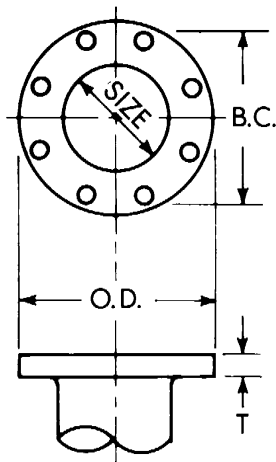


SAMPLE SPECIFICATION

Flanged Fittings, 2" through 48" shall be manufactured of Ductile Iron in accordance with all applicable terms and provisions of standards ANSI/AWWA C110/A21.10 (current revisions). Flange surface shall be faced and drilled in accordance with ANSI Class 125 B16.1. All Ductile Iron Flanged Fittings shall be rated for water pressure of 250 PSI. Flanged ductile-iron fittings in 24-in. (610 mm) and smaller sizes may be rated for 350 psi (2,413 kPa) with the use of special gaskets. NOTE: Fittings are CEMENT-LINED and seal coated in accordance with ANSI/AWWA C104/A21.4, also available prime coated, bare or epoxy coated. All coated fittings meet requirements of NSF-61. Interiors shall be lined and seal coated in accordance with ANSI/AWWA C104/A21.04, "Cement-mortar Lining for Ductile Iron Pipe and Fittings for Water" unless otherwise specified.

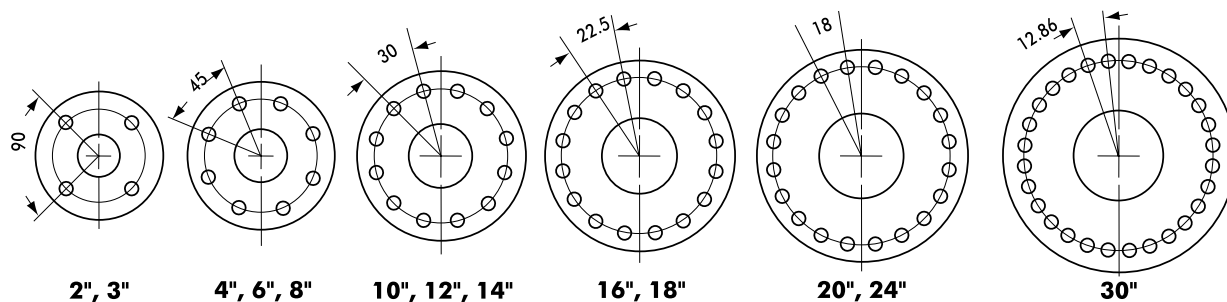


NOTE: No flange joint material furnished.

FLANGE DETAILS

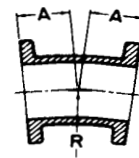
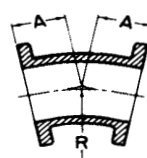
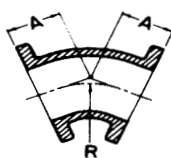
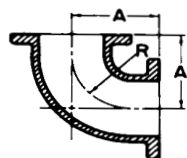
Nominal Pipe Size Inch	Flange O.D.	Dia. of Bolt Circle	Flange Thickness T	Bolt Hole Diameter	Number of Bolts	Bolt Dia. and Lengths
2	6	4.75	.62	.75	4	$\frac{5}{8}$ x 2 $\frac{1}{4}$
3	7.5	6	.75	.75	4	$\frac{5}{8}$ x 2 $\frac{1}{2}$
4	9	7.5	.94	.75	8	$\frac{5}{8}$ x 3
6	11	9.5	1.00	.875	8	$\frac{3}{4}$ x 3 $\frac{1}{2}$
8	13.5	11.75	1.12	.875	8	$\frac{3}{4}$ x 3 $\frac{1}{2}$
10	16	14.25	1.19	1.00	12	$\frac{7}{8}$ x 4
12	19	17	1.25	1.00	12	$\frac{7}{8}$ x 4
14	21	18.75	1.38	1.125	12	1 x 4 $\frac{1}{2}$
16	23.5	21.25	1.44	1.125	16	1 x 4 $\frac{1}{2}$
18	25	22.75	1.56	1.25	16	1 $\frac{1}{8}$ x 5
20	27.5	25	1.69	1.25	20	1 $\frac{1}{8}$ x 5
24	32	29.5	1.88	1.375	20	1 $\frac{1}{4}$ x 5 $\frac{1}{2}$
30	38.75	36	2.12	1.375	28	1 $\frac{1}{4}$ x 6 $\frac{1}{2}$
36	46	42.75	2.38	1.675	32	1 $\frac{1}{2}$ x 7
42	53	49.50	2.62	1.625	36	1 $\frac{1}{2}$ x 7 $\frac{1}{2}$
48	59.50	56.00	2.75	1.625	44	1 $\frac{1}{2}$ x 8

NOTE: Drilling templates are in multiples of four, so that fittings may be made to face in any quarter. Bolt holes shall straddle the center line.



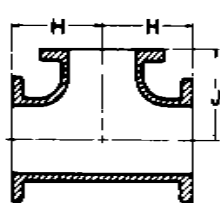
BENDS

Note: Base Bends are on page 33 and 34, reducing and long radius 90° bends are on page 33.

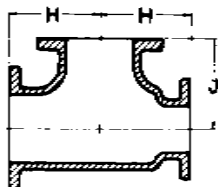


90° Bends (1/4)				45° Bends (1/8)				22 1/2° Bends (1/16)				11 1/4° Bends (1/32)			
Size	Dimensions		Weight	Dimensions		Weight		Dimensions		Weight		Dimensions		Weight	
	R	A		R	A			R	A			R	A		
2	3.0	4.5	14	...	...	...		...	...	...		...	...	...	
3	4	5.5	26	3.62	3	20		7.56	3	22		15.25	3	20	
4	4.5	6.5	44	4.81	4	36		10.06	4	35		20.31	4	40	
6	6	8	67	7.25	5	57		15.06	5	64		30.5	5	56	
8	7	9	115	8.44	5.5	105		17.62	5.5	90		35.5	5.5	90	
10	9	11	164	10.88	6.5	131		22.62	6.5	130		45.69	6.5	130	
12	10	12	236	13.25	7.5	196		27.67	7.5	194		55.81	7.5	193	
14	11.5	14	330	12.06	7.5	245		25.12	7.5	250		50.75	7.5	245	
16	12.5	15	478	13.25	8	315		27.62	8	315		55.81	8	315	
18	14	16.5	527	14.5	8.5	422		30.19	8.5	402		60.94	8.5	385	
20	15.5	18	878	16.88	9.5	485		35.19	9.5	505		71.06	9.5	505	
24	18.5	22	1085	18.12	11	730		37.69	11	528		76.12	11	760	
30	21.5	25	1755	27.75	15	1355		57.81	15	1385		116.75	15	1395	
36	24.5	28	2135	35.00	18	1755		72.88	18	1790		147.25	18	1805	
42	27.5	31	3055	42.25	21	2600		88.00	21	2665		177.69	21	2680	
48	30.5	34	4095	49.50	24	3580		103.06	24	3665		208.12	24	3695	

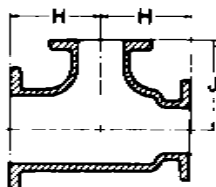
TEES, REDUCING TEES, CROSSES



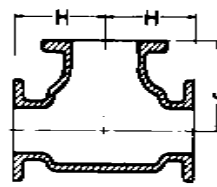
**Straight Tees, Reducing
on Branch Tees**



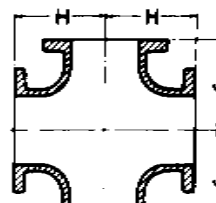
***Reducing
on Run**



***Reducing on
Run and Branch**



***Bullhead
Tees**



**Straight and
Reducing Crosses**

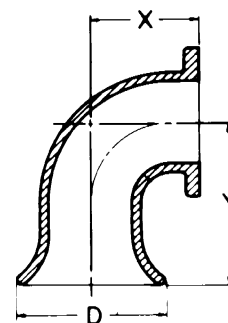
Straight Tees, Reducing on Branch Tees							*Reducing on Run and Branch						
Run	Size Run	Branch	Dimensions		Weights		Run	Size Run	Branch	Dimensions		Weights	
			H	J	Tee	Cross				H	J	Tee	Cross
2	2	2	4.5	4.5	20		*12	8	8	12.0	12.0	375	...
3	3	2	5.5	5.5	35	...	*12	8	12	12.0	12.0	420	...
3	3	3	5.5	5.5	42	51	*†12	10	6	14.0	14.0	390	...
4	3	3	6.5	5.5	53	...	12	10	8	12.0	12.0	400	...
*4	4	2	6.5	6.5	55	...	12	10	10	12.0	12.0	420	...
4	4	3	6.5	6.5	54	76	12	10	12	12.0	12.0	440	...
4	4	4	6.5	6.5	60	87	12	12	4	12.0	12.0	322	310
*4	4	6	8.0	8.0	88	...	12	12	6	12.0	12.0	297	326
*6	4	4	8.0	8.0	96	...	12	12	8	12.0	12.0	346	351
*6	4	6	8.0	8.0	100	...	12	12	10	12.0	12.0	394	415
*6	6	2	8.0	8.0	85	...	12	12	12	12.0	12.0	369	438
6	6	3	8.0	8.0	85	96	*14	14	4	14.0	14.0	410	...
6	6	4	8.0	8.0	90	112	14	14	6	14.0	14.0	420	450
6	6	6	8.0	8.0	98	141	14	14	8	14.0	14.0	435	475
6	6	8	9.0	9.0	138	...	14	14	10	14.0	14.0	450	...
*8	6	4	9.0	9.0	130	...	14	14	12	14.0	14.0	470	555
*8	6	6	9.0	9.0	148	...	14	14	14	14.0	14.0	500	595
*8	6	8	9.0	9.0	154	...	*16	16	4	15.0	15.0	525	...
8	8	3	9.0	9.0	128	140	16	16	6	15.0	15.0	573	565
8	8	4	9.0	9.0	155	155	16	16	8	15.0	15.0	555	590
8	8	6	9.0	9.0	148	172	16	16	10	15.0	15.0	565	620
8	8	8	9.0	9.0	179	195	16	16	12	15.0	15.0	590	665
*8	8	10	11.0	11.0	225	...	16	16	14	15.0	15.0	610	...
*8	8	12	12.0	12.0	277	...	16	16	16	15.0	15.0	635	755
*†10	6	6	13.0	13.0	278	...	18	18	6	13.0	15.5	780	...
*†10	6	10	13.0	13.0	308	...	18	18	8	13.0	15.5	609	...
*†10	8	6	13.0	13.0	298	...	18	18	10	13.0	15.5	585	...
*†10	8	8	13.0	13.0	278	...	18	18	12	13.0	15.5	638	706
*†10	8	10	13.0	13.0	325	...	18	18	14	16.5	16.5	808	...
10	10	4	11.0	11.0	239	220	18	18	16	16.5	16.5	760	...
10	10	6	11.0	11.0	215	242	18	18	18	16.5	16.5	865	915
10	10	8	11.0	11.0	254	294	* Not included in AWWA C110 † H and J dimensions are two-inches longer than straight tees.						
10	10	10	11.0	11.0	265	330							
10	10	12	12.0	12.0	337	...							
*†12	6	6	14.0	14.0	346	...							
*†12	6	8	14.0	14.0	362	...							
*†12	8	6	14.0	14.0	355	...							

TEES, REDUCING TEES, CROSSES (Con't)

Run	Size		Dimensions		Weights	
	Run	Branch	H	J	Tee	Cross
20	20	6	14.0	17.0	773	...
20	20	8	14.0	17.0	720	...
20	20	10	14.0	17.0	735	...
20	20	12	14.0	17.0	816	820
20	20	14	14.0	17.0	770	...
20	20	16	18.0	18.0	950	1065
20	20	18	18.0	18.0	965	...
20	20	20	18.0	18.0	1005	1175
24	24	6	15.0	19.0	1089	...
24	24	8	15.0	19.0	1060	...
24	24	10	15.0	19.0	1020	...
24	24	12	15.0	19.0	1125	1100
24	24	14	15.0	19.0	1050	1125
24	24	16	15.0	19.0	1070	1160
24	24	18	22.0	22.0	1534	...
24	24	20	22.0	22.0	1510	1695
24	24	24	22.0	22.0	1685	1850
*30	30	6	18.0	23.0	1725	...
30	30	12	18.0	23.0	1801	...
30	30	18	18.0	23.0	1852	...
30	30	24	25.0	25.0	2475	2695
30	30	30	25.0	25.0	2615	2985
36	36	24	20.0	26.0	2255	...
36	36	30	28.0	28.0	3000	...
36	36	36	28.0	28.0	3160	...
42	42	24	23.0	30.0	3245	...
42	42	30	31.0	31.0	4125	...
42	42	36	31.0	31.0	5360	...
42	42	42	31.0	31.0	5580	...
48	48	24	28.0	34.0	4385	...
48	48	30	26.0	34.0	4455	...
48	48	36	34.0	34.0	5555	...
48	48	42	34.0	34.0	7195	...
48	48	48	34.0	34.0	7385	...

* Not included in AWWA C110

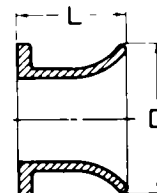
FLANGE AND FLARE



*Flange and Flare 90° Ell

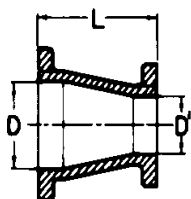
Size	Dimensions			Weight
	D	X	Y	
3	7.5	5.5	8.5	26
4	9.0	6.5	9.5	39
6	11.0	8.0	12.0	73
8	13.5	9.0	13.0	110
10	16.0	11.0	15.0	171
12	19.0	12.0	16.0	253
14	21.0	14.0	22.0	450
16	23.5	15.0	23.0	545
18	25.0	16.5	24.5	675
20	27.5	18.0	26.0	860
24	32.0	22.0	30.0	1195

* Not included in AWWA C110



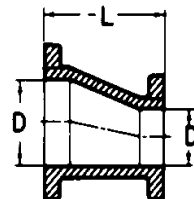
*Flange and Flare Piece

Size	Dimensions		Weight
	D	L	
3	7.25	8	21
4	9.00	8	30
6	11.00	8	44
8	13.50	10	75
10	16.00	10	113
12	19.00	12	155
14	21.00	16	225
16	23.50	16	330
18	25.00	16	355
20	27.50	18	465
24	32.00	18	598



Concentric Reducer

Size		Dimensions	Wts	Size		Dimensions	Wts
D	D'	L		D	D'	L	
3	2	6	17	18	8	19	265
4	2	7	23	18	10	19	290
4	3	7	29	18	12	19	320
6	2	9	30	18	14	19	350
6	3	9	44	18	16	19	405
6	4	9	46	20	10	20	418
6	5	9	56	20	12	20	465
8	3	11	61	20	14	20	430
8	4	11	63	20	16	20	445
8	5	11	70	20	18	20	470
8	6	11	75	24	12	24	608
10	4	12	98	24	14	24	565
10	6	12	107	24	16	24	610
10	8	12	116	24	18	24	645
12	4	14	119	24	20	24	695
12	6	14	130	30	16	30	945
12	8	14	152	30	18	30	970
12	10	14	178	30	20	30	1144
14	6	16	165	30	24	30	1155
14	8	16	185	42	24	42	1810
14	10	16	205	42	30	42	2060
14	12	16	235	42	36	42	2345
16	6	18	210	48	30	48	2615
16	8	18	230	48	36	48	2940
16	10	18	255	48	42	48	3320
16	12	18	285				
16	14	18	315				



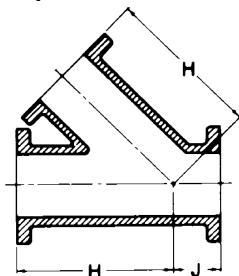
Eccentric Reducer

Size		Dimensions	Wts	Size		Dimensions	Wts
D	D'	L		D	D'	L	
4	3	7	30	18	14	19	350
6	3	9	45	18	16	19	385
6	4	9	52	20	10	20	350
8	4	11	70	20	12	20	370
8	6	11	80	20	14	20	402
10	6	12	98	20	16	20	449
10	8	12	123	20	18	20	455
12	6	14	135	24	12	24	535
12	8	14	149	24	14	24	570
12	10	14	177	24	16	24	614
16	6	18	210	24	18	24	645
16	8	18	230	24	20	24	695
16	10	18	255	42	24	42	1820
16	12	18	285	42	30	42	2060
16	14	18	315	42	36	42	2345
18	8	19	265	48	30	48	2625
18	10	19	290	48	36	48	2950
18	12	19	306	48	42	48	3320

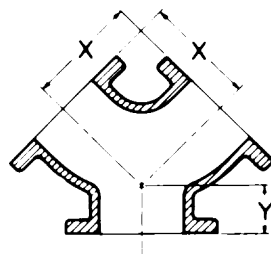
NOTE: Eccentric Reducers not included in AWWA C110

NOTE: Eccentric Reducers Offset
 $1/2 D \text{ minus } 1/2 D' = \text{Offset}$
Example:
 6x3 Ecc.Reducer
 $3 - 1\frac{1}{2} = 1\frac{1}{2}" \text{ Offset}$

* WYES/LATERALS



***45° Wye**



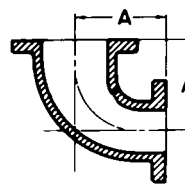
True Wye

Size	Dimensions			
Run	Branch	H	J	Weight
3	3	10	3	49
4	3	12	3	68
4	4	12	3	76
6	4	14.5	3.5	106
6	6	14.5	3.5	131
8	4	17.5	4.5	153
8	6	17.5	4.5	188
8	8	17.5	4.5	201
10	4	20.5	5	232
10	6	20.5	5	288
10	8	20.5	5	333
10	10	20.5	5	300
12	4	24.5	5.5	355
12	6	24.5	5.5	370
12	8	24.5	5.5	395
12	10	24.5	5.5	420
12	12	24.5	5.5	460
14	6	27	6	500
14	8	27	6	525
14	10	27	6	555
14	12	27	6	600
14	14	27	6	640
16	6	30	6.5	655
16	8	30	6.5	680
16	10	30	6.5	715
16	12	30	6.5	755
16	14	30	6.5	800
16	16	30	6.5	850
18	8	32	7	820
18	10	32	7	855
18	12	32	7	1003
18	14	32	7	940
18	16	32	7	990
18	18	32	7	1035
20	10	35	8	1095
20	12	35	8	1130
20	14	35	8	1170
20	16	35	8	1220
20	20	35	8	1345
24	24	40.5	9	2020

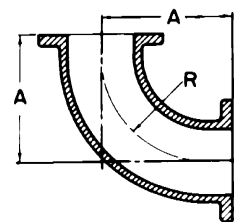
Size	Dimensions			
Stem	Branches	X	Y	Weight
4	4	6.5	3.0	49
6	4	8.0	3.5	75
6	6	8.0	3.5	84
8	6	9.0	4.5	134
8	8	9.0	4.5	125

* Not included in AWWA C110

BENDS



***90° Reducing Bend (1/4)**



***90° Long Radius Bend (1/4)**

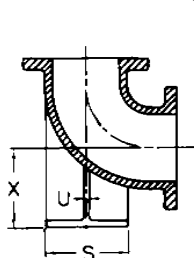
Size	Dimensions	
	A	Weight
4x3	6.5	35
6x4	8	65
8x4	9	88
8x6	9	96
10x6	11	126
10x8	11	151
12x6	12	172
12x8	12	191
12x10	12	218

* Not included in AWWA C110

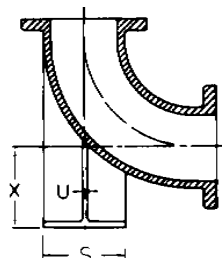
Size	Dimensions		
	R	A	Weight
3	6.25	7.75	32
4	7	9	46
6	9.5	11.5	83
8	14	14	140
10	16.5	16.5	252
12	17	19	310
14	19	21.5	475
16	21.5	24	630

* Not included in AWWA C110

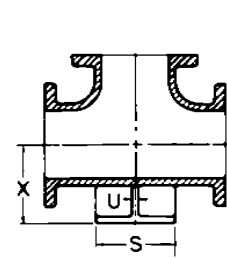
BASE BENDS, BASE TEES



90° Base Bend (1/4)



***90° Long Radius Base Bend (1/4)**



Base Tees

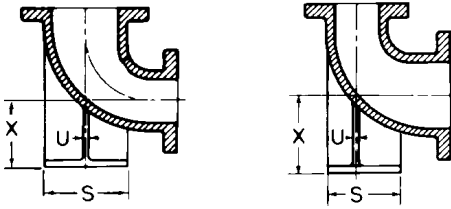
Size	Dimensions	Support					
	X	S	U	Pipe Size	90°	Weight 90°LR	Tee
3	4.88	5	.50	1.5	38	41	47
4	5.5	6	.50	2	50	60	76
6	7	7	.62	2.5	83	100	115
8	8.38	9	.88	4	142	180	195
10	9.75	9	.88	4	210	315	315
12	11.25	11	1.00	6	300	427	450
14	12.5	11	1.00	6	400	580	570
16	13.75	11	1.00	6	505	740	710
18	15	13.5	1.12	8	645	...	900
20	16	13.5	1.12	8	805	...	1125
24	18.5	13.5	1.12	8	1215	...	1927
30	23	16	1.15	10	1945	...	...

* Not included in AWWA C110

Base Bends are made to order only, not returnable. Bases are furnished faced and drilled.

* Not included in AWWA C110

* REDUCING BASE BENDS



**Base Under
Large End**

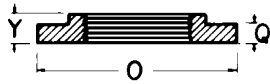
**Base Under
Small End**

Size	Dimensions		U	Weight
	X	S		
4x3	5.5	6	.50	45
6x4	7	7	.62	75
8x4	8.38	9	.88	118
8x6	8.38	9	.88	135
10x6	9.75	9	.88	175
10x8	9.75	9	.88	184
12x6	11.25	11	1.00	230
12x8	11.25	11	1.00	255
12x10	11.25	11	1.00	285

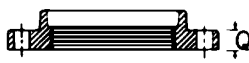
* Not included in AWWA C110

NOTE: "X" dimensions are identical on Base-under-large-end and Base-under-small-end. "S" dimensions are determined by the largest fitting opening.

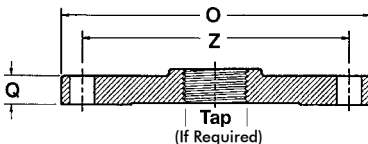
FLANGES (COMPANION FLG)



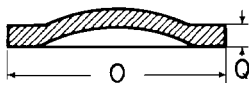
Flange for Steel Pipe
Reducing Flange for Steel Pipe



Flange for DI Pipe
Reducing Flange for DI Pipe

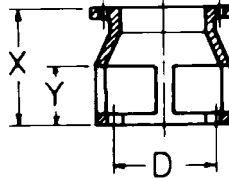


Under 12" Blind Flange
With Optional 2" Taps



12" and Larger Blind Flange
With Optional 2" Taps

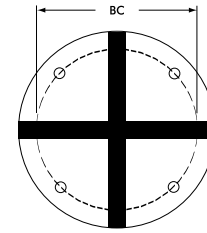
* FLANGE SLUDGE SHOE



Flange Sludge Shoe

Size	Dimensions			Weight
	D	X	Y	
3	5.75	12	6	28
4	7.00	12	6	35
6	7.87	12	6	45
8	10.12	12	6	69
10	12.25	12	6	88
12	15.25	12	6	120

* Not included in AWWA C110



Base Drilling Details

Nom. Diameter Inches	Dimensions - Inches		
	BC	Bolt Hole Diameter	Number of Bolts
3	3.88	5/8	4
4	4.75	3/4	4
6	5.50	3/4	4
8	7.50	3/4	4
10	7.50	3/4	4
12	9.50	7/8	4
14	9.50	7/8	4
16	9.50	7/8	4
18	11.75	7/8	4
20	11.75	7/8	4
24	11.75	7/8	4
30	14.25	1	4
36	17.00	1	4
42	21.25	1-1/8	4
48	22.75	1-1/4	4

Size	Dimensions				Weight			
	O	Q	Y	Z	Steel	DI	Blind	Blind Tap
2	6	.62	1	4.75	4	...	...	...
2½	7	.69	1.13	5.50	8	...	...	...
3	7.5	.75	1.19	6.00	7	6	8	8
4	9	.94	1.31	7.50	12	11	15	15
6	11	1.00	1.56	9.50	21	14	28	28
8	13.5	1.12	1.75	11.75	28	34	45	45
10	16	1.19	1.94	14.25	49	33	62	62
12	19	1.25	2.19	...	61	52	72	87
14	21	1.38	2.25	...	...	72	110	110
16	23.5	1.44	2.5	...	...	90	165	165
18	25	1.56	2.69	...	...	105	192	190
20	27.5	1.69	2.88	...	...	115	249	250
24	32	1.88	3.25	...	...	160	375	370
30	38.75	2.12	...	...	...	255	580	580
36	46.00	2.38	...	...	...	...	790	...
42	53.00	2.62	...	...	...	...	1175	...
48	59.50	2.75	...	...	...	...	1585	...

NOTE: All flanges conform to ANSI/AWWA C110/A21.10 Standards.

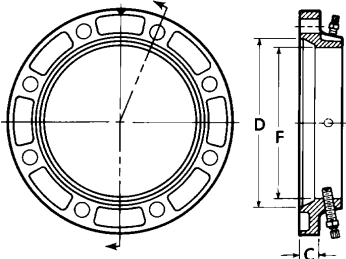
DI Reducing Flange Threaded For Steel Pipe

Size	Tap x O.D.	Weight
4x3	3x9	16
6x4	4x11	25
8x4	4x13½	44
8x6	6x13½	31
10x6	6x16	50
12x6	6x19	60
10x8	8x16	55
12x10	10x19	72

DI Reducing Flange Threaded For Cast Iron Pipe

Size	Tap x O.D.	Weight
4x3	3x9	16
6x4	4x11	25
8x4	4x13½	40
8x6	6x13½	35
10x8	8x16	50
12x8	8x19	85

ADAPTER FLANGES (EZ OR UNI)



See Index for Installation Instructions

Size	Rated Working Pressure	No. of Set Screws	Bolt Circle	No. of Bolt & Nuts	Size of Bolt	Bolt Hole Dia.
3	250	4	6.00	4	5/8x2 1/2	3/4
4	250	4	7.50	8	5/8x3	3/4
6	250	8	9.50	8	3/4x3 1/2	7/8
8	250	8	11.75	8	3/4x3 1/2	7/8
10	250	12	14.25	12	7/8x4	1
12	150	12	17.00	12	7/8x4	1

DUCTILE IRON ADAPTER FLANGE

Size	Ductile Iron Pipe OD + .06 or - .06	D + .06 - .04	F + .07 - .03	C	Weight
3	3.96	4.94	4.06	.94	7
4	4.80	6.02	4.90	1.00	10
6	6.90	8.12	7.00	1.06	14
8	9.05	10.27	9.15	1.12	22
10	11.10	12.34	11.20	1.19	30
12	13.20	14.44	13.30	1.25	40

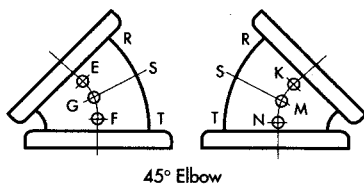
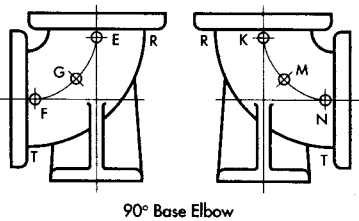
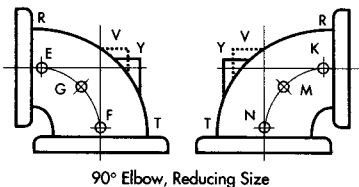
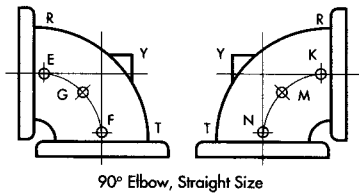
All set screws are 5/8" 80 lb. torque head.

Wall Thickness Note: Recommended for Ductile Iron Pipe Class 53 thru Class 56.

LOCATION OF TAPPED HOLES FOR DRAINS AWWA C110 Flanged Fittings

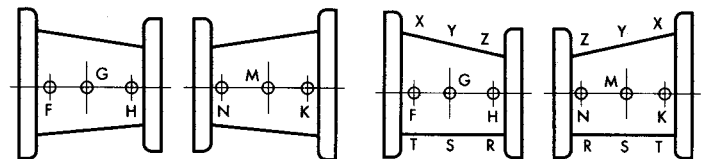
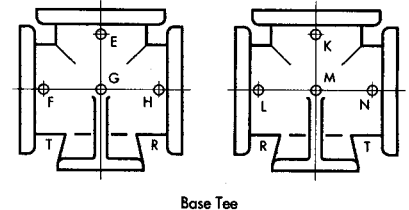
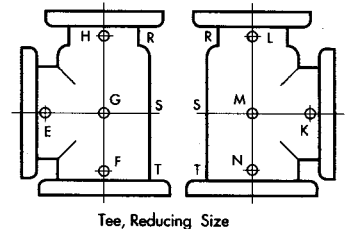
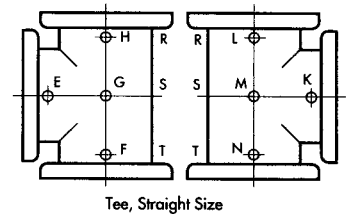
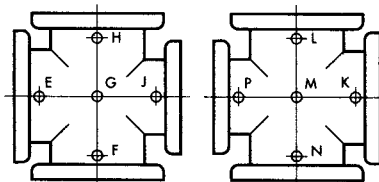
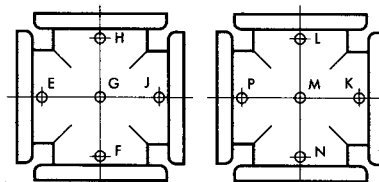
Fittings can be supplied with taps sized and located to ANSI B16.1 and MSS-SP-45. Specify fitting size, tap location by letter (refer to drawings) and tap size by NPT dimension, on order.

NOTE:
A BOSS IS ALWAYS REQUIRED AT "Y" OR "V" ON STRAIGHT AND REDUCING SIZES OF 90-DEGREE ELBOWS, AND ON TAPERED SIDES OF REDUCERS.



Fitting Size Maximum Tap Without Boss

3"	1/2"
4" - 6"	3/4"
8"	1-1/4"
10" - 16"	1-1/2"
18" - 30"	2"



SPECIAL TAP PRICING POLICY

Special taps in fittings apply to C-110 Flanged Fittings only. Flanged Fittings that require a tapping boss will have a one time \$200.00 (net) set up charge per boss per position. Consult your Customer Service Representative for current special tap pricing and more details.