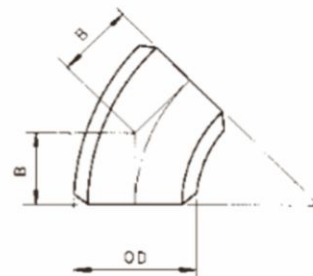
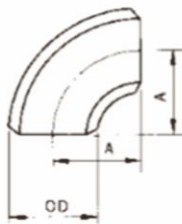
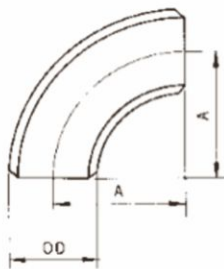


Long and Short Radius Elbows



ASME B16.9 B16.28

*Standard (mm)

Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD	Center-to-End			
		Long Radius Elbow		Short Radius Elbow	
		90 Deg. A	45 Deg. B	90 Deg. A	45 Deg.* B
1/2	21.3	38.1	15.7	—	—
3/4	26.7	38.1	19.0	—	—
1	33.4	38.1	22.4	25.4	—
1-1/4	42.2	47.8	25.4	31.8	—
1-1/2	48.3	57.2	28.4	38.1	—
2	60.3	76.2	35.0	50.8	—
2-1/2	73.0	95.2	44.4	63.5	—
3	88.9	114.3	50.8	76.2	31.6
3-1/2	101.6	113.4	57.2	88.9	36.8
4	114.3	152.4	63.5	101.6	42.1
5	141.3	190.5	79.2	127.0	52.6
6	168.3	228.6	95.2	152.4	63.4
8	219.1	304.8	127.0	203.2	84.2
10	273.1	381.0	158.8	254.0	105.2
12	323.9	457.2	190.5	304.8	126.3
14	355.6	533.4	222.2	355.6	147.3
16	406.4	609.6	254.0	406.4	168.3
18	457.2	685.8	285.8	457.2	189.4
20	508.0	762.0	317.5	508.0	210.4
22	558.8	838.2	342.9	558.8	231.5
24	609.6	914.4	381.0	609.6	252.5
26	660.4	990.6	406.4	660.4*	273.5
28	711.2	1066.8	438.2	711.2*	294.6
30	762.0	1143.0	469.9	762.0*	315.6
32	812.8	1219.2	501.6	812.8*	378.1
34	863.6	1295.4	533.4	863.6*	357.7
36	914.4	1371.6	565.2	914.4*	378.8
38	965.2	1447.8	599.9	—	—
40	1016.0	1524.0	632.0	1016.0*	420.8
42	1066.8	1600.2	660.4	1066.8*	441.9
44	1117.6	1676.4	695.4	1117.6*	462.9
46	1168.4	1752.6	726.9	—	—
48	1219.2	1828.8	759.0	1219.2*	505.0
52*	1320.8	—	—	1320.8	547.1
54*	1371.6	2057.4	852.2	1371.6	568.1
56*	1422.4	2133.6	883.8	1422.4	589.2
60*	1524.0	2286.0	946.9	1524.0	631.3
66*	1676.4	2514.6	1041.6	—	—
72*	1828.8	2743.2	1262.5	—	—
80*	2032.0	—	—	2032.0	—



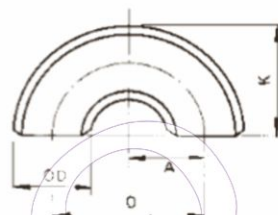
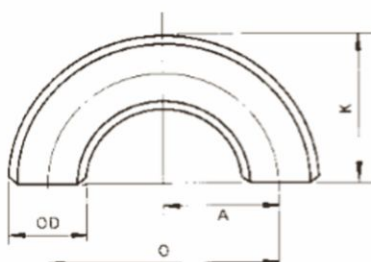
تلفن: گان، پترونیس و نیروگاهی
تلفن دفتر مرکزی: ۸۸۵۹۴۱۲۰۴ (۰۲۱)
تلفن فروشگاه شیرالات: ۳۹۱۸۸۰۸۰ (۰۲۱)

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Long and Short Radius Elbows



ASME B16.9
ASME B16.28 (mm)

Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD	Long Radius		Short Radius	
		Center-to- Center O	Back-to- Face K	Center-to- Center O	Back-to- Face K
1/2	21.3	76.2	47.8	—	—
3/4	26.7	76.2	50.8	—	—
1	33.4	76.2	55.6	50.8	41.1
1-1/4	42.2	95.2	69.8	63.5	52.3
1-1/2	48.3	114.3	82.6	76.2	62.0
2	60.3	152.4	106.4	101.6	81.0
2-1/2	73.0	190.5	131.8	127.0	100.1
3	88.9	228.6	158.8	152.4	120.7
3-1/2	101.6	266.7	184.2	177.8	139.7
4	114.3	304.8	209.6	203.2	158.8
5	141.3	381.0	261.9	254.0	196.9
6	168.3	457.2	312.7	304.8	236.5
8	219.1	609.6	414.3	406.4	312.7
10	273.1	762.0	517.6	508.0	390.7



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تلفن دفتر مرکزی: ۰۲۱)۸۸۵۹۴۱۲۲-۴

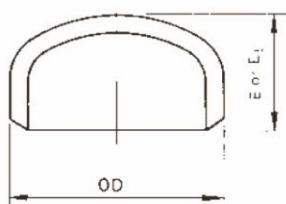
تلفن فروشگاه شیر آلات: ۰۲۱)۳۳۹۱۸۸۰۸

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Caps



**MSS SP-75
ASME B16.9**

(mm)

Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD	Length(2) E	Limiting Wall Thickness for Length E	Length(3) E ₁
1/2	21.3	25.4	4.5	25.4
3/4	26.7	25.4	3.8	25.4
1	33.4	38.1	4.5	38.1
1-1/4	42.2	38.1	4.8	38.1
1-1/2	48.3	38.1	5.0	38.1
2	60.3	38.1	5.5	44.4
2-1/2	73.0	38.1	7.1	50.8
3	88.9	50.8	7.6	63.5
3-1/2	101.6	63.5	8.1	76.2
4	114.3	63.5	8.6	76.2
5	141.3	76.2	9.6	88.9
6	168.3	88.9	10.9	101.6
8	219.1	101.6	12.7	127.0
10	273.1	127.0	12.7	152.4
12	323.9	152.4	12.7	177.8
14	355.6	165.1	12.7	190.5
16	406.4	177.8	12.7	203.2
18	457.2	203.2	12.7	228.6
20	508.0	228.6	12.7	254.0
22	558.8	254.0	12.7	254.0
24	609.6	266.7	12.7	304.8

Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD	Length E
26	660.4	266.7
28	711.2	266.7
30	762.0	266.7
32	812.8	266.7
34	863.6	266.7
36	914.4	266.7
38	965.2	304.8
40	1016.0	304.8
42	1066.8	304.8
44	1117.6	342.9
46	1168.4	342.9
48	1219.2	342.9

- Wall thickness for Caps up to and including 36" conform to ASME B36.10 Specifications; Caps 38" and larger conform to XS Specifications for wall thicknesses of 36". These are Benkan Standards as no Internationally Recognized Standards have been set for such large size wall thickness.

- (1) The shape of these caps shall be ellipsoidal and shall conform to the shape requirements as given in the ASME Boiler and Pressure Vessel Code.
- (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 NPS 24 and smaller. For NPS 26 and larger, Length E₁ shall be by agreement between manufacturer and purchaser.
- (4) 48" and larger can be manufactured. Please contact us for size capability.



تلفن: گران، پتروشیمی و نیروگاهی

تلفن دفتر مرکزی: (۰۲۱) ۸۸۵۹۴۱۳۲-۴

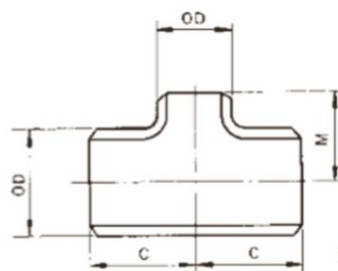
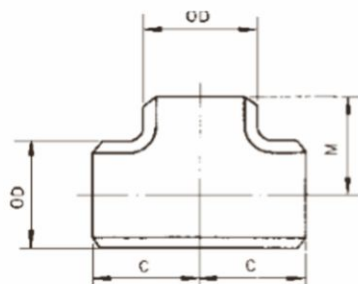
تلفن فروشگاه شیرآلات: (۰۲۱) ۳۳۹۱۸۸۰۸

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Straight and Reducing Tees



MSS SP-75
ASME B16.9

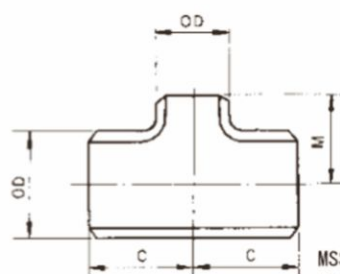
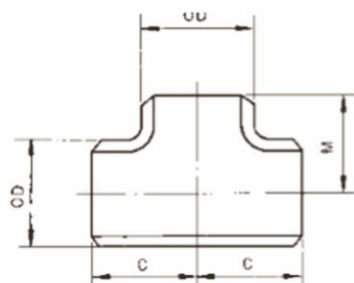
*Standard (mm)

Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD		Center-to-End		Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD		Center-to-End	
	Run	Outlet	Run C	Outlet ^{(1) (2)} M		Run	Outlet	Run C	Outlet ^{(1) (2)} M
1/2 x 1/2	21.3	21.3	25.4	25.4	5 x 5	141.3	141.3	124.0	124.0
3/8		17.3		25.4	4		114.3		117.3
1/4		13.7		25.4	3-1/2		101.6		114.3
3/4 x 3/4	26.7	26.7	28.4	28.4	3		88.9		111.3
1/2		21.3		28.4	2-1/2		73.0		108.0
3/8		17.3		28.4	2		60.3		104.6
1 x 1	33.4	33.4	38.1	38.1	1-1/2*		48.3		
3/4		26.7		38.1	6 x 6	168.3	168.3	142.7	142.7
1/2		21.3		38.1	5		141.3		136.7
1-1/4 x 1-1/4	42.2	42.2	47.8	47.8	4		114.3		130.0
1		33.4		47.8	3-1/2		101.6		127.0
3/4		26.7		47.8	3		88.9		124.0
1/2		21.3		47.8	2-1/2		73.0		120.6
1-1/2 x 1-1/2	48.3	48.3	57.2	57.2	2*		60.3		
1-1/4		42.2		57.2	8 x 8	219.1	219.1	177.8	177.8
1		33.4		57.2	6		168.3		168.1
3/4		26.7		57.2	5		141.3		162.1
1/2		21.3		57.2	4		114.3		155.4
2 x 2	60.3	60.3	63.5	63.5	3-1/2		101.6		152.4
1-1/2		48.3		60.5	3*		88.9		
1-1/4		42.2		57.2	10 x 10	273.1	273.1	215.9	215.9
1		33.4		50.8	8		219.1		203.2
3/4		26.7		44.4	6		168.3		193.5
1/2*		21.3			5		141.3		190.5
2-1/2 x 2-1/2	73.0	73.0	76.2	76.2	4		114.3		184.2
2		60.3		69.8	12 x 12	323.9	323.9	254.0	254.0
1-1/2		48.3		66.5	10		273.1		241.3
1-1/4		42.2		63.5	8		219.1		228.6
1		33.4		57.2	6		168.3		218.9
3 x 3	88.9	88.9	85.8	85.8	5		141.3		215.9
2-1/2		73.0		82.6	14 x 14	355.6	355.6	279.4	279.4
2		60.3		76.2	12		323.9		269.7
1-1/2		48.3		73.2	10		273.1		257.0
1-1/4		42.2		69.8	8		219.1		247.6
1*		33.4			6		168.3		238.3
3-1/2 x 3-1/2	101.6	101.6	95.2	95.2	16 x 16	406.4	406.4	304.8	304.8
3		88.9		91.9	14		355.6		304.8
2-1/2		73.0		88.9	12		323.9		295.1
2		60.3		82.6	10		273.1		282.4
1-1/2		48.3		79.2	8		219.1		273.0
4 x 4	114.3	114.3	104.6	104.6	6		168.3		263.7
3-1/2		101.6		101.6	18 x 18	457.2	457.2	342.9	342.9
3		88.9		98.6	16		406.4		330.2
2-1/2		73.0		95.2	14		355.6		330.2
2		60.3		88.9	12		323.9		320.5
1-1/2		48.3		85.8	10		273.1		307.8
1-1/4*		42.2			8		219.1		298.4
1*		33.5							

Note (1) Outlet dimension "M" for NPS 26 and larger is recommended but not required.

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Straight and Reducing Tees



MSS SP-75
ASME B16.9

*Standard (mm)

Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD		Center-to-End		Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD		Center-to-End	
	Run	Outlet	Run C	Outlet(1) (2) M		Run	Outlet	Run C	Outlet(1) (2) M
20 x 20	508.0	508.0	381.0	381.0	30 x 12	762.0	323.9	558.8	472.6
18		457.2		368.3	10		273.1		460.2
16		406.4		355.6	32 x 32	812.8	812.8	596.9	596.9
14		355.6		355.6	30		762.0		584.2
12		323.9		345.9	28		711.2		571.5
10		273.1		333.2	26		660.4		571.5
8		219.1		323.8	24		609.6		558.8
22 x 22	558.8	558.8	419.1	419.1	22		558.8		546.1
20		508.0		406.4	20		508.0		533.4
18		457.2		393.7	18		457.2		520.7
16		406.4		381.0	16		406.4		508.0
14		355.6		381.0	14		355.6		508.0
12		323.9		371.3	34 x 34	863.6	863.6	635.0	635.0
10		273.1		358.6	32		812.8		622.3
24 x 24	609.6	609.6	431.8	431.8	30		762.0		609.6
22		558.8		431.8	28		711.2		596.9
20		508.0		431.8	26		660.4		596.9
18		457.2		419.1	24		609.6		584.2
16		406.4		406.4	22		558.8		571.5
14		355.6		406.4	20		508.0		558.8
12		323.9		396.7	18		457.2		546.1
10		273.1		384.0	16		406.4		533.4
26 x 26	660.4	660.4	495.3	495.3	36 x 36	914.4	914.4	673.1	673.1
24		609.6		482.6	34		863.6		660.4
22		558.8		469.9	32		812.8		647.7
20		508.0		457.2	30		762.0		635.0
18		457.2		444.5	28		711.2		622.3
16		406.4		431.8	26		660.4		622.3
14		355.6		431.8	24		609.6		609.6
12		323.9		422.1	22		558.8		596.9
28 x 28	711.2	711.2	520.7	520.7	20		508.0		584.2
26		660.4		520.7	18		457.2		571.5
24		609.6		508.0	16		406.4		558.8
22		558.8		495.3	38 x 38	965.2	965.2	711.2	711.2
20		508.0		482.6	36		914.4		711.2
18		457.2		469.9	34		863.6		698.5
16		406.4		457.2	32		812.8		685.8
14		355.6		457.2	30		762.0		673.1
12		323.9		447.5	28		711.2		647.7
30 x 30	762.0	762.0	558.8	558.8	26		660.4		647.7
28		711.2		546.1	24		609.6		635.0
26		660.4		546.1	22		558.8		622.3
24		609.6		533.4	20		508.0		609.6
22		558.8		520.7	18		457.2		
20		508.0		508.0					
18		457.2		495.3					
16		406.4		482.6					
14		355.6		482.6					



تلفن: گران، پتروشیمی و انرژی

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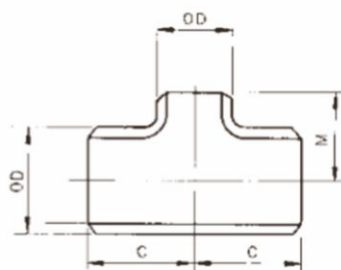
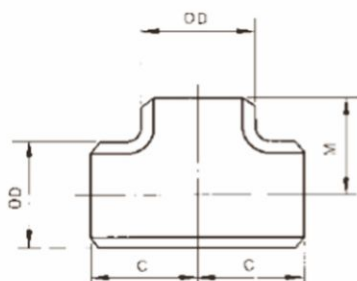
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Straight and Reducing Tees



MSS SP-75
ASME B16.9

*Standard (mm)

Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD		Center-to-End		Nominal Pipe Size (NPS)	Outside Diameter at Bevel OD		Center-to-End	
	Run	Outlet	Run C	Outlet(1) (2) M		Run		Run C	Outlet(1) (2) M
40 x 40	1016.0	1016.0	749.3	749.3	46 x 26	1168.4	660.4	850.9	736.6
38		965.2		749.3	24		609.6		723.9
36		914.4		736.6	22		558.8		723.9
34		863.6		723.9	20*		508.0		723.9
32		812.8		711.2	48 x 48	1219.2	1219.2	889.0	838.2
30		762.0		698.5	46		1168.4		838.2
28		711.2		673.1	44		1117.6		838.2
26		660.4		673.1	42		1066.8		812.8
24		609.6		660.4	40		1016.0		812.8
22		558.8		647.7	38		965.2		812.8
20		508.0		635.0	36		914.4		787.4
18		457.2		622.3	34		863.6		787.4
42 x 42	1066.8	1066.8	762.0	711.2	32		812.8		787.4
40		1016.0		711.2	30		762.0		762.0
38		965.2		711.2	28		711.2		762.0
36		914.4		711.2	26		660.4		762.0
34		863.6		711.2	24		609.6		736.6
32		812.8		711.2	22		558.8		736.6
30		762.0		711.2	52 x 52*	1320.8	1320.8	965.2	914.4
28		711.2		698.5	48*		1219.2		863.6
26		660.4		698.5	44*		1117.6		812.8
24		609.6		660.4	40*		1016.0		762.0
22		558.8		660.4	54 x 54*	1371.6	1371.6	1003.3	952.5
20		508.0		660.4	52*		1320.8		914.4
18		457.2		647.7	48*		1219.2		863.6
16		406.4		635.0	44*		1117.6		863.6
44 x 44	1117.6	1117.6	812.8	762.0	40*		1016.0		812.8
42		1066.8		762.0	28*		711.2		787.4
40		1016.0		749.3	20*		508.0		787.4
38		965.2		736.6	56 x 56*	1422.4	1422.4	1041.4	965.2
36		914.4		723.9	52*		1320.8		914.4
34		863.6		723.9	48*		1219.2		863.6
32		812.8		711.2	44*		1117.6		812.8
30		762.0		711.2	40*		1016.0		812.8
28		711.2		698.5	28*		711.2		812.8
26		660.4		698.5	20*		508.0		812.8
24		609.6		698.5	60 x 60*	1524.0	1524.0	1117.6	1016.0
22		558.8		685.8	56*		1422.4		965.2
20		508.0		685.8	52*		1320.8		914.4
46 x 46	1168.4	1168.4	850.9	800.1	48*		1219.2		863.6
44		1117.6		800.1	40*		1016.0		863.6
42		1066.8		787.4	28*		711.2		863.6
40		1016.0		774.7	20*		508.0		863.6
38		965.2		762.0	66 x 66*	1676.4	1676.4	1219.2	1066.8
36		914.4		762.0					
34		863.6		749.3					
32		812.8		749.3					
30		762.0		736.6					
28		711.2		736.6					



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