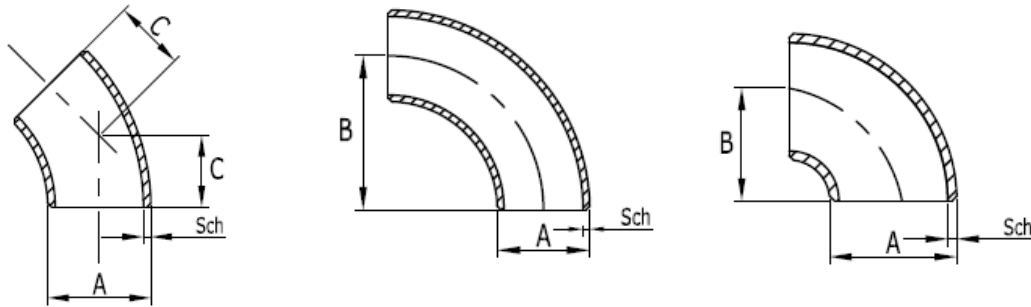


Data Sheet

Nominal Bore – Butt Weld Fittings

ANSI 16.9:1993 MSS SP43 ANSI 16.28:1994



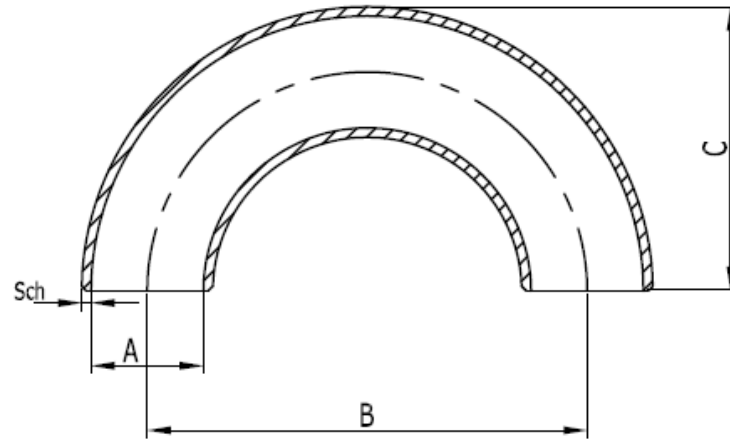
Dimensions for Long and Short Radius Elbows

Nominal Bore	Outside Diameter "A"		Centre to Face Dimension "C"		Centre to Face Dimension "B"			
			45° Elbow Long Radius		90° Elbow Long Radius		90° Elbow Short Radius	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/2"	0.84	21	0.62	16	1.50	38		
3/4"	1.05	27	0.44	11	1.12	29	1.00	25
1"	1.32	33	0.88	22	1.50	38	1.25	32
1 1/4"	1.66	42	1.00	25	1.88	48	1.50	38
1 1/2"	1.90	48	1.12	29	2.25	57	2.00	51
2"	2.38	60	1.38	35	3.00	76	2.50	64
2 1/2"	2.88	73	1.75	44	3.75	95	3.00	76
3"	3.50	89	2.00	51	4.50	114	3.50	89
3 1/2"	4.00	102	2.25	57	5.25	133	4.00	102
4"	4.50	114	2.50	64	6.00	152	5.00	127
5"	5.56	141	3.12	79	7.50	190	6.00	152
6"	6.62	168	3.75	95	9.00	229	8.00	203
8"	8.62	219	5.00	127	12.00	305	10.00	254
10"	10.75	273	6.25	159	15.00	381	12.00	305
12"	12.75	324	7.50	190	18.00	457	14.00	356
14"	14.00	356	8.75	222	21.00	533	16.00	406
16"	16.00	406	10.00	254	24.00	610	18.00	457
18"	18.00	457	11.25	286	27.00	686	20.00	508
20"	20.00	508	12.50	318	30.00	762	22.00	559
22"	22.00	559	13.50	343	33.00	838	24.00	610
24"	24.00	610	15.00	381	36.00	914	-	-
26"	26.00	660	16.00	406	39.00	991	-	-
28"	28.00	711	17.25	438	42.00	1067	-	-
30"	30.00	762	18.50	470	45.00	1143	-	-
32"	32.00	813	19.75	502	48.00	1219	-	-
34"	34.00	864	21.00	533	51.00	1295	-	-
36"	36.00	914	22.25	565	54.00	1372	-	-
38"	38.00	965	23.65	600	57.00	1448	-	-
40"	40.00	1016	24.88	632	60.00	1524	-	-
42"	42.00	1067	26.00	660	63.00	1600	-	-
44"	44.00	1118	27.38	695	66.00	1676	-	-
46"	46.00	1168	28.62	727	69.00	1753	-	-
48"	48.00	1219	29.88	759	72.00	1829	-	-

Data Sheet

180° Elbow (Return) – Long & Short Radius

ANSI 16.9:1993 MSS SP43 ANSI 16.28:1994

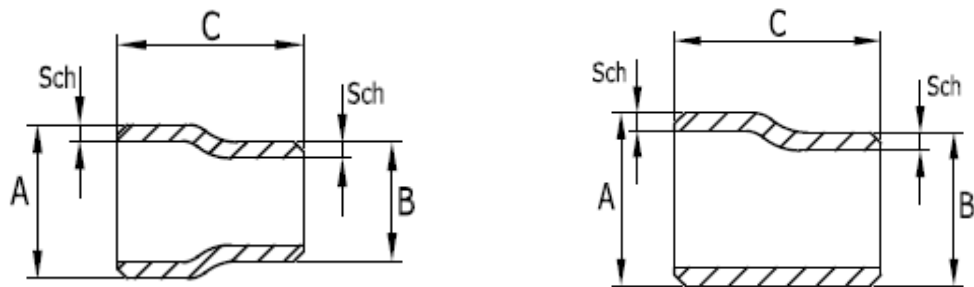


Nominal Bore	Outside Diameter "A"		Long Radius Dimensions				Short Radius Dimensions			
			Centre tp Centre "B"		Height of Bend "C"		Centre tp Centre "B"		Height of Bend "C"	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/2"	0.84	21	3.00	76	1.88	48				
3/4"	1.05	27	2.25	57	1.69	43				
1"	1.32	33	3.00	76	2.19	56	2.00	51	1.62	41
1 1/4"	1.66	42	3.75	95	2.75	70	2.50	64	2.06	52
1 1/2"	1.90	48	4.50	114	3.25	83	3.00	76	2.44	62
2"	2.38	60	6.00	152	4.19	106	4.00	102	3.19	81
2 1/2"	2.88	73	7.50	191	5.19	132	5.00	127	3.94	100
3"	3.50	89	9.00	229	6.25	159	6.00	152	4.75	121
3 1/2"	4.00	102	10.50	267	7.25	184	7.00	178	5.50	140
4"	4.50	114	12.00	305	8.25	210	8.00	203	6.25	159
5"	5.56	141	15.00	381	10.31	262	10.00	254	7.75	197
6"	6.62	168	18.00	457	12.31	313	12.00	305	9.31	237
8"	8.62	219	24.00	610	16.31	414	16.00	406	12.31	313
10"	10.75	273	30.00	762	20.38	518	20.00	508	15.38	391
12"	12.75	324	36.00	914	24.38	619	24.00	610	18.38	467
14"	14.00	356	42.00	1067	28.00	711	28.00	711	21.00	533
16"	16.00	406	48.00	1219	32.00	813	32.00	813	24.00	610
18"	18.00	457	54.00	1372	36.00	914	36.00	914	27.00	686
20"	20.00	508	60.00	1524	40.00	1016	40.00	1016	30.00	782
22"	22.00	559	66.00	1676	44.00	1118	44.00	1118	33.00	838
24"	24.00	610	72.00	1829	48.00	1219	48.00	1219	36.00	914

Data Sheet

Nominal Bore – Butt Weld Reducers

ANSI 16.9:1993 MSS SP43 ANSI 16.28:1994

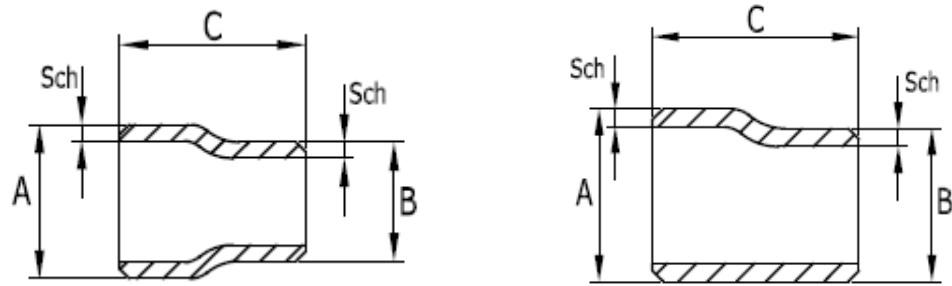


Nominal Bore Size	Outside Diameter Large End "A"		Outside Diameter Small End "B"		Length of Fitting "C"	
	Inch	mm	Inch	mm	Inch	mm
3/4" x 3/8"	1.05	27	0.68	17	1.50	38
3/4" x 1/2"	1.05	27	0.84	21	1.50	38
1" x 3/4"	1.32	33	1.05	27	2.00	51
1" x 1/2"	1.32	33	0.84	21	2.00	51
1 1/4" x 1"	1.66	42	1.32	33	2.00	51
1 1/4" x 3/4"	1.66	42	1.05	27	2.00	51
1 3/4" x 1/2"	1.66	42	0.84	21	2.00	51
1 1/2" x 1 1/4"	1.90	48	1.66	42	2.50	64
1 1/2" x 1"	1.90	48	1.32	33	2.50	64
1 1/2" x 3/4"	1.90	48	1.05	27	2.50	64
1 1/2" x 1/2"	1.90	48	0.84	21	2.50	64
2" x 1 1/2"	2.38	60	1.90	48	3.00	76
2" x 1 1/4"	2.38	60	1.67	42	3.00	76
2" x 1"	2.38	60	1.32	33	3.00	76
2" x 3/4"	2.38	60	1.05	27	3.00	76
2 1/2" x 2"	2.88	73	2.38	60	3.50	89
2 1/2" x 1 1/2"	2.88	73	1.90	48	3.50	89
2 1/2" x 1 1/4"	2.88	73	1.67	42	3.50	89
2 1/2" x 1"	2.88	73	1.31	33	3.50	89
3" x 2 1/2"	3.50	89	2.88	73	3.50	89
3" x 2"	3.50	89	2.38	60	3.50	89
3" x 1 1/2"	3.50	89	1.90	48	3.50	89
3" x 1 1/4"	3.50	89	1.67	42	3.50	89
3 1/2" x 3"	4.00	102	3.50	89	4.00	102
3 1/2" x 2 1/2"	4.00	102	2.88	73	4.00	102
3 1/2" x 2"	4.00	102	2.38	60	4.00	102
3 1/2" x 1 1/2"	4.00	102	1.90	48	4.00	102
3 1/2" x 1 1/4"	4.00	102	1.67	42	4.00	102
4" x 3 1/2"	4.50	114	4.00	102	4.00	102
4" x 3"	4.50	114	3.50	89	4.00	102
4" x 2 1/2"	4.50	114	2.88	73	4.00	102
4" x 2"	4.50	114	2.38	60	4.00	102
4" x 1 1/2"	4.50	114	1.90	48	4.00	102

Data Sheet

Nominal Bore – Butt Weld Reducers

ANSI 16.9:1993 MSS SP43 ANSI 16.28:1994

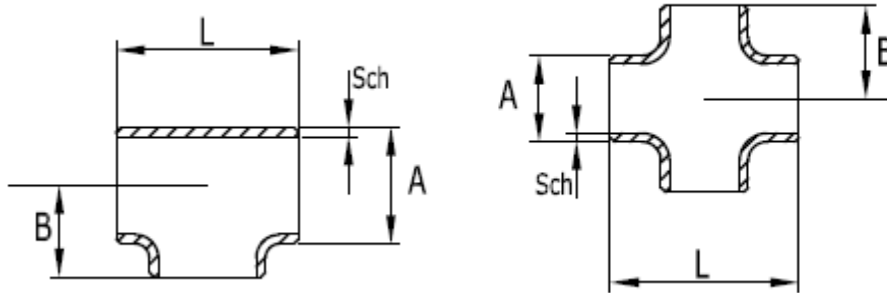


Nominal Bore Size	Outside Diameter Large End "A"		Outside Diameter Small End "B"		Length of Fitting "C"	
	Inch	mm	Inch	mm	Inch	mm
5" x 4"	5.56	141	4.50	114	5.00	127
5" x 3 1/2"	5.56	141	4.00	102	5.00	127
5" x 3"	5.56	141	3.50	89	5.00	127
5" x 2 1/2"	5.56	141	2.88	73	5.00	127
5" x 2"	5.56	141	2.38	60	5.00	127
6" x 5"	6.62	168	5.56	141	5.50	140
6" x 4"	6.62	168	4.50	114	5.50	140
6" x 3 1/2"	6.62	168	4.00	102	5.50	140
6" x 3"	6.62	168	3.50	89	5.50	140
6 x 2 1/2"	6.62	168	2.88	73	5.50	140
8" x 6"	8.62	219	6.62	168	6.00	152
8" x 5"	8.62	219	5.57	141	6.00	152
8" x 4"	8.62	219	4.50	114	6.00	152
8" x 3 1/2"	8.62	219	4.00	102	6.00	152
10" x 8"	10.75	273	8.63	219	7.00	178
10" x 6"	10.75	273	6.61	168	7.00	178
10" x 5"	10.75	273	5.56	141	7.00	178
10" x 4"	10.75	273	4.50	114	7.00	178
12" x 10"	12.75	324	10.75	273	8.00	203
12" x 8"	12.75	324	8.63	219	8.00	203
12" x 6"	12.75	324	6.63	168	8.00	203
12" x 5"	12.75	324	5.56	141	8.00	203

Data Sheet

Nominal Bore – Butt Weld Equal Tees and Crosses

ANSI 16.9:1986

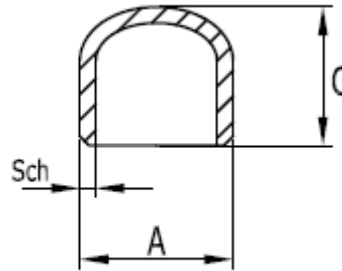


Nominal Bore Size	Outside Diameter "A"		Centre to Face "B"		Length of Fitting "L"	
	Inch	mm	Inch	mm	Inch	mm
1/2"	0.84	21	1.00	25	2.00	50
3/4"	1.05	27	1.12	29	2.24	58
1"	1.32	33	1.50	38	3.00	76
1 1/4"	1.66	42	1.88	48	3.75	96
1 1/2"	1.90	48	2.25	57	4.50	114
2"	2.38	60	2.50	64	5.00	128
2 1/2"	2.88	73	3.00	76	6.00	152
3"	3.50	89	3.38	86	6.75	172
3 1/2"	4.00	102	3.75	95	7.50	190
4"	4.50	114	4.12	105	8.25	210
5"	5.56	141	4.88	124	9.75	248
6"	6.62	168	5.62	143	11.25	286
8"	8.62	219	7.00	178	14.00	356
10"	10.75	273	8.50	216	17.00	432
12"	12.75	324	10.00	254	20.00	508
14"	14.00	356	11.00	279	22.00	558
16"	16.00	406	12.00	305	24.00	610
18"	18.00	457	13.50	343	27.00	686
20"	20.00	508	15.00	381	30.00	762
22"	22.00	559	16.50	419	33.00	838
24"	24.00	610	17.00	432	34.00	864
26"	26.00	660	19.50	495	39.00	990
28"	28.00	711	20.50	521	41.00	1042
30"	30.00	762	22.00	559	44.00	1118
32"	32.00	813	23.50	597	47.00	1194
34"	34.00	864	25.00	635	50.00	1270
36"	36.00	914	26.50	673	53.00	1346
38"	38.00	965	28.00	711	56.00	1422
40"	40.00	1016	29.50	749	59.00	1498
42"	42.00	1067	30.00	711	60.00	1422
44"	44.00	1118	32.00	762	64.00	1524
46"	46.00	1168	33.50	800	67.00	1600
48"	48.00	1219	35.00	838	70.00	1676

Data Sheet

Nominal Bore – Butt Weld End Caps

ANSI 16.9:1986 & MSS SP43



Nominal Bore Size	Outside Diameter "A"		Height "C"		Schedule 5 Wall		Schedule 10 Wall		Schedule 40 Wall		Schedule 80 Wall		Schedule 160 Wall	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/2"	0.84	21	1.0	25.4	0.065	1.65	0.083	2.11	0.109	2.77	0.147	3.73	0.187	4.75
3/4"	1.05	27	1.0	25.4	0.065	1.65	0.083	2.11	0.113	2.87	0.154	3.91	0.218	5.54
1"	1.32	33	1.5	38.1	0.065	1.65	0.109	2.77	0.133	3.38	0.179	4.55	0.250	6.35
1 1/4"	1.66	42	1.5	38.1	0.065	1.65	0.109	2.77	0.140	3.56	0.191	4.85	0.250	6.35
1 1/2"	1.90	48	1.5	38.1	0.065	1.65	0.109	2.77	0.145	3.69	0.200	5.08	0.281	7.14
2"	2.38	60	1.5	38.1	0.065	1.65	0.109	2.77	0.154	3.91	0.218	5.54	0.343	8.71
2 1/2"	2.88	73	1.5	38.1	0.083	2.11	0.120	3.05	0.203	5.16	0.276	7.01	0.375	9.53
3"	3.50	89	2.0	50.8	0.083	2.11	0.120	3.05	0.216	5.49	0.300	7.62	0.438	11.13
3 1/2"	4.00	102	2.5	63.5	0.083	2.11	0.120	3.05	0.226	5.74	0.318	8.08	-	-
4"	4.50	114	2.5	63.5	0.083	2.11	0.120	3.05	0.237	6.02	0.337	8.56	0.531	13.49
5"	5.56	141	3.0	76.2	0.109	2.77	0.134	3.40	0.258	6.55	0.375	9.53	0.625	15.88
6"	6.62	168	3.5	88.9	0.109	2.77	0.134	3.40	0.280	7.11	0.432	10.97	0.718	18.24
8"	8.62	219	4.0	101.6	0.109	2.77	0.148	3.76	0.322	8.18	0.500	12.70	0.906	23.01
10"	10.75	273	5.0	127.0	0.134	3.40	0.165	4.10	0.365	9.27	0.500	12.70	1.125	28.58
12"	12.75	324	6.0	152.4	0.156	3.96	0.180	4.57	0.375	9.53	0.500	12.70	1.312	33.33
14"	14.00	356	6.5	165.1	-	-	0.250	6.35	0.437	11.09	0.750	19.05	1.406	35.71
16"	16.00	406	7.0	177.8	-	-	0.250	6.35	0.500	12.70	0.844	21.44	1.594	40.49
18"	18.00	457	8.0	203.2	-	-	0.250	6.35	0.561	14.28	0.938	23.83	1.781	45.24
20"	20.00	508	9.0	228.6	-	-	0.250	6.35	0.594	15.09	1.031	26.19	1.969	50.01
22"	22.00	559	10.0	254.0	-	-	0.250	6.35	-	-	1.125	28.58	2.125	53.98
24"	24.00	610	10.5	266.7	-	-	0.250	6.35	0.688	17.48	1.219	30.96	2.344	59.54
26"	26.00	660	10.5	266.7	-	-	0.312	7.93	-	-	-	-	-	-
28"	28.00	711	10.5	266.7	-	-	0.312	7.93	-	-	-	-	-	-
30"	30.00	762	10.5	266.7	-	-	0.312	7.93	-	-	-	-	-	-
32"	32.00	813	10.5	266.7	-	-	0.312	7.93	0.688	17.48	-	-	-	-
34"	34.00	864	10.5	266.7	-	-	0.312	7.93	0.688	17.48	-	-	-	-
36"	36.00	914	10.5	266.7	-	-	0.312	7.93	0.750	19.05	-	-	-	-
38"	38.00	965	12.0	304.8	-	-	-	-	-	-	-	-	-	-
40"	40.00	1016	12.0	304.8	-	-	-	-	-	-	-	-	-	-
42"	42.00	1067	12.0	304.8	-	-	-	-	-	-	-	-	-	-
44"	44.00	1118	13.5	342.9	-	-	-	-	-	-	-	-	-	-
46"	46.00	1168	13.5	342.9	-	-	-	-	-	-	-	-	-	-
48"	48.00	1219	13.5	342.9	-	-	-	-	-	-	-	-	-	-

The shape and form of these caps shall be ellipsoidal and the dimensions given as reference only.
For design criteria, please consult the requirements given in ASME Boiler and Pressure Vessel Code.