

Weld Fittings

ASTM A234

SCOPE

This standard covers wrought carbon steel fittings of seamless and welded construction which are manufactured to the dimensional specifications of ASME B16.9 and B16.28. These fittings are primarily for use in pressure piping and in pressure vessel fabrication for service at moderate and elevated temperatures.

MATERIALS

The starting material for fittings shall consist of killed steel, forgings, bars, plates, seamless or fusion-welded tubular products with filler metal added and shall conform to the chemical requirements of ASTM A 234. Unless otherwise specified, carbon steel plates may be either coarse grain or fine grain practice.

MANUFACTURE

Forging or shaping operations are performed by hammering, pressing, piercing, extruding, upsetting, rolling, bending, machining, or by a combination of two or more of these operations. The forming process shall be applied so that it will not produce injurious imperfections in the fittings.

HEAT TREATMENT

Hot-formed WPB fittings, upon which the final forming operation is completed at a temperature above 1150°F and below 1800°F, need not be heat treated.

Cold-formed WPB fittings, upon which the final forming operation is completed at a temperature below 1150°F, shall be normalized, or shall be stress relieved at 1100°F to 1275°F.

DIMENSIONS

Butt-welding fittings and butt-welding short radius elbows and returns purchased in accordance with this specification shall conform to the dimensions and tolerances given in the latest revision of ANSI B16.9 and B16.28, respectively.

CERTIFICATION

When requested by the purchaser, the manufacturer shall provide a certificate of compliance to this specification.

TEST REPORTS

When test reports are required, the following will also be provided (if applicable):

- Chemical analysis results. When the amount of an element is less than .02%, the analysis for that element is reported as "<0.02%."
- Tensile property results. Report the yield strength and ultimate strength in ksi [or MPa] and elongation in percent, hardness acceptable in accordance with Section 10 of ASTM A-234.
- Seamless or Welded.
- Type of heat treatment, if any.
- Starting material, specifically pipe, plate, etc.
- Statement regarding radiographic or ultrasonic examination.
- Any supplemental testing required by the purchase order.

PRODUCT MARKING

All fittings shall have the prescribed information stamped or otherwise suitably marked on each fitting in accordance with ASTM A 234/MSS SP-25.

Fittings to be marked as follows: Manufacturer's Name, Nominal Pipe Size, Pipe Wall Thickness Designation, Material Grade (WPB/WPC) and Heat Identification Number.

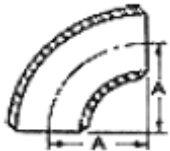
FITTINGS SUMMARY DATA SHEET

Chemical Requirements (in %)	
Carbon	.30 max
Manganese	.29-1.06
Phosphorus (max)	.050
Sulfur (max)	.058
Silicon	.10 min
Chromium	.40 max
Molybdenum	.15 max
Nickel	.40 max
Copper	.40 max
Vanadium	.80 max
Columbium	.02 max

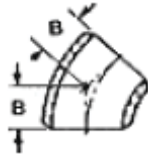
Mechanical Requirements		
Tensile Strength	60,000 - 85,000 psi	
Yield Strength (min)	35,000 psi	
Elongation	Longitudinal	22%
	Transverse	14%

Note: All information contained in this document, and for a complete description of all requirements, refer to ASTM A 105. Sheets are subject to change without notice.

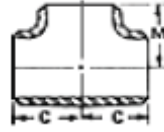
Weld Fittings • Dimensional Specification



90° Elbow



45° Elbow



Tee

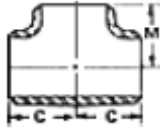


Cap

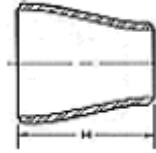
Nominal Pipe Size	90° Elbow		45° Elbow	Tee		Caps
	Long Rad.	Short Rad.	Long Rad.	C	M	E
	A	A	B			
1/2"	1.50	-	0.62	1.00	1.00	1.00
3/4"	1.50	-	0.75	1.12	1.12	1.00
1"	1.50	1.00	0.88	1.50	1.50	1.50
1-1/4"	1.88	1.25	1.00	1.88	1.88	1.50
1-1/2"	2.25	1.50	1.12	2.25	2.25	1.50
2"	3.00	2.00	1.38	2.50	2.50	1.50
2-1/2"	3.75	2.50	1.75	3.00	3.00	1.50
3"	4.50	3.00	2.00	3.38	3.38	2.00
3-1/2"	5.25	3.50	2.25	3.75	3.75	2.50
4"	6.00	4.00	2.50	4.12	4.12	2.50
5"	7.50	5.00	3.12	4.88	4.88	3.00
6"	9.00	6.00	3.75	5.62	5.62	3.50
8"	12.00	8.00	5.00	7.00	7.00	4.00
10"	15.00	10.00	6.25	8.50	8.50	5.00
12"	18.00	12.00	7.50	10.00	10.00	6.00
14"	21.00	14.00	8.70	11.00	11.00	6.50
16"	24.00	16.00	10.00	12.00	12.00	7.00
18"	27.00	18.00	11.25	13.50	13.50	8.00
20"	30.00	20.00	12.50	15.00	15.00	9.00
24"	36.00	24.00	15.00	17.00	17.00	10.50

All dimensions given in inches for common diameters and wall thickness.
Dimensions in accordance with ASME B16.9

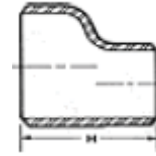
Weld Fittings • Dimensional Specification



Reducing Tee



Concentric Reducer



Eccentric Reducer

Nominal Pipe Size	Reducing Outlet Tees		Concentric & Eccentric Reducers	Nominal Pipe Size	Reducing Outlet Tees cont.		Concentric & Eccentric Reducers
	C	M	H		C	M	H
3/4" X 1/2"	1.12	1.12	1.50	6" X 2-1/2"	5.62	4.75	5.50
1" X 1/2"	1.50	1.50	2.00	6" X 3"	5.62	4.88	5.50
1" X 3/4"	1.50	1.50	2.00	6" X 4"	5.62	5.12	5.50
1-1/4" X 3/4"	1.88	1.88	2.00	6" X 5"	5.62	5.38	5.50
1-1/4" X 1"	1.88	1.88	2.00	8" X 4"	7.00	6.12	6.00
1-1/2" X 3/4"	2.25	2.25	2.50	8" X 5"	7.00	6.38	6.00
1-1/2" X 1"	2.25	2.25	2.50	8" X 6"	7.00	6.62	6.00
1-1/2" X 1-1/4"	2.25	2.25	2.50	10" X 6"	8.50	7.62	7.00
2" X 3/4"	2.50	1.75	3.00	10" X 8"	8.50	8.00	7.00
2" X 1"	2.50	2.00	3.00	12" X 6"	10.00	8.62	8.0
2" X 1-1/4"	2.50	2.25	3.00	12" X 8"	10.00	9.00	8.00
2" X 1-1/2"	2.50	2.38	3.00	12" X 10"	10.00	9.50	8.00
2-1/2" X 1"	3.00	2.25	3.50	14" X 8"	11.00	9.75	13.00
2-1/2" X 1-1/4"	3.00	2.50	3.50	14" X 10"	11.00	10.12	13.00
2-1/2" X 1-1/2"	3.00	2.62	3.50	14" X 12"	11.00	10.62	13.00
2-1/2" X 2"	3.00	2.75	3.50	16" X 10"	12.00	11.12	14.00
3" X 1-1/2"	3.38	2.88	3.50	16" X 12"	12.00	11.62	14.00
3" X 2"	3.38	3.00	3.50	16" X 14"	12.00	12.00	14.00
3" X 2-1/2"	3.38	3.25	3.50	18" X 12"	13.50	12.62	15.00
4" X 1-1/2"	4.12	3.38	4.00	18" X 14"	13.50	13.00	15.00
4" X 2"	4.12	3.50	4.00	18" X 16"	13.50	13.00	15.00
4" X 2-1/2"	4.12	3.75	4.00	20" X 16"	15.00	14.00	20.00
4" X 3"	4.12	3.88	4.00	20" X 18"	15.00	14.50	20.00
5" X 2-1/2"	4.88	4.25	5.00	24" X 16"	17.00	16.00	20.00
5" X 3"	4.88	4.38	5.00	24" X 18"	17.00	16.50	20.00
5" X 3-1/2"	4.88	4.50	5.00	24" X 20"	17.00	17.00	20.00
5" X 4"	4.88	4.62	5.00				

All dimensions given in inches for common diameters and wall thickness.
Dimensions in accordance with ASME B16.9

Weld Fittings • Calculated Fittings Weights in Lbs.

Approximate Weights

Nominal Pipe Size	90° Elbow				45° Elbow		Straight Tees		Caps	
	Long Rad.		Short Rad.		Long Rad.		STD	XS	STD	XS
	STD	XS	STD	XS	STD	XS				
1/2"	0.18	0.25	-	-	0.09	0.19	0.35	0.45	-	-
3/4"	0.18	0.25	-	-	0.09	0.19	0.45	0.60	-	-
1"	0.40	0.50	0.25	-	0.25	0.31	0.75	0.88	0.20	0.30
1-1/4"	0.60	0.90	0.40	-	0.38	0.50	1.30	1.60	0.30	0.40
1-1/2"	0.90	1.15	0.56	0.75	0.40	0.69	2.00	2.25	0.40	0.50
2"	1.60	2.20	1.00	1.50	0.81	1.19	3.50	4.00	0.60	0.75
2-1/2"	3.25	4.00	2.13	2.80	1.75	2.13	6.00	7.00	0.90	1.00
3"	5.00	6.50	3.00	4.25	2.63	3.50	7.00	8.50	1.50	1.75
3-1/2"	6.75	8.35	4.50	6.00	3.50	4.50	9.00	12.00	2.00	2.50
4"	9.00	13.50	6.25	8.50	4.50	6.10	12.00	15.80	2.50	3.00
5"	15.00	22.00	9.60	14.00	7.50	10.70	21.00	26.00	4.50	5.50
6"	24.50	35.00	18.00	23.00	12.0	17.50	34.00	40.00	6.50	9.00
8"	50.00	71.00	34.00	47.50	23.00	35.00	55.00	75.00	12.00	16.00
10"	88.00	107	58.00	70.00	43.00	53.00	85.00	105	20.00	25.00
12"	125	160	80.00	104	62.00	84.00	120	160	30.00	36.00
14"	160	205	105	140	80.00	100	165	240	36.00	45.00
16"	206	276	132	174	100	135	195	280	40.00	54.00
18"	260	340	167	219	126	167	249	332	54.00	72.00
20"	320	420	210	275	160	206	342	480	75.00	86.00
24"	460	600	298	392	238	300	528	610	96.00	130

Weld Fittings • Calculated Fittings Weights in Lbs.

Approximate Weights

Nominal Pipe Size	Reducing Outlet Tees		Concentric & Eccentric Reducers		Nominal Pipe Size	Reducing Outlet Tees		Concentric & Eccentric Reducers	
	STD	XS	STD	XS		STD	XS	STD	XS
3/4" X 1/2"	0.50	0.50	0.17	0.22	6" X 2-1/2"	32.00	36.00	7.25	10.00
1" X 1/2"	0.88	1.00	0.40	0.45	6" X 3"	32.50	37.00	8.00	10.50
1" X 3/4"	0.93	1.00	0.40	0.45	6" X 4"	33.50	39.20	8.25	11.50
1-1/4" X 3/4"	1.50	1.75	0.40	0.50	6" X 5"	34.50	40.00	8.50	12.00
1-1/4" X 1"	1.50	1.75	0.50	0.50	8" X 4"	51.70	71.70	11.00	17.00
1-1/2" X X3/4"	2.13	2.50	0.54	0.70	8" X 5"	53.00	73.00	12.00	18.00
1-1/2" X 1"	2.18	2.50	0.62	0.75	8" X 6"	54.00	74.00	13.20	18.70
1-1/2" X 1-1/4"	2.25	2.50	0.70	0.75	10" X 6"	83.00	108	21.50	29.50
2" X 3/4"	3.25	4.00	0.70	1.00	10" X 8"	84.50	109	22.00	29.50
2" X 1"	3.50	4.10	0.76	1.10	12" X 6"	114	165	31.00	40.00
2" X 1-1/4"	3.60	4.13	0.84	1.15	12" X 8"	117	175	32.00	42.00
2" X 1-1/2"	3.75	4.25	0.90	1.20	12" X 10"	119	184	34.00	43.50
2-1/2" X 1"	5.00	7.00	1.25	1.75	14" X 8"	155	225	58.50	78.50
2-1/2" X 1-1/4"	5.25	7.06	1.25	1.85	14" X 10"	158	233	59.20	79.20
2-1/2" X 1-1/2"	5.50	7.13	1.38	1.90	14" X 12"	160	237	60.00	80.00
2-1/2" X 2"	6.00	7.19	1.50	2.00	16" X 10"	186	266	69.50	89.00
3" X 1-1/4"	6.15	7.60	1.60	2.40	16" X 12"	191	270	70.00	90.00
3" X 1-1/2"	6.25	7.50	1.70	2.50	16" X 14"	194	275	71.00	91.00
3" X 2"	6.50	8.00	1.80	2.60	18" X 12"	230	307	83.00	113
3" X 2-1/2"	6.75	8.25	2.00	2.75	18" X 14"	236	315	84.00	114
4" X 1-1/2"	11.25	15.20	2.88	4.00	18" X 16"	241	321	85.00	115
4" X 2"	11.15	15.50	3.00	4.25	20" X 16"	338	475	124	169
4" X 2-1/2"	11.30	15.00	3.25	4.38	20" X 18"	340	477	125	170
4" X 3"	11.60	15.20	3.38	4.50	24" X 16"	516	598	145	190
5" X 2-1/2"	19.50	24.00	5.25	7.00	24" X 18"	519	601	148	195
5" X 3"	20.00	24.50	5.50	7.50	24" X 20"	522	604	150	200
5" X 3-1/2"	20.50	25.00	5.75	7.75					
5" X 4"	21.00	25.50	6.00	8.25					

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Although care was taken for proper representation, verification of all specifications is the sole responsibility of the customer.