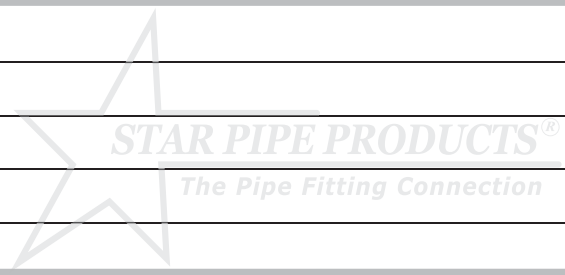
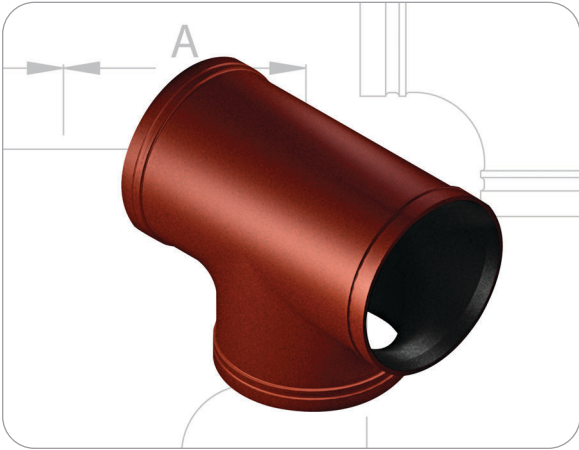


Star Pipe Products AWWA Grooved Submittal Form

Project Name _____
 Engineer _____
 Contractor _____
 Spec Section _____



AWWA Grooved Fittings



- Fittings supplied with rigid radius grooves in accordance with ANSI/AWWA C606.
- Fittings conform to ANSI/AWWA C110/A21.10 for center-to-end dimensions. Wall thickness per ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10.
- Fittings rated to 350 psi for sizes 3"-12", 250 psi for sizes 14"-24" and 150 psi for sizes 30"-36".
- Sizes 3"-12" Underwriters Laboratories listed and Factory Mutual approved.
- The Standard asphaltic seal coat applied on cement lining is UL/NSF 61 listed. Optional linings and coatings are available.



Material Specifications

- Material: Ductile Iron per ASTM A536 Grade 65-45-12.
 Interior lining: Cement lined per ANSI/AWWA C104/A21.4 and asphaltic seal coated.
 Exterior coating: Rust inhibitor prime coat.

*Optional Coatings:	Tnemec Series 37-77	Tnemec Series 90-97	Tnemec Series 160
	Tnemec Series 20	Tnemec Series 104	Tnemec Series 161
	Tnemec Series 66	Tnemec Series 135	Coal Tar Epoxy
	Tnemec Series 69	Tnemec Series 140	Other _____
			<i>please contact Star Pipe Products for availability</i>

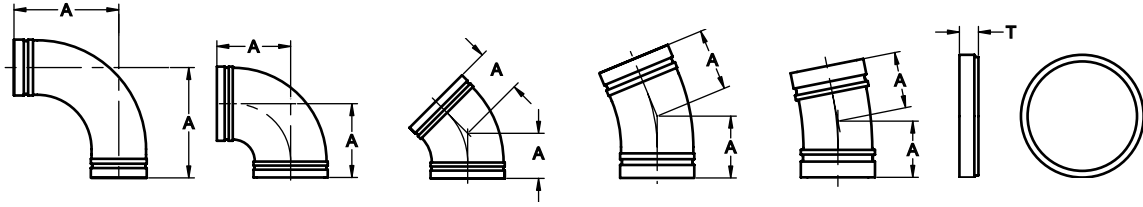
*(All special coating options are non-cancellable and non-returnable)

**Optional Linings	Unlined	
	Cement Lined	SP2000
	Glass Lined	Other _____
	Fusion Bonded Epoxy	<i>please contact Star Pipe Products for availability</i>

*(All special coating options are non-cancellable and non-returnable)

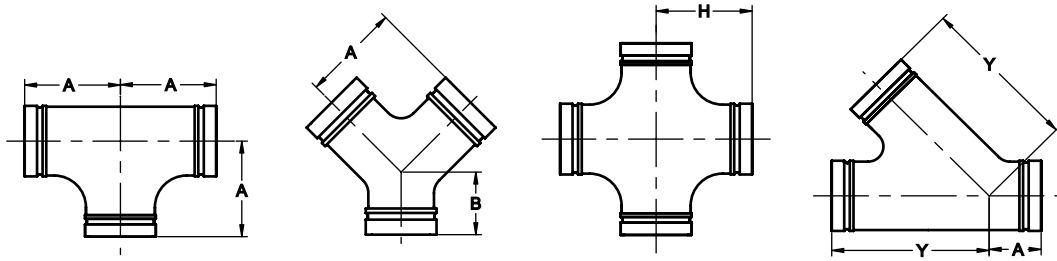
STAR PIPE PRODUCTS

Dimensions

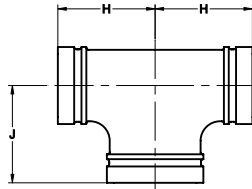


PIPE SIZE		AE-6C 90° L.R. ELBOW		AE-1C 90° ELBOW		AE-2C 45° ELBOW		AE-3C 22 1/2° ELBOW		AE-4C 11 1/4° ELBOW		AK-1C CAP	
NOMINAL SIZE IN. (mm)	ACTUAL PIPE SIZE IN. (mm)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	T IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)
3	3.96	7.75	19	5.50	10	3.00	7	3.00	12	3.00	9	1.07	3
80	100.6	197	8.6	140	4.5	76	3.2	76	5.4	76	4.1	27	1.4
4	4.80	9.00	28	6.50	15	4.00	10	4.00	11	4.00	11	1.07	4
100	121.9	229	12.7	165	6.8	102	4.5	102	5.0	102	5.0	27	1.8
6	6.90	11.50	55	8.00	28	5.00	22	5.00	25	5.00	21	1.07	7
150	175.3	292	25.0	203	12.7	127	10.0	127	11.3	127	9.5	27	3.2
8	9.05	14.00	83	9.00	44	5.50	35	5.50	39	5.50	39	1.31	15
200	229.9	356	37.7	229	20.0	140	15.9	140	17.7	140	17.7	33	6.8
10	11.10	16.50	160	11.00	72	6.50	53	6.50	67	6.50	77	1.39	22
250	281.9	419	72.6	279	32.7	165	24.0	165	30.4	165	34.9	35	10.0
12	13.20	19.00	210	12.00	99	7.50	76	7.50	108	7.50	120	1.39	34
300	335.3	483	95.3	305	44.9	191	34.5	191	49.0	191	54.4	35	15.4
14	15.30	21.50	261	14.00	165	7.50	92	7.50	92	7.50	101	1.39	43
350	388.6	546	118.4	356	74.8	191	41.7	191	41.7	191	45.8	35	19.5
16	17.40	24.00	337	15.00	207	8.00	124	8.00	112	8.00	121	1.75	85
400	442.0	610	152.9	381	93.9	203	56.2	203.0	50.8	203	54.9	45	38.5
18	19.50	26.50	451	16.50	330	8.50	191	8.50	145	8.50	146	1.75	103
450	495.3	673	204.6	419	149.7	216	86.6	216	65.8	216	66.2	45	46.7
20	21.60	29.00	588	18.00	424	9.50	258	9.50	200	9.50	202	1.75	120
500	548.6	737	266.7	457	192.3	241	117	241	90.7	241	91.6	45	54.4
24	25.80	34.00	909	22.00	646	11.00	409	11.00	282	11.00	284	1.75	180
600	655.3	864	412.3	559	293.0	279	185.5	279	127.9	279	128.8	45	81.6
30	32.00	41.50	2136	25.00	1002	15.00	1146	15.00	681	15.00	699	4.00	323
750	762.0	1054	968.9	635	454.0	381	519.8	381	308.9	381	317.1	102	146.5
36	38.30	49.00	3120	28.00	1697	18.00	1152	18.00	975	18.00	1124	4.00	554
900	914.4	1245	1415.2	711	769.7	457	523	457	442.3	457	509.8	102	251.3

STAR[®] PIPE PRODUCTS

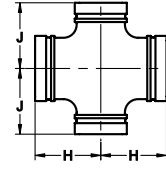
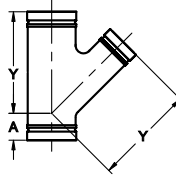
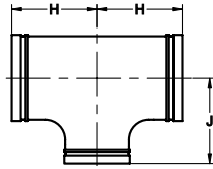


PIPE SIZE		AT-1C TEE		AY-1C TRUE WYE			AX-1C CROSS		AL-1C 45° LATERAL		
NOMINAL SIZE IN.	ACTUAL PIPE SIZE IN.	A IN.	APPROX. WEIGHT EACH Lbs. (Kg)	A IN.	B IN.	APPROX. WEIGHT EACH Lbs. (Kg)	H IN.	APPROX. WEIGHT EACH Lbs. (Kg)	Y IN.	A IN.	APPROX. WEIGHT EACH Lbs. (Kg)
(mm)	(mm)	(mm)		(mm)	(mm)		(mm)		(mm)	(mm)	
3	3.96	5.50	16	5.50	5.50	25	5.50	24	10.0	3.00	21
80	100.6	140	7.3	140	140	11.4	140	10.9	254	76	9.5
4	4.80	6.50	22	6.50	3.00	55	6.50	40	12.00	3.00	34
100	121.9	165	10	165	76	25.0	165	18.1	305	76	15.4
6	6.90	8.00	42	8.00	3.50	90	8.00	64	14.50	3.50	64
150	175.3	203	19.1	203	89	40.8	203	29.0	368	89	29.0
8	9.05	9.00	65	9.00	4.50	140	9.00	106	17.50	4.50	104
200	229.9	229	29.5	229	114	63.5	229	48.1	445	114	47.2
10	11.10	11.00	122	11.00	5.00	220	11.00	225	20.50	5.00	145
250	281.9	279	55.3	279	127	99.8	279	102.1	521	127	65.8
12	13.20	12.00	161	12.00	5.50	315	12.00	310	24.50	5.50	225
300	335.3	305	73	305	140	143.0	305	140.6	622	140	102.0
14	15.30	14.00	221	14.00	6.00	425	14.00	307	27.00	6.00	492
350	388.6	356	100.2	356	152	193.0	356	139.3	686	152	223
16	17.40	15.00	290	15.00	6.50	555	15.00	426	30.00	6.50	696
400	442.0	381	131.5	381	165	252.0	381	193	762	165	316
18	19.50	16.50	461	16.50	7.00	720	16.50	567	32.00	7.00	870
450	495.3	419	209.1	419	178	327.0	419	255	813	178	395
20	21.60	18.00	589	18.00	8.00	910	18.00	717	35.00	8.00	1103
500	548.6	457	267.2	457	203	413.0	457	325	889	203	500
24	25.80	22.00	980	22.00	9.00	1135	22.00	1177	40.50	9.00	1746
600	655.3	559	445	559	229	515.0	559	534	1029	229	792
30	32.00	25.00	1505	25.00	10.00	1700	25.00	1366	49.00	10.00	3280
750	762.0	635	682.6	635	254	771.0	635	620	1245	254	1488
36	38.30	28.00	2175	28.00	15.25	2300	28.00	1885	56.00	15.25	5020
900	914.4	711	986.6	711	387	1043.0	711	855	1422	387	2277



PIPE SIZE				AT-6C BULL HEAD TEE		
NOMINAL SIZE IN.				H IN.	J IN.	APPROX. WEIGHT EACH Lbs. (Kg)
(mm)				(mm)	(mm)	
4 X 4 X 6				8.00	8.00	47
100 X 100 X 150				203	203	213
6 X 6 X 8				8.00	8.00	79
150 X 150 X 200				203	203	358
8 X 8 X 10				11.00	11.00	164
200 X 200 X 250				279	279	744
10 X 10 X 12				12.00	12.00	226
250 X 250 X 300				305	305	1025

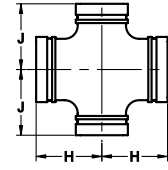
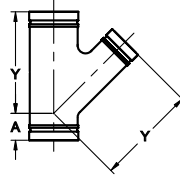
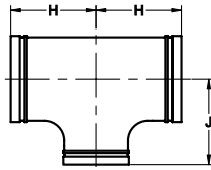
STAR[®] PIPE PRODUCTS



PIPE SIZE	AT-2C REDUCING TEE			AL-2C 45° RED. LATERAL			AX-2C RED. CROSS		
	NOMINAL SIZE IN. (mm)	H IN. (mm)	J IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	Y IN. (mm)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	H IN. (mm)	J IN. (mm)
4 X 3	6.50	6.50	26	12.00	3.00	45	6.50	6.50	22
100 X 80	165	165	11.8	305	76.0	20.4	165	165	10
6 X 3	8.00	8.00	53	14.50	3.50	74	8.00	8.00	46
150 X 80	203	203	24.0	368	89.0	33.6	203	203	20.9
X 4	8.00	8.00	42	14.50	3.50	80	8.00	8.00	38
X 100	203	203	19.0	368	89.0	36.3	203	203	17.2
8 X 3	9.00	9.00	85	+	+	+	+	+	+
200 X 80	229	229	38.6	+	+	+	+	+	+
X 4	9.00	9.00	78	17.50	4.50	125	9.00	9.00	76
X 100	229	229	35.4	445	114	56.7	229	229	34.5
X 6	9.00	9.00	67	17.50	4.50	140	9.00	9.00	59
X 150	229	229	30.4	445	114	63.5	229	229	26.8
10 X 4	11.00	11.00	120	20.50	5.00	204	11.00	11.00	120
250 X 100	279	279	54.4	521	127	92.5	279	279	54.5
X 6	11.00	11.00	128	20.50	5.00	212	11.00	11.00	114
X 150	279	279	58.1	521	127	96.2	279	279	51.7
X 8	11.00	11.00	119	20.50	5.00	236	11.00	11.00	123
X 200	279	279	54.0	521	127	107	279	279	56.8
12 X 4	12.00	12.00	112	24.50	5.50	290	12.00	12.00	174
300 X 100	305	305	50.8	622	140	132	305	305	78.9
X 6	12.00	12.00	140	24.50	5.50	302	12.00	12.00	130
X 150	305	305	63.5	622	140	137	305	305	59.0
X 8	12.00	12.00	147	24.50	5.50	324	12.00	12.00	139
X 200	305	305	66.7	622	140	147	305	305	63.1
X 10	12.00	12.00	153	24.50	5.50	356	12.00	12.00	154
X 250	305	305	69.4	622	140	162	305	305	69.9
14 X 6	14.00	14.00	238	27.00	6.00	330	14.00	14.00	215
350 X 150	356	356	108	686	152	150	356	356	97.5
X 8	14.00	14.00	241	27.00	6.00	346	14.00	14.00	221
X 200	356	356	109	686	152	157	356	356	100
X 10	14.00	14.00	258	27.00	6.00	540	14.00	14.00	235
X 250	356	356	114	686	152	245	356	356	107
X 12	14.00	14.00	267	27.00	6.00	625	14.00	14.00	244
X 300	356	356	121	686	152	284	356	356	111
16 X 6	15.00	15.00	288	30.00	6.50	570	15.00	15.00	266
400 X 150	381	381	131	762	165	259	381	381	121
X 8	15.00	15.00	315	30.00	6.50	585	15.00	15.00	276
X 200	381	381	143	762	165	265	381	381	125
X 10	15.00	15.00	319	30.00	6.50	630	15.00	15.00	291
X 250	381	381	145	762	165	286	381	381	132
X 12	15.00	15.00	330	30.00	6.50	650	15.00	15.00	305
X 300	381	381	150	762	165	295	381	381	138
X 14	15.00	15.00	341	30.00	6.50	692	15.00	15.00	280
X 350	381	381	155	762	165	314	381	381	127
18 X 8	13.00	15.50	326	+	+	+	15.50	15.50	272
450 X 200	330	394	148	+	+	+	394	394	123
X 10	13.00	15.50	332	32.00	7.00	765	15.50	15.50	277
X 250	330	394	151	813	178	347	394	394	126
X 12	13.00	15.50	339	32.00	7.00	800	15.50	15.50	291
X 300	330	394	154	813	178	363	394	394	132
X 14	16.50	16.50	441	32.00	7.00	865	16.50	16.50	361
X 350	419	419	200	813	178	392	419	419	164
X 16	16.50	16.50	453	32.00	7.00	895	16.50	16.50	367
X 400	419	419	206	813	178	406	419	419	166

+ Contact Star Pipe Products for details

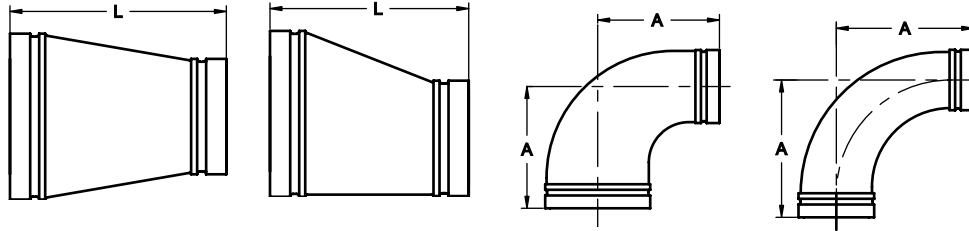
STAR[®] PIPE PRODUCTS



PIPE SIZE	AT-2C REDUCING TEE				AL-2C 45° RED. LATERAL			AX-2C RED. CROSS		
	NOMINAL SIZE IN. (mm)	H IN. (mm)	J IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	Y IN. (mm)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	H IN. (mm)	J IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)
20 X 500	X 6	14.00	17.00	407	+	+	+	+	+	+
	X 150	356	432	185	+	+	+	+	+	+
	X 8	14.00	17.00	412	+	+	+	17.00	17.00	343
	X 200	356	432	187	+	+	+	432	432	156
	X 10	14.00	17.00	419	+	+	+	17.00	17.00	343
	X 250	356	432	190	+	+	+	432	432	156
	X 12	14.00	17.00	426	35.00	8.00	1000	17.00	17.00	357
	X 300	356	432	193	889	203	454	432	432	162
	X 14	14.00	17.00	443	35.00	8.00	1062	17.00	17.00	327
	X 350	356	432	201	889	203	482	432	432	148
	X 16	18.00	18.00	571	35.00	8.00	1105	18.00	18.00	458
	X 400	457	457	259	889	203	501	457	457	208
X 18	18.00	18.00	584	35.00	8.00	1150	18.00	18.00	469	
X 450	457	457	265	889	203	522	457	457	213	
24 X 600	X 6	15.00	19.00	534	+	+	+	+	+	+
	X 150	381	483	242	+	+	+	+	+	+
	X 8	15.00	19.00	540	+	+	+	+	+	+
	X 200	381	483	245	+	+	+	+	+	+
	X 10	15.00	19.00	549	+	+	+	+	+	+
	X 250	381	483	249	+	+	+	+	+	+
	X 12	15.00	19.00	593	+	+	+	15.00	19.00	475
	X 300	381	483	269	+	+	+	381	483	216
	X 14	15.00	19.00	610	40.50	9.00	1510	15.00	19.00	450
	X 350	381	483	277	1029	229	685	381	483	204
	X 16	15.00	19.00	620	40.50	9.00	1580	15.00	19.00	446
	X 400	381	483	281	1029	229	717	381	483	202
X 18	22.00	22.00	918	40.50	9.00	871	22.00	22.00	782	
X 450	559	559	416	1029	229	395	559	559	355	
X 20	22.00	22.00	937	40.50	9.00	1705	22.00	22.00	788	
X 500	559	559	425	1029	229	773	559	559	357	
30 X 750	X 6	18.00	23.00	1000	+	+	+	+	+	+
	X 150	457	584	454	+	+	+	+	+	+
	X 8	18.00	23.00	1065	+	+	+	+	+	+
	X 200	457	584	483	+	+	+	+	+	+
	X 10	18.00	23.00	1110	+	+	+	+	+	+
	X 250	457	584	504	+	+	+	+	+	+
	X 12	18.00	23.00	1175	49.00	10.00	2178	18.00	23.00	888
	X 300	457	584	533	1245	254	988	457	584	403
	X 14	18.00	23.00	1250	49.00	10.00	2208	18.00	23.00	853
	X 350	457	584	567	1245	254	1002	457	584	387
	X 16	18.00	23.00	1437	49.00	10.00	2248	18.00	23.00	843
	X 400	457	584	651	1245	254	1020	457	584	382
X 18	18.00	23.00	1450	49.00	10.00	2294	18.00	23.00	839	
X 450	457	584	658	1245	254	1041	457	584	381	
X 20	18.00	23.00	1462	49.00	10.00	2339	18.00	23.00	835	
X 500	457	584	663	1245	254	1061	457	584	379	
X 24	25.00	25.00	1475	49.00	10.00	2451	18.00	23.00	1304	
X 600	635	635	669	1245	254	1112	457	584	592	
36 X 900	X 8	20.00	26.00	1410	+	+	+	+	+	+
	X 200	508	660	640	+	+	+	+	+	+
	X 10	20.00	26.00	1415	+	+	+	+	+	+
	X 250	508	660	642	+	+	+	+	+	+
	X 12	20.00	26.00	1420	+	+	+	20.00	26.00	1262
	X 300	508	660	644	+	+	+	508	66	572
	X 14	20.00	26.00	1425	54.00	15.25	3200	20.00	26.00	1222
	X 350	508	660	646	1372	387	1452	508	66	554
	X 16	20.00	26.00	1430	54.00	15.25	3493	20.00	26.00	1213
	X 400	508	660	649	1372	387	1584	508	66	550
	X 18	20.00	26.00	1435	54.00	15.25	3533	20.00	26.00	1204
	X 450	508	660	651	1372	387	1603	508	66	546
X 20	20.00	26.00	1440	54.00	15.25	3574	20.00	26.00	1190	
X 500	508	660	653	1372	387	1621	508	66	540	
X 24	20.00	26.00	1445	54.00	15.25	3675	20.00	26.00	1163	
X 600	508	660	655	1372	387	1667	508	66	528	
X 30	28.00	28.00	2100	56.00	15.25	3879	28.00	28.00	1865	
X 750	711	711	953	1422	387	1760	711	711	846	

+ Contact Star Pipe Products for details

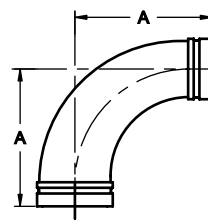
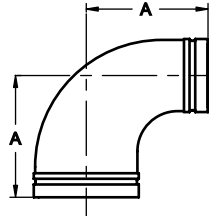
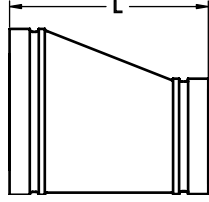
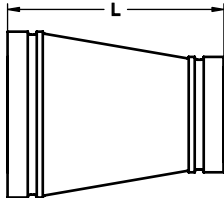
STAR[®] PIPE PRODUCTS



PIPE SIZE			AR-1C CONC. REDUCER		AR-2C ECC. REDUCER		AE-5C 90° RED. EL		AE-7C 90° L.R. RED. EL	
NOMINAL SIZE IN. (mm)			L IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	L IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs. (Kg)
4	X	3	7.00	8	7.00	9	6.50	17	9.00	20
100	X	80	178	3.6	178	4.1	165	7.7	229	8.1
6	X	3	9.00	15	9.00	20	8.00	29	11.50	36
150	X	80	229	6.8	229	9.1	203	13.1	292	16.3
	X	4	9.00	16	9.00	17	8.00	30	11.50	40
	X	100	229	7.3	229	7.7	203	13.6	292	18.1
8	X	3	11.00	33	11.00	30	+	+	+	+
200	X	80	279	15.0	279	13.6	+	+	+	+
	X	4	11.00	28	11.00	35	9.00	47	14.00	60
	X	100	279	12.7	279	15.9	229	21.3	356	27.2
	X	6	11.00	30	11.00	30	9.00	49	14.00	71
	X	150	279	13.6	279	13.6	229	22.2	356	32.2
10	X	4	12.00	42	12.00	54	11.00	68	16.50	90
250	X	100	305	19.1	305	24.5	279	30.8	419	40.8
	X	6	12.00	46	12.00	60	11.00	77	16.50	106
	X	150	305	20.9	305	27.2	279	34.9	419	48.1
	X	8	12.00	46	12.00	43	11.00	88	16.50	121
	X	200	305	20.9	305	19.5	279	39.9	419	54.9
12	X	4	14.00	60	14.00	82	12.00	83	+	+
300	X	100	356	27.2	356	37.2	305	37.6	+	+
	X	6	14.00	70	14.00	84	12.00	110	19.00	143
	X	150	356	31.8	356	38.1	305	49.9	483	64.9
	X	8	14.00	74	14.00	91	12.00	126	19.00	163
	X	200	356	33.6	356	41.3	305	57.2	483	73.9
	X	10	14.00	73	14.00	70	12.00	150	19.00	188
	X	250	356	33.1	356	31.8	305	68.0	483	85.3
14	X	6	16.00	89	16.00	104	14.00	123	+	+
350	X	150	406	40.4	406	47.2	356	55.8	+	+
	X	8	16.00	102	16.00	121	14.00	135	21.50	183
	X	200	406	46.3	406	54.9	356	61.2	546	83.0
	X	10	16.00	112	16.00	135	14.00	170	21.50	213
	X	250	406	50.8	406	61.2	356	77.1	546	96.6
	X	12	16.00	126	16.00	150	14.00	195	21.50	240
	X	300	406	57.4	406	68.0	356	88.5	546	109
16	X	6	18.00	110	18.00	140	15.00	123	+	+
400	X	150	457	49.9	457	63.5	381	55.8	+	+
	X	8	18.00	122	18.00	160	15.00	145	24.00	228
	X	200	457	55.3	457	72.6	381	65.8	610	103
	X	10	18.00	135	18.00	168	15.00	195	24.00	263
	X	250	457	61.2	457	76.2	381	88.5	610	119
	X	12	18.00	146	18.00	190	15.00	240	24.00	295
	X	300	457	66.2	457	86.2	381	109	610	134
	X	14	18.00	173	18.00	210	15.00	280	24.00	290
	X	350	457	78.5	457	95.3	381	127	610	132
18	X	8	19.00	148	19.00	180	16.50	170	+	+
450	X	200	483	67.1	483	81.6	419	77.1	+	+
	X	10	19.00	158	19.00	215	16.50	200	26.50	323
	X	250	483	71.1	483	97.5	419	90.7	673	146.5
	X	12	19.00	173	19.00	215	16.50	305	26.50	336
	X	300	483	78.5	483	97.5	419	138	673	152
	X	14	19.00	200	19.00	230	16.50	345	26.50	355
	X	350	483	90.7	483	104	419	157	673	161
	X	16	19.00	220	19.00	275	16.50	360	26.50	386
	X	400	483	100	483	125	419	163	673	175

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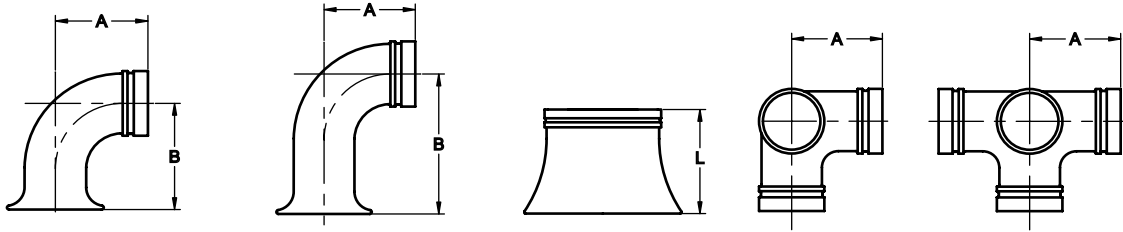
STAR[®] PIPE PRODUCTS



PIPE SIZE		AR-1C CONC. REDUCER			AR-2C ECC. REDUCER		AE-5C 90° RED. EL.		AE-7C 90° L.R. RED. EL.	
NOMINAL SIZE IN.		L IN.	APPROX. WEIGHT EACH Lbs. (Kg)	L IN.	APPROX. WEIGHT EACH Lbs. (Kg)	A IN.	APPROX. WEIGHT EACH Lbs. (Kg)	A IN.	APPROX. WEIGHT EACH Lbs. (Kg)	
(mm)		(mm)		(mm)		(mm)		(mm)		
20	X	8	20.00	173	20.00	203	+	+	+	
500	X	200	508	78.5	508	92.1	+	+	+	
	X	10	20.00	182	20.00	215	18.00	242	29.00	
	X	250	508	82.6	508	97.5	457	109.8	737	
	X	12	20.00	201	20.00	250	18.00	365	29.00	
	X	300	508	91.2	508	113	457	166	737	
	X	14	20.00	230	20.00	270	18.00	405	29.00	
	X	350	508	104	508	123	457	184	737	
	X	16	20.00	251	20.00	300	18.00	440	29.00	
	X	400	508	114	508	136	457	200	737	
	X	18	20.00	275	20.00	320	18.00	485	29.00	
	X	450	508	125	508	145	457	220	737	
24	X	8	+	+	+	+	+	+	+	
600	X	200	+	+	+	+	+	+	+	
	X	10	+	+	+	+	+	+	+	
	X	250	+	+	+	+	+	+	+	
	X	12	24.00	293	24.00	395	22.00	590	34.00	
	X	300	610	133	610	179	559	268	864	
	X	14	24.00	331	24.00	425	22.00	630	34.00	
	X	350	610	150	610	193	559	286	864	
	X	16	24.00	358	24.00	455	22.00	690	34.00	
	X	400	610	162	610	206	559	313	864	
	X	18	24.00	386	24.00	465	22.00	735	34.00	
	X	450	610	175	610	211	559	333	864	
	X	20	24.00	418	24.00	525	22.00	815	34.00	
	X	500	610	190	610	238	559	370	864	
30	X	6	+	+	+	+	+	+	+	
750	X	150	+	+	+	+	+	+	+	
	X	8	+	+	+	+	+	+	+	
	X	200	+	+	+	+	+	+	+	
	X	10	+	+	+	+	+	+	+	
	X	250	+	+	+	+	+	+	+	
	X	12	+	+	+	+	+	+	+	
	X	300	+	+	+	+	+	+	+	
	X	14	+	+	+	+	25.00	566	+	
	X	350	+	+	+	+	635	256.7	+	
	X	16	+	+	30.00	466	25.00	596	41.50	
	X	400	+	+	762	211.4	635	270.3	1054	
	X	18	30.00	500	30.00	500	25.00	631	41.50	
	X	450	762	226.8	762	226.8	635	286.2	1054	
	X	20	30.00	535	30.00	535	25.00	675	41.50	
	X	500	762	242.7	762	282.7	635	306.2	1054	
	X	24	30.00	595	30.00	595	25.00	1170	41.50	
	X	600	762	270	762	270	635	531	1054	
36	X	8	+	+	+	+	+	+	+	
900	X	200	+	+	+	+	+	+	+	
	X	10	+	+	+	+	+	+	+	
	X	250	+	+	+	+	+	+	+	
	X	12	+	+	+	+	+	+	+	
	X	300	+	+	+	+	+	+	+	
	X	14	+	+	+	+	+	+	+	
	X	350	+	+	+	+	+	+	+	
	X	16	+	+	+	+	+	+	+	
	X	400	+	+	+	+	+	+	+	
	X	18	+	+	+	+	+	+	+	
	X	450	+	+	+	+	+	+	+	
	X	20	36.00	1280	36.00	+	+	49.00	1710	
	X	500	914	581	914	+	+	1245	776	
	X	24	36.00	1370	36.00	+	+	49.00	1960	
	X	600	914	621	914	+	+	1245	889	
	X	30	36.00	1450	36.00	+	+	49.00	2280	
	X	750	914	658	914	+	+	1245	1034	

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STAR[®] PIPE PRODUCTS

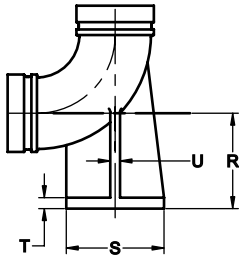


PIPE SIZE		AE-8C 90° Flare			AE-9C 90° Long Radius Flare			AS-1C Straight Flare		AE-10C * 90° Side Outlet		AT-3C * Tee Side Outlet	
NOMINAL SIZE IN. (mm)	ACTUAL PIPE SIZE IN. (mm)	A IN. (mm)	B IN. (mm)	APPROX. WEIGHT EACH Lbs.(Kg)	A IN. (mm)	B IN. (mm)	APPROX. WEIGHT EACH Lbs.(Kg)	L IN. (mm)	APPROX. WEIGHT EACH Lbs.(Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs.(Kg)	A IN. (mm)	APPROX. WEIGHT EACH Lbs.(Kg)
3 80	3.96 100.6	5.50 140	8.50 216	18 8.2	7.75 197	11.25 286	23 10.4	8.00 203	13 5.9	5.50 140	13 5.9	5.50 140	28 12.7
4 100	4.80 121.9	6.50 165	9.50 241	35 15.9	9.00 229	12.50 318	42 19.1	8.00 203	17 7.7	6.50 165	30 13.6	6.50 165	42 19.1
6 150	6.90 175.3	8.00 203	12.00 305	70 31.8	11.50 292	15.00 381	68 30.9	8.00 203	23 10.4	8.00 203	58 26.3	8.00 203	85 38.6
8 200	9.05 229.9	9.00 229	13.00 330	120 54.4	14.00 356	18.50 470	118 53.5	10.00 254	43 19.5	9.00 229	90 40.8	9.00 229	114 51.7
10 250	11.10 281.9	11.00 279	15.00 381	157 71.2	16.50 419	22.50 572	188 85.3	10.00 254	58 26.3	11.00 279	124 56.3	11.00 279	219 99.3
12 300	13.20 335.3	12.00 305	16.00 406	190 86.2	19.00 483	25.50 648	275 124.7	12.00 305	100 45.4	12.00 305	170 77.1	12.00 305	295 133.8
14 350	15.30 388.6	14.00 356	22.00 559	235 106.6	21.50 546	29.00 737	325 147.4	12.00 305	120 40.8	14.00 356	202 91.6	14.00 356	290 131.5
16 400	17.40 442.0	15.00 381	23.00 584	300 136.1	24.00 610	32.00 813	435 197.3	16.00 406	156 70.8	15.00 381	272 123.4	15.00 381	337 152.9
18 450	19.50 495.3	16.50 419	24.50 622	391 177.4	26.50 673	35.00 889	571 259	16.00 406	205 93.0	16.50 419	378 171.5	16.50 419	456 206.8
20 500	21.60 548.6	18.00 457	26.00 660	496 225.0	29.00 737	38.00 965	713 331.6	18.00 457	221 100.3	18.00 457	468 212.3	18.00 457	607 275.3
24 600	25.80 655.3	22.00 559	30.00 762	808 366.5	34.00 864	44.50 1130	1642 744.8	18.00 457	293 132.9	22.00 559	736 333.8	22.00 559	1048 475.4
30 750	32.00 762.0	+ +	+ +	+ +	+ +	+ +	+ +	24.00 610	567 257.2	25.00 635	1097 497.6	25.00 635	1647 747.1
36 900	38.30 914.4	+ +	+ +	+ +	+ +	+ +	+ +	24.00 610	736 333.9	28.00 711	1740 789.3	28.00 711	2182 989.7

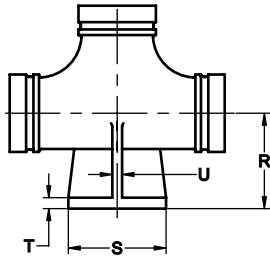
+ Contact Star Pipe Products for details

* Reducing side outlet 90° Elbows, Tees and Crosses are available. Contact Star Pipe Products for details.

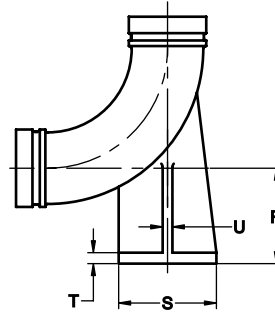
STAR[®] PIPE PRODUCTS



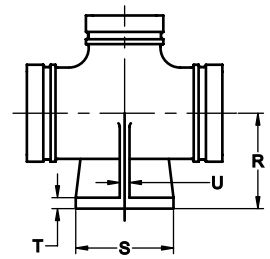
AE-11C
90° BASE ELBOW



AT-4C
BASE TEE



AE-12C
90° LONG RADIUS BASE ELBOW



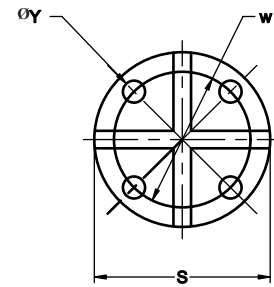
AT-5C
REDUCING BASE TEE

PIPE SIZE		Base Dimensions							APPROX. WEIGHT EACH Lbs.(kg)			
NOMINAL SIZE IN. (mm)	ACTUAL PIPE SIZE IN. (mm)	R IN. (mm)	S IN. (mm)	T IN. (mm)	U IN. (mm)	W IN. (mm)	øY IN. (mm)	No of Bolts	AE-11C Base Elbow	AT-4C Base Tee	AE-12C LR Base Elbow	AT-5C Reducing Base Tee
3	3.96	4.88	5.00	0.56	0.50	3.88	0.63	4	19	19	25	+
80	100.6	124	127	14	13	99	16		8.6	8.6	11.3	+
4	4.80	5.50	6.00	0.62	0.50	4.75	0.75	4	24	26	40	+
100	121.9	140	152	16	13	121	19		10.9	11.8	18.1	+
6	6.90	7.00	7.00	0.69	0.62	5.50	0.75	4	42	50	76	+
150	175.3	178	178	18	16	140	19		19.1	22.7	34.5	+
8	9.05	8.38	9.00	0.94	0.88	7.50	0.75	4	75	92	141	+
200	229.9	213	229	24	22	191	19		34	41.7	64.0	+
10	11.10	9.75	9.00	0.94	0.88	7.50	0.75	4	114	125	206	+
250	281.9	248	229	24	22	191	19		51.7	56.7	93.4	+
12	13.20	11.25	11.00	1.00	1.00	9.50	0.88	4	152	183	310	+
300	335.3	286	279	25	25	241	22		69	83.0	140.6	+
14	15.30	12.50	11.00	1.00	1.00	9.50	0.88	4	262	293	340	+
350	388.6	318	279	25	25	241	22		118.8	132.9	154.2	+
16	17.40	13.75	11.00	1.00	1.00	9.50	0.88	4	312	338	425	+
400	442.0	349	279	25	25	241	22		141.5	153.3	192.8	+
18	19.50	15.00	13.50	1.12	1.12	11.75	0.88	4	451	489	591	+
450	495.3	381	343	29	29	299	22		204.6	221.8	268.1	+
20	21.60	16.00	13.50	1.12	1.12	11.75	0.88	4	557	632	717	+
500	548.6	406	343	29	29	299	22		252.7	286.7	325.2	+
24	25.80	18.50	13.50	1.12	1.12	11.75	0.88	4	814	895	1056	+
600	655.3	470	343	29	29	299	22		369.2	406.0	479.0	+
30	32.00	23.00	16.00	1.19	1.15	14.25	1.00	4	1192	1742	2431	+
350	762.0	584	406	30	29	362	25		540.7	790.2	1102.7	+
36	38.30	26.00	19.00	1.25	1.15	17.00	1.00	4	1798	2240	3415	+
900	914.4	660	483	32	29	432	25		815.5	1016.0	1549.0	+

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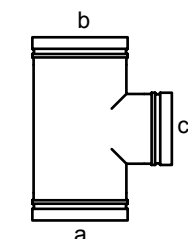
NOTES

1. Bases of these fittings are intended for support in compression and are not to be used for anchors or supports in tension or shear.
2. Bases are faced and drilled. Dimension "R" is finished dimension.
3. Bases 3" - 24" meet the dimensions of ASME B16.1 and B16.42.

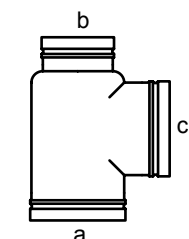


ROUND BASE

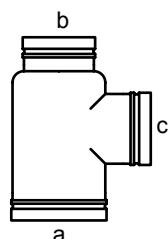
Reducing Tees



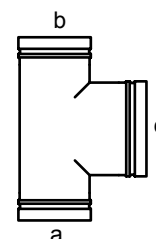
Reducing on Outlet



Reducing on One Run

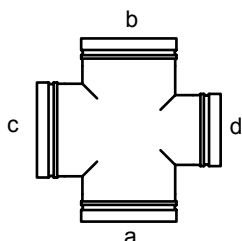


Reducing on One Run and Outlet

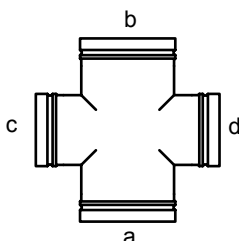


Reducing on Both Runs (Bull Head)

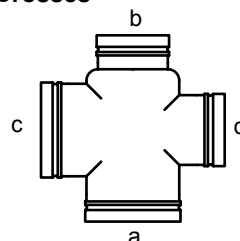
Reducing Crosses



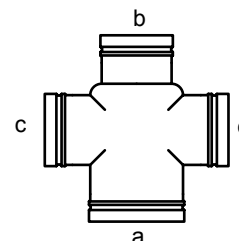
Reducing on One Outlet



Reducing on Both Outlets

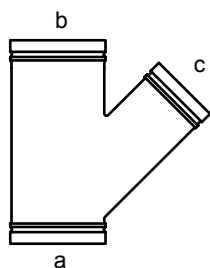


Reducing on One Run and Outlet

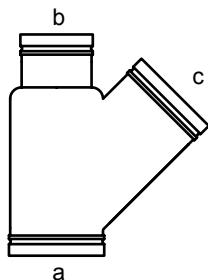


Reducing on One Run and Both Outlets

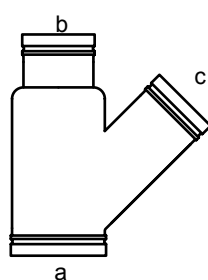
Reducing Laterals



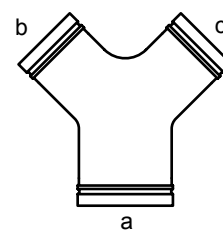
Reducing on Branch



Reducing on One Run

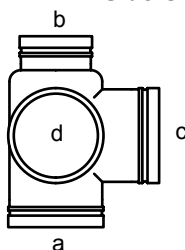


Reducing on One Run and Branch

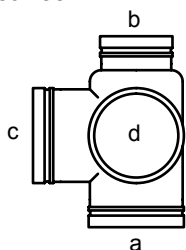


True Y

Side Outlet Tee

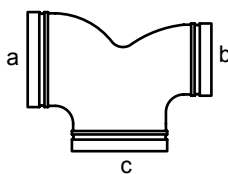


Right Hand

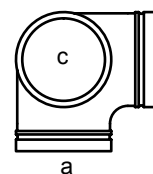


Left Hand

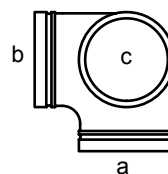
Double Branch Elbow



Side Outlet 90 deg. Elbow



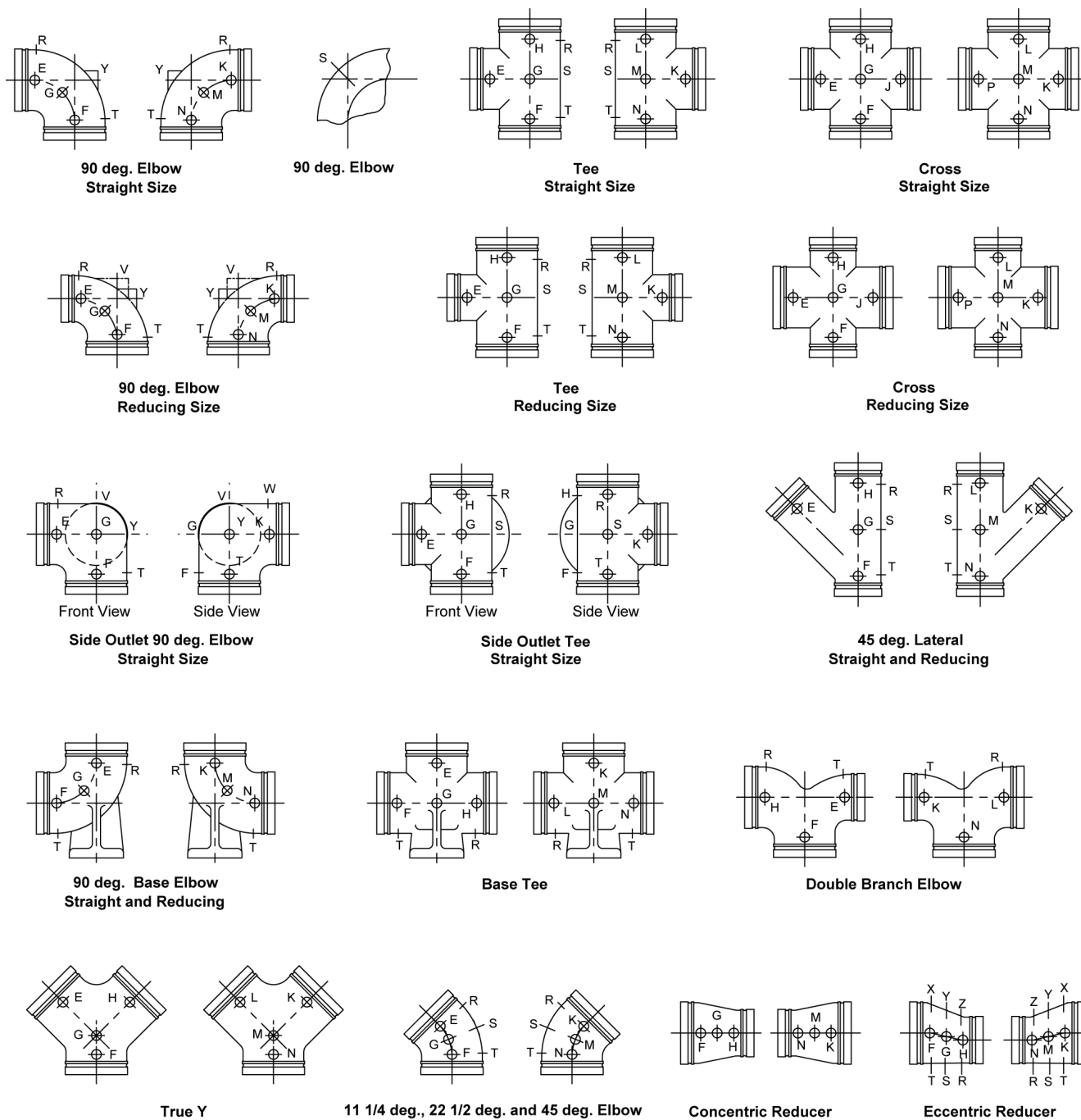
Right Hand



Left Hand

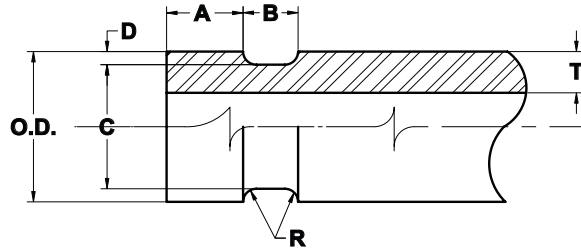
The Largest opening establishes the basic size of a reducing fitting. The largest opening is named first, except for bull head tees which are reducing on both runs and double branch elbows where both branches are reducing; the outlet is the largest opening and named last in both cases.

In designating the openings of reducing fittings, they should be read in the order indicated by the sequence of the letters, a, b, c and d. In designating the outlets of side outlet reducing fittings, the side outlet is named last; and in the case of the side outlet cross, which is not shown, the side outlet is designated by the letter.



The above illustrations show two views of the same fitting and represent fittings with symmetrical shapes, with the exception of the side outlet elbow and the side outlet tee (straight sizes).

STAR[®] PIPE PRODUCTS



DUCTILE IRON PRESSURE PIPE CUT GROOVING SPECIFICATIONS FOR FLEXIBLE AND RIGID JOINTS

Nominal Pipe Size	Pipe Outside Dia.		Gasket Seat A +0.000/-0.020		Groove Width B +0.031/-0.016	Groove Dia. C		Groove Depth D		Radius R	Min. Wall Thickness T
	Actual O.D.	Tol.	Flexible Joint	Rigid Joint		Actual	Tol.	Min.	Max.		
3	3.960	+0.045/-0.045	0.750	0.840	0.375	3.723	+0.000/-0.020	0.096	0.151	0.120	0.31
4	4.800	+0.060/-0.060	0.750	0.840	0.375	4.563	+0.000/-0.020	0.096	0.151	0.120	0.32
6	6.900	+0.060/-0.060	0.750	0.840	0.375	6.656	+0.000/-0.020	0.100	0.154	0.120	0.34
8	9.050	+0.060/-0.060	0.875	0.950	0.500	8.781	+0.000/-0.025	0.104	0.177	0.145	0.36
10	11.100	+0.060/-0.060	0.938	1.015	0.500	10.813	+0.000/-0.025	0.114	0.186	0.145	0.38
12	13.200	+0.060/-0.060	0.938	1.015	0.500	12.906	+0.000/-0.030	0.117	0.192	0.145	0.40
14	15.300	+0.050/-0.080	0.938	1.015	0.625	14.969	+0.000/-0.030	0.126	0.206	0.165	0.42
16	17.400	+0.050/-0.080	1.188	1.340	0.625	17.063	+0.000/-0.030	0.128	0.208	0.165	0.43
18	19.500	+0.050/-0.080	1.188	1.340	0.625	19.125	+0.000/-0.030	0.148	0.228	0.185	0.47
20	21.600	+0.050/-0.080	1.188	1.340	0.625	21.219	+0.000/-0.030	0.150	0.230	0.185	0.51
24	25.800	+0.050/-0.080	1.188	1.340	0.625	25.406	+0.000/-0.030	0.157	0.237	0.185	0.56
30	32.000	+0.080/-0.060	1.375	1.625	0.750	31.550	+0.000/-0.035	0.195	0.282	0.215	0.63
36	38.300	+0.080/-0.060	1.375	1.625	0.750	37.850	+0.000/-0.035	0.195	0.282	0.215	0.73

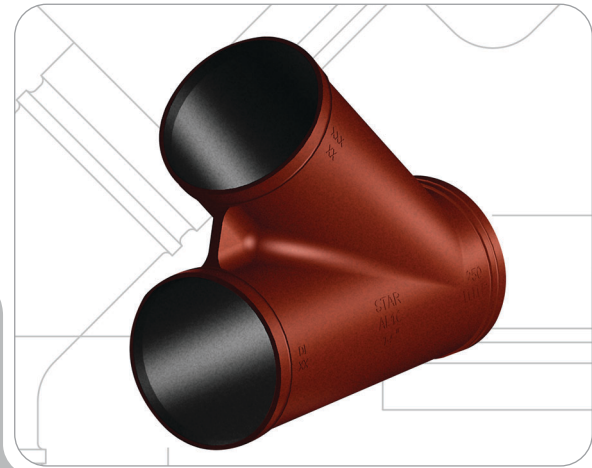
1.) All dimensions in inches.

NOTES

- When rigid radius groove is used, the pipe or fitting ends are drawn together in contact as the coupling is tightened whereas when flexible radius groove is used it allows for moderate conditions of pipe movement or deflection due to thermal, seismic or settling activities.
- Gasket seat "A" must be free from scores, seams, loose paint, scale, dirt, grease and rust to assure a leak tight seal.
- Pipe end squareness (ends must be square cut) maximum allowable tolerance from square cut ends is 0.030" for 3" size, 0.045" for sizes 4" and 6", 0.060" for sizes 8" through 36".
- Groove diameter must have uniform depth for entire circumference.
- Pipe out of roundness - difference between maximum O.D. and minimum O.D. measured at 90° must not exceed total O.D. tolerance listed.

Grooved Fittings

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 Houston, TX 77082
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STAR[®] PIPE PRODUCTS