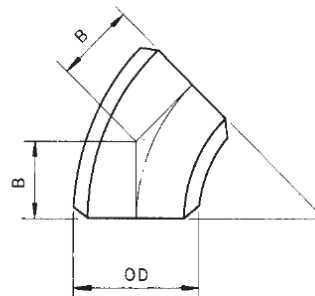
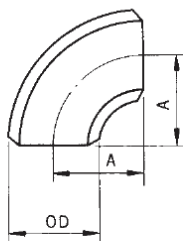
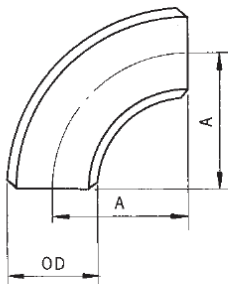


Long and Short Radius Elbows



ASME B16.9

*BENKAN's Standards (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	19.1	—	—
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	35.1	50.8	—
2-1/2	73.0	95.3	44.5	63.5	—
3	88.9	114.3	50.8	76.2	31.6
3-1/2	101.6	133.4	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	95.3	152.4	63.4
8	219.1	304.8	127.0	203.2	84.2
10	273.0	381.0	158.8	254.0	105.2
12	323.8	457.2	190.5	304.8	126.3
14	355.6	533.4	222.3	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	501.7	812.8*	336.7
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	965.2*	399.8
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	695.5	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	—	—
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	841.7



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BUTT-WELDING FITTINGS WEIGHT AND VOLUME

Nominal Pipe Size	WEIGHT (Kg)									
	90° LONG		90° SHORT		TEE		CAP		REDUCER	
	STD	XS	STD	XS	STD	XS	STD	XS	STD	XS
1/2	0.08	0.10	—	—	0.08	0.11	0.04	0.05	—	—
3/4	0.10	0.13	—	—	0.12	0.16	0.05	0.07	0.06	0.07
1	0.15	0.19	0.10	0.13	0.25	0.31	0.11	0.14	0.11	0.14
1-1/4	0.26	0.34	0.17	0.22	0.42	0.55	0.14	0.19	0.15	0.20
1-1/2	0.37	0.49	0.24	0.32	0.60	0.80	0.17	0.23	0.24	0.32
2	0.65	0.89	0.43	0.59	0.87	1.19	0.23	0.33	0.37	0.50
2-1/2	1.30	1.70	0.87	1.14	1.67	2.19	0.40	0.53	0.70	0.91
3	2.03	2.73	1.35	1.82	2.41	3.25	0.66	0.91	0.91	1.22
3-1/2	2.82	3.91	1.88	2.61	3.17	4.39	0.96	1.36	1.28	1.77
4	3.83	5.36	2.55	3.57	4.11	5.75	1.17	1.68	1.53	2.14
5	6.55	9.23	4.37	6.15	6.60	9.30	1.92	2.77	2.50	3.52
6	10.1	15.3	6.75	10.2	9.71	14.7	2.89	4.48	3.61	5.45
8	20.4	30.9	13.6	20.6	18.1	27.4	5.20	8.05	5.71	8.63
10	36.2	48.7	24.1	32.5	30.9	41.7	9.17	12.5	9.65	13.0
12	52.8	69.9	35.2	46.6	44.2	58.4	13.3	17.7	13.7	18.2
14	67.9	89.9	45.2	59.9	53.5	70.9	15.9	21.2	25.5	33.8
16	89.0	118.0	59.3	78.6	66.1	87.7	20.0	26.7	30.9	41.0
18	112.9	149.8	75.3	99.9	83.9	111.3	25.5	34.1	37.7	50.0
20	139.7	185.5	93.1	123.7	103.8	137.8	31.8	42.5	56.3	74.7
22	169.3	225.0	112.8	150.0	125.8	167.2	38.7	51.7	62.3	82.8
24	201.7	268.3	134.5	178.8	139.2	185.1	45.0	60.1	68.4	90.9
26	237.0	315.3	158.0	210.2	176.1	234.3	50.3	67.3	89.3	118.7
28	275.2	366.2	183.5	244.2	198.2	263.8	56.0	74.8	96.5	128.4
30	316.2	420.9	210.8	280.6	228.3	303.9	61.9	82.8	103.8	138.1
32	360.1	479.4	240.0	319.6	260.4	346.7	68.2	91.2	111.0	147.8
34	406.8	541.7	271.2	361.2	294.6	392.4	74.8	100.0	118.3	157.5
36	456.3	607.8	304.2	405.2	331.0	440.9	81.7	109.2	125.5	167.2
38	508.7	677.8	—	—	369.5	492.3	94.4	126.2	132.8	176.9
40	563.9	751.5	376.0	501.0	410.1	546.5	102.1	136.5	140.0	186.6
42	622.0	829.0	414.7	552.7	421.3	561.6	110.1	147.2	147.3	196.3
44	682.9	910.3	455.3	606.9	474.5	632.5	124.9	166.9	154.5	206.0
46	746.7	995.5	—	—	520.4	693.8	133.7	178.7	188.8	251.6
48	813.3	1,084.4	542.2	722.9	568.4	757.9	142.8	191.0	197.2	262.9

* Weight and volume are according to theoretical calculation.

* Figures of tees are on equal tees and figures of reducers are on one size reduction reducers.



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VOLUME (m³)					Nominal Pipe Size
90° LONG	90° SHORT	TEE	CAP	REDUCER	
—	—	—	—	—	1/2
—	—	—	—	—	3/4
—	—	—	—	—	1
—	—	—	—	—	1-1/4
—	—	—	—	—	1-1/2
0.001	0.001	0.001	—	—	2
0.002	0.001	0.001	—	0.001	2-1/2
0.003	0.002	0.002	—	0.001	3
0.004	0.003	0.003	0.001	0.001	3-1/2
0.005	0.004	0.004	0.001	0.001	4
0.010	0.007	0.007	0.001	0.002	5
0.016	0.011	0.011	0.002	0.004	6
0.037	0.025	0.022	0.005	0.007	8
0.070	0.046	0.040	0.009	0.013	10
0.118	0.079	0.067	0.015	0.021	12
0.164	0.109	0.091	0.021	0.042	14
0.245	0.163	0.126	0.029	0.059	16
0.349	0.232	0.179	0.042	0.080	18
0.479	0.319	0.246	0.059	0.131	20
0.638	0.424	0.327	0.052	0.159	22
0.828	0.551	0.388	0.066	0.189	24
1.053	0.700	0.540	0.083	0.266	26
1.315	0.875	0.649	0.103	0.308	28
1.618	1.076	0.800	0.125	0.354	30
1.964	1.306	0.974	0.151	0.403	32
2.355	1.566	1.170	0.180	0.455	34
2.796	1.859	1.391	0.212	0.510	36
3.288	2.187	1.639	0.248	0.568	38
3.835	2.550	1.914	0.288	0.629	40
4.440	2.953	2.023	0.332	0.694	42
5.105	3.395	2.400	0.381	0.761	44
5.833	3.879	2.753	0.433	0.971	46
6.627	4.407	3.138	0.491	1.057	48

Wall Thickness Schedules (ASME)

Nominal Pipe Size		Outside Diameter	Nominal Wall Thickness							
A	B		Sch5S	Sch10S	Sch40S	Sch80S	Sch5	Sch10	Sch20	Sch30
8	1/4	13.7	—	1.65	2.2	3.0	—	1.65	—	1.9
10	3/8	17.1	—	1.65	2.3	3.2	—	1.65	—	1.9
15	1/2	21.3	1.65	2.1	2.8	3.7	1.65	2.1	—	2.4
20	3/4	26.7	1.65	2.1	2.9	3.9	1.65	2.1	—	2.4
25	1	33.4	1.65	2.8	3.4	4.5	1.65	2.8	—	2.9
32	1-1/4	42.2	1.65	2.8	3.6	4.9	1.65	2.8	—	3.0
40	1-1/2	48.3	1.65	2.8	3.7	5.1	1.65	2.8	—	3.2
50	2	60.3	1.65	2.8	3.9	5.5	1.65	2.8	—	3.2
65	2-1/2	73.0	2.1	3.0	5.2	7.0	2.1	3.0	—	4.8
80	3	88.9	2.1	3.0	5.5	7.6	2.1	3.0	—	4.8
90	3-1/2	101.6	2.1	3.0	5.7	8.1	2.1	3.0	—	4.8
100	4	114.3	2.1	3.0	6.0	8.6	2.1	3.0	—	4.8
125	5	141.3	2.8	3.4	6.6	9.5	2.8	3.4	—	—
150	6	168.3	2.8	3.4	7.1	11.0	2.8	3.4	—	—
200	8	219.1	2.8	3.8	8.2	12.7	2.8	3.8	6.4	7.0
250	10	273.0	3.4	4.2	9.3	12.7	3.4	4.2	6.4	7.8
300	12	323.8	4.0	4.6	9.5	12.7	4.0	4.6	6.4	8.4
350	14	355.6	4.0	4.8	9.5	12.7	4.0	6.4	7.9	9.5
400	16	406.4	4.2	4.8	9.5	12.7	4.2	6.4	7.9	9.5
450	18	457.2	4.2	4.8	9.5	12.7	4.2	6.4	7.9	11.1
500	20	508.0	4.8	5.5	9.5	12.7	4.8	6.4	9.5	12.7
550	22	558.8	4.8	5.5	—	—	4.8	6.4	9.5	12.7
600	24	609.6	5.5	6.4	9.5	12.7	5.5	6.4	9.5	14.3
650	26	660.4	—	—	—	—	—	7.9	12.7	—
700	28	711.2	—	—	—	—	—	7.9	12.7	15.9
750	30	762.0	6.4	7.9	—	—	6.4	7.9	12.7	15.9
800	32	812.8	—	—	—	—	—	7.9	12.7	15.9
850	34	863.6	—	—	—	—	—	7.9	12.7	15.9
900	36	914.4	—	—	—	—	—	7.9	12.7	15.9
950	38	965.2	—	—	—	—	—	—	—	—
1000	40	1016.0	—	—	—	—	—	—	—	—
1050	42	1066.8	—	—	—	—	—	—	—	—
1100	44	1117.6	—	—	—	—	—	—	—	—
1150	46	1168.4	—	—	—	—	—	—	—	—
1200	48	1219.2	—	—	—	—	—	—	—	—

*1 Figures are converted from inch to mm (inch=25.4mm)



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