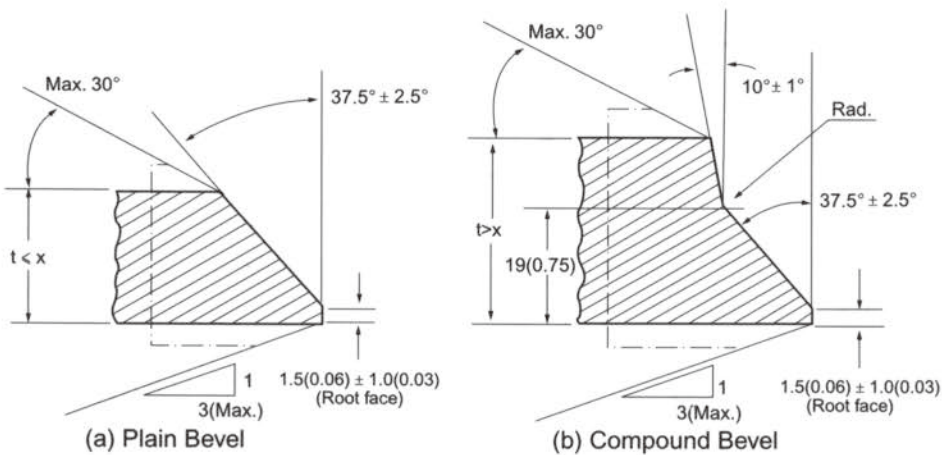


DIN 2615 DIN2616

Unit:mm

Nominal Size DN1	Outside Diameter d1	Nominal Size DN2	Outside Diameter d2	Tees		Reducers l1
				a	b	
500	508	200	219.1	381	324	508
600	610	600	610	432	432	508
600	610	500	508	432	432	508
600	610	450	457	432	419	508
600	610	400	406.4	432	406	508
600	610	350	355.6	432	406	508
600	610	300	323.9	432	397	508
600	610	250	273	432	384	508
700	711	700	711	521	521	610
700	711	600	610	521	508	610
700	711	500	508	521	483	610
700	711	450	457	521	470	610
700	711	400	406.4	521	457	610
700	711	350	355.6	521	457	610
700	711	300	323.9	521	448	610
800	813	800	813	597	597	610
800	813	700	711	597	572	610
800	813	600	610	597	559	610
800	813	500	508	597	533	610
800	813	450	457	597	521	610
800	813	400	406.4	597	508	610
800	813	350	355.6	597	508	610
900	914	900	914	673	673	610
900	914	800	813	673	648	610
900	914	700	711	673	622	610
900	914	600	610	673	610	610
900	914	500	508	673	584	610
900	914	450	457	673	572	610
900	914	400	406.4	673	559	610
1000	1016	1000	1016	749	749	610
1000	1016	900	914	749	737	610
1000	1016	800	813	749	711	610
1000	1016	700	711	749	673	610
1000	1016	600	610	749	660	610
1000	1016	500	508	749	635	610
1000	1016	450	457	749	622	610
1200	1220	1200	1220	889	838	711
1200	1220	1000	1016	889	813	711
1200	1220	900	914	889	787	711
1200	1220	800	813	889	787	711
1200	1220	700	711	889	762	711
1200	1220	600	610	889	737	711

Welding End Preparation
ASME B16.9,B16.25



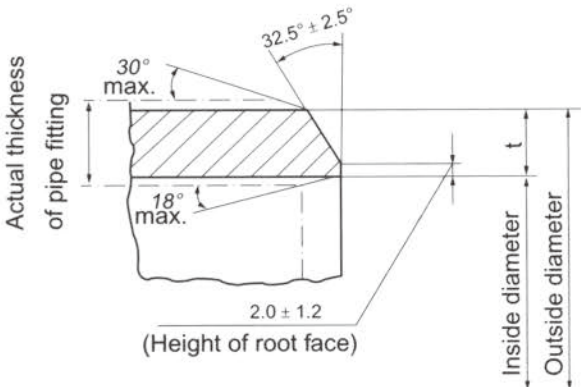
Welding Bevels and Root Face

Nominal Wall Thickness,t	End Preparation
Less than x [Note]	Cut square or slightly chamfer, at manufacturer's option. (Not illustrated.)
x to 22 (0.88)	Plain bevel as in sketch (a) above.
More than 22 (0.88)	Compound bevel as in sketch (b) above.

GENERAL NOTES: Dimensions in parentheses are in inches. Others are in Millimeters.
NOTE: X=5(0.19) for carbon steel or ferritic alloy steel
x=3(0.12) for austenitic alloy steel

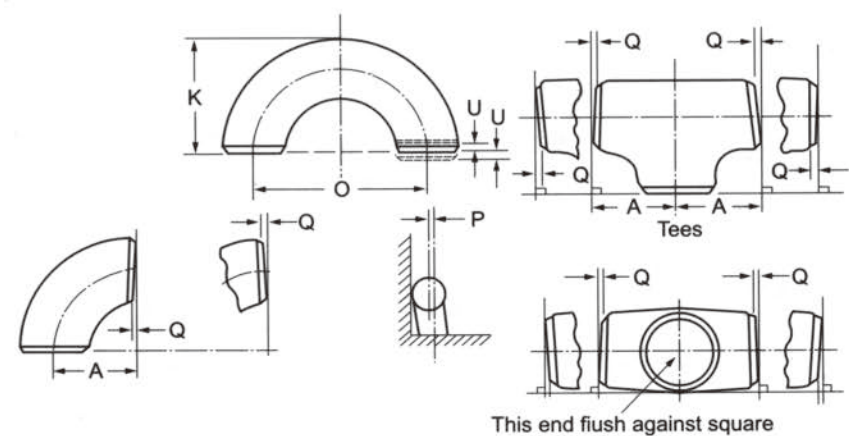
JIS B2311

Unit:mm



Shape and Dimensions of Bevel End

Dimensional Tolerances(ASME)



ASME B16.9, B16.28

Pipe Size	All Fittings				90° & 45° Elbows and Tees	Reducers and Lap Joint Stub ends		Caps			
	Outside Diameter at Bevel,D(1)		Inside Diameter at End (1)			Center-to-End Dimensions A,B,C,M				Overall Length, F,H	
								Overall Length,E			
	IN	MM	IN	MM		IN	MM	IN	MM	IN	MM
1/2-2 1/2	+0.06 -0.03	+1.6 -0.8	±0.03	±0.8	Not Less Than 87.5% of Nominal Thickness	±0.06	±2	±0.06	±2	±0.12	±3
3-2 1/2	±0.06	±1.6	±0.06	±1.6							
4	±0.06	±1.6									
5~8	+0.09 -0.06	+2.4 -1.6				±0.12	±3.2	±0.09	±0.09	±0.25	±6
10~18	+0.16 -0.12	+4.0 -3.2									
20~24	+0.25 -0.19	+6.4 -4.8	±0.19	±4.8							
26~30											
32~48											

Pipe Size	Lap Joint Stub Ends (2)						180 Return Bends					
	Outside Diameter of Lap,G		Lap Thickness		Fillet Radius of Lap,R		Center-to-Center Dimension,O		Back-to-Face Dimension,K		Alignment of Ends,U	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
1/2-2 1/2	+0 -0.03	+0 -1	+0.06 -0	+1.6 -0	+0	+0	±0.25	±6	±0.25	±6	0.03	±1
3-2 1/2					-0.03	-1						
4												
5-8	+0 -0.06	+0 -2	+0.12 -0	+3.2 -0	+0	+0	±0.38	±10			±0.06	±2
10-18					-0.06	-2						
20-24												

Pipe Size	Off Angle,Q		Off Plane,P	
	IN	MM	IN	MM
1/2-4	±0.03	±1	±0.06	±2
5-8	±0.06	±2	±0.12	±4
10-12	±0.09	±3	±0.19	±5
14-16			±0.25	±6
18-24			±0.38	±10
26-30	±0.19	±5	±0.50	±13
32-42			±0.75	±19
44-48				

NOTES:
 (1)Out-of-round is the sum of absolute values of plus and minus tolerances.
 (2)Outside diameter of barrel see the table on page 14.

Dimensional Tolerances(MSS)

MSS SP-43

Nominal Pipe Size	All Fittings		90° Elbows 45° Elbows Tees	Reducers Lap-Joint Stub Ends	180° Returns			Caps	Lap-Joint Stub Ends	
	Outside Diameter at Welding End(a)	Wall Thickness	Center-to-End A-B-C-M	Overall Length F-H	Center-to-Center O	Back-to-Face K	Alignment of Ends U	Overall Length E	Fillet(b) Radius of Lap A	Outside Diameter of Lap G
1/2-1 1/2	±0.03 (±0.8)	Not less than 87.5% of nominal thick-ness	±0.06 (±1.6)	±0.25 (±6.4)	±0.25 (±6.4)	±0.25 (±6.4)	±0.03 (±0.8)	±0.12 (±3.2)	+0 -0.03 (+0) (-0.8)	+0 -0.03 (+0) (-0.8)
2-3 1/2										
4										
5-8	+0.06 -0.03 (+1.6) (-0.8)		±0.09	±0.38 (±9.6)	±0.38 (±9.6)	±0.25 (±6.4)	±0.06 (±1.6)	±0.25 (±6.4)	+0 -0.06 (+0) (-1.6)	+0 -0.06 (+0) (-1.6)
10-18	0.09 -0.03 (+2.4) (-0.8)									
20-24	+0.12 -0.03 (+3.2) (-0.8)									

GENERAL NOTE:
 All dimensions are in inches.Dimensions in brachets are in millimeters for reference only.

NOTES:
 (a)Out of roundness is the vector sum of plus and minus tolerance.
 (B)Fillet B radius is maximum.See page 17.

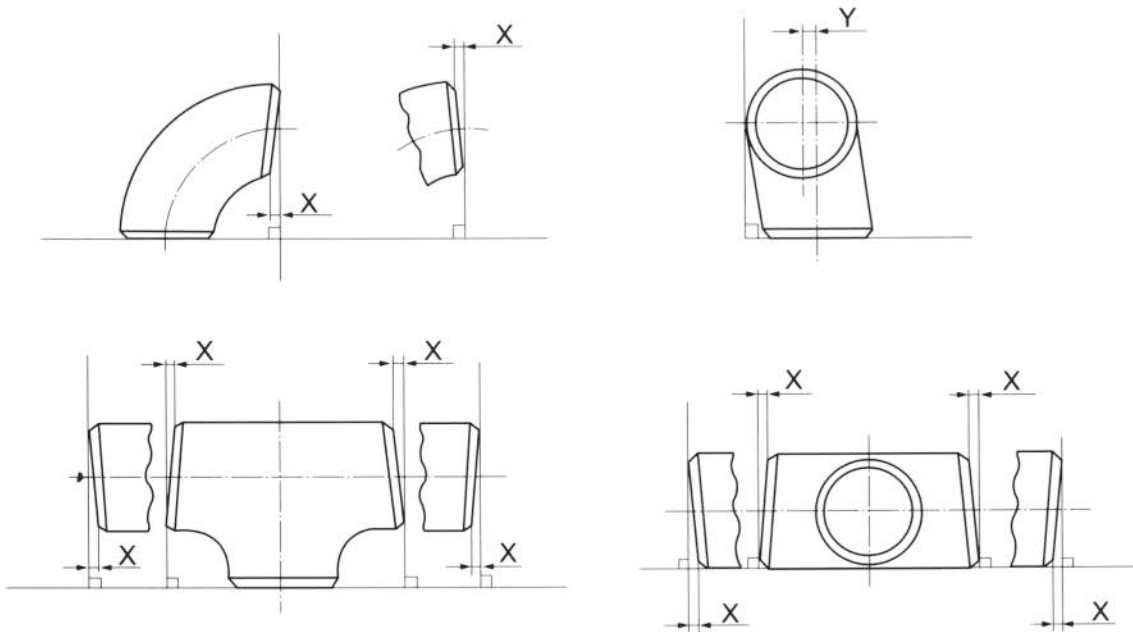
Dimensional Tolerances(JIS)

JIS B2311

Item	Types of pipe fittings	Nominal diameter							
		A	15~65 1/2~2 1/2	80~100	125~200	250~450	500~600	650~750	800~1200
		B	1 1/2~2 1/2	3~4	5~8	10~18	20~24	26~30	32~48
		Tolerance							
Outside diamter at end	All types of pipe fittings	±2.0	±2.5	±3.5	+5.0 -4.5	+6.4 -4.8			
Inside diameter at end face					±4.5	±4.8			
Thickness		+Not specifie -15%							
Bevel angle		See figure Shape and Dimensions of Bevel End on pape							
Height of root face									
Dimension from center line to end face(H,F)	45° elbows 90° elbows	±2.0		±3.2				±4.8	
Centerline dimension(P)	180° elbows	±6.4		±9.5		-			
Dimension from back to end face(K)		±6.4				-			
Alignment of end faces(U) (max.)		1.6		3.2		-			
Overall length(H)	Reducers	±2.0		±3.2			±4.8		
Dimension from centerline to end face(C,M)	Tees			±3.2			±4.8		
Dimension from back to end face(E)	Caps	±3.2		±6.4			-		
Outer peripheral length at end	All types of pipe fittings	-					±0.5%		

Remarks 1 For the dimensional tolerances for H of reducer and M of reduced tee,the tolerances specified for larger diameter side shall apply.
2 For the galvanized part of white pipe fittings,the above-mentioned tolerance shall be applied before galvanizing.

Dimensional Tolerances(JIS)



JIS B2311

Item	Types of pipe fitting	Nominal diameter								
		A	15~100	125~200	250~300	350~400	450~600	650~750	800~1050	1100~1200
		B	1/2~4	5~8	10~12	14~16	18~24	26~30	32~42	44~48
		Tolerance								
Off angle(X)	Elbws, reducers, tees	0.8	1.6	2.4		3.2	4.8			
Off plane(Y)	Elbows, tees	1.6	3.2	4.8	6.4	9.5		12.7	19.1	

Remarks 1 For the tolerances on alignment of reducer and reduced tee,the tolerances specified for larger diameter side shall apply.
2 For the galvanized part of white pipe fittings,the above-mentioned tolerance shall be applied before galvanizing.

MATERIAL SPECIFICATIONS FOR BUTT-WELDING FITTINGS(ASTM)

ASTM A234/A234M-00a

Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

Grade	Composition, %										
	C	Mn	P	S	Si	Cr	Mo	Ni	Cu	V	Nb
WPB(1)(2)(3)(4)	0.30	0.29-1.06	0.050	0.058	0.10	0.40	0.15	0.40	0.40	0.08	0.02
WPC(1)(2)(3)(4)	0.35	0.29-1.06	0.050	0.058	0.10	0.40	0.15	0.40	0.40	0.08	0.02
WP11 CL1	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.00	1.00-1.50	0.44-0.65	-	-	-	-
WP11 CL2 WP11 CL3	0.05-0.20	0.30-0.80	0.040	0.040	0.50-1.00	1.00-1.50	0.44-0.65	-	-	-	-

GENERAL NOTE:

All values are maximum unless otherwise indicated.

NOTES:

- (1) For each reduction of 0.01% below the specified C maximum, an increase of 0.06% Mn above the specified maximum will be permitted, up to a maximum of 1.35%.
- (2) The sum of Cu, Ni, Cr, and Mo shall not exceed 1.00%.
- (3) The sum of Cr and Mo shall not exceed 0.32%.
- (4) The maximum carbon equivalent (C.E.) shall be 0.50, based on heat analysis and the formula C.E.=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15.

Tensile Requirements	WPB	WPC, WP11CL2	WP11CL1	WP11CL3
Tensile Strength, min, ksi[MPa]	60-85	70-95	60-85	75-100
(0.2% offset or 0.5% Extension-under-load)	[415-585]	[485-655]	[415-585]	[520-690]
Yield Strength, min, ksi[MPa]	32	40	30	45
	[240]	[275]	[205]	[310]

	Wall thickness		Elongation Requirements	
	in	mm	Longitudinal	Transverse
			22	14
Standard round specimen, or small proportional specimen, min % in 4D				
Rectangular Specimen for wall thickness 0.312in [7.94mm] and over, and for all small sizes tested in full section; min % in 2in[50mm]	≥0.312	≥7.94	30	20
Rectangular Specimen for wall thickness less than 0.312in [7.94mm]; min % in 2 in[50mm] (0.5in [12.7mm] wide specimen)	0.281 0.250 0.219 0.188 0.156 0.125 0.094 0.062	7.14 6.35 5.56 4.76 3.97 3.17 2.38 1.59	28.5 27.0 25.5 24.0 22.5 21.0 19.5 18.0	19 18 - - - - - -

Where the wall thickness lies between two values above, the min elongation value is determined by the following equations:

Longitudinal E=48t+15.00
Transverse E=32t+10.00

E = elongation in 2in[50mm], %
t = actual thickness of specimen, in[mm]

Material Specifications for Butt-Welding Fittings (JIS and DIN)

JIS B2311 Steel Butt-Welding Pipe Fittings for Ordinary Use

JIS G3452 Carbon Steel Pipes for Ordinary Piping

JIS G3457 Arc Welded Carbon Steel Pipes

Steel Grade	Chemical Composition %			Tensile	Yield	Elongation%(1)	
	C	p	S	Strength	Point	Longitudinal	Transverse
	Max			N/mm2 Min		Min	Min
SGP	-	0.040	0.040	290	-	30 ₍₂₎	25 ₍₂₎
PY400	0.25	0.040	0.040	400	255	-	18

NOTES:

- (1)Values specified are for wall thickness 8mm and over.For each 1mm decrease in wall thickness below 8mm,a deduction of 1.5%for both longitudinal and transverse from the values shown above is permitted.
- (2)Values not applicable to NPS below 32A.

DIN 1626 Welded Circular Unalloyed Steel Tubes Subject to Special Requirements

DIN 1629 Seamless Circular Unalloyed Steel Tubes Subject to Special Requirements

DIN 17175 Seamless Tubes of Heat-Resistant Steels

Steel Grade Symbol	Type of deoxidization	Chemical Composition (cast analysis)% (max unless otherwise specified)					
		C	Si(1)	Mn	P	S	N ₍₂₎
St 37.0	R	0.17	-	-	0.040	0.040	0.009 ₍₃₎
St 35.8	-	0.17	0.10-0.35	0.40-0.80	0.040	0.040	-

NOTES:

- (1)The minimum Si content is allowed to fall below 0.10%,when the steel is alumimium-killed or vacuum-deoxidized.
- (2)A content in excess of the maximum value stated is permitted if a Pcontent less than the maximum specified by 0.005% P per 0.001%N is observed.However the N content shall not exceed a value of 0.012% in the case analysis and 0.014% in the product analysis.
- (3)The specified value does not apply if the steels are supplied with the RR (instead of R) type of deoxidization.
R=killed,including semi-killed
RR=fully killed

Amounts by which the chemical composition in the product/sample analysis may deviate from the limiting values applicable to the cast analysis.

Element	St 37.0 Allowable Deviation Amount %	St 35.8	
		Limits Quoted in Cast Analysis	Allowable Deviation Amount ₍₂₎ %
C	0.02	≤0.24	±0.02
Si	-	≤0.35	±0.03
Mn	-	≤1.00	±0.04
P	0.010	≤0.040	±0.010
S	0.010	≤0.040	±0.010
N	0.001(1)	-	-

NOTES:

- (1)A content in excess of the maximum value stated is permitted if a P content less than the maximum specified by 0.005% P per 0.001% N is observed.However the N content shall not exceed a value of 0.012% in the case analysis and 0.014% in the product analysis (this dose not apply to the RR type of deoxidization).
- (2)In a cast the deviation of an element in a sample analysis is permitted to be below the minimum value or only above the maximum value of the range stipulated for the cast analysis,though not both at the same time.

Steel Grade Symbol	Upper Yield Stress ReH for Wall thicknesses,in mm			Tensile Strength Rm	Elongation after Fracture A5		Impact Strength Transverse
	ReH≤16	16<ReH≤40	40<ReH≤60		Longitudinal	Transverse	
	Min N/mm2				Min %		
St 37.0	235	225	215	350(1)-480	25	23	-
St 35.8	235	225	215	360-480	25	23	34

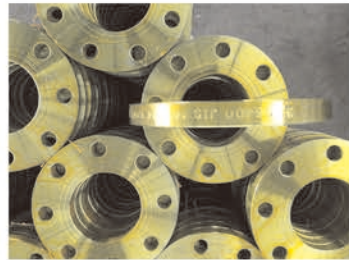
NOTE:

- (1)For cold finished tubes in the NBKcondition,minmum values of tensile strength lower than this value by 10N/mm2 is permitted.

FLANGES



MAIN STANDARD
BS 10:1965
DIN
BS4504(EN 1092-1)
ANSI B16.5
JIS



JIS

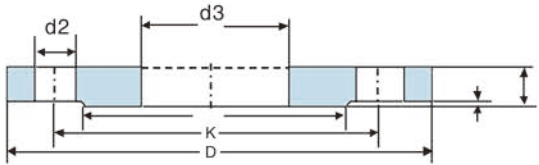


ANSI B16.5



BS4504(EN1092-1)

STEEL PLATE FLANGE BS10:1965
STANDARD

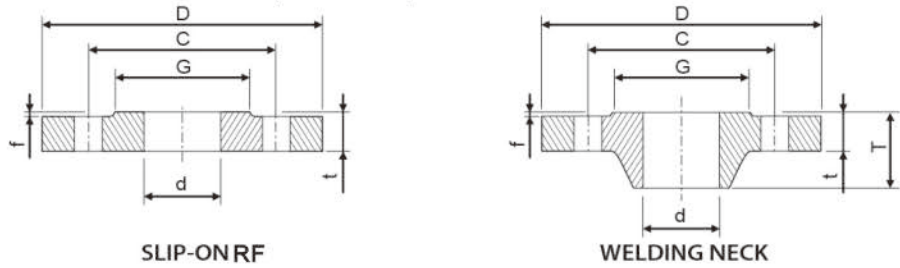


BS 4504 - 5K									Unit: mm	
SIZE		Outsize (D)	Insize (D1)	B=(t+f)		d2	d3	k	U. Weight (kg/pc)	
DN	Inch			t	f				SORF	BLIND
Dn15	1/2"	80	22	8	1.5	14	40	55	0.3	0.42
DN20	3/4"	90	27	8	1.5	14	50	65	0.38	0.53
DN25	1"	100	34	8	1.5	14	60	75	0.46	0.64
DN32	1 1/4"	125	43	8	1.5	18	76	98	0.7	0.98
DN40	1 1/2"	135	49	8	1.5	18	86	108	0.81	1.12
DN50	2"	150	61	8	1.5	18	98	123	0.98	1.35
DN65	2 1/2"	170	77	9	1.5	18	118	143	1.35	1.89
DN80	3"	185	90	9	1.5	18	133	158	1.54	2.15
DN100	4"	205	116	10	1.5	18	153	178	1.78	2.5
DN125	5"	235	142	10	1.5	18	183	208	2.42	3.35
DN150	6"	270	170	12	1.5	18	208	238	3.21	4.45
DN200	8"	325	220	12	2.0	23	263	293	4.6	6.4
DN250	10"	380	275	16	2.0	23	318	348	6.59	9.2
DN300	12"	430	325	16	2.0	23	385	398	8.07	11.3

BS 4504-10K									Unit: mm	
SIZE		D	d	B=(t+f)		d2	d3	k	U. Weight (kg/pc)	
DN	Inch			t	f				SORF	BLIND
DN15	1/2"	95	22	10	1.5	14	50	65	0.5	0.7
DN20	3/4"	105	27	10	1.5	14	59	75	0.62	0.86
DN25	1"	115	34	10	1.5	14	69	85	0.81	1.13
DN32	1 1/4"	135	43	12	1.5	18	81	100	1.24	1.73
DN40	1 1/2"	145	49	12	1.5	18	90	110	1.41	1.95
DN50	2"	155	61	12	1.5	18	105	125	1.66	2.32
DN65	2 1/2"	180	77	12	1.5	18	110	145	2.19	3.06
DN80	3"	195	90	13	1.5	18	125	160	2.65	3.71
DN100	4"	215	116	13	1.5	18	150	180	2.9	4.06
DN125	5"	245	142	14	2.0	18	178	210	3.82	5.34
DN150	6"	280	170	16	2.0	23	205	240	5.47	7.65
DN200	8"	335	220	17	2.0	23	250	295	7.01	9.8
DN250	10"	390	275	18	2.0	23	325	350	8.56	11.9
DN300	12"	440	325	18	2.5	25	375	400	10.19	14.2
DN350	14"	495	356	20	2.5	25	430	460	13.5	18.9
DN400	16"	560	410	22	2.5	25	485	520	17.5	24.5
DN500	20"	670	512	24	2.5	25	580	620	25.3	35.42
DN600	24"	780	612	30	2.5	30	690	730	38.5	53.9

【TECHNICAL DATA】

STEEL PLATE FLANGE DIN/BS4504 (EN 1092-1)
STANDARD



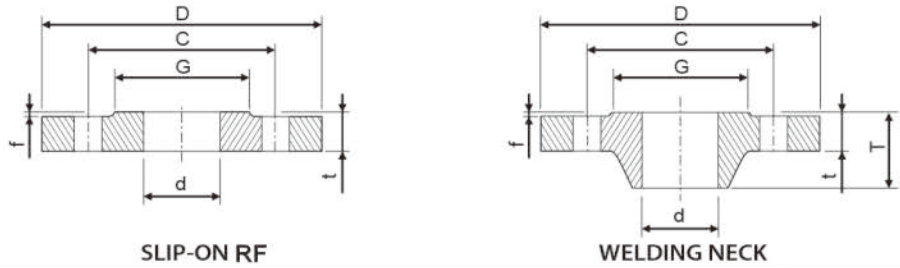
DIN 2543 / BS4504 - PN10								Unit: mm	
SIZE		D	d	Thickness = (t + f)			C	No of Bolt	Diameter of Bolt
DN	Inch			Slip On	WN	Blind			
DN15	1/2'	95	22	14	35	14	65	4	14
DN20	3/4"	105	27	14	38	14	75	4	14
DN25	1"	115	34	14	38	14	85	4	14
DN32	1 1/4"	140	43	14	40	14	100	4	18
DN40	1 1/2"	150	49	16	42	16	110	4	18
DN50	2"	165	61	16	45	16	125	4	18
DN65	2 1/2"	185	77	16	45	16	145	4	18
DN80	3"	200	90	18	50	18	160	4	18
DN100	4"	220	116	18	52	18	180	8	18
DN125	5"	250	142	20	55	20	210	8	18
DN150	6"	285	170	22	55	22	240	8	22
DN200	8'	340	220	22	62	22	295	8	22
DN250	10"	395	275	25	68	25	350	12	22
DN300	12"	445	325	25	68	25	400	12	22
DN350	14"	505	358	28	68	28	460	16	22
DN400	16"	565	410	30	72	30	515	16	26
DN450	18"	615	460	34	75	34	565	20	26
DN500	20"	670	512	36	75	36	620	20	26
DN600	24"	780	612	38	80	38	725	20	30

DIN 2543 / BS4504 - PN16								Unit: mm	
SIZE		D	d	Thickness = (t + f)			c	No of Bolt	Diameter of Bolt
DN	Inch			Slip On	WN	Blind			
DN15	1/2'	95	22	14	35	14	65	4	14
DN20	3/4"	105	27	14	38	14	75	4	14
DN25	1"	115	34	16	38	16	85	4	14
DN32	1 1/4"	140	43	16	40	16	100	4	18
DN40	1 1/2"	150	49	18	42	16	110	4	18
DN50	2"	165	61	18	45	16	125	4	18
DN65	2 1/2"	185	77	20	45	18	145	4	18
DN80	3"	200	90	20	50	18	160	8	18
DN100	4"	220	116	22	52	20	180	8	18
DN125	5"	250	142	24	55	22	210	8	20
DN150	6"	285	172	24	55	22	240	8	22
DN200	8'	340	220	26	62	26	295	12	22
DN250	10"	405	275	28	70	26	355	12	25
DN300	12"	460	325	30	78	28	410	12	25
DN350	14"	520	356	32	82	30	470	16	30
DN400	16"	580	410	36	85	32	525	16	30
DN450	18"	640	460	38	87	36	585	20	30
DN500	20"	715	512	42	90	40	650	20	33
DN600	24"	840	612	45	95	42	770	20	36

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STEEL PLATE FLANGE DIN/BS4504(EN 1902-1)



DIN 2543 / BS4504 - PN25							Unit: mm	
SIZE		D	d	Thickness = (t + f)		C	No of Bolt	Diameter of Bolt
DN	Inch			Slip On	Blind			
DN15	1/2'	95	22	14	14	65	4	14
DN20	3/4"	105	27	16	16	75	4	14
DN25	1"	115	34	16	16	85	4	14
DN32	1 1/4"	140	43	18	18	100	4	18
DN40	1 1/2"	150	49	18	18	110	4	18
DN50	2"	165	61	20	20	125	4	18
DN65	2 1/2"	185	77	22	20	145	8	18
DN80	3"	200	90	22	20	160	8	18
DN100	4"	235	116	26	24	190	8	22
DN125	5"	270	142	28	26	220	8	26
DN150	6"	300	170	30	28	250	8	26
DN200	8'	360	220	32	30	310	12	26
DN250	10"	425	275	35	32	370	12	30
DN300	12"	485	325	38	35	430	16	30
DN350	14"	555	360	42	40	490	16	33
DN400	16"	620	411	48	45	550	16	36
DN450	18"	670	462	54	50	600	20	36
DN500	20"	730	513	58	55	660	20	36
DN600	24"	845	615	68	60	770	20	39

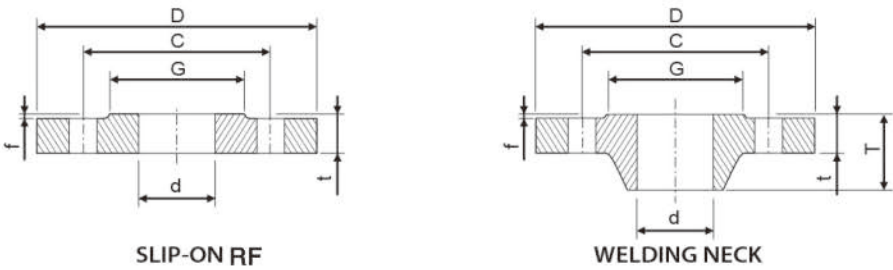
DIN 2543 / BS4504 - PN40							Unit: mm	
SIZE		D	d	Thickness = (t + f)		c	No of Bolt	Diameter of Bolt
DN	Inch			Slip On	Blind			
DN15	1/2'	95	22	14	14	65	4	14
DN20	3/4"	105	27	16	16	75	4	14
DN25	1"	115	34	16	16	85	4	14
DN32	1 1/4"	140	43	18	18	100	4	18
DN40	1 1/2"	150	49	18	18	110	4	18
DN50	2"	165	61	20	20	125	4	18
DN65	2 1/2"	185	77	22	20	145	8	18
DN80	3"	200	90	24	22	160	8	18
DN100	4"	235	116	26	24	190	8	22
DN125	5"	270	142	28	26	220	8	26
DN150	6"	300	170	30	28	250	8	26
DN200	8'	375	220	36	34	320	12	30
DN250	10"	450	275	42	40	385	12	33
DN300	12"	515	325	52	50	450	16	33
DN350	14"	580	360	58	55	510	16	36
DN400	16"	660	411	65	60	585	16	39
DN450	18"	685	462	68	62	610	20	39
DN500	20"	755	513	72	65	670	20	42
DN600	24"	890	615	80	70	795	20	48

【TECHNICAL DATA】

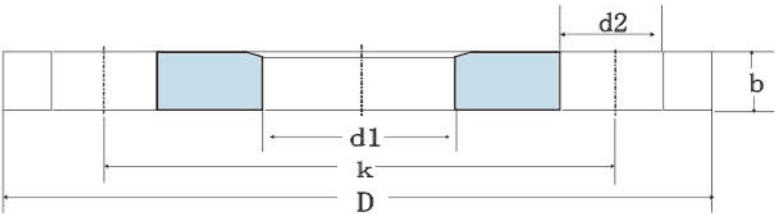
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STEEL PLATE FLANGE ASTM A105 ANSI B16.5
STANDARD



FORGED FLANGE JIS B 2220



ASTM A105 ANSI B 16.5 150LB								Unit: mm	
SIZE		D	d	Thickness T = (t1 + f)			C	No of Bolt	Diameter of Bolt
DN	Inch			Slip on	WN	Blind			
DN15	1/2"	89	22	16	48	14	61	4	15.9
DN20	3/4"	98	27	16	52	14	70	4	15.9
DN25	1"	108	34	17	56	14	79	4	15.9
DN32	1 1/4"	117	43	21	57	16	89	4	15.9
DN40	1 1/2"	127	49	22	62	16	98	4	15.9
DN50	2"	152	61	25	64	16	121	4	19.1
DN65	2 1/2"	178	77	29	70	18	140	4	19.1
DN80	3"	190	90	30	70	18	152	4	19.1
DN100	4"	229	116	33	76	18	190	8	19.1
DN125	5"	254	142	37	90	22	216	8	22.2
DN150	6"	280	170	40	90	24	242	8	22.2
DN200	8"	343	220	44	102	26	299	8	22.2
DN250	10"	406	275	49	102	28	362	12	25.4
DN300	12"	483	325	56	114	30	432	12	25.4
DN350	14"	533	358	57	127	32	476	12	28.6
DN400	16"	597	410	64	127	34	540	16	28.6
DN450	18"	635	460	68	140	36	578	16	31.8
DN500	20"	699	512	73	144	40	635	20	31.8
DN600	24"	813	612	83		42	749	20	34.9

JIS B 2220 10K							Unit: mm	
SIZE		D	d	B		k	No of Bolt	Diameter of Bolt
DN	Inch			FF	Blind			
DN15	1/2'	95	22	12	12	70	4	15
DN20	3/4"	100	27	14	14	75	4	15
DN25	1"	125	34	14	14	90	4	19
DN32	1 1/4"	135	43	16	16	100	4	19
DN40	1 1/2"	140	49	16	16	105	4	19
DN50	2"	155	61	16	16	120	4	19
DN65	2 1/2"	175	77	18	18	140	4	19
DN80	3"	185	90	18	18	150	8	19
DN100	4"	210	116	18	18	175	8	19
DN125	5"	250	142	20	20	210	8	23
DN150	6"	280	170	22	22	240	8	23
DN200	8'	330	220	22	22	290	12	23
DN250	10"	400	275	24	24	355	12	25
DN300	12"	445	325	24	24	400	16	25
DN350	14"	490	358	26	26	445	16	25
DN400	16"	560	410	28	28	510	16	27
DN450	18"	620	460	30	30	565	20	27
DN500	20"	675	512	30	30	620	20	27
DN600	24"	795	612	32	32	730	24	33

ASTM A105 ANSI B 16.5 300LB								Unit: mm	
SIZE		D	d	Thickness T = (t1 + f)			C	No of Bolt	Diameter of Bolt
DN	Inch			Slip on	WN	Blind			
DN15	1/2"	95	22	23	52	16	67	4	15.9
DN20	3/4"	117	27	25	57	16	83	4	19.1
DN25	1"	124	34	27	62	16	90	4	19.1
DN32	1 1/4"	133	43	27	65	18	99	4	19.1
DN40	1 1/2"	155	49	30	68	18	114	4	19.1
DN50	2"	165	61	33	70	18	127	4	22.4
DN65	2 1/2"	190	77	38	76	22	149	8	19.1
DN80	3"	210	90	43	79	22	168	8	22.4
DN100	4"	254	116	48	86	22	200	8	22.4
DN125	5"	280	142	51	99	25	235	8	22.4
DN150	6"	318	170	52	99	25	268	12	22.4
DN200	8"	381	220	62	111	28	330	12	28.1
DN250	10"	444	275	67	117	30	387	16	31.8
DN300	12"	521	325	73	130	34	451	16	31.8
DN350	14"	584	358	76	143	38	514	20	35.1
DN400	16"	648	410	83	146	40	572	20	35.1
DN450	18"	711	460	90	159	45	629	24	35.1
DN500	20"	775	512	95	162	48	685	24	41.2
DN600	24"	914	612	106	168	52	812	24	41.1

JIS B 2220 16K							Unit: mm	
SIZE		D	d	B		k	No of Bolt	Diameter of Bolt
DN	Inch			FF	Blind			
DN15	1/2'	95	22	12	12	70	4	15
DN20	3/4"	100	27	14	14	75	4	15
DN25	1"	125	34	14	14	90	4	19
DN32	1 1/4"	135	43	16	16	100	4	19
DN40	1 1/2"	140	49	16	16	105	4	19
DN50	2"	155	61	16	16	120	8	19
DN65	2 1/2"	175	77	18	18	140	8	19
DN80	3"	200	90	20	18	160	8	23
DN100	4"	225	116	22	20	185	8	23
DN125	5"	270	142	22	20	225	8	25
DN150	6"	305	170	24	22	260	12	25
DN200	8'	350	220	26	24	305	12	25
DN250	10"	430	275	28	25	380	12	27
DN300	12"	480	325	30	28	430	16	27
DN350	14"	540	358	34	30	480	16	33
DN400	16"	605	410	38	32	540	16	33
DN450	18"	675	460	40	35	605	20	33
DN500	20"	730	512	42	38	660	20	33
DN600	24"	845	612	46	40	770	24	39