

ASTM C-450

Long Radius Ells - Recommended Dimensional Standards

Pipe Size	Insulation Thickness																			
	1"					1 1/2"					2"					2 1/2"				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
1/2	4	27/32	*	0.53	1 31/32	4	1 3/32	*	0.67	2 11/32	4	1 9/32	*	0.79	2 11/16	4	1 19/32	*	1.00	3 1/4
3/4	4	1	*	0.49	1 11/16	4	1 7/32	*	0.63	2 3/32	4	1 7/16	*	0.75	2 7/16	4	1 3/4	*	0.95	3
1	4	1 9/32	*	0.52	1 21/32	4	1 3/8	*	0.58	1 27/32	4	1 11/16	*	0.78	2 3/8	4	1 29/32	*	0.91	2 3/4
1 1/4	4	1 7/16	1/32	0.26		4	1 23/32	*	0.66	1 29/32	4	1 27/32	*	0.73	2 1/8	4	2 1/16	*	0.87	2 15/32
1 1/2	4	1 11/16	3/32	0.31		4	1 7/8	*	0.62	1 21/32	4	2 3/16	*	0.82	2 7/32	4	2 13/32	*	0.95	2 9/16
2	4	1 31/32	3/8	0.41		4	2 9/32	1/16	0.41		4	2 1/2	*	0.74	1 11/16	4	2 11/16	*	0.86	2 1/16
2 1/2	4	2 15/32	15/32	0.51		4	2 25/32	5/32	0.51		4	3	*	0.77	1 17/32	6	2 3/32	*	0.90	1 7/8
3	4	2 7/8	21/32	0.60		4	3 3/32	7/16	0.61		6	2 3/16	5/32	0.61		6	2 5/16	1/32	0.61	
3 1/2	6	2 1/4	1/2	0.71		6	2 3/8	3/8	0.71		6	2 1/2	7/32	0.71		6	2 5/8	3/32	0.71	
4	6	2 7/16	11/16	0.80		6	2 9/16	9/16	0.80		6	2 11/16	7/16	0.80		6	2 27/32	9/32	0.80	
4 1/2	6	2 9/16	9/16	0.80		6	2 11/16	7/16	0.80		6	2 27/32	9/32	0.80		6	2 31/32	5/32	0.81	
5	6	2 31/32	15/16	1.00		6	3 3/32	13/16	1.00		6	3 7/32	11/16	1.00		6	3 3/8	17/32	1.00	
6	6	3 1/2	1 7/32	1.20		6	3 5/8	1 1/16	1.20		6	3 25/32	15/16	1.20		6	3 29/32	13/16	1.20	
7	6	3 5/8	1 1/16	1.20		6	3 25/32	15/16	1.20		6	3 29/32	13/16	1.20		6	4 1/32	21/32	1.20	
8	6	4 9/16	1 23/32	1.59		6	4 11/16	1 19/32	1.59		8	3 19/32	1 3/32	1.59		8	3 23/32	31/32	1.60	
9						8	3 19/32	1 3/32	1.59		8	3 23/32	31/32	1.60		8	3 13/16	7/8	1.60	
10						8	4 5/16	1 9/16	1.99		8	4 13/32	1 15/32	1.99		8	4 1/2	1 11/32	1.99	
11						8	4 13/32	1 15/32	1.99		8	4 1/2	1 11/32	1.99		8	4 5/8	1 1/4	1.99	
12						8	5 3/32	1 15/16	2.38		8	5 7/32	1 27/32	2.38		8	5 5/16	1 3/4	2.38	
14						8	5 25/32	2 7/16	2.77		8	5 29/32	2 11/32	2.77		8	6	2 1/4	2.77	
15						8	5 29/32	2 11/32	2.77		8	6	2 1/4	2.77		8	6 3/32	2 5/32	2.78	
16						10	5 1/4	2 1/4	3.17		10	5 11/32	2 3/16	3.17		10	5 13/32	2 3/32	3.17	
17						10	5 11/32	2 3/16	3.17		10	5 13/32	2 3/32	3.17		10	5 1/2	2 1/32	3.17	
18						10	5 7/8	2 9/16	3.56		10	5 31/32	2 1/2	3.56		10	6 1/32	2 13/32	3.56	
19						10	6 3/16	2 23/32	3.76		10	6 1/32	2 13/32	3.56		10	6 1/8	2 11/32	3.56	
20						10	6 17/32	2 7/8	3.96		10	6 19/32	2 13/16	3.96		10	6 11/16	2 23/32	3.96	
21						10	6 27/32	3 1/32	4.15		10	6 11/16	2 23/32	3.96		10	6 3/4	2 21/32	3.96	
22						10	7 5/32	3 3/16	4.35		10	7 7/32	3 1/8	4.35		10	7 5/16	3 1/32	4.35	
23						10	7 15/32	3 11/32	4.55		10	7 5/16	3 1/32	4.35		10	7 3/8	2 31/32	4.35	
24						10	7 25/32	3 1/2	4.74		10	7 27/32	3 7/16	4.74		10	7 15/16	3 11/32	4.74	

A = Minimum Number of Miters for 90° Ell, use half for 45° Ell
 B = Miter Base Dimension
 C = Miter Top Dimension (* Denotes Negative Radius, See Column E)
 D = Lineal Feet of Pipe Covering for One Fitting Cover
 (Based on alternating cuts and allowing for saw kerf and waste)
 E = Tangent Length for Negative Radius Fittings (Figure 1.2)¹

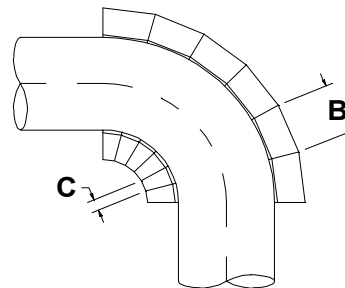


Figure 1.1 Regular Long Radius Ell

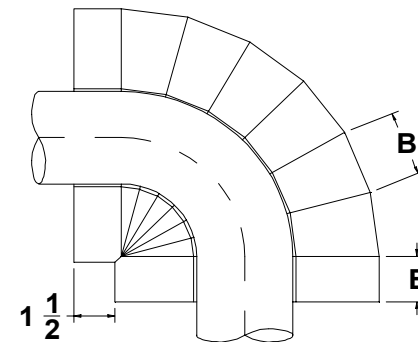


Figure 1.2 Negative Radius Ell

¹ - Mitered Negative Radius Fitting Covers create a 'humped' phenomenon in the throat of the fitting. This 'hump' must be rasped down to ensure proper fit with metal elbow covers.

ASTM C-450

Long Radius Ells - Recommended Dimensional Standards

Pipe Size	Insulation Thickness																			
	3"					3 1/2"					4"					4 1/2"				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
1/2	4	1 13/16	*	1.12	3 19/32	4	2	*	1.24	3 31/32	4	2 3/16	*	1.37	4 5/16	4	2 13/32	*	1.51	4 11/16
3/4	4	1 15/16	*	1.08	3 11/32	4	2 5/32	*	1.20	3 11/16	4	2 11/32	*	1.32	4 1/32	4	2 9/16	*	1.46	4 7/16
1	4	2 3/32	*	1.03	3 3/32	4	2 9/32	*	1.16	3 7/16	4	2 1/2	*	1.28	3 25/32	4	2 23/32	*	1.42	4 5/32
1 1/4	4	2 1/4	*	0.99	2 13/16	4	2 7/16	*	1.11	3 3/16	4	2 21/32	*	1.24	3 17/32	4	2 7/8	*	1.38	3 29/32
1 1/2	4	2 19/32	*	1.07	2 29/32	4	2 25/32	*	1.19	3 1/4	4	3 1/32	*	1.33	3 21/32	6	2 1/8	*	1.46	4 1/32
2	4	2 29/32	*	0.98	2 13/32	4	3 3/32	*	1.11	2 3/4	6	2 3/16	*	1.25	3 5/32	6	2 5/16	*	1.38	3 1/2
2 1/2	6	2 1/4	*	1.02	2 7/32	6	2 3/8	*	1.16	2 5/8	6	2 17/32	*	1.29	2 31/32	6	2 21/32	*	1.41	3 5/16
3	6	2 7/16	*	0.94	1 23/32	6	2 19/32	*	1.08	2 3/32	6	2 23/32	*	1.20	2 7/16	6	2 27/32	*	1.32	2 13/16
3 1/2	6	2 25/32	*	0.99	1 9/16	6	2 29/32	*	1.11	1 15/16	6	3 1/32	*	1.24	2 9/32	6	3 7/32	*	1.39	2 23/32
4	6	2 31/32	5/32	0.81		6	3 1/8	1/32	0.81		6	3 1/4	*	1.15	1 3/4	6	3 13/32	*	1.30	2 3/16
4 1/2	6	3 1/8	1/32	0.81		6	3 1/4	*	1.15	1 3/4	6	3 13/32	*	1.30	2 3/16	6	3 17/32	*	1.43	2 17/32
5	6	3 1/2	13/32	1.00		6	3 5/8	9/32	1.00		6	3 13/16	1/8	1.00		6	3 15/16	*	1.25	1 1/2
6	6	4 1/32	21/32	1.20		6	4 3/16	1/2	1.20		6	4 11/32	3/8	1.20		6	4 15/32	1/4	1.20	
7	6	4 3/16	1/2	1.20		6	4 11/32	3/8	1.20		6	4 15/32	1/4	1.20		6	4 19/32	1/8	1.20	
8	8	3 13/16	7/8	1.60		8	3 15/16	25/32	1.60		8	4 1/32	21/32	1.60		8	4 1/8	9/16	1.60	
9	8	3 15/16	25/32	1.60		8	4 1/32	21/32	1.60		8	4 1/8	9/16	1.60		8	4 7/32	15/32	1.60	
10	8	4 5/8	1 1/4	1.99		8	4 23/32	1 5/32	1.99		8	4 13/16	1 1/16	1.99		8	4 29/32	31/32	1.99	
11	8	4 23/32	1 5/32	1.99		8	4 13/16	1 1/16	1.99		8	4 29/32	31/32	1.99		8	5	7/8	1.99	
12	8	5 13/32	1 21/32	2.38		8	5 1/2	1 9/16	2.38		8	5 19/32	1 15/32	2.38		8	5 11/16	1 11/32	2.38	
14	8	6 3/32	2 5/32	2.78		8	6 3/16	2 1/32	2.78		8	6 9/32	1 15/16	2.78		10	5 3/32	1 15/32	2.78	
15	8	6 3/16	2 1/32	2.78		8	6 9/32	1 15/16	2.78		10	5 3/32	1 15/32	2.78		10	5 3/16	1 13/32	2.78	
16	10	5 1/2	2 1/32	3.17		10	5 9/16	1 15/16	3.17		10	5 21/32	1 7/8	3.17		10	5 23/32	1 25/32	3.17	
17	10	5 9/16	1 15/16	3.17		10	5 21/32	1 7/8	3.17		10	5 23/32	1 25/32	3.17		10	5 13/16	1 23/32	3.17	
18	10	6 1/8	2 11/32	3.56		10	6 3/16	2 1/4	3.56		10	6 9/32	2 3/16	3.56		10	6 11/32	2 3/32	3.56	
19	10	6 3/16	2 1/4	3.56		10	6 9/32	2 3/16	3.56		10	6 11/32	2 3/32	3.56		10	6 19/32	1 7/8	3.57	
20	10	6 3/4	2 21/32	3.96		10	6 27/32	2 9/16	3.96		10	6 29/32	2 1/2	3.96		10	7	2 13/32	3.96	
21	10	6 27/32	2 9/16	3.96		10	6 29/32	2 1/2	3.96		10	7	2 13/32	3.96		10	7 1/16	2 11/32	3.96	
22	10	7 3/8	2 31/32	4.35		10	7 15/32	2 7/8	4.35		10	7 17/32	2 13/16	4.35		10	7 5/8	2 23/32	4.35	
23	10	7 15/32	2 7/8	4.35		10	7 17/32	2 13/16	4.35		10	7 5/8	2 23/32	4.35		10	7 11/16	2 21/32	4.35	
24	12	6 21/32	2 23/32	4.75		12	6 3/4	2 21/32	4.75		12	6 13/16	2 19/32	4.75		12	6 7/8	2 17/32	4.75	

A = Minimum Number of Miters for 90° Ell, use half for 45° Ell
 B = Miter Base Dimension
 C = Miter Top Dimension (* Denotes Negative Radius, See Column E)
 D = Lineal Feet of Pipe Covering for One Fitting Cover
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 E = Tangent Length for Negative Radius Fittings (Figure 1.2)¹

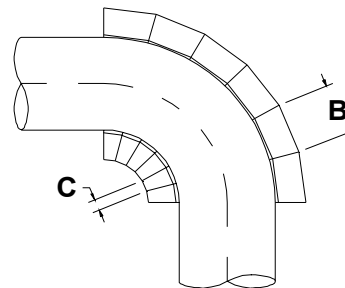


Figure 1.1 Regular Long Radius Ell

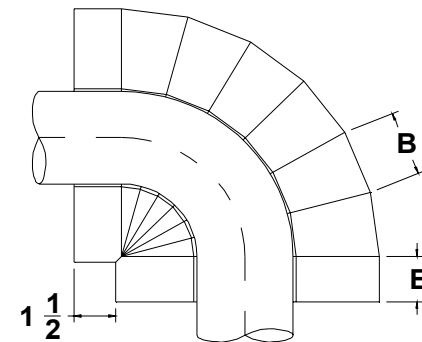


Figure 1.2 Negative Radius Ell

¹ - Mitered Negative Radius Fitting Covers create a 'humped' phenomenon in the throat of the fitting. This 'hump' must be rasped down to ensure proper fit with metal elbow covers.

ASTM C-450

Long Radius Ells - Recommended Dimensional Standards

Insulation Thickness

Pipe Size	5"					5 1/2"					6"				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
1/2	4	2 5/8	*	1.63	5 1/32	4	2 13/16	*	1.76	5 3/8	4	3 1/16	*	1.91	5 13/16
3/4	4	2 25/32	*	1.59	4 25/32	4	2 31/32	*	1.71	5 1/8	6	2 1/8	*	1.87	5 19/32
1	4	2 29/32	*	1.55	4 17/32	4	3 1/8	*	1.67	4 7/8	6	2 7/32	*	1.83	5 11/32
1 1/4	4	3 1/16	*	1.50	4 1/4	6	2 5/32	*	1.63	4 5/8	6	2 5/16	*	1.79	5 1/16
1 1/2	6	2 1/4	*	1.59	4 3/8	6	2 13/32	*	1.74	4 13/16	6	2 9/16	*	1.87	5 5/32
2	6	2 7/16	*	1.50	3 27/32	6	2 5/8	*	1.65	4 9/32	6	2 3/4	*	1.78	4 5/8
2 1/2	6	2 13/16	*	1.57	3 3/4	6	2 15/16	*	1.69	4 1/8	6	3 3/32	*	1.82	4 15/32
3	6	3	*	1.48	3 1/4	6	3 5/32	*	1.60	3 19/32	6	3 9/32	*	1.73	3 15/16
3 1/2	6	3 11/32	*	1.52	3 1/16	6	3 15/32	*	1.64	3 13/32	6	3 19/32	*	1.76	3 3/4
4	6	3 17/32	*	1.43	2 17/32	6	3 21/32	*	1.55	2 7/8	6	3 13/16	*	1.68	3 1/4
4 1/2	6	3 21/32	*	1.55	2 7/8	6	3 13/16	*	1.68	3 1/4	6	3 15/16	*	1.80	3 19/32
5	6	4 1/16	*	1.38	1 27/32	6	4 3/16	*	1.50	2 3/16	6	4 11/32	*	1.63	2 17/32
6	6	4 19/32	1/8	1.20		6	4 23/32	*	1.45	1 1/2	8	3 5/8	*	1.58	1 27/32
7	6	4 23/32	*	1.45	1 1/2	8	3 5/8	*	1.58	1 27/32	8	3 23/32	*	1.70	2 3/16
8	8	4 7/32	15/32	1.60		8	4 5/16	3/8	1.60		8	4 13/32	9/32	1.60	
9	8	4 5/16	3/8	1.60		8	4 13/32	9/32	1.60		8	4 1/2	3/16	1.60	
10	8	5	7/8	1.99		8	5 3/32	25/32	1.99		8	5 7/32	21/32	1.99	
11	8	5 3/32	25/32	1.99		8	5 7/32	21/32	1.99		8	5 5/16	9/16	1.99	
12	8	5 25/32	1 1/4	2.38		8	5 29/32	1 5/32	2.38		8	6	1 1/16	2.38	
14	10	5 3/16	1 13/32	2.78		10	5 1/4	1 5/16	2.78		10	5 11/32	1 1/4	2.78	
15	10	5 1/4	1 5/16	2.78		10	5 11/32	1 1/4	2.78		10	5 13/32	1 5/32	2.78	
16	10	5 13/16	1 23/32	3.17		10	5 7/8	1 5/8	3.17		10	5 31/32	1 9/16	3.17	
17	10	5 7/8	1 5/8	3.17		10	5 31/32	1 9/16	3.17		10	6 1/32	1 15/32	3.17	
18	10	6 7/16	2 1/32	3.56		10	6 17/32	1 15/16	3.57		10	6 19/32	1 7/8	3.57	
19	10	6 17/32	1 15/16	3.57		10	6 19/32	1 7/8	3.57		10	6 11/16	1 25/32	3.57	
20	10	7 1/16	2 11/32	3.96		10	7 5/32	2 1/4	3.96		10	7 7/32	2 3/16	3.96	
21	10	7 5/32	2 1/4	3.96		10	7 7/32	2 3/16	3.96		10	7 5/16	2 3/32	3.96	
22	10	7 11/16	2 21/32	4.35		10	7 25/32	2 9/16	4.35		10	7 27/32	2 1/2	4.35	
23	10	7 25/32	2 9/16	4.35		10	7 27/32	2 1/2	4.35		10	7 15/16	2 13/32	4.35	
24	12	6 15/16	2 15/32	4.75		12	7	2 13/32	4.75		12	7 1/16	2 11/32	4.75	

A = Minimum Number of Miters for 90° Ell, use half for 45° Ell
 B = Miter Base Dimension
 C = Miter Top Dimension (* Denotes Negative Radius, See Column E)
 D = Lineal Feet of Pipe Covering for One Fitting Cover
 (Based on alternating cuts and allowing for saw kerf and waste)
 E = Tangent Length for Negative Radius Fittings (Figure 1.2)¹

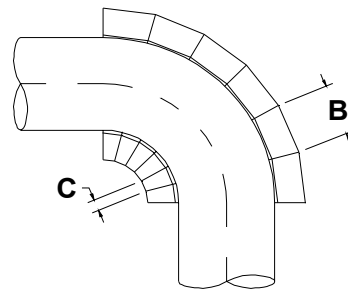


Figure 1.1 Regular Long Radius Ell

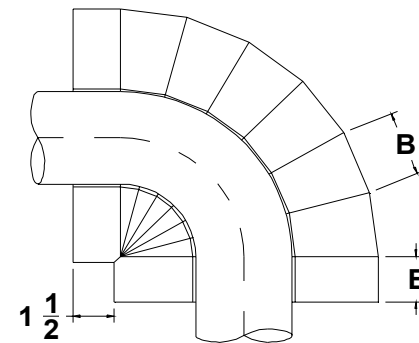


Figure 1.2 Negative Radius Ell

¹ - Mitered Negative Radius Fitting Covers create a 'humped' phenomenon in the throat of the fitting. This 'hump' must be rasped down to ensure proper fit with metal elbow covers.