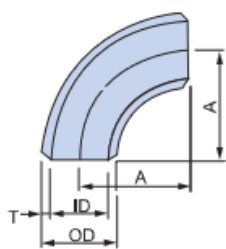


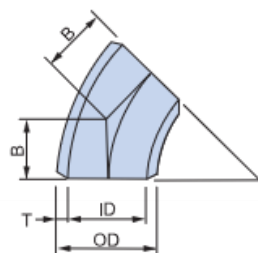
ELBOW

Long & Short Radius

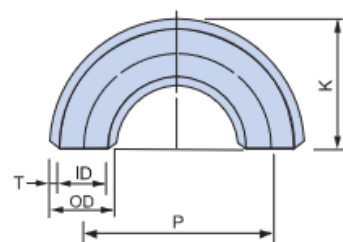
ASME / ANSI B 16.9
ANSI B 16.28
MSS SP-43



90°ELBOW (LONG)

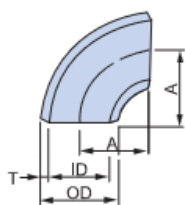


45°ELBOW

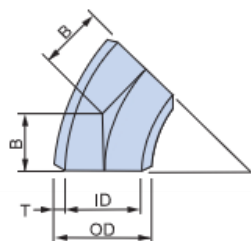


180°ELBOW

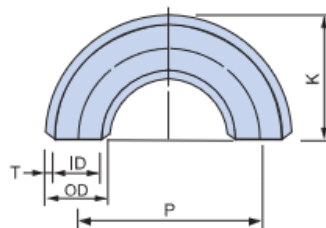
Nominal Pipe Size	Dimensions		Wall Thickness		Long Radius	Short Radius
	O D	I D	Sch. No.	c		
inch	mm	mm		mm	mm	mm
1/2	21.34	18.04	5s	1.65	A = 38.1 B = 15.7 P = 76.2 K = 47.8	-
		17.12	10s	2.11		
		15.80	Std/40 40s	2.77		
		13.88	XS/80 80s	3.73		
		11.78	160	4.78		
		6.40	XXS	7.47		
3/4	26.67	23.37	5s	1.65	A = 38.1 B = 19.1 P = 76.2 K = 50.8	-
		22.45	10s	2.11		
		20.93	Std/40 40s	2.87		
		18.85	XS/80 80s	3.91		
		15.55	160	5.56		
		11.03	XXS	7.82		
1	33.40	30.10	5s	1.65	A = 38.1 B = 22.4 P = 76.2 K = 55.6	A = 25.4 P = 50.8 K = 41.1
		27.86	10s	2.77		
		26.64	Std/40 40s	3.38		
		24.30	XS/80 80s	4.55		
		20.70	160	6.35		
		15.22	XXS	9.09		
1 1/4	42.16	38.86	5s	1.65	A = 47.6 B = 25.4 P = 95.3 K = 69.9	A = 31.8 P = 63.5 K = 52.3
		36.62	10s	2.77		
		35.04	Std/40 40s	3.56		
		32.46	XS/80 80s	4.85		
		29.46	160	6.35		
		22.76	XXS	9.70		
1 1/2	48.26	44.96	5s	1.65	A = 57.2 B = 28.4 P = 114.3 K = 82.6	A = 38.1 P = 76.2 K = 62.0
		42.72	10s	2.77		
		40.90	Std/40 40s	3.68		
		38.10	XS/80 80s	5.08		
		33.98	160	7.14		
		27.94	XXS	10.16		
2	60.32	57.02	5s	1.65	A = 76.2 B = 35.1 P = 152.4 K = 106.4	A = 50.8 P = 101.6 K = 81.0
		54.78	10s	2.77		
		52.50	Std/40 40s	3.91		
		49.24	XS/80 80s	5.54		
		42.84	160	8.74		
		38.18	XXS	11.07		



90°ELBOW (SHORT)



45°ELBOW



180°ELBOW

ELBOW

Long & Short Radius

ASME / ANSI B 16.9
ANSI B 16.28
MSS SP-43

Nominal Pipe Size	Dimensions		Wall Thickness		Long Radius	Short Radius
	OD	ID	Sch. No.	t		
	inch	mm		mm	mm	mm
2 1/2	73.03	68.81	5s	2.11	A = 95.3 B = 44.5 P = 190.5 K = 131.8	A = 63.5 P = 127.0 K = 100.1
		66.93	10s	3.05		
		62.71	Std/40 40s	5.16		
		59.01	XS/80 80s	7.01		
		53.99	160	9.52		
		44.99	XXS	14.02		
3	88.90	84.68	5s	2.11	A = 114.3 B = 50.8 P = 228.6 K = 158.8	A = 76.2 P = 152.4 K = 120.7
		82.80	10s	3.05		
		77.92	Std/40 40s	5.49		
		73.66	XS/80 80s	7.62		
		66.66	160	11.12		
		58.42	XXS	15.24		
3 1/2	101.60	97.38	5s	2.11	A = 133.4 B = 57.2 P = 266.7 K = 184.2	A = 88.9 P = 177.8 K = 139.7
		95.50	10s	3.05		
		90.12	Std/40 40s	5.74		
		85.44	XS/80 80s	8.08		
		-	120	-		
		-	160	-		
4	114.30	110.08	5s	2.11	A = 152.4 B = 63.5 P = 304.8 K = 209.6	A = 101.6 P = 203.2 K = 158.8
		108.20	10s	3.05		
		102.26	Std/40 40s	6.02		
		97.18	XS/80 80s	8.56		
		92.06	120	11.12		
		87.32	160	13.49		
5	141.30	80.06	XXS	17.12	A = 190.5 B = 79.2 P = 381.0 K = 261.9	A = 127.0 P = 254.0 K = 196.9
		135.76	5s	2.77		
		134.50	10s	3.40		
		128.20	Std/40 40s	6.55		
		122.24	XS/80 80s	9.53		
		115.90	120	12.70		
6	168.30	109.54	160	15.88	A = 228.6 B = 95.3 P = 457.2 K = 312.7	A = 152.4 P = 304.8 K = 236.5
		103.20	XXS	19.05		
		162.76	5s	2.77		
		161.50	10s	3.40		
		154.08	Std/40 40s	7.11		
		146.36	XS/80 80s	10.97		
		139.76	120	14.27		
		131.78	160	18.26		
		124.42	XXS	21.94		

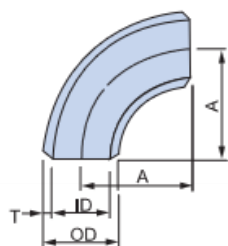
ELBOW

Long & Short Radius

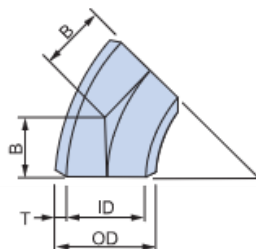
ASME / ANSI B 16.9

ANSI B 16.28

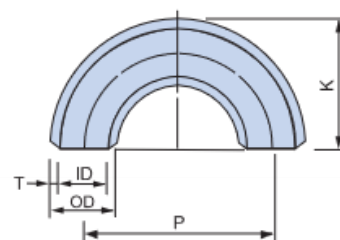
MSS SP-43



90°ELBOW (LONG)

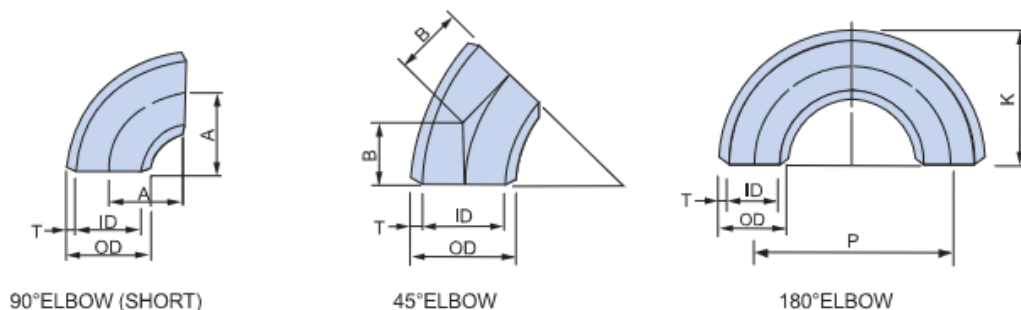


45°ELBOW



180°ELBOW

Nominal Pipe Size	Dimensions		Wall Thickness		Long Radius	Short Radius
	OD	ID	Sch. No.	t		
	mm	mm		mm	mm	mm
8	219.08	213.54	5s	2.77	A = 304.8 B = 127.0 P = 609.6 K = 414.3	A = 203.2 P = 406.4 K = 312.7
		211.56	10s	3.76		
		206.38	20	6.35		
		205.00	30	7.04		
		202.72	Std/40 40s	8.18		
		198.46	60	10.31		
		193.68	XS/80 80s	12.70		
		188.90	100	15.09		
		182.56	120	18.26		
		177.84	140	20.62		
		173.06	160	23.01		
		174.64	XXS	22.22		
10	273.05	266.25	5s	3.40	A = 381.0 B = 158.8 P = 762.0 K = 517.7	A = 254.0 P = 508.0 K = 390.7
		264.67	10s	4.19		
		260.35	20	6.35		
		257.45	30	7.80		
		254.51	Std/40 40s	9.27		
		247.65	XS/60 80s	12.70		
		242.87	80	15.09		
		236.53	100	18.26		
		230.17	120	21.44		
		222.25	140/XXS	25.40		
12	323.80	315.88	5s	3.96	A = 457.2 B = 190.5 P = 914.4 K = 619.3	A = 304.8 P = 609.6 K = 466.9
		314.66	10s	4.57		
		311.10	20	6.35		
		307.04	30	8.38		
		304.76	Std/40s	9.52		
		303.18	40	10.31		
		298.40	XS/80s	12.70		
		295.26	60	14.27		
		288.84	80	17.48		
		280.92	100	21.44		
		273.00	120/XXS	25.40		
		266.64	140	28.58		
		257.16	160	33.32		



ELBOW

Long & Short Radius

ASME / ANSI B 16.9
ANSI B 16.28
MSS SP-43

Nominal Pipe Size	Dimensions		Wall Thickness		Long Radius	Short Radius
	OD	ID	Sch. No.	t		
inch	mm	mm		mm	mm	mm
14	355.60	347.68	5s	3.96	A = 533.4 B = 222.3 P = 1066.8 K = 711.2	A = 355.6 P = 711.2 K = 533.4
		346.04	10s	4.78		
		342.90	10	6.35		
		339.76	20	7.92		
		336.56	Std/30	9.52		
		333.34	40	11.13		
		330.20	XS	12.70		
		325.42	60	15.09		
		317.50	80	19.05		
		307.94	100	23.83		
		300.02	120	27.79		
		292.10	140	31.75		
		284.18	160	35.71		
16	406.40	398.02	4.19	4.19	A = 609.6 B = 254.0 P = 1219.2 K = 812.8	A = 406.4 P = 812.8 K = 609.6
		396.84	4.78	4.78		
		393.70	6.35	6.35		
		390.56	7.92	7.92		
		387.36	9.52	9.52		
		381.00	12.70	12.70		
		373.08	16.66	16.66		
		363.52	21.44	21.44		
		354.02	26.19	26.19		
		344.48	30.96	30.96		
		333.36	36.52	36.52		
		325.42	40.49	40.49		
18	457.20	448.82	4.19	4.19	A = 685.8 B = 285.8 P = 1371.6 K = 914.4	A = 457.2 P = 914.4 K = 685.8
		447.64	4.78	4.78		
		444.50	6.35	6.35		
		441.36	7.92	7.92		
		434.96	11.12	11.12		
		438.16	9.52	9.52		
		431.80	12.70	12.70		
		428.66	14.27	14.27		
		419.10	19.05	19.05		
		409.56	23.82	23.82		
		398.48	29.36	29.36		
		387.36	34.92	34.92		
		377.86	39.67	39.67		
		366.72	45.24	45.24		

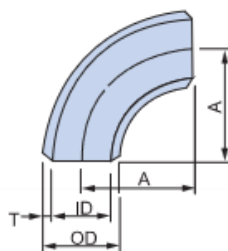
ELBOW

Long & Short Radius

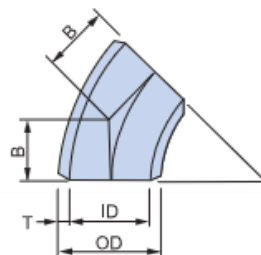
ASME / ANSI B 16.9

ANSI B 16.28

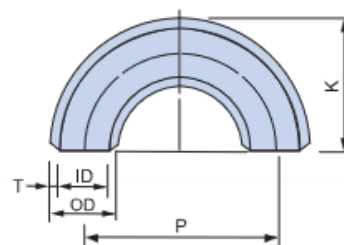
MSS SP-43



90°ELBOW (LONG)

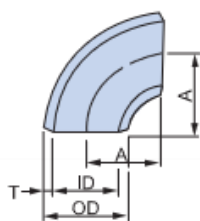


45°ELBOW

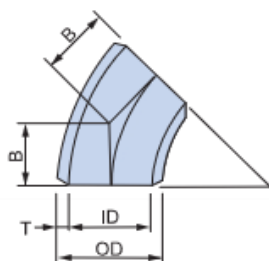


180°ELBOW

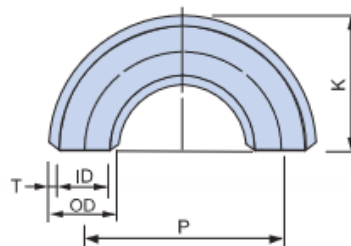
Nominal Pipe Size	Dimensions		Wall Thickness		Long Radius	Short Radius
	O D	I D	Sch. No.	t		
inch	mm	mm		mm	mm	mm
20	508.00	498.44	5s	4.78	A = 762.0 B = 317.5 P = 1524.0 K = 1016.0	A = 508.0 P = 1016.0 K = 762.0
		496.92	10s	5.54		
		495.30	10	6.35		
		488.96	Std/20	9.52		
		482.60	XS/30	12.70		
		477.82	40	15.09		
		466.76	60	20.62		
		455.62	80	26.19		
		442.92	100	32.54		
		431.80	120	38.10		
		419.10	140	44.45		
		407.98	160	50.01		
22	558.80	549.24	5s	4.78	A = 838.2 B = 342.9 P = 1676.4 K = 1117.6	A = 558.8 P = 1117.6 K = 838.2
		547.72	10s	5.54		
		546.10	10	6.35		
		539.76	Std/20	9.52		
		533.40	XS/30	12.70		
		514.36	60	22.22		
		501.64	80	28.58		
		488.96	100	34.92		
		476.24	120	41.28		
		463.56	140	47.62		
		450.84	160	53.98		
24	609.60	598.52	5s	5.54	A = 914.4 B = 381.0 P = 1828.8 K = 1219.2	A = 609.6 P = 1219.2 K = 914.4
		596.90	10s	6.35		
		596.90	10	6.35		
		590.56	Std/20	9.52		
		584.20	XS	12.70		
		581.06	30	14.27		
		574.64	40	17.48		
		560.38	60	24.61		
		547.68	80	30.96		
		531.82	100	38.89		
		517.56	120	46.02		
		504.86	140	52.37		
		490.52	160	59.54		
26	660.40	644.56	10	7.92	A = 990.6 B = 406.4	A = 660.4
		644.36	Std	9.52		
		635.00	XS/20	12.70		



90°ELBOW (SHORT)



45°ELBOW



180°ELBOW

ELBOW

Long & Short Radius

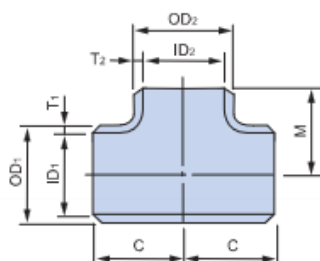
ASME / ANSI B 16.9
ANSI B16.28
MSS SP-43

Nominal Pipe Size	Dimensions		Wall Thickness		Long Radius	Short Radius
	OD	ID	Sch. No.	t		
inch	mm	mm		mm	mm	mm
28	711.20	695.36	10	7.92	A = 1066.8 B = 438.2	A = 711.0
		692.16	Std	9.52		
		685.80	XS/20	12.70		
		679.44	30	15.88		
30	762.00	749.30	5s	6.35	A = 1143.0 B = 469.9	A = 762.0
		746.16	10s	7.92		
		746.16	10	7.92		
		742.96	Std	9.52		
		736.60	XS/20	12.70		
		730.24	30	15.88		
32	812.80	796.96	10	7.92	A = 1219.2 B = 501.7	A = 813.0
		793.76	Std	9.52		
		787.40	XS/20	12.70		
		781.04	30	15.88		
		777.84	40	17.48		
34	863.60	847.76	10	7.92	A = 1295.4 B = 533.4	A = 864.0
		844.56	Std	9.52		
		838.20	XS/20	12.70		
		831.84	30	15.88		
		828.64	40	17.48		
36	914.40	898.56	10	7.92	A = 1371.6 B = 565.2	A = 914.4
		895.34	Std	9.53		
		889.00	XS/20	12.70		
		882.64	30	15.88		
		876.30	40	19.05		
38	965.20	946.16	Std/40	9.52	A = 1447.8 B = 600.0	A = 965.2
		939.80	XS/80	12.70		
40	1016.00	996.96	Std/40	9.52	A = 1524.0 B = 631.8	A = 1016.0
		990.60	XS/80	12.70		
42	1066.80	1047.76	Std/40	9.52	A = 1600.2 B = 660.4	A = 1066.8
		1041.40	XS/80	12.70		
44	1117.60	1098.56	Std/40	9.52	A = 1676.4 B = 695.3	A = 1117.6
		1092.20	XS/80	12.70		
46	1168.40	1149.36	Std/40	9.52	A = 1752.6 B = 727.1	A = 1168.4
		1143.00	XS/80	12.70		
48	1219.20	1200.16	Std/40	9.52	A = 1828.8 B = 758.8	A = 1219.2
		1193.80	XS/80	12.70		

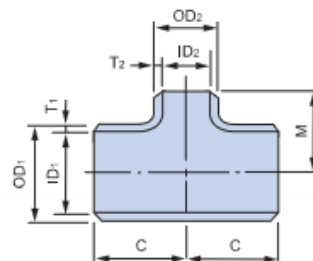
TEE

Straight and Reducing Outlet Tee

ASME / ANSI B 16.9

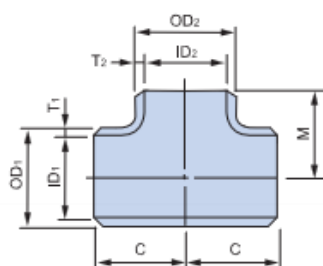


(STRAIGHT)

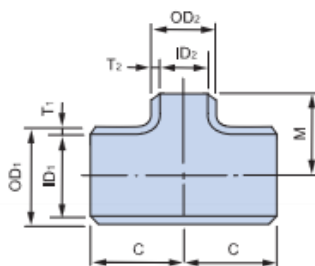


(REDUCING)

Nominal Pipe Size	Dimensions				Wall Thickness									
	Outside Diameter at Bevel : D ₁ /D ₂		Center to End		Sch. 20		Sch. 30		Std		Sch.40		Sch. 60	
	OD ₁	OD ₂	C	M	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1/2 x 1/2	21.34	21.34	25.4	25.4	-	-	-	-	2.77	2.77	2.77	2.77	-	-
3/4 x 3/4	26.67	26.67	28.5	28.5	-	-	-	-	2.87	2.87	2.87	2.87	-	-
3/4 x 1/2	26.67	21.34	28.5	28.5	-	-	-	-	2.87	2.77	2.87	2.77	-	-
1 x 1	33.40	33.40	38.1	38.1	-	-	-	-	3.38	3.38	3.38	3.38	-	-
1 x 3/4	33.40	26.67	38.1	38.1	-	-	-	-	3.38	2.87	3.38	2.87	-	-
1 x 1/2	33.40	21.34	38.1	38.1	-	-	-	-	3.38	2.77	3.38	2.77	-	-
1 1/4 x 1 1/4	42.16	42.16	47.8	47.8	-	-	-	-	3.56	3.56	3.56	3.56	-	-
1 1/4 x 1	42.16	33.40	47.8	47.8	-	-	-	-	3.56	3.38	3.56	3.38	-	-
1 1/4 x 3/4	42.16	26.67	47.8	47.8	-	-	-	-	3.56	2.87	3.56	2.87	-	-
1 1/2 x 1 1/2	48.26	48.26	57.2	57.2	-	-	-	-	3.68	3.68	3.68	3.68	-	-
1 1/2 x 1 1/4	48.26	42.16	57.2	57.2	-	-	-	-	3.68	3.56	3.68	3.56	-	-
1 1/2 x 1	48.26	33.40	57.2	57.2	-	-	-	-	3.68	3.38	3.68	3.38	-	-
1 1/2 x 3/4	48.26	26.67	57.2	57.2	-	-	-	-	3.68	2.87	3.68	2.87	-	-
1 1/2 x 1/2	48.26	21.34	57.2	57.2	-	-	-	-	3.68	2.77	3.68	2.77	-	-
2 x 2	60.32	60.32	63.5	63.5	-	-	-	-	3.91	3.91	3.91	3.91	-	-
2 x 1 1/2	60.32	48.26	63.5	60.5	-	-	-	-	3.91	3.68	3.91	3.68	-	-
2 x 1 1/4	60.32	42.16	63.5	57.2	-	-	-	-	3.91	3.56	3.91	3.56	-	-
2 x 1	60.32	33.40	63.5	50.8	-	-	-	-	3.91	3.38	3.91	3.38	-	-
2 x 3/4	60.32	26.67	63.5	44.5	-	-	-	-	3.91	2.87	3.91	2.87	-	-
2 1/2 x 2 1/2	73.02	73.02	76.2	76.2	-	-	-	-	5.16	5.16	5.16	5.16	-	-
2 1/2 x 2	73.02	60.32	76.2	69.9	-	-	-	-	5.16	3.91	5.16	3.91	-	-
2 1/2 x 1 1/2	73.02	48.26	76.2	66.6	-	-	-	-	5.16	3.68	5.16	3.68	-	-
2 1/2 x 1 1/4	73.02	42.16	76.2	63.5	-	-	-	-	5.16	3.56	5.16	3.56	-	-
2 1/2 x 1	73.02	33.40	76.2	57.2	-	-	-	-	5.16	3.38	5.16	3.38	-	-
3 x 3	88.90	88.90	85.7	85.7	-	-	-	-	5.49	5.49	5.49	5.49	-	-
3 x 2 1/2	88.90	73.02	85.7	82.6	-	-	-	-	5.49	5.16	5.49	5.16	-	-
3 x 2	88.90	60.32	85.7	76.2	-	-	-	-	5.49	3.91	5.49	3.91	-	-
3 x 1 1/2	88.90	48.26	85.7	73.2	-	-	-	-	5.49	3.68	5.49	3.68	-	-
3 x 1 1/4	88.90	42.16	85.7	69.9	-	-	-	-	5.49	3.56	5.49	3.56	-	-
4 x 4	114.30	114.30	104.7	104.7	-	-	-	-	6.02	6.02	6.02	6.02	-	-
4 x 3	114.30	88.90	104.7	98.6	-	-	-	-	6.02	5.49	6.02	5.49	-	-
4 x 2 1/2	114.30	73.02	104.7	95.3	-	-	-	-	6.02	5.16	6.02	5.16	-	-
4 x 2	114.30	60.32	104.7	88.9	-	-	-	-	6.02	3.91	6.02	3.91	-	-
4 x 1 1/2	114.30	48.26	104.7	85.9	-	-	-	-	6.02	3.68	6.02	3.68	-	-



(STRAIGHT)



(REDUCING)

TEE

Straight and Reducing Outlet Tee

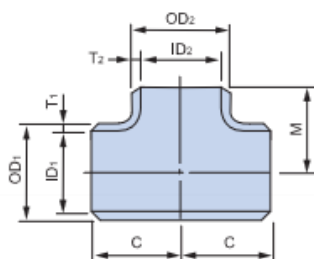
ASME / ANSI B 16.9

Wall Thickness														Nominal Pipe Size
XS		Sch. 80		Sch. 100		Sch. 120		Sch.140		Sch.160		XXS		
t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch
3.73	3.73	3.73	3.73	-	-	-	-	-	-	4.78	4.78	7.47	7.47	1/2 x 1/2
3.91	3.91	3.91	3.91	-	-	-	-	-	-	5.56	5.56	7.82	7.82	3/4 x 3/4
3.91	3.73	3.91	3.73	-	-	-	-	-	-	5.56	4.78	7.82	7.47	3/4 x 1/2
4.55	4.55	4.55	4.55	-	-	-	-	-	-	6.35	6.35	9.09	9.09	1 x 1
4.55	3.91	4.55	3.91	-	-	-	-	-	-	6.35	5.56	9.09	7.82	1 x 3/4
4.55	3.73	4.55	3.73	-	-	-	-	-	-	6.35	4.78	9.09	7.47	1 x 1/2
4.85	4.85	4.85	4.85	-	-	-	-	-	-	6.35	6.35	9.70	9.70	1 1/4 x 1 1/4
4.85	4.55	4.85	4.55	-	-	-	-	-	-	6.35	6.35	9.70	9.09	1 1/4 x 1
4.85	3.91	4.85	3.91	-	-	-	-	-	-	6.35	5.56	9.70	7.82	1 1/4 x 3/4
5.08	5.08	5.08	5.08	-	-	-	-	-	-	7.14	7.14	10.16	10.16	1 1/2 x 1 1/2
5.08	4.85	5.08	4.85	-	-	-	-	-	-	7.14	6.35	10.16	9.70	1 1/2 x 1 1/4
5.08	4.55	5.08	4.55	-	-	-	-	-	-	7.14	6.35	10.16	9.09	1 1/2 x 1
5.08	3.91	5.08	3.91	-	-	-	-	-	-	7.14	5.56	10.16	7.82	1 1/2 x 3/4
5.08	3.73	5.08	3.73	-	-	-	-	-	-	7.14	4.78	10.16	7.47	1 1/2 x 1/2
5.54	5.54	5.54	5.54	-	-	-	-	-	-	8.74	8.74	11.07	11.07	2 x 2
5.54	5.08	5.54	5.08	-	-	-	-	-	-	8.74	7.14	11.07	10.16	2 x 1 1/2
5.54	4.85	5.54	4.85	-	-	-	-	-	-	8.74	6.35	11.07	9.70	2 x 1 1/4
5.54	4.55	5.54	4.55	-	-	-	-	-	-	8.74	6.35	11.07	9.09	2 x 1
5.54	3.91	5.54	3.91	-	-	-	-	-	-	8.74	5.56	11.07	7.82	2 x 3/4
7.01	7.01	7.01	7.01	-	-	-	-	-	-	9.52	9.52	14.02	14.02	2 1/2 x 2 1/2
7.01	5.54	7.01	5.54	-	-	-	-	-	-	9.52	8.74	14.02	11.07	2 1/2 x 2
7.01	5.08	7.01	5.08	-	-	-	-	-	-	9.52	7.14	14.02	10.16	2 1/2 x 1 1/2
7.01	4.85	7.01	4.85	-	-	-	-	-	-	9.52	6.35	14.02	9.70	2 1/2 x 1 1/4
7.01	4.55	7.01	4.55	-	-	-	-	-	-	9.52	6.35	14.02	9.09	2 1/2 x 1
7.62	7.62	7.62	7.62	-	-	-	-	-	-	11.12	11.12	15.24	15.24	3 x 3
7.62	7.01	7.62	7.01	-	-	-	-	-	-	11.12	9.52	15.24	14.02	3 x 2 1/2
7.62	5.54	7.62	5.54	-	-	-	-	-	-	11.12	8.74	15.24	11.07	3 x 2
7.62	5.08	7.62	5.08	-	-	-	-	-	-	11.12	7.14	15.24	10.16	3 x 1 1/2
7.62	4.85	7.62	4.85	-	-	-	-	-	-	13.49	6.35	15.24	9.70	3 x 1 1/4
8.56	8.56	8.56	8.56	-	-	-	-	-	-	13.49	13.49	17.12	17.12	4 x 4
8.56	7.62	8.56	7.62	-	-	-	-	-	-	13.49	11.12	17.12	15.24	4 x 3
8.56	7.01	8.56	7.01	-	-	-	-	-	-	13.49	9.52	17.12	14.02	4 x 2 1/2
8.56	5.54	8.56	5.54	-	-	-	-	-	-	13.49	8.74	17.12	11.07	4 x 2
8.56	5.08	8.56	5.08	-	-	-	-	-	-	13.49	7.14	17.12	10.16	4 x 1 1/2

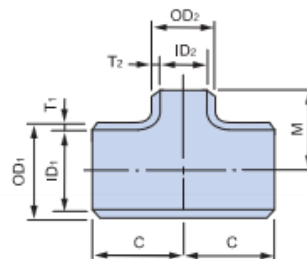
TEE

Straight and Reducing Outlet Tee

ASME / ANSI B 16.9

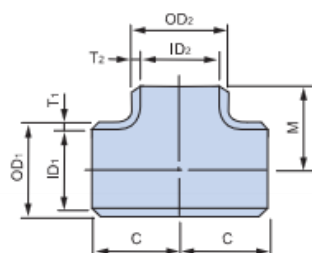


(STRAIGHT)

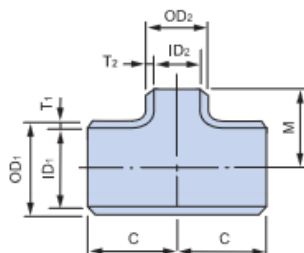


(REDUCING)

Nominal Pipe Size	Dimensions				Wall Thickness									
	Outside Diameter at Bevel : D ₁ /D ₂		Center to End		Sch. 20		Sch. 30		Std		Sch.40		Sch. 60	
	OD ₁	OD ₂	C	M	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
5 x 5	141.30	141.30	124.0	124.0	-	-	-	-	6.55	6.55	6.55	6.55	-	-
5 x 4	141.30	114.30	124.0	117.3	-	-	-	-	6.55	6.02	6.55	6.02	-	-
5 x 3	141.30	88.90	124.0	111.3	-	-	-	-	6.55	5.49	6.55	5.49	-	-
5 x 2 1/2	141.30	73.02	124.0	108.0	-	-	-	-	6.55	5.16	6.55	5.16	-	-
5 x 2	141.30	60.32	124.0	104.6	-	-	-	-	6.55	3.91	6.55	3.91	-	-
6 x 6	168.30	168.30	142.8	142.8	-	-	-	-	7.11	7.11	7.11	7.11	-	-
6 x 5	168.30	141.30	142.8	136.7	-	-	-	-	7.11	6.55	7.11	6.55	-	-
6 x 4	168.30	114.30	142.8	130.0	-	-	-	-	7.11	6.02	7.11	6.02	-	-
6 x 3	168.30	88.90	142.8	124.0	-	-	-	-	7.11	5.49	7.11	5.49	-	-
6 x 2 1/2	168.30	73.02	142.8	120.7	-	-	-	-	7.11	5.16	7.11	5.16	-	-
8 x 8	219.08	219.08	177.8	177.8	6.35	6.35	7.04	7.04	8.18	8.18	8.18	8.18	10.31	10.31
8 x 6	219.08	168.30	177.8	168.1	-	-	-	-	8.18	7.11	8.18	7.11	-	-
8 x 5	219.08	141.30	177.8	162.1	-	-	-	-	8.18	6.55	8.18	6.55	-	-
8 x 4	219.08	114.30	177.8	155.4	-	-	-	-	8.18	6.02	8.18	6.02	-	-
10 x 10	273.05	273.05	215.9	215.9	6.35	6.35	7.80	7.80	9.27	9.27	9.27	9.27	12.70	12.70
10 x 8	273.05	219.08	215.9	203.2	6.35	6.35	7.80	7.04	9.27	8.18	9.27	8.18	12.70	10.31
10 x 6	273.05	168.30	215.9	193.5	6.35	6.35	-	-	9.27	7.11	9.27	7.11	-	-
10 x 5	273.05	141.30	215.9	190.5	-	-	-	-	9.27	6.55	9.27	6.55	-	-
10 x 4	273.05	114.30	215.9	184.2	-	-	-	-	9.27	6.02	9.27	6.02	-	-
12 x 12	273.05	323.80	254.0	254.0	6.35	6.35	8.38	8.38	9.52	9.52	10.31	10.31	14.27	14.27
12 x 10	273.05	273.05	254.0	241.3	6.35	6.35	8.38	7.80	9.52	9.27	10.31	9.27	14.27	12.70
12 x 8	273.05	219.08	254.0	228.6	6.35	6.35	8.38	7.04	9.52	8.18	10.31	8.18	14.27	10.31
12 x 6	273.05	168.30	254.0	218.9	-	-	-	-	9.52	7.11	10.31	7.11	-	-
12 x 5	273.05	141.30	254.0	215.9	-	-	-	-	9.52	6.55	10.31	6.55	-	-
14 x 14	355.60	355.60	279.4	279.4	7.92	7.92	9.52	9.52	9.52	9.52	11.13	11.13	15.09	15.09
14 x 12	355.60	323.90	279.4	269.7	7.92	6.35	9.52	8.38	9.52	9.52	11.13	10.31	15.09	14.27
14 x 10	355.60	273.05	279.4	257.0	7.92	6.35	9.52	7.80	9.52	9.27	11.13	9.27	15.09	12.70
14 x 8	355.60	219.08	279.4	247.7	7.92	6.35	9.52	7.04	9.52	8.18	11.13	8.18	15.09	10.31
14 x 6	355.60	168.30	279.4	238.3	-	-	-	-	9.52	7.11	11.13	7.11	-	-
16 x 16	406.40	406.40	304.8	304.8	7.92	7.92	9.52	9.52	9.52	9.52	12.70	12.70	16.66	16.66
16 x 14	406.40	355.60	304.8	304.8	7.92	7.92	9.52	9.52	9.52	9.52	12.70	11.13	16.66	15.09
16 x 12	406.40	323.80	304.8	295.1	7.92	6.35	9.52	8.38	9.52	9.52	12.70	10.31	16.66	14.27
16 x 10	406.40	273.05	304.8	282.4	7.92	6.35	9.52	7.80	9.52	9.27	12.70	9.27	16.66	12.70
16 x 8	406.40	219.08	304.8	273.1	7.92	6.35	9.52	7.04	9.52	8.18	12.70	8.18	16.66	10.31
16 x 6	406.40	168.30	304.8	263.7	-	-	-	-	9.52	7.11	12.70	7.11	-	-



(STRAIGHT)



(REDUCING)

TEE

Straight and Reducing Outlet Tee

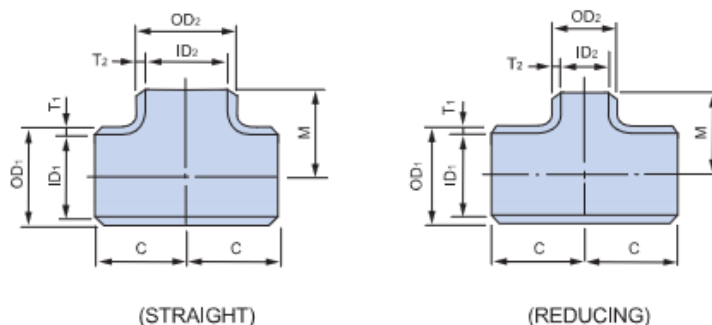
ASME / ANSI B 16.9

Wall Thickness														Nominal Pipe Size
XS		Sch. 80		Sch. 100		Sch. 120		Sch.140		Sch.160		XXS		
t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch
9.53	9.53	9.53	9.53	-	-	12.70	12.70	-	-	15.88	15.88	19.05	19.05	5 x 5
9.53	8.56	9.53	8.56	-	-	12.70	11.12	-	-	15.88	13.49	19.05	17.12	5 x 4
9.53	7.62	9.53	7.62	-	-	-	-	-	-	15.88	11.12	19.05	15.24	5 x 3
9.53	7.01	9.53	7.01	-	-	-	-	-	-	15.88	9.52	19.05	14.02	5 x 2 1/2
9.53	5.54	9.53	5.54	-	-	-	-	-	-	15.88	8.74	19.05	11.07	5 x 2
10.97	10.97	10.97	10.97	-	-	14.27	14.27	-	-	18.26	18.26	21.94	21.94	6 x 6
10.97	9.53	10.97	9.53	-	-	14.27	12.70	-	-	18.26	15.88	21.94	19.05	6 x 5
10.97	8.56	10.97	8.56	-	-	14.27	11.12	-	-	18.26	13.49	21.94	17.12	6 x 4
10.97	7.62	10.97	7.62	-	-	-	-	-	-	18.26	11.12	21.94	15.24	6 x 3
10.97	7.01	10.97	7.01	-	-	-	-	-	-	18.26	9.52	21.94	14.02	6 x 2 1/2
12.70	12.70	12.70	12.70	15.09	15.09	18.26	18.26	20.62	20.62	23.01	23.01	22.22	22.22	8 x 8
12.70	10.97	12.70	10.97	-	-	18.26	14.27	-	-	23.01	18.26	22.22	21.94	8 x 6
12.70	9.53	12.70	9.53	-	-	18.26	12.70	-	-	23.01	15.88	22.22	19.05	8 x 5
12.70	8.56	12.70	8.56	-	-	18.26	11.12	-	-	23.01	13.49	22.22	17.12	8 x 4
12.70	12.70	15.09	15.09	18.26	8.26	21.44	21.44	25.40	25.40	28.58	28.58	25.40	25.40	10 x 10
12.70	12.70	15.09	12.70	18.26	15.09	21.44	18.26	25.40	20.62	28.58	23.01	25.40	22.22	10 x 8
12.70	10.97	15.09	10.97	-	-	21.44	14.27	-	-	28.58	18.26	25.40	21.94	10 x 6
12.70	9.53	15.09	9.53	-	-	21.44	12.70	-	-	28.58	15.88	25.40	19.05	10 x 5
12.70	8.56	15.09	8.56	-	-	21.44	11.12	-	-	28.58	13.49	25.40	17.12	10 x 4
12.70	12.70	17.48	17.48	21.44	21.44	25.40	25.40	28.58	28.58	33.32	33.32	25.40	25.40	12 x 12
12.70	12.70	17.48	15.09	21.44	18.26	25.40	21.44	28.58	25.40	33.32	28.58	25.40	25.40	12 x 10
12.70	12.70	17.48	12.70	21.44	15.09	25.40	18.26	28.58	20.62	33.32	23.01	25.40	22.22	12 x 8
12.70	10.97	17.48	10.97	-	-	25.40	14.27	-	-	33.32	18.26	25.40	21.94	12 x 6
12.70	9.53	17.48	9.53	-	-	25.40	12.70	-	-	33.32	15.88	25.40	19.05	12 x 5
12.70	12.70	19.05	19.05	23.83	23.83	27.79	27.79	31.75	31.75	35.71	35.71	-	-	14 x 14
12.70	12.70	19.05	17.48	23.83	21.44	27.79	25.40	31.75	28.58	35.71	33.32	-	-	14 x 12
12.70	12.70	19.05	15.09	23.83	18.26	27.79	21.44	31.75	25.40	35.71	28.58	-	-	14 x 10
12.70	12.70	19.05	12.70	23.83	15.09	27.79	18.26	31.75	20.62	35.71	23.01	-	-	14 x 8
12.70	10.97	19.05	10.97	-	-	27.79	14.27	-	-	35.71	18.26	-	-	14 x 6
12.70	12.70	21.44	21.44	26.19	26.19	30.96	30.96	36.52	36.52	40.49	40.49	-	-	16 x 16
12.70	12.70	21.44	19.05	26.19	23.83	30.96	27.79	36.52	31.75	40.49	35.71	-	-	16 x 14
12.70	12.70	21.44	17.48	26.19	21.44	30.96	25.40	36.52	28.58	40.49	33.32	-	-	16 x 12
12.70	12.70	21.44	15.09	26.19	18.26	30.96	21.44	36.52	25.40	40.49	28.58	-	-	16 x 10
12.70	12.70	21.44	12.70	26.19	15.09	30.96	18.26	36.52	20.62	40.49	23.01	-	-	16 x 8
12.70	10.97	21.44	10.97	-	-	30.96	14.27	-	-	40.49	18.26	-	-	16 x 6

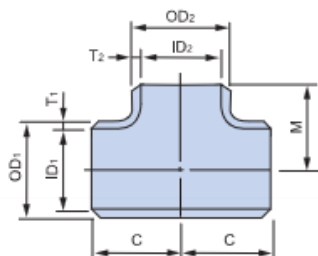
TEE

Straight and Reducing Outlet Tee

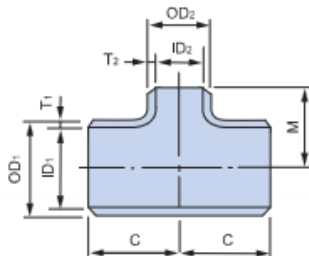
ASME / ANSI B 16.9



Nominal Pipe Size	Dimensions				Wall Thickness									
	Outside Diameter at Bevel : D ₁ /D ₂		Center to End		Sch. 20		Sch. 30		Std		Sch.40		Sch. 60	
	OD ₁	OD ₂	C	M	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
18 x 18	457.20	457.20	342.9	342.9	7.92	7.92	-	-	9.52	9.52	14.27	14.27	19.05	19.05
18 x 16	457.20	406.40	342.9	330.2	7.92	7.92	-	-	9.52	9.52	14.27	12.70	19.05	16.66
18 x 14	457.20	355.60	342.9	330.2	7.92	7.92	-	-	9.52	9.52	14.27	11.13	19.05	15.09
18 x 12	457.20	323.80	342.9	320.6	7.92	6.35	-	-	9.52	9.52	14.27	10.31	19.05	14.27
20 x 20	508.00	508.00	381.0	381.0	9.52	9.52	-	-	9.52	9.52	15.09	15.09	20.62	20.62
20 x 18	508.00	457.20	381.0	368.3	9.52	9.52	-	-	9.52	9.52	15.09	14.27	20.62	19.05
20 x 16	508.00	406.40	381.0	355.6	9.52	9.52	-	-	9.52	9.52	15.09	12.70	20.62	16.66
20 x 14	508.00	355.60	381.0	355.6	9.52	9.52	-	-	9.52	9.52	15.09	11.13	20.62	15.09
22 x 22	558.80	558.80	419.1	419.1	9.52	9.52	-	-	9.52	9.52	-	-	22.22	22.22
22 x 20	558.80	508.00	419.1	406.4	9.52	9.52	-	-	9.52	9.52	-	-	22.22	20.62
22 x 18	558.80	457.20	419.1	393.7	9.52	9.52	-	-	9.52	9.52	-	-	22.22	19.05
22 x 16	558.80	406.40	419.1	381.0	9.52	9.52	-	-	9.52	9.52	-	-	22.22	16.66
24 x 24	609.60	609.60	431.8	431.8	9.52	9.52	-	-	9.52	9.52	17.48	17.48	24.61	24.61
24 x 22	609.60	558.80	431.8	431.8	9.52	9.52	-	-	9.52	9.52	-	-	24.61	22.22
24 x 20	609.60	508.00	431.8	431.8	9.52	9.52	-	-	9.52	9.52	17.48	15.09	24.61	20.62
24 x 18	609.60	457.20	431.8	419.1	9.52	9.52	-	-	9.52	9.52	17.48	14.27	24.61	19.05
26 x 26	660.40	660.40	495.3	495.3	-	-	-	-	9.52	9.52	-	-	-	-
26 x 22	660.40	558.80	495.3	469.9	-	-	-	-	9.52	9.52	-	-	-	-
26 x 18	660.40	457.20	495.3	444.5	-	-	-	-	9.52	9.52	-	-	-	-
26 x 16	660.40	406.40	495.3	431.8	-	-	-	-	9.52	9.52	-	-	-	-
28 x 28	711.20	711.20	520.7	520.7	-	-	-	-	9.52	9.52	-	-	-	-
28 x 24	711.20	609.60	520.7	508.0	-	-	-	-	9.52	9.52	-	-	-	-
28 x 20	711.20	508.00	520.7	482.6	-	-	-	-	9.52	9.52	-	-	-	-
28 x 18	711.20	457.20	520.7	469.9	-	-	-	-	9.52	9.52	-	-	-	-
30 x 30	762.00	762.00	558.8	558.8	-	-	-	-	9.52	9.52	-	-	-	-
30 x 26	762.00	660.40	558.8	546.1	-	-	-	-	9.52	9.52	-	-	-	-
30 x 22	762.00	558.80	558.8	520.7	-	-	-	-	9.52	9.52	-	-	-	-
30 x 20	762.00	508.00	558.8	508.0	-	-	-	-	9.52	9.52	-	-	-	-
32 x 32	812.80	812.80	596.9	596.9	-	-	-	-	9.52	9.52	17.48	17.48	-	-
32 x 28	812.80	711.20	596.9	571.5	-	-	-	-	9.52	9.52	-	-	-	-
32 x 24	812.80	609.60	596.9	558.8	-	-	-	-	9.52	9.52	-	-	-	-
32 x 22	812.80	558.80	596.9	546.1	-	-	-	-	9.52	9.52	-	-	-	-



(STRAIGHT)



(REDUCING)

TEE

Straight and Reducing Outlet Tee

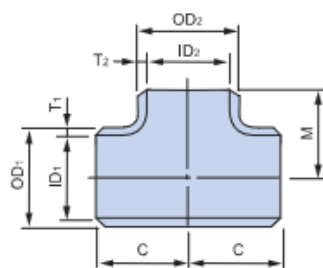
ASME / ANSI B 16.9

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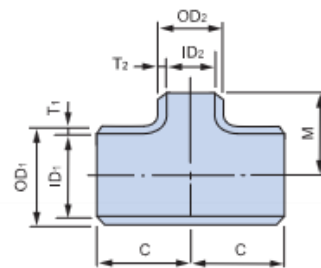
TEE

Straight and Reducing Outlet Tee

ASME / ANSI B 16.9



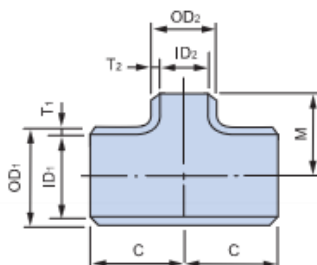
(STRAIGHT)



(REDUCING)

Nominal Pipe Size	Dimensions				Wall Thickness									
	Outside Diameter at Bevel : D ₁ /D ₂		Center to End		Sch. 20									
	OD ₁	OD ₂	C	M	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
34 x 34	863.60	836.60	635.0	635.0	-	-	-	-	9.52	9.52	17.48	17.48	-	-
34 x 32	863.60	812.80	635.0	-	-	-	-	-	9.52	9.52	17.48	17.48	-	-
34 x 30	863.60	762.00	635.0	609.6	-	-	-	-	9.52	9.52	-	-	-	-
34 x 28	863.60	711.20	635.0	-	-	-	-	-	9.52	9.52	-	-	-	-
36 x 36	914.40	914.40	673.1	673.1	-	-	-	-	9.52	9.52	19.05	19.05	-	-
36 x 34	914.40	863.60	673.1	-	-	-	-	-	9.52	9.52	19.05	17.43	-	-
36 x 32	914.40	812.80	673.1	647.7	-	-	-	-	9.52	9.52	19.05	17.43	-	-
36 x 30	914.40	762.00	673.1	-	-	-	-	-	9.52	9.52	-	-	-	-
38 x 38	965.20	965.20	711.2	711.2	-	-	-	-	9.52	9.52	-	-	-	-
38 x 36	965.20	914.40	711.2	-	-	-	-	-	9.52	9.52	-	-	-	-
38 x 34	965.20	863.60	711.2	698.5	-	-	-	-	9.52	9.52	-	-	-	-
38 x 32	965.20	812.80	711.2	-	-	-	-	-	9.52	9.52	-	-	-	-
40 x 40	1016.00	1016.00	749.3	749.3	-	-	-	-	9.52	9.52	-	-	-	-
40 x 38	1016.00	965.20	749.3	-	-	-	-	-	9.52	9.52	-	-	-	-
40 x 36	1016.00	914.40	749.3	736.6	-	-	-	-	9.52	9.52	-	-	-	-
40 x 34	1016.00	863.60	749.3	-	-	-	-	-	9.52	9.52	-	-	-	-
42 x 42	1066.80	1066.80	762.0	762.0	-	-	-	-	9.52	9.52	-	-	-	-
42 x 40	1066.80	1016.00	762.0	-	-	-	-	-	9.52	9.52	-	-	-	-
42 x 38	1066.80	965.20	762.0	711.2	-	-	-	-	9.52	9.52	-	-	-	-
42 x 36	1066.80	914.40	762.0	-	-	-	-	-	9.52	9.52	-	-	-	-
44 x 44	1117.60	1117.60	812.8	812.8	-	-	-	-	9.52	9.52	-	-	-	-
44 x 42	1117.60	1066.80	812.8	-	-	-	-	-	9.52	9.52	-	-	-	-
44 x 40	1117.60	1016.00	812.8	749.3	-	-	-	-	9.52	9.52	-	-	-	-
44 x 38	1117.60	965.20	812.8	-	-	-	-	-	9.52	9.52	-	-	-	-
46 x 46	1168.40	1168.40	850.9	850.9	-	-	-	-	9.52	9.52	-	-	-	-
46 x 44	1168.40	1117.60	850.9	-	-	-	-	-	9.52	9.52	-	-	-	-
46 x 42	1168.40	1066.80	850.9	787.4	-	-	-	-	9.52	9.52	-	-	-	-
46 x 40	1168.40	1016.00	850.9	-	-	-	-	-	9.52	9.52	-	-	-	-
48 x 48	1219.20	1219.20	889.0	889.0	-	-	-	-	9.52	9.52	-	-	-	-
48 x 46	1219.20	1168.40	889.0	-	-	-	-	-	9.52	9.52	-	-	-	-
48 x 44	1219.20	1117.60	889.0	838.2	-	-	-	-	9.52	9.52	-	-	-	-
48 x 42	1219.20	1066.80	889.0	-	-	-	-	-	9.52	9.52	-	-	-	-

DIMENSIONS ARE FOR REFERENCE ONLY AND ACTUAL DIMENSIONS MUST BE VERIFIED



(REDUCING)

TEE

Straight and Reducing Outlet Tee

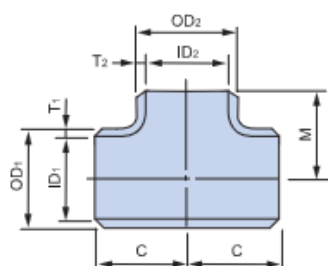
ASME / ANSI B 16.9

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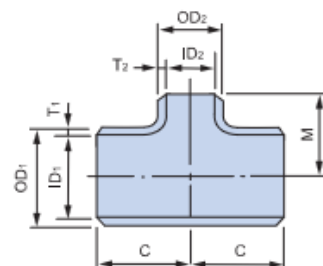
TEE

Straight and Reducing Outlet Tee

ANSI B 16.9 MSS SP-43



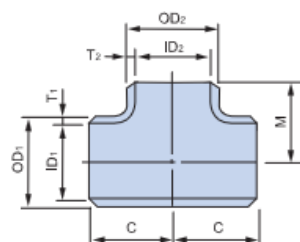
(STRAIGHT)



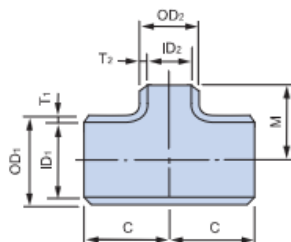
(REDUCING)

Nominal Pipe Size	Dimensions				Wall Thickness							
	Outside Diameter at Bevel : D ₁ /D ₂		Center to End		5s		10s		40s		80s	
	OD ₁	OD ₂	C	M	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1/2 x 1/2	21.34	21.34	25.4	25.4	1.65	1.65	2.11	2.11	2.77	2.77	3.73	3.73
3/4 x 3/4	26.67	26.67	28.5	28.5	1.65	1.65	2.11	2.11	2.87	2.87	3.91	3.91
3/4 x 1/2	26.67	21.34	28.5	28.5	1.65	1.65	2.11	2.11	2.87	2.77	3.91	3.73
1 x 1	33.40	33.40	38.1	38.1	1.65	1.65	2.77	2.77	3.38	3.38	4.55	4.55
1 x 3/4	33.40	26.67	38.1	38.1	1.65	1.65	2.77	2.11	2.87	2.87	4.55	3.91
1 x 1/2	33.40	21.34	38.1	38.1	1.65	1.65	2.77	2.11	2.87	2.77	4.55	3.73
1 1/4 x 1 1/4	42.16	42.16	47.8	47.8	1.65	1.65	2.77	2.77	3.56	3.56	4.55	4.85
1 1/4 x 1	42.16	33.40	47.8	47.8	1.65	1.65	2.77	2.77	3.56	2.87	4.55	4.55
1 1/4 x 3/4	42.16	26.67	47.8	47.8	1.65	1.65	2.77	2.11	3.56	2.77	4.55	3.91
1 1/2 x 1 1/2	48.26	48.26	57.2	57.2	1.65	1.65	2.77	2.77	3.68	3.68	5.08	5.08
1 1/2 x 1 1/4	48.26	42.16	57.2	57.2	1.65	1.65	2.77	2.77	3.68	3.56	5.80	4.85
1 1/2 x 1	48.26	33.40	57.2	57.2	1.65	1.65	2.77	2.77	3.68	2.87	5.80	4.55
1 1/2 x 3/4	48.26	26.67	57.2	57.2	1.65	1.65	2.77	2.11	3.68	2.77	5.80	3.91
2 x 2	60.32	60.32	63.5	63.5	1.65	1.65	2.77	2.77	3.91	3.91	5.54	5.54
2 x 1 1/2	60.32	48.26	63.5	60.5	1.65	1.65	2.77	2.77	3.91	3.68	5.54	5.08
2 x 1 1/4	60.32	42.16	63.5	57.2	1.65	1.65	2.77	2.77	3.91	3.56	5.54	4.85
2 x 1	60.32	33.40	63.5	50.8	1.65	1.65	2.77	2.77	3.91	3.38	5.54	4.55
3 x 3	73.02	73.02	76.2	76.2	2.11	1.65	3.05	3.05	5.16	5.16	7.01	7.01
3 x 2 1/2	73.02	60.32	76.2	69.9	2.11	1.65	3.05	2.77	5.16	3.91	7.01	5.54
3 x 2	73.02	48.26	76.2	66.6	2.11	2.11	3.05	2.77	5.16	3.68	7.01	5.08
3 x 1 1/2	73.02	42.16	76.2	63.5	2.11	1.65	3.05	2.77	5.16	3.56	7.01	4.85
3 x 3	88.90	88.90	85.7	85.7	2.11	2.11	3.05	3.05	5.49	5.49	7.62	7.62
3 x 2 1/2	88.90	73.02	85.7	82.6	2.11	2.11	3.05	3.05	5.49	5.16	7.62	7.01
3 x 2	88.90	60.32	85.7	76.2	2.11	1.65	3.05	2.77	5.49	3.91	7.62	5.54
3 x 1 1/2	88.90	48.26	85.7	73.2	2.11	1.65	3.05	2.77	5.49	3.68	7.62	5.08
3 1/2 x 3 1/2	101.60	101.60	95.3	95.3	2.11	2.11	3.05	3.05	5.74	5.74	8.08	8.08
3 1/2 x 3	101.60	88.90	95.3	92.0	2.11	2.11	3.05	3.05	5.74	5.49	8.08	7.62
3 1/2 x 2 1/2	101.60	73.02	95.3	88.9	2.11	2.11	3.05	3.05	5.74	5.16	8.08	7.01
3 1/2 x 2	101.60	60.32	95.3	82.6	2.11	1.65	3.05	2.77	5.74	3.91	8.08	5.54
3 1/2 x 1 1/2	101.60	48.26	95.3	79.3	2.11	1.65	3.05	2.77	5.74	3.68	8.08	5.08
4 x 4	114.30	114.30	104.7	104.7	2.11	2.11	3.05	3.05	6.02	6.02	8.56	8.56
4 x 3 1/2	114.30	101.60	104.7	101.6	2.11	2.11	3.05	3.05	6.02	5.74	8.56	8.08
4 x 3	114.30	88.90	104.7	98.6	2.11	2.11	3.05	3.05	6.02	5.49	8.56	7.62
4 x 2 1/2	114.30	73.02	104.7	95.3	2.11	2.11	3.05	3.05	6.02	5.16	8.56	7.01
4 x 2	114.30	60.32	104.7	88.9	2.11	1.65	3.05	2.77	6.02	3.91	8.56	5.54
5 x 5	141.30	141.30	124.0	124.0	2.77	2.77	3.40	3.40	6.55	6.55	9.53	9.53
5 x 4	141.30	114.30	124.0	117.3	2.77	2.11	3.40	3.05	6.55	6.02	9.53	8.56
5 x 3 1/2	141.30	101.60	124.0	114.3	2.77	2.11	3.40	3.05	6.55	5.74	9.53	8.08
5 x 3	141.30	88.90	124.0	111.3	2.77	2.11	3.40	3.05	6.55	5.49	9.53	7.62
5 x 2 1/2	141.30	73.02	124.0	108.0	2.77	2.11	3.40	3.05	6.55	5.16	9.53	7.01

DIMENSIONS ARE FOR REFERENCE ONLY AND ACTUAL DIMENSIONS MUST BE VERIFIED



(STRAIGHT)



(REDUCING)

TEE

Straight and Reducing Outlet Tee

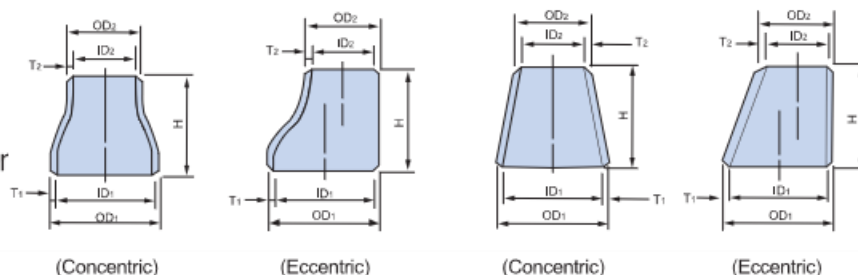
ANSI B 16.9 MSS SP-43

Nominal Pipe Size	Dimensions				Wall Thickness							
	Outside Diameter at Bevel : D ₁ /D ₂		Center to End		5s		10s		40s		80s	
	OD ₁	OD ₂	C	M	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
6 x 6	168.30	168.30	142.8	142.8	2.77	2.77	3.40	3.40	7.11	7.11	10.97	10.97
6 x 5	168.30	141.30	142.8	136.7	2.77	2.77	3.40	3.40	7.11	6.55	10.97	9.53
6 x 4	168.30	114.30	142.8	130.0	2.77	2.11	3.05	3.05	7.11	6.02	10.97	8.56
6 x 3 1/2	168.30	101.60	142.8	127.0	2.77	2.11	3.05	3.05	7.11	5.74	10.97	8.08
6 x 3	168.30	88.90	142.8	124.0	2.77	2.11	3.05	3.05	7.11	5.49	10.97	7.62
8 x 8	219.08	219.08	177.8	177.8	2.77	2.77	3.76	3.76	8.18	8.18	12.70	12.70
8 x 6	219.08	168.30	177.8	168.1	2.77	2.77	3.76	3.40	8.18	7.11	12.70	10.97
8 x 5	219.08	141.30	177.8	162.1	2.77	2.77	3.76	3.40	8.18	6.55	12.70	9.53
8 x 4	219.08	114.30	177.8	155.5	2.77	2.11	3.76	3.05	8.18	6.02	12.70	8.56
10 x 10	273.05	273.05	215.9	215.9	3.40	3.40	4.19	4.19	9.27	9.27	12.70	12.70
10 x 8	273.05	219.08	215.9	203.2	3.40	2.77	4.19	3.76	9.27	8.18	12.70	12.70
10 x 6	273.05	168.30	215.9	193.5	3.40	2.77	4.19	3.40	9.27	7.11	12.70	10.97
10 x 5	273.05	141.30	215.9	190.5	3.40	2.77	4.19	3.40	9.27	6.55	12.70	9.53
12 x 12	323.80	323.80	254.0	254.0	3.96	3.96	4.57	4.57	9.52	9.52	12.70	12.70
12 x 10	323.80	273.05	254.0	241.3	3.96	3.40	4.57	4.19	9.52	9.27	12.70	12.70
12 x 8	323.80	219.08	254.0	228.6	3.96	2.77	4.57	3.76	9.52	8.18	12.70	12.70
12 x 6	323.80	168.30	254.0	219.0	3.96	2.77	4.57	3.40	9.52	7.11	12.70	10.97
14 x 14	355.60	355.60	279.4	279.4	3.96	3.96	4.78	4.78	-	-	-	-
14 x 12	355.60	323.80	279.4	269.7	3.96	3.96	4.78	4.57	-	-	-	-
14 x 10	355.60	273.05	279.4	257.0	3.96	3.40	4.78	4.19	-	-	-	-
14 x 8	355.60	219.08	279.4	247.7	3.96	2.77	4.78	3.76	-	-	-	-
16 x 16	406.40	406.40	304.8	304.8	4.19	4.19	4.78	4.78	-	-	-	-
16 x 14	406.40	355.60	304.8	304.8	4.19	3.96	4.78	4.78	-	-	-	-
16 x 12	406.40	323.80	304.8	295.1	4.19	3.96	4.78	4.57	-	-	-	-
16 x 10	406.40	273.05	304.8	282.4	4.19	3.40	4.78	4.19	-	-	-	-
18 x 18	457.20	457.20	342.9	342.9	4.19	4.19	4.78	4.78	-	-	-	-
18 x 16	457.20	406.40	342.9	330.2	4.19	4.19	4.78	4.78	-	-	-	-
18 x 14	457.20	355.60	342.9	330.2	4.19	3.96	4.78	4.78	-	-	-	-
18 x 12	457.20	323.80	342.9	320.6	4.19	3.96	4.78	4.57	-	-	-	-
20 x 20	508.00	508.00	381.0	381.0	4.78	4.78	5.54	5.54	-	-	-	-
20 x 18	508.00	457.20	381.0	368.3	4.78	4.19	5.54	4.78	-	-	-	-
20 x 16	508.00	406.40	381.0	355.6	4.78	4.19	5.54	4.78	-	-	-	-
20 x 14	508.00	355.60	381.0	355.6	4.78	3.96	5.54	4.78	-	-	-	-
22 x 22	558.80	558.80	419.1	419.1	4.78	4.78	5.54	5.54	-	-	-	-
22 x 20	558.80	508.00	419.1	406.4	4.78	4.78	5.54	5.54	-	-	-	-
22 x 18	558.80	457.20	419.1	393.7	4.78	4.19	5.54	4.78	-	-	-	-
22 x 16	558.80	406.40	419.1	381.0	4.78	4.19	5.54	4.78	-	-	-	-
24 x 24	609.60	609.60	431.8	5.54	6.35	5.54	6.35	6.35	-	-	-	-
24 x 22	609.60	558.80	431.8	5.54	5.54	4.78	6.35	5.54	-	-	-	-
24 x 20	609.60	508.00	431.8	5.54	4.78	4.78	6.35	5.54	-	-	-	-
24 x 18	609.60	457.20	419.1	5.54	4.78	4.19	6.35	4.78	-	-	-	-
30 x 30	762.00	762.00	558.8	558.8	6.35	6.35	-	-	-	-	-	-
30 x 24	762.00	609.60	558.8	533.4	6.35	5.54	-	-	-	-	-	-
30 x 22	762.00	558.80	558.8	520.7	6.35	4.78	-	-	-	-	-	-
30 x 20	762.00	508.00	558.8	508.0	6.35	4.78	-	-	-	-	-	-

REDUCER

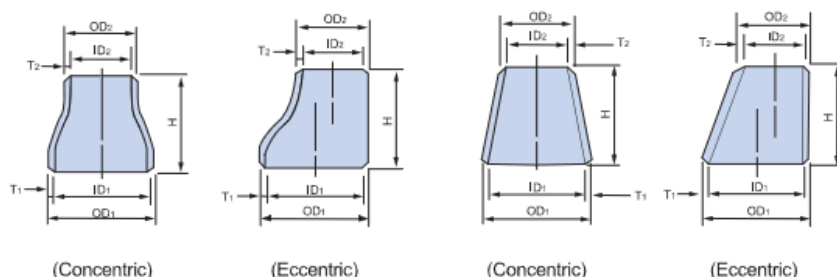
Concentric & Eccentric Reducer

ASME / ANSI B 16.9



Nominal Pipe Size	Dimensions			Wall Thickness									
	Outside Diameter at Bevel : D ₁ /D ₂		End to End	Sch. 20		Sch. 30		Std		Sch.40		Sch. 60	
	OD ₁	OD ₂		t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1 x 3/4	33.40	26.67	50.8	-	-	-	-	3.38	2.87	3.38	2.87	-	-
1 1/2 x 1 1/4	48.26	42.16	63.5	-	-	-	-	3.68	3.56	3.68	3.56	-	-
1 1/2 x 1	48.26	33.40	63.5	-	-	-	-	3.68	3.38	3.68	3.38	-	-
1 1/2 x 3/4	48.26	26.67	63.5	-	-	-	-	3.68	2.87	3.68	2.87	-	-
2 x 1 1/2	60.32	48.26	76.2	-	-	-	-	3.91	3.68	3.91	3.68	-	-
2 x 1 1/4	60.32	42.16	76.2	-	-	-	-	3.91	3.56	3.91	3.56	-	-
2 x 1	60.32	33.40	76.2	-	-	-	-	3.91	3.38	3.91	3.38	-	-
2 1/2 x 2	73.02	60.32	88.9	-	-	-	-	5.16	3.91	5.16	3.91	-	-
2 1/2 x 1 1/2	73.02	48.26	88.9	-	-	-	-	5.16	3.68	5.16	3.68	-	-
2 1/2 x 1 1/4	73.02	42.16	88.9	-	-	-	-	5.16	3.56	5.16	3.56	-	-
3 x 2 1/2	88.90	73.02	88.9	-	-	-	-	5.49	5.16	5.49	5.16	-	-
3 x 2	88.90	60.32	88.9	-	-	-	-	5.49	3.91	5.49	3.91	-	-
3 x 1 1/2	88.90	48.26	88.9	-	-	-	-	5.49	3.68	5.49	3.68	-	-
4 x 3	114.30	88.90	101.6	-	-	-	-	6.02	5.49	6.02	5.49	-	-
4 x 2 1/2	114.30	73.02	101.6	-	-	-	-	6.02	5.16	6.02	5.16	-	-
4 x 2	114.30	60.32	101.6	-	-	-	-	6.02	3.91	6.02	3.91	-	-
5 x 4	141.30	114.30	127.0	-	-	-	-	6.55	6.02	6.55	6.02	-	-
5 x 3	141.30	88.90	127.0	-	-	-	-	6.55	5.49	6.55	5.49	-	-
5 x 2 1/2	141.30	73.02	127.0	-	-	-	-	6.55	5.16	6.55	5.16	-	-
6 x 5	168.30	141.30	139.7	-	-	-	-	7.11	6.55	7.11	6.55	-	-
6 x 4	168.30	114.30	139.7	-	-	-	-	7.11	6.02	7.11	6.02	-	-
6 x 3	168.30	88.90	139.7	-	-	-	-	7.11	5.49	7.11	5.49	-	-
8 x 6	219.08	168.30	152.4	-	-	-	-	8.18	7.11	8.18	7.11	-	-
8 x 5	219.08	141.30	152.4	-	-	-	-	8.18	6.55	8.18	6.55	-	-
8 x 4	219.08	114.30	152.4	-	-	-	-	8.18	6.02	8.18	6.02	-	-
10 x 8	273.05	219.08	177.8	6.35	6.35	7.80	7.04	9.27	8.18	9.27	8.18	12.70	10.31
10 x 6	273.05	168.30	177.8	-	-	-	-	9.27	7.11	9.27	7.11	-	-
10 x 5	273.05	141.30	177.8	-	-	-	-	9.27	6.55	9.27	6.55	-	-
12 x 10	323.80	273.05	203.2	6.35	6.35	8.38	7.80	9.52	9.27	10.31	9.27	14.27	12.70
12 x 8	323.80	219.08	203.2	6.35	6.35	8.38	7.04	9.52	8.18	10.31	8.18	14.27	10.31
12 x 6	323.80	168.30	203.2	-	-	-	-	9.52	7.11	10.31	7.11	-	-
14 x 12	355.60	323.80	330.2	7.92	6.35	9.52	8.38	9.52	9.52	11.13	10.31	15.09	14.27
14 x 10	355.60	273.05	330.2	7.92	6.35	9.52	7.80	9.52	9.27	11.13	9.27	15.09	12.70
14 x 8	355.60	219.08	330.2	7.92	6.35	9.52	7.04	9.52	8.18	11.13	8.18	15.09	10.31
16 x 14	406.40	355.60	355.6	7.92	7.92	9.52	9.52	9.52	9.52	12.70	11.13	16.66	15.09
16 x 12	406.40	323.80	355.6	7.92	6.35	9.52	8.38	9.52	9.52	12.70	10.31	16.66	14.27
16 x 10	406.40	273.05	355.6	7.92	6.35	9.52	7.80	9.52	9.27	12.70	9.27	16.66	12.70
16 x 8	406.40	219.08	355.6	7.92	6.35	9.52	7.04	9.52	8.18	12.70	8.18	16.66	10.31
18 x 16	457.20	406.40	381.0	7.92	7.92	-	-	9.52	9.52	14.27	12.70	19.05	16.66
18 x 14	457.20	355.60	381.0	7.92	7.92	-	-	9.52	9.52	14.27	11.13	19.05	15.09
18 x 12	457.20	323.80	381.0	7.92	6.35	-	-	9.52	9.52	14.27	10.31	19.05	14.27
20 x 18	508.00	457.20	508.0	9.52	7.92	-	-	9.52	9.52	15.09	14.27	20.62	19.05
20 x 16	508.00	406.40	508.0	9.52	7.92	-	-	9.52	9.52	15.09	12.70	20.62	16.66
20 x 14	508.00	355.60	508.0	9.52	7.92	-	-	9.52	9.52	15.09	11.13	20.62	15.09

DIMENSIONS ARE FOR REFERENCE ONLY AND ACTUAL DIMENSIONS MUST BE VERIFIED



REDUCER

Concentric & Eccentric Reducer

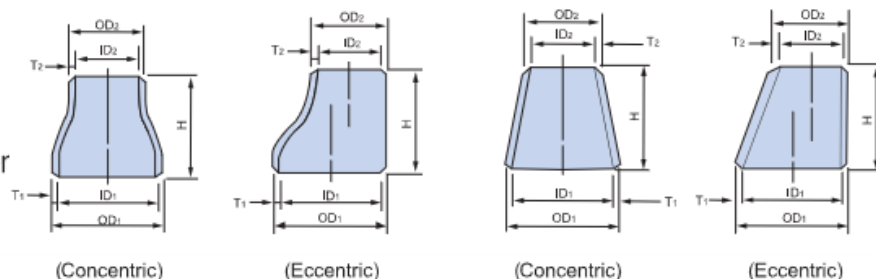
ASME / ANSI B 16.9

Wall Thickness														Nominal Pipe Size
XS		Sch. 80		Sch. 100		Sch. 120		Sch. 140		Sch.160		XXS		
t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
4.55	3.91	4.55	3.91	-	-	-	-	-	-	6.35	5.56	9.09	7.82	1 x 3/4
5.08	4.85	5.08	4.85	-	-	-	-	-	-	7.14	6.35	10.16	9.70	1 1/2 x 1 1/4
5.08	4.55	5.08	4.55	-	-	-	-	-	-	7.14	6.35	10.16	9.09	1 1/2 x 1
5.08	3.91	5.08	3.91	-	-	-	-	-	-	7.14	5.56	10.16	7.82	1 1/2 x 3/4
5.54	5.08	5.54	5.08	-	-	-	-	-	-	8.74	7.14	11.07	10.16	2 x 1 1/2
5.54	4.85	5.54	4.85	-	-	-	-	-	-	8.74	6.35	11.07	9.70	2 x 1 1/4
5.54	4.55	5.54	4.55	-	-	-	-	-	-	8.74	6.35	11.07	9.09	2 x 1
7.01	5.54	7.01	5.54	-	-	-	-	-	-	9.52	8.74	14.02	11.07	2 1/2 x 2
7.01	5.08	7.01	5.08	-	-	-	-	-	-	9.52	7.14	14.02	10.16	2 1/2 x 1 1/2
7.01	4.85	7.01	4.85	-	-	-	-	-	-	9.52	6.35	14.02	9.70	2 1/2 x 1 1/4
7.62	7.01	7.62	7.01	-	-	-	-	-	-	11.12	9.52	15.24	14.02	3 x 2 1/2
7.62	5.54	7.62	5.54	-	-	-	-	-	-	11.12	8.74	15.24	11.07	3 x 2
7.62	5.08	7.62	5.08	-	-	-	-	-	-	11.12	7.14	15.24	10.16	3 x 1 1/2
8.56	7.62	8.56	7.62	-	-	-	-	-	-	13.49	11.12	17.12	15.24	4 x 3
8.56	7.01	8.56	7.01	-	-	-	-	-	-	13.49	9.52	17.12	14.02	4 x 2 1/2
8.56	5.54	8.56	5.54	-	-	-	-	-	-	13.49	8.74	17.12	11.07	4 x 2
9.53	8.56	9.53	8.56	-	-	12.70	11.12	-	-	15.88	13.49	19.05	17.12	5 x 4
9.53	7.62	9.53	7.62	-	-	-	-	-	-	15.88	11.12	19.05	15.24	5 x 3
9.53	7.01	9.53	7.01	-	-	-	-	-	-	15.88	9.52	19.05	14.02	5 x 2 1/2
10.97	9.53	10.97	9.53	-	-	14.27	12.70	-	-	18.26	15.88	21.94	19.05	6 x 5
10.97	8.56	10.97	8.56	-	-	14.27	11.12	-	-	18.26	13.49	21.94	17.12	6 x 4
10.97	7.62	10.97	7.62	-	-	-	-	-	-	18.26	11.12	21.94	15.24	6 x 3
12.70	10.97	12.70	10.97	-	-	18.26	14.27	-	-	23.01	18.26	22.22	21.94	8 x 6
12.70	9.53	12.70	9.53	-	-	18.26	12.70	-	-	23.01	15.88	22.22	19.05	8 x 5
12.70	8.56	12.70	8.56	-	-	18.26	11.12	-	-	23.01	13.49	22.22	17.12	8 x 4
12.70	12.70	15.09	12.70	18.26	15.09	21.44	18.26	25.40	20.62	28.58	23.01	25.40	22.22	10 x 8
12.70	10.97	15.09	10.97	-	-	21.44	14.27	-	-	28.58	18.26	25.40	21.94	10 x 6
12.70	9.53	15.09	9.53	-	-	21.4	12.70	-	-	28.58	15.88	25.40	19.05	10 x 5
12.70	12.70	17.48	15.09	21.44	18.26	25.40	21.44	28.58	25.40	33.32	28.58	25.40	25.40	12 x 10
12.70	12.70	17.48	12.70	21.44	15.09	25.40	18.26	28.58	20.62	33.32	23.01	25.40	22.22	12 x 8
12.70	10.97	17.48	10.97	-	-	25.40	14.27	-	-	33.32	18.26	25.40	21.94	12 x 6
12.70	12.70	19.05	17.48	23.83	21.44	27.79	25.40	31.75	28.58	35.71	33.32	-	-	14 x 12
12.70	12.70	19.05	15.09	23.83	18.26	27.79	21.44	31.75	25.40	35.71	28.58	-	-	14 x 10
12.70	12.70	19.05	12.70	23.83	15.09	27.79	18.26	31.75	20.62	35.71	23.01	-	-	14 x 8
12.70	12.70	21.44	19.05	26.19	23.83	30.96	27.79	36.52	31.75	40.49	35.71	-	-	16 x 14
12.70	12.70	21.44	17.48	26.19	21.44	30.96	25.40	36.52	28.58	40.49	33.32	-	-	16 x 12
12.70	12.70	21.44	15.09	26.19	18.26	30.96	21.44	36.52	25.40	40.49	28.58	-	-	16 x 10
12.70	12.70	21.44	12.70	26.19	15.09	30.96	18.26	36.52	20.62	40.49	23.01	-	-	16 x 8
12.70	12.70	23.82	21.44	29.36	26.19	34.92	30.96	39.67	36.52	45.24	40.49	-	-	18 x 16
12.70	12.70	23.82	19.05	29.36	23.83	34.92	27.79	39.67	31.75	45.24	35.71	-	-	18 x 14
12.70	12.70	23.82	17.48	29.36	21.44	34.92	25.40	39.67	28.58	45.24	33.32	-	-	18 x 12
12.70	12.70	26.19	23.82	32.54	29.36	38.10	34.92	44.45	39.67	50.01	45.24	-	-	20 x 18
12.70	12.70	26.19	21.44	32.54	26.19	38.10	30.96	44.45	36.52	50.01	40.49	-	-	20 x 16
12.70	12.70	26.19	19.05	32.54	23.83	38.10	27.79	44.45	31.75	50.01	35.71	-	-	20 x 14

REDUCER

Concentric & Eccentric Reducer

ASME / ANSI B 16.9



Nominal Pipe Size	Dimensions			Wall Thickness									
	Outside Diameter at Bevel : D ₁ /D ₂		End to End										
	OD ₁	OD ₂		Sch. 20		Sch. 30		Std		Sch.40		Sch. 60	
inch	mm	mm	mm	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
24 x 22	609.6	558.8	508.0	9.52	9.52	-	-	9.52	9.52	17.48	-	24.61	22.22
24 x 20	609.6	508.0	508.0	9.52	9.52	-	-	9.52	9.52	17.48	15.09	24.61	20.62
24 x 18	609.6	457.2	508.0	9.52	7.92	-	-	9.52	9.52	17.48	14.27	24.61	19.05
26 x 22	660.4	558.8	609.6	-	-	-	-	9.52	9.52	-	-	-	-
26 x 18	660.4	457.2	609.6	-	-	-	-	9.52	9.52	-	-	-	-
26 x 16	660.4	406.4	609.6	-	-	-	-	9.52	9.52	-	-	-	-
28 x 24	711.2	609.6	609.6	-	-	-	-	9.52	9.52	-	-	-	-
28 x 20	711.2	508.0	609.6	-	-	-	-	9.52	9.52	-	-	-	-
28 x 18	711.2	457.2	609.6	-	-	-	-	9.52	9.52	-	-	-	-
30 x 26	762.0	660.4	609.6	-	-	-	-	9.52	9.52	-	-	-	-
30 x 22	762.0	558.8	609.6	-	-	-	-	9.52	9.52	-	-	-	-
30 x 20	762.0	508.0	609.6	-	-	-	-	9.52	9.52	-	-	-	-
32 x 28	812.8	711.2	609.6	-	-	-	-	9.52	9.52	-	-	-	-
32 x 24	812.8	609.6	609.6	-	-	-	-	9.52	9.52	17.48	17.48	-	-
32 x 22	812.8	558.8	609.6	-	-	-	-	9.52	9.52	-	-	-	-
34 x 30	863.6	762.0	609.6	-	-	-	-	9.52	9.52	-	-	-	-
34 x 26	863.6	660.4	609.6	-	-	-	-	9.52	9.52	-	-	-	-
34 x 22	863.6	558.8	609.6	-	-	-	-	9.52	9.52	-	-	-	-
36 x 32	914.4	812.8	609.6	-	-	-	-	9.52	9.52	19.05	17.48	-	-
36 x 28	914.4	711.2	609.6	-	-	-	-	9.52	9.52	-	-	-	-
36 x 24	914.4	609.6	609.6	-	-	-	-	9.52	9.52	19.05	17.48	-	-
38 x 34	965.2	863.6	609.6	-	-	-	-	9.52	9.52	-	-	-	-
38 x 30	965.2	762.0	609.6	-	-	-	-	9.52	9.52	-	-	-	-
38 x 26	965.2	660.4	609.6	-	-	-	-	9.52	9.52	-	-	-	-
40 x 36	1016.0	914.4	609.6	-	-	-	-	9.52	9.52	-	-	-	-
40 x 32	1016.0	812.8	609.6	-	-	-	-	9.52	9.52	-	-	-	-
40 x 28	1016.0	711.2	609.6	-	-	-	-	9.52	9.52	-	-	-	-
42 x 38	1066.8	965.2	609.6	-	-	-	-	9.52	9.52	-	-	-	-
42 x 34	1066.8	863.6	609.6	-	-	-	-	9.52	9.52	-	-	-	-
42 x 30	1066.8	762.0	609.6	-	-	-	-	9.52	9.52	-	-	-	-
44 x 40	1117.6	1016.0	609.6	-	-	-	-	9.52	9.52	-	-	-	-
44 x 36	1117.6	914.4	609.6	-	-	-	-	9.52	9.52	-	-	-	-
44 x 32	1117.6	812.8	609.6	-	-	-	-	9.52	9.52	-	-	-	-
46 x 42	1168.4	1066.8	711.2	-	-	-	-	9.52	9.52	-	-	-	-
46 x 38	1168.4	965.2	711.2	-	-	-	-	9.52	9.52	-	-	-	-
46 x 34	1168.4	863.6	711.2	-	-	-	-	9.52	9.52	-	-	-	-
48 x 44	1219.2	1117.6	711.2	-	-	-	-	9.52	9.52	-	-	-	-
48 x 40	1219.2	1016.0	711.2	-	-	-	-	9.52	9.52	-	-	-	-
48 x 36	1219.2	914.4	711.2	-	-	-	-	9.52	9.52	-	-	-	-

ASME / ANSI B 16.9

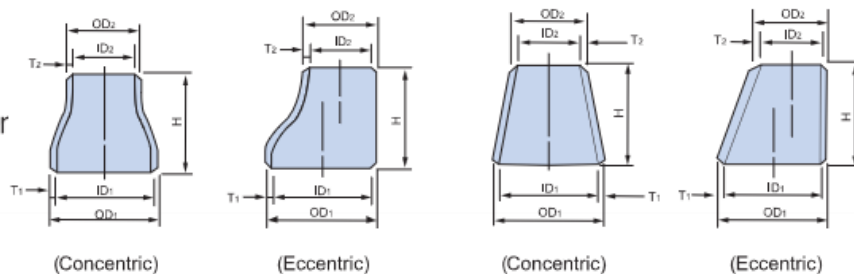
(Eccentric)

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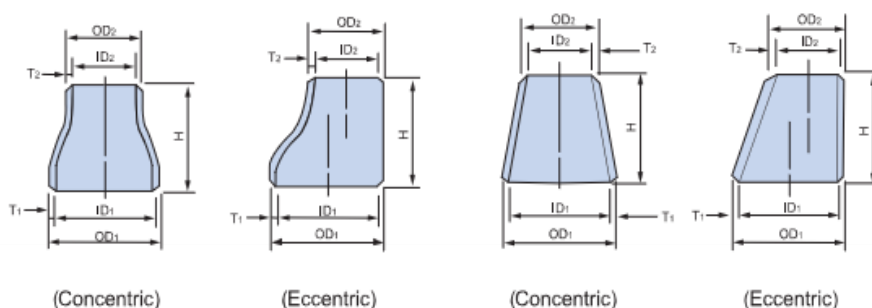
REDUCER

Concentric & Eccentric Reducer

ASME / ANSI B 16.9
MSS SP - 43



Nominal Pipe Size	Dimensions			Wall Thickness							
	Outside Diameter at Bevel : D ₁ /D ₂		End to End	5s		10s		40s		80s	
	OD ₁	OD ₂		t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
3/4 x 1/2	26.67	21.34	38.1	1.65	1.65	2.11	2.11	2.87	2.77	3.91	3.73
1 x 3/4	33.40	26.67	50.8	1.65	1.65	2.77	2.11	3.38	2.87	4.55	3.91
1 x 1/2	33.40	21.34	50.8	1.65	1.65	2.77	2.11	3.38	2.77	4.55	3.73
1 1/4 x 1	42.16	33.40	50.8	1.65	1.65	2.77	2.77	3.56	3.38	4.85	4.55
1 1/4 x 3/4	42.16	26.67	50.8	1.65	1.65	2.77	2.11	3.56	2.87	4.85	3.91
1 1/4 x 1/2	42.16	21.34	50.8	1.65	1.65	2.77	2.11	3.56	2.77	4.85	3.73
1 1/2 x 1 1/4	48.26	42.16	63.5	1.65	1.65	2.77	2.77	3.68	3.56	5.08	4.85
1 1/2 x 1	48.26	33.40	63.5	1.65	1.65	2.77	2.77	3.68	3.38	5.08	4.55
1 1/2 x 3/4	48.26	26.67	63.5	1.65	1.65	2.77	2.11	3.68	2.87	5.08	3.91
1 1/2 x 1/2	48.26	21.34	63.5	1.65	1.65	2.77	2.11	3.68	2.77	5.08	3.73
2 x 1 1/2	60.32	48.26	76.2	1.65	1.65	2.77	2.77	3.91	3.68	5.54	5.08
2 x 1 1/4	60.32	42.16	76.2	1.65	1.65	2.77	2.77	3.91	3.56	5.54	4.85
2 x 1	60.32	33.40	76.2	1.65	1.65	2.77	2.77	3.91	3.38	5.54	4.55
2 x 3/4	60.32	26.67	76.2	1.65	1.65	2.77	2.11	3.91	2.87	5.54	3.91
2 1/2 x 2	73.02	60.32	88.9	2.11	1.65	3.05	2.77	5.16	3.91	7.01	5.54
2 1/2 x 1 1/2	73.02	48.26	88.9	2.11	1.65	3.05	2.77	5.16	3.68	7.01	5.08
2 1/2 x 1 1/4	73.02	42.16	88.9	2.11	1.65	3.05	2.77	5.16	3.56	7.01	4.85
3 x 2 1/2	88.90	73.02	88.9	2.11	2.11	3.05	3.05	5.49	5.16	7.62	7.01
3 x 2	88.90	60.32	88.9	2.11	1.65	3.05	2.77	5.49	3.91	7.62	5.54
3 x 1 1/2	88.90	48.26	88.9	2.11	1.65	3.05	2.77	5.49	3.68	7.62	5.08
3 x 1 1/4	88.90	42.16	88.9	2.11	1.65	3.05	2.77	5.49	3.56	7.62	4.85
3 1/2 x 3	101.60	88.90	101.6	2.11	2.11	3.05	3.05	5.74	5.49	8.08	7.62
3 1/2 x 2 1/2	101.60	73.02	101.6	2.11	2.11	3.05	3.05	5.74	5.16	8.08	7.01
3 1/2 x 2	101.60	60.32	101.6	2.11	1.65	3.05	2.77	5.74	3.91	8.08	5.54
4 x 3 1/2	114.30	101.60	101.6	2.11	2.11	3.05	3.05	6.02	5.74	8.56	8.08
4 x 3	114.30	88.90	101.6	2.11	2.11	3.05	3.05	6.02	5.49	8.56	7.62
4 x 2 1/2	114.30	73.02	101.6	2.11	2.11	3.05	3.05	6.02	5.16	8.56	7.01
4 x 2	114.30	60.32	101.6	2.11	1.65	3.05	2.77	6.02	3.91	8.56	5.54
5 x 4	141.30	114.30	127.0	2.77	2.11	3.40	3.05	6.55	.02	9.53	8.56
5 x 3 1/2	141.30	101.60	127.0	2.77	2.11	3.40	3.05	6.55	5.74	9.53	8.08
5 x 3	141.30	88.90	127.0	2.77	2.11	3.40	3.05	6.55	5.49	9.53	7.62
5 x 2 1/2	141.30	73.02	127.0	2.77	2.11	3.40	3.05	6.55	5.16	9.53	7.01
6 x 5	168.30	141.30	139.7	2.77	2.77	3.40	3.40	7.11	6.55	10.97	9.53
6 x 4	168.30	114.30	139.7	2.77	2.11	3.40	3.05	7.11	6.02	10.97	8.56
6 x 3 1/2	168.30	101.60	139.7	2.77	2.11	3.40	3.05	7.11	5.74	10.97	8.08
6 x 3	168.30	88.90	139.7	2.77	2.11	3.40	3.05	7.11	5.49	10.97	7.62



REDUCER

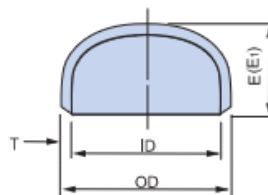
Concentric & Eccentric Reducer

ASME / ANSI B 16.9
MSS SP - 43

Nominal Pipe Size	Dimensions			Wall Thickness							
	Outside Diameter at Bevel : D ₁ /D ₂		End to End	5s		10s		40s		80s	
	OD ₁	OD ₂		t ₁	t ₂	t ₁	t ₂	t ₁	t ₂	t ₁	t ₂
inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
8 x 6	219.08	168.30	152.4	2.77	2.77	3.76	3.40	8.18	7.11	12.70	10.97
8 x 5	219.08	141.30	152.4	2.77	2.77	3.76	3.40	8.18	6.55	12.70	9.53
8 x 4	219.08	114.30	152.4	2.77	2.11	3.76	3.05	8.18	6.02	12.70	8.56
10 x 8	273.05	219.08	177.8	3.40	2.77	4.19	3.76	9.27	8.18	12.70	12.70
10 x 6	273.05	168.30	177.8	3.40	2.77	4.19	3.40	9.27	7.11	12.70	10.97
10 x 5	273.05	141.30	177.8	3.40	2.77	4.19	3.40	9.27	6.55	12.70	9.53
12 x 10	323.80	273.05	203.2	3.96	3.40	4.57	4.19	9.52	9.27	12.70	12.70
12 x 8	323.80	219.08	203.2	3.96	2.77	4.57	3.76	9.52	8.18	12.70	12.70
12 x 6	323.80	168.30	203.2	3.96	2.77	4.57	3.40	9.52	7.11	12.70	10.97
14 x 12	355.60	323.80	330.2	3.96	3.96	4.78	4.57	-	-	-	-
14 x 10	355.60	273.05	330.2	3.96	3.40	4.78	4.19	-	-	-	-
14 x 8	355.60	219.08	330.2	3.96	2.77	4.78	3.76	-	-	-	-
16 x 14	406.40	355.60	355.6	4.19	3.96	4.78	4.78	-	-	-	-
16 x 12	406.40	323.80	355.6	4.19	3.96	4.78	4.57	-	-	-	-
16 x 10	406.40	273.05	355.6	4.19	3.40	4.78	4.19	-	-	-	-
18 x 16	457.20	406.40	381.0	4.19	4.19	4.78	4.78	-	-	-	-
18 x 14	457.20	355.60	381.0	4.19	3.96	4.78	4.78	-	-	-	-
18 x 12	457.20	323.80	381.0	4.19	3.96	4.78	4.57	-	-	-	-
20 x 18	508.00	457.20	508.0	4.78	4.19	5.54	4.78	-	-	-	-
20 x 16	508.00	406.40	508.0	4.78	4.19	5.54	4.78	-	-	-	-
20 x 14	508.00	355.60	508.0	4.78	3.96	5.54	4.78	-	-	-	-
22 x 20	558.80	508.00	508.0	4.78	4.78	5.54	5.54	-	-	-	-
22 x 18	558.80	457.20	508.0	4.78	4.19	5.54	4.78	-	-	-	-
22 x 16	558.80	406.40	508.0	4.78	4.19	5.54	4.78	-	-	-	-
24 x 22	609.60	558.80	508.0	5.54	4.78	6.35	5.54	-	-	-	-
24 x 20	609.60	508.00	508.0	5.54	4.78	6.35	5.54	-	-	-	-
24 x 18	609.60	457.20	508.0	5.54	4.19	6.35	4.78	-	-	-	-
30 x 24	762.00	609.60	609.6	6.35	5.54	7.92	6.35	-	-	-	-
30 x 22	762.00	558.80	609.6	6.35	4.78	7.92	5.54	-	-	-	-
30 x 20	762.00	508.00	609.6	6.35	4.78	7.92	5.54	-	-	-	-

CAP

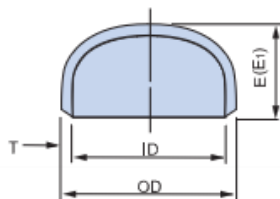
ASME / ANSI B 16.9
MSS SP-43



Nominal Pipe Size	Dimensions							Wall Thickness		
	Outside Diameter at Bevel:D OD		Inside Diameter at Bevel:D ID		Length			Sch. No.	t	
					E	Limiting Wall Thickness For Length	E ₁			
inch	mm	mm	mm	mm	mm	mm	mm		inch	mm
1/2	0.840	21.34	0.710	18.04	25.4	4.57	25.4	5s	0.065	1.65
			0.674	17.12				10s	0.083	2.11
			0.622	15.80				Std/40 40s	0.109	2.77
			0.546	13.88				XS/80 80s	0.147	3.73
			0.464	11.78				160	0.188	4.78
			0.252	6.40				XXS	0.294	7.47
3/4	1.050	26.67	0.920	23.37	25.4	3.81	25.4	5s	0.065	1.65
			0.884	22.45				10s	0.083	2.11
			0.824	20.93				Std/40 40s	0.113	2.87
			0.742	18.85				XS/80 80s	0.154	3.91
			0.612	15.55				160	0.219	5.56
			0.434	11.03				XXS	0.308	7.82
1	1.315	33.40	1.185	30.10	38.1	4.57	38.1	5s	0.065	1.65
			1.097	27.86				10s	0.109	2.77
			1.049	26.64				Std/40 40s	0.133	3.38
			0.957	24.30				XS/80 80s	0.179	4.55
			0.815	20.70				160	0.250	6.35
			0.599	15.22				XXS	0.358	9.09
1 1/4	1.660	42.16	1.530	38.86	38.1	4.83	38.1	5s	0.065	1.65
			1.442	36.62				10s	0.109	2.77
			1.380	34.86				Std/40 40s	0.140	3.56
			1.278	32.46				XS/80 80s	0.191	4.85
			1.160	29.46				160	0.250	6.35
			0.896	22.76				XXS	0.382	9.70
1 1/2	1.900	48.26	1.770	44.96	38.1	5.08	38.1	5s	0.065	1.65
			1.682	42.72				10s	0.109	2.77
			1.610	40.90				Std/40 40s	0.145	3.68
			1.500	38.10				XS/80 80s	0.200	5.08
			1.338	33.98				160	0.281	7.14
			1.100	27.94				XXS	0.400	10.16
2	2.375	60.32	2.245	57.02	38.1	5.59	44.5	5s	0.065	1.65
			2.157	54.78				10s	0.109	2.77
			2.067	52.50				Std/40 40s	0.154	3.91
			1.939	49.24				XS/80 80s	0.218	5.54
			1.687	42.84				160	0.344	8.74
			1.503	38.18				XXS	0.436	11.07

CAP

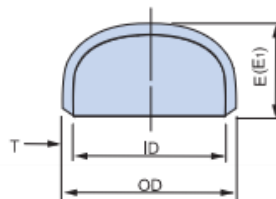
ASME / ANSI B 16.9
MSS SP-43



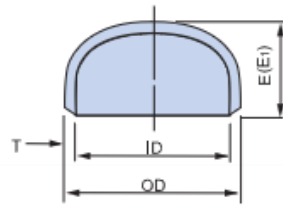
Nominal Pipe Size	Dimensions							Wall Thickness		
	Outside Diameter at Bevel: D OD		Inside Diameter at Bevel: D ID		Length			Sch. No.	t	
					E	Limiting Wall Thickness For Length	E _i			
inch	mm	mm	mm	mm	mm	mm	mm		inch	mm
2 1/2	2.875	73.02	2.709	68.80	38.1	7.11	.8	5s	0.083	2.11
			2.635	66.92				10s	0.120	3.05
			2.469	62.70				Std/40 40s	0.203	5.16
			2.323	59.00				XS/80 80s	0.276	7.01
			2.125	53.98				160	0.375	9.52
			1.771	44.98				XXS	0.552	14.02
3	3.500	88.90	3.334	84.68	50.8	7.62	63.5	5s	0.083	2.11
			3.260	82.80				10s	0.120	3.05
			3.068	77.92				Std/40 40s	0.216	5.49
			2.900	73.66				XS/80 80s	0.300	7.62
			2.624	66.66				160	0.438	11.12
			2.300	58.42				XXS	0.600	15.24
4	4.500	114.30	4.334	110.08	63.5	8.64	76.2	5s	0.083	2.11
			4.260	108.20				10s	0.120	3.05
			4.026	102.26				Std/40 40s	0.237	6.02
			3.726	97.18				XS/80 80s	0.387	8.56
			3.624	92.06				120	0.438	11.12
			3.438	87.32				160	0.531	13.49
5	5.563	141.30	3.125	80.06	76.2	9.65	88.9	XXS	0.674	17.12
			5.345	135.76				5s	0.109	2.77
			5.295	134.50				10s	0.134	3.40
			5.047	128.20				Std/40 40s	0.258	6.55
			4.813	122.24				XS/80 80s	0.375	9.53
			4.563	115.90				120	0.500	12.70
6	6.625	168.30	4.313	109.54	88.9	10.92	101.6	160	0.625	15.88
			4.063	103.20				XXS	0.750	19.05
			6.407	162.76				5s	0.109	2.77
			6.357	161.50				10s	0.134	3.40
			6.065	154.08				Std/40 40s	0.280	7.11
			5.761	146.36				XS/80 80s	0.432	10.97
			5.501	139.76				120	0.562	14.27
			5.187	131.78				160	0.719	18.26
			4.897	124.40				XXS	0.864	21.95

CAP

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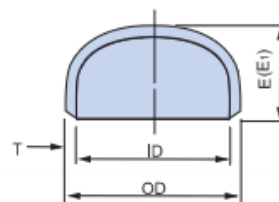
Nominal Pipe Size	Dimensions							Wall Thickness		
	Outside Diameter at Bevel:D OD		Inside Diameter at Bevel:D ID		Length			Sch. No.	t	
					E	Limiting Wall Thickness For Length	E ₁			
inch	mm	mm	mm	mm	mm	mm	mm		inch	mm
8	8.625	219.08	8.407	213.54	101.6	12.70	127.0	5s	0.109	2.77
			8.329	211.56				10s	0.148	3.76
			7.981	202.72				STD/40 40s	0.322	8.18
			7.625	193.68				XS/80 80s	0.500	12.70
			8.125	206.38				20	0.250	6.35
			7.813	198.46				60	0.406	10.31
			7.437	188.90				100	0.594	15.09
			7.187	182.56				120	0.719	18.26
			7.001	178.54				140	0.812	20.62
			6.813	173.06				160	0.906	23.01
			6.875	174.64				XXS	0.875	22.22
10	10.750	273.05	10.482	266.25	127.0	12.70	152.4	5S	0.134	3.40
			10.420	264.67				10S	0.165	4.19
			10.020	254.51				STD/40 40S	0.365	9.27
			9.750	247.65				XS/80S 60	0.500	12.70
			9.562	242.87				80	0.594	15.09
			10.250	260.35				20	0.250	6.35
			9.312	236.53				100	0.719	18.26
			9.062	230.17				120	0.844	21.44
			8.750	222.25				140/XXS	1.000	25.40
			8.500	215.89				160	1.125	28.58
12	12.750	323.80	12.438	315.88	152.4	12.70	177.8	5S	0.156	3.96
			12.390	314.66				10S	0.180	4.57
			12.000	304.76				STD 40S	0.375	9.52
			11.750	298.40				XS/80S	0.500	12.70
			12.250	311.10				20	0.250	6.35
			11.938	303.18				40	0.406	10.31
			11.374	288.84				80	0.688	17.48
			11.062	280.92				100	0.844	21.44
			10.750	273.00				120	1.000	25.40
			10.500	266.64				140	1.125	28.58
			10.126	257.16				160	1.312	33.32



Nominal Pipe Size	Dimensions							Wall Thickness		
	Outside Diameter at Bevel: D OD		Inside Diameter at Bevel: D ID		Length			Sch. No.	t	
					E	Limiting Wall Thickness For Length	E ₁			
inch	mm	mm	mm	mm	mm	mm	mm		inch	mm
14	14.000	355.60	13.688	347.68	165.1	12.70	190.5	5S	0.156	3.96
			13.624	346.04				10S	0.188	4.78
			13.250	336.56				STD	0.375	9.52
			13.376	339.76				20	0.312	7.92
			13.124	333.34				40	0.438	11.13
			13.000	330.20				XS	0.500	12.70
			12.812	325.42				60	0.594	15.09
			12.500	317.50				80	0.750	19.05
			12.124	307.94				100	0.938	23.83
			11.812	300.02				120	1.094	27.79
			11.500	292.10				140	1.250	31.75
			11.188	284.18				160	1.406	35.71
16	16.000	406.40	15.670	398.02	177.8	12.70	203.2	5S	0.165	4.19
			15.624	396.84				10S	0.188	4.78
			15.250	387.36				STD	0.375	9.52
			15.000	381.00				XS/40	0.500	12.70
			15.376	390.56				20	0.312	7.92
			14.688	373.08				60	0.656	16.66
			14.312	363.52				80	0.844	21.44
			13.938	354.02				100	1.031	26.19
			13.562	344.48				120	1.219	30.96
			13.124	333.36				140	1.438	36.52
			12.812	325.42				160	1.594	40.49
18	18.000	457.20	17.670	448.82	203.2	203.2	228.6	5S	0.165	4.19
			17.624	447.64				10S	0.188	4.78
			17.250	438.16				STD	0.375	9.52
			17.000	431.80				XS	0.500	12.70
			17.736	441.36				20	0.132	7.92
			16.876	428.66				40	0.562	14.27
			16.500	419.10				60	0.750	19.05
			16.124	409.56				80	0.938	23.82
			15.688	398.48				100	1.156	29.36
			15.250	387.36				120	1.375	34.92
			14.876	377.86				140	1.562	39.67
			14.438	366.72				160	1.781	45.24

CAP

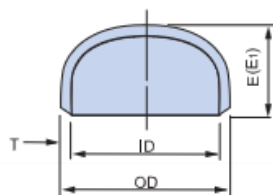
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Nominal Pipe Size	Dimensions							Wall Thickness		
	Outside Diameter at Bevel:D OD		Inside Diameter at Bevel:D ID		Length			Sch. No.	t	
					E	Limiting Wall Thickness For Length	E1			
inch	mm	mm	mm	mm	mm	mm	mm		inch	mm
20	20.000	508.0	19.664	499.44	228.6	12.70	254.0	5S	0.168	4.78
			19.564	496.92				10S	0.218	5.54
			19.250	488.96				STD/20	0.375	9.52
			19.000	482.60				XS	0.500	12.70
			18.812	477.82				40	0.594	15.09
			18.376	466.76				60	0.812	20.62
			17.938	455.62				80	1.031	26.19
			17.438	442.92				100	1.281	32.54
			17.000	431.80				120	1.500	38.10
			16.500	419.10				140	1.750	44.45
			16.062	407.98				160	1.969	50.01
22	22.000	558.80	21.624	549.24	254.0	12.70	254.0	5S	0.188	4.78
			21.564	547.72				10S	0.218	5.54
			21.250	539.76				STD/20	0.375	9.52
			21.000	533.40				XS	0.500	12.70
			20.250	514.36				60	0.875	22.22
			19.750	501.64				80	1.125	28.58
			19.250	488.96				100	1.375	34.92
			18.750	476.24				120	1.625	41.28
			18.250	463.56				140	1.875	47.62
			17.750	450.84				160	2.125	53.98
24	24.000	609.60	23.564	598.52	266.7	12.70	304.8	5S	0.218	5.54
			23.500	596.90				10S	0.250	6.35
			23.250	590.56				STD/20	0.375	9.52
			23.000	584.20				XS	0.500	12.70
			22.624	574.64				40	0.688	17.48
			22.062	560.38				60	0.969	24.61
			21.562	547.68				80	1.219	30.96
			20.938	531.82				100	1.531	38.89
			20.376	517.56				120	1.812	46.02
			19.876	504.86				140	2.062	52.37
			19.312	490.52				160	2.344	59.54

CAP

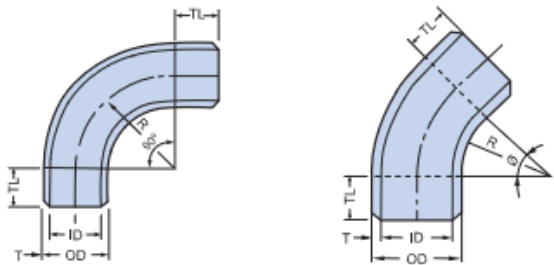
ASME / ANSI B 16.9
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Nominal Pipe Size	Dimensions							Wall Thickness		
	Outside Diameter at Bevel:D OD		Inside Diameter at Bevel:D ID		Length			Sch. No.	t	
					E	Limiting Wall Thickness For Length	E ₁			
inch	mm	mm	mm	mm	mm	mm	mm		inch	mm
26	26.000	660.40	25.250	641.36	266.7	-	-	STD	0.375	9.52
			25.000	635.00				XS	0.500	12.70
28	28.000	711.20	27.250	692.56	266.7	-	-	STD	0.375	9.52
			27.000	685.80				XS	0.500	12.70
30	30.000	762.00	29.500	749.30	266.7	-	-	5S	0.250	6.35
			29.376	746.16				10S	0.312	7.92
			29.250	742.96				STD	0.375	9.52
			29.000	736.60				XS	0.500	12.70
32	32.000	812.80	31.250	793.76	266.7	-	-	STD	0.375	9.52
			31.200	787.40				XS	0.500	12.70
			30.624	777.84				40	0.688	17.48
34	34.000	863.60	33.250	844.54	266.7	-	-	STD	0.375	9.52
			33.000	838.20				XS	0.500	12.70
			32.624	828.64				40	0.688	17.48
36	36.000	914.00	35.250	894.96	266.7	-	-	STD	0.375	9.52
			35.000	888.60				XS	0.500	12.70
			34.500	875.90				40	0.750	19.05
38	38.000	965.20	37.250	946.16	304.8	-	-	STD	0.375	9.52
			37.000	939.80				XS	0.500	12.70
40	40.000	1016.00	39.250	996.96	304.8	-	-	STD	0.375	9.52
			39.000	990.60				XS	0.500	12.70
42	42.000	1066.80	41.250	1047.76	304.8	-	-	STD	0.375	9.52
			41.000	1041.40				XS	0.500	12.70
44	44.000	1117.60	43.250	1098.56	342.9	-	-	STD	0.375	9.52
			43.000	1092.20				XS	0.500	12.70
46	46.000	1168.40	45.250	1149.36	342.9	-	-	STD	0.375	9.52
			45.000	1143.00				XS	0.500	12.70
48	48.000	1219.20	47.250	1200.16	342.9	-	-	STD	0.375	9.52
			47.000	1193.80				XS	0.500	12.70

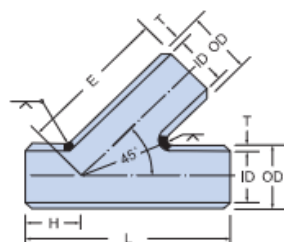
PIPE BEND

ASME / ANSI B 16.9
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Nominal Pipe Size	Outside Diameter OD	Inside Diameter ID		Wall Thickness T	
		STD (Sch 40)	xs (Sch 80)	STD (Sch 40)	xs (Sch 80)
inch	inch	inch	inch	inch	inch
1/2	0.840	0.622	0.546	0.109	0.147
3/4	1.050	0.824	0.742	0.113	0.154
1	1.315	1.049	0.957	0.133	0.179
1 1/4	1.660	1.380	1.278	0.140	0.191
1 1/2	1.900	1.610	1.500	0.145	0.200
2	2.375	2.067	1.939	0.154	0.218
2 1/2	2.875	2.469	2.323	0.203	0.276
3	3.500	3.068	2.900	0.216	0.300
3 1/2	4.000	3.548	3.364	0.226	0.318
4	4.500	4.026	3.826	0.237	0.337
5	5.563	5.047	4.813	0.258	0.375
6	6.625	6.065	5.761	0.280	0.432
8	8.625	7.981	7.625	0.322	0.500
10	10.750	10.020	9.750	0.365	0.500
*10	10.750	-	9.562	-	0.594
12	12.750	12.000	11.750	0.375	0.500
*12	12.750	11.938	11.374	0.406	0.688
14	14.000	13.250	13.000	0.375	0.500
*14	14.000	13.124	12.500	0.438	0.750
16	16.000	15.250	15.000	0.375	0.500
*16	16.000	15.000	14.312	0.500	0.844
18	18.000	17.250	17.000	0.375	0.500
*18	18.000	16.876	16.124	0.562	0.938
20	20.000	19.250	19.000	0.375	0.500
*20	20.000	18.812	17.938	0.594	1.031
22	22.000	21.250	21.000	0.375	0.500
*22	22.000	-	19.750	-	1.125
24	24.000	23.250	23.000	0.375	0.500
*24	24.000	22.624	21.562	0.688	1.219
26	26.000	25.250	25.000	0.375	0.500
28	28.000	27.250	27.000	0.375	0.500
30	30.000	29.250	29.000	0.375	0.500
32	32.000	31.250	31.000	0.375	0.500
*32	32.000	30.624	-	0.688	-
34	34.000	33.250	33.000	0.375	0.500
*34	34.000	32.624	-	0.688	-
36	36.000	35.250	35.000	0.375	0.500
*36	36.000	34.500	-	0.750	-
38	38.000	37.250	37.000	0.375	0.500
40	40.000	39.250	39.000	0.375	0.500
42	42.000	41.250	41.000	0.375	0.500
44	44.000	43.250	43.000	0.375	0.500
46	46.000	45.250	45.000	0.375	0.500

DIMENSIONS ARE FOR REFERENCE ONLY AND ACTUAL DIMENSIONS MUST BE VERIFIED

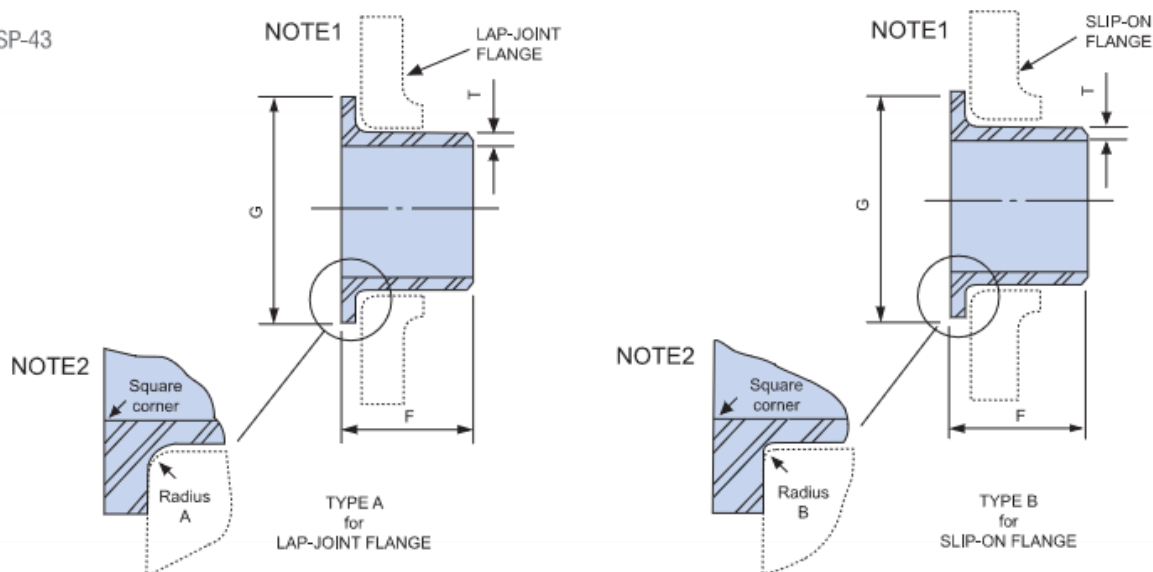


LATERAL

Nominal Pipe Size	Outside Diameter OD	Length			STD		X-S	
		H	E	L	T	ID	T	ID
inch	inch	inch	inch	inch	inch	inch	inch	inch
1	1.315	2.165	3.346	5.511	0.133	1.049	0.179	0.957
1 1/4	1.660	2.520	4.724	7.244	0.140	1.380	0.191	1.278
1 1/2	1.900	2.520	4.724	7.244	0.145	1.610	0.200	1.500
2	2.375	2.520	7.992	10.512	0.154	2.067	0.218	1.939
2 1/2	2.875	2.520	9.488	12.008	0.203	2.469	0.276	2.323
3	3.500	3.000	10.000	13.000	0.216	3.068	0.300	2.900
3 1/2	4.000	3.000	10.000	13.000	0.226	0.548	0.318	3.364
4	4.500	3.000	12.008	15.008	0.237	4.026	0.337	3.826
5	5.562	3.504	13.504	17.008	0.258	5.046	0.375	4.812
6	6.625	3.504	14.528	18.032	0.280	6.065	0.432	5.761
8	8.625	4.488	17.520	22.008	0.322	7.981	0.500	7.625
10	10.750	5.000	20.512	25.512	0.365	10.020	0.500	9.750
12	12.750	5.512	24.882	30.394	0.375	12.000	0.500	11.750
14	14.000	5.984	27.008	32.992	0.375	13.250	0.500	13.000
16	16.000	6.496	30.000	36.496	0.375	15.250	0.500	15.000
18	18.000	7.008	32.008	39.016	0.375	17.250	0.500	17.000
20	20.000	8.031	35.000	43.031	0.375	19.250	0.500	19.000
22	22.000	8.500	37.000	45.500	0.375	21.250	0.500	21.000
24	24.000	9.016	40.512	49.528	0.375	23.250	0.500	23.000

LAP JOINT(STUB-END)

MSS SP-43



Nominal Pipe Size	Outside Diameter OD	Length F	Dia. of Lap-G Nominal & Maximum	Radius of Fillet		Wall Thickness T		
				A Nominal Max.	B Max.	Sch 5s	Sch 10s	Sch 40s
inch	inch	inch	inch	inch	inch	inch	inch	inch
1/2	0.84	2.00	1.38	0.12	0.03	0.065	0.083	0.109
3/4	1.05	2.00	1.69	0.12	0.03	0.065	0.083	0.113
1	1.32	2.00	2.00	0.12	0.03	0.065	0.109	0.133
1 1/4	1.66	2.00	2.50	0.19	0.03	0.065	0.109	0.140
1 1/2	1.90	2.00	2.88	0.25	0.03	0.065	0.109	0.145
2	2.38	2.50	3.62	0.31	0.03	0.065	0.109	0.154
2 1/2	2.88	2.50	4.12	0.31	0.03	0.083	0.120	0.203
3	3.50	2.50	5.00	0.38	0.03	0.083	0.120	0.216
3 1/2	4.00	3.00	5.50	0.38	0.03	0.083	0.120	0.226
4	4.50	3.00	6.19	0.44	0.03	0.083	0.120	0.237
5	5.56	3.00	7.31	0.44	0.06	0.109	0.134	0.258
6	6.62	3.50	8.50	0.50	0.06	0.109	0.134	0.280
8	8.62	4.00	10.62	0.50	0.06	0.109	0.148	0.322
10	10.75	5.00	12.75	0.50	0.06	0.134	0.165	0.365
12	12.75	6.00	15.00	0.50	0.06	0.156	0.180	0.375
14	14.00	6.00	16.25	0.50	0.06	0.156	0.188	-
16	16.00	6.00	18.50	0.50	0.06	0.165	0.188	-
18	18.00	6.00	21.00	0.50	0.06	0.165	0.188	-
20	20.00	6.00	23.00	0.50	0.06	0.188	0.218	-
24	24.00	6.00	27.25	0.50	0.06	0.218	0.250	-

• Wall Thickness Conform to ASME B 36.19M

1. Minimum Lap Thickness Shall Not Be Less Than Nominal Wall Thickness
2. Contact Faces of Stub Ends Shall Have a Modified Spiral or Concentric Serration.