



ANSI B16.28-Wrought Steel Butt-Welding Short Radius Elbows And Returns.

B16.28 standard is about the short radius elbows, includes the information of general scope, design and pressure ratings, Sizes, Markings, Materials, Dimensions, End preparations, Production Test, Design proof test and Tolerance.

Tolerance information, unit in inch.

TABLE 1 TOLERANCES

Nominal Pipe Size	All Fittings					90 deg Elbows	180 deg Returns		
	Outside Diameter at Bevel [Notes (1), (2)]	Inside Diameter at End [Notes (1), (3), (4)]	Wall Thickness [Note (3)]	Angularity		Center-to-End Dimension A	Center-to-Center Dimension O	Back-to-Face Dimension K	Alignments of Ends U
				Off Angle Q	Off Plane P				
½ to 2½	+0.06 -0.03	0.03		0.03	0.06	0.06	0.25	0.25	0.03
3 to 3½	0.06	0.06		0.03	0.06	0.06	0.25	0.25	0.03
4	0.06	0.06		0.03	0.06	0.06	0.25	0.25	0.03
5 to 8	+0.09 -0.06	0.06	Not less than 87.5% of nominal thickness marked on fitting	0.06	0.12	0.06	0.25	0.25	0.03
10 to 12	+0.16 -0.12	0.12		0.09	0.19	0.09	0.38	0.25	0.06
14 to 16	+0.16 -0.12	0.12		0.09	0.25	0.09	0.38	0.25	0.06
18	+0.16 -0.12	0.12		0.12	0.38	0.09	0.38	0.25	0.06
20 to 24	+0.25 -0.19	0.19		0.12	0.38	0.09	0.38	0.25	0.06

GENERAL NOTE: Dimensions are in inches. Tolerances are equal plus and minus except as noted.

NOTES:

- (1) Out-of-round is the sum of absolute values of plus and minus tolerance.
- (2) This tolerance may be exceeded in localized areas of formed fittings where increased wall thickness is required to meet design requirements of para. 2.1.
- (3) The inside diameter and the nominal wall thicknesses at ends are to be specified by the purchaser. Wall thickness tolerance applies throughout the fitting.
- (4) Unless otherwise specified by the purchaser, these tolerances apply to the nominal inside diameter, which equals the difference between the nominal outside diameter and twice the nominal wall thickness.

Tolerance Information : Unit in mm.

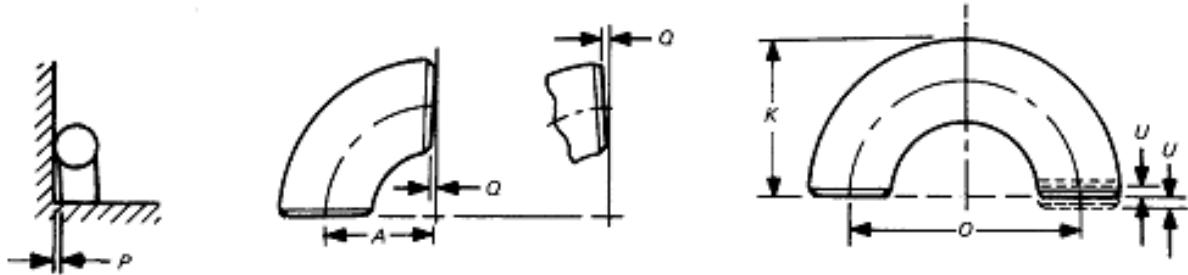


TABLE A1 TOLERANCES

Nominal Pipe Size	All Fittings					90 deg Elbows	180 deg Returns		
	Outside Diameter at Bevel [Notes (1), (2)]	Inside Diameter at End [Notes (1), (3), (4)]	Wall Thickness [Note (3)]	Angularity		Center-to-End Dimension A	Center-to-Center Dimension O	Back-to-Face Dimension K	Alignments of Ends U
				Off Angle Q	Off Plane P				
½ to 2½	1	0.8	Not less than 87.5% of nominal thickness marked on fitting	1	2	2	7	7	1
3 to 3½	1	1.6		1	2	2	7	7	1
4	+2 -1	1.6		1	2	2	7	7	1
5 to 6	+3 -1	1.6		2	4	2	7	7	1
8	2	1.6		2	4	2	7	7	1
10 to 12	+4 -3	3.2		3	5	3	10	7	2
14 to 18	+4 -3	3.2		4	10	3	10	7	2
20 to 24	+6 -5	4.8		4	10	3	10	7	2

GENERAL NOTE: Dimensions are in millimeters. Tolerances are equal plus and minus except as noted.

NOTES:

- (1) Out-of-round is the sum of absolute values of plus and minus tolerance.
- (2) This tolerance may be exceeded in localized areas of formed fittings where increased wall thickness is required to meet design requirements of para. 2.1.
- (3) The inside diameter and the nominal wall thicknesses at ends are to be specified by the purchaser. Wall thickness tolerance applies throughout the fitting.
- (4) Unless otherwise specified by the purchaser, these tolerances apply to the nominal inside diameter, which equals the difference between the nominal outside diameter and twice the nominal wall thickness.

Elbows dimensions in ASME/ANSI B16.28, Unit in inch.

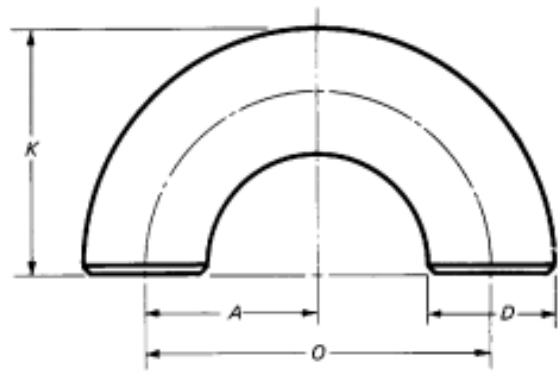
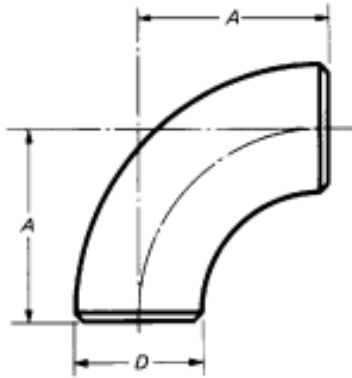


TABLE 2 DIMENSIONS OF SHORT RADIUS ELBOWS

Nominal Pipe Size	Outside Diameter at Bevel D	Center-to-End A
1	1.32	1.00
1 $\frac{1}{4}$	1.66	1.25
1 $\frac{1}{2}$	1.90	1.50
2	2.38	2.00
2 $\frac{1}{2}$	2.88	2.50
3	3.50	3.00
3 $\frac{1}{2}$	4.00	3.50
4	4.50	4.00
5	5.56	5.00
6	6.62	6.00
8	8.62	8.00
10	10.75	10.00
12	12.75	12.00
14	14.00	14.00
16	16.00	16.00
18	18.00	18.00
20	20.00	20.00
22	22.00	22.00
24	24.00	24.00

GENERAL NOTE: Dimensions are in inches.

TABLE 3 DIMENSIONS OF SHORT RADIUS 180 deg RETURNS

Nominal Pipe Size	Outside Diameter at Bevel D	Center-to-Center O	Back-to-Face K
1	1.32	2.00	1.62
1 $\frac{1}{4}$	1.66	2.50	2.06
1 $\frac{1}{2}$	1.90	3.00	2.44
2	2.38	4.00	3.19
2 $\frac{1}{2}$	2.88	5.00	3.94
3	3.50	6.00	4.75
3 $\frac{1}{2}$	4.00	7.00	5.50
4	4.50	8.00	6.25
5	5.56	10.00	7.75
6	6.62	12.00	9.31
8	8.62	16.00	12.31
10	10.75	20.00	15.38
12	12.75	24.00	18.38
14	14.00	28.00	21.00
16	16.00	32.00	24.00
18	18.00	36.00	27.00
20	20.00	40.00	30.00
22	22.00	44.00	33.00
24	24.00	48.00	36.00

GENERAL NOTES:

- (a) Dimensions are in inches.
- (b) Dimension A is equal to one-half of dimension O .

90 degree Elbows dimensions in ASME/ANSI B16.28, Unit in inch.

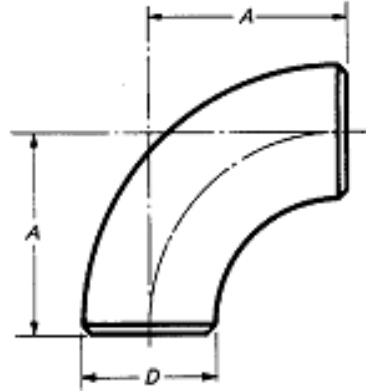


TABLE A2 DIMENSIONS OF SHORT RADIUS ELBOWS

Nominal Pipe Size	Outside Diameter at Bevel D			Center-to-End A		
				90 deg Elbows		
	Min.	Nom.	Max.	Min.	Nom.	Max.
1	32	33	34	23	25	27
1¼	41	42	43	30	32	34
1½	47	48	49	36	38	40
2	59	60	61	49	51	53
2½	72	73	74	62	64	66
3	88	89	90	74	76	78
3½	101	102	103	87	89	91
4	113	114	116	100	102	104
5	140	141	144	125	127	129
6	167	168	171	150	152	154
8	217	219	221	201	203	205
10	270	273	277	252	254	256
12	321	324	328	302	305	308
14	353	356	360	353	356	359
16	403	406	410	403	406	409
18	454	457	461	454	457	460
20	503	508	514	505	508	511
22	554	559	565	556	559	562
24	605	610	616	607	610	613

GENERAL NOTE: Dimensions are in millimeters.

180 degree Elbows dimensions in ASME/ANSI B16.28, Unit in inch.

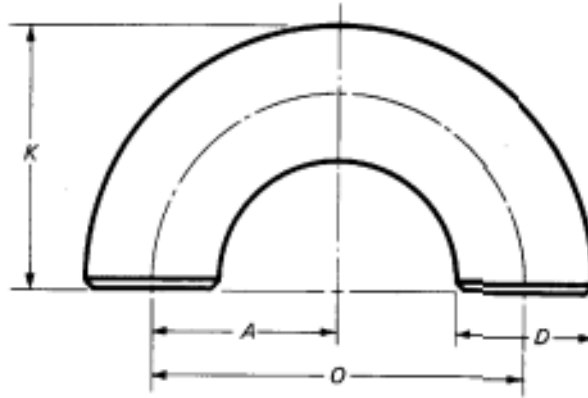


TABLE A3 DIMENSIONS OF SHORT RADIUS 180 deg RETURNS

Nominal Pipe Size	Outside Diameter at Bevel D			Center-to-Center O			Back-to-Face K		
	Min.	Nom.	Max.	Min.	Nom.	Max.	Min.	Nom.	Max.
1	32	33	34	44	51	58	34	41	48
1¼	41	42	43	57	64	71	45	52	59
1½	47	48	49	69	76	83	55	62	69
2	59	60	61	95	102	109	74	81	88
2½	72	73	74	120	127	134	93	100	107
3	88	89	90	145	152	159	114	121	128
3½	101	102	103	171	178	185	133	140	147
4	113	114	116	196	203	210	152	159	166
5	140	141	144	247	254	261	190	197	204
6	167	168	171	298	305	312	230	237	244
8	217	219	221	399	406	413	306	313	320
10	270	273	277	498	508	518	384	391	398
12	321	324	328	600	610	620	460	467	474
14	353	356	360	701	711	721	526	533	540
16	403	406	410	803	813	823	603	610	617
18	454	457	461	904	914	924	679	686	693
20	503	506	514	1006	1016	1026	755	762	769
22	554	559	565	1108	1118	1128	831	838	845
24	605	610	616	1209	1219	1229	907	914	921

GENERAL NOTES:

- (a) Dimensions are in millimeters.
- (b) Dimension A is equal to one-half of dimension O .