



**SPECIAL FLANGED FITTINGS**

Fittings not covered by AWWA/ANSI C110/A21.10 are produced according to manufacturers' standard. However, where applicable, wall thickness shall be in accordance with the above standard and laying length in accordance with ANSI B16.1 Class 125 (see tables 1.2-1.4). Such fittings are:

Reducing 90° Bends  
Long Radius 90° Bends  
Tee Reducing on Run and/or on Run and Branch  
Bullhead Tees  
Eccentric Reducers  
Laterals (45°)  
True Wyes  
1"-2 1/2" Fittings, 3 1/2"-5" Fittings and/or any larger Fitting  
with a Reducing Branch 2 1/2" and smaller or a 3 1/2" or 5"  
Side Outlet Bend  
Side Outlet Tee or Cross  
Double Branch Elbow  
Wye Branches

Additional flanged fittings not covered above are listed here and shown on Table 1.6. These fittings are produced to manufacturers' standard. In practice they are produced to the standards listed above where applicable and/or practical. Such fittings are:

Flange x Flare Straight Fitting  
Flange x Flare 90° Bend  
Flange x Flare Long Radius 90° Bend  
Sludge Shoes

**AMERICAN NATIONAL STANDARD  
CAST IRON PIPE FLANGES AND FLANGED FITTINGS**

**TABLE 1.2 DIMENSIONS OF CLASS 125 CAST IRON FLANGED FITTINGS**

Nominal Pipe Size	Flanges		General		Straight Fittings					Reducing Fittings (Short Body Patterns)				
	Dia. of Flange	Thickness of Flange (Min)	Inside Dia. of Fittings	Wall Thickness	Center to Face 90 deg Elbow Tees, Crosses True "y" and Double Branch Elbow A	Center to Face 90 deg Long Radius Elbow B	Center to Face to 45 deg Elbow C	Center to Face Lateral D	Short Center to Face True "y" and Lateral E	Face to Face Reducer F	Tees and Crosses			
											NPS Size of Outlet and Smaller	Center to Face Run H	Center to Face to Outlet or Side Outlet J	
1	4.25	0.44	1.00	0.31	3.50	5.00	1.75	5.75	1.75	-	-	-	-	-
1 1/4	5.62	0.50	1.25	0.31	3.75	5.50	2.00	6.25	1.75	-	-	-	-	-
1 1/2	5.00	0.56	1.50	0.31	4.00	6.00	2.25	7.00	2.00	-	-	-	-	-
2	6.00	0.62	2.00	0.31	4.50	6.50	2.50	8.00	2.50	5.0	5.0	5.0	5.0	5.0
2 1/2	7.00	0.69	2.50	0.31	5.00	7.00	3.00	9.50	2.50	5.5	5.5	5.5	5.5	5.5
3	7.50	0.75	3.00	0.38	5.50	7.75	3.00	10.00	3.00	6.0	6.0	6.0	6.0	6.0
3 1/2	8.50	0.81	3.50	0.44	6.00	8.50	3.50	11.50	3.00	6.5	6.5	6.5	6.5	6.5
4	9.00	0.94	4.00	0.50	6.50	9.00	4.00	12.00	3.00	7.0	7.0	7.0	7.0	7.0
5	10.00	0.94	5.00	0.50	7.50	10.25	4.50	13.50	3.50	8.0	8.0	8.0	8.0	8.0
6	11.00	1.00	6.00	0.56	8.00	11.50	5.00	14.50	3.50	9.0	9.0	9.0	9.0	9.0
8	13.50	1.12	8.00	0.62	9.00	14.00	5.50	17.50	4.50	11.0	11.0	11.0	11.0	11.0
10	16.00	1.19	10.00	0.75	11.00	16.50	6.50	20.50	5.00	12.0	12.0	12.0	12.0	12.0
12	19.00	1.25	12.00	0.81	12.00	19.00	7.50	24.50	5.50	14.0	14.0	14.0	14.0	14.0
14	21.00	1.38	14.00	0.88	14.00	21.50	7.50	27.00	6.00	16.0	16.0	16.0	16.0	16.0
16	23.50	1.44	16.00	1.00	15.00	24.00	8.00	30.00	6.50	18.0	18.0	18.0	18.0	18.0
18	25.00	1.56	18.00	1.06	16.50	26.50	8.50	32.00	7.00	19.0	19.0	19.0	19.0	19.0
20	27.50	1.69	20.00	1.12	18.00	29.00	9.50	35.00	8.00	20.0	20.0	20.0	20.0	20.0
24	32.00	1.88	24.00	1.25	22.00	34.00	11.00	40.50	9.00	24.0	24.0	24.0	24.0	24.0
30	38.75	2.12	30.00	1.44	25.00	41.50	15.00	49.00	10.00	30.0	30.0	30.0	30.0	30.0
36	46.00	2.38	36.00	1.62	28.00	49.00	18.00	-	-	36.0	36.0	36.0	36.0	36.0
42	53.00	2.62	42.00	1.81	31.00	56.50	21.00	-	-	42.0	42.0	42.0	42.0	42.0
48	59.50	2.75	48.00	2.00	34.00	64.00	24.00	-	-	48.0	48.0	48.0	48.0	48.0

All reducing tees and crosses, sizes 16 in. and smaller, shall have same center to face dimensions as straight size fittings, corresponding to the size of the largest opening.

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TABLE 1.3 DIMENSIONS OF CLASS 125 CAST IRON FLANGED FITTINGS (CONTINUED)

Nominal Pipe Size	Reducing Fittings (Short Body Patterns)					Base Elbows and Tees						Base Drilling	
	Laterals					Center to Base R	Dia. of Round Base or Width of Square Base S	Thickness of Base T	Thickness of Ribs U	NPS Size of Supporting Pipe for Base	Bolt Circle or Bolt Spacing W	Dia of Holes	
	NPS Size of Branch and Smaller	Center to Face Run M	Center to Face Run N	Center to Face Branch P									
1					3.50	3.50	0.44	0.38	3/4	2.75	0.62		
1 1/4					3.62	3.50	0.44	0.38	3/4	2.75	0.62		
1 1/2					3.75	4.25	0.44	0.50	1	3.12	0.62		
2					4.12	4.62	0.50	0.50	1 1/4	3.50	0.62		
2 1/2					4.50	4.62	0.50	0.50	1 1/4	3.50	0.62		
3					4.88	5.00	0.56	0.50	1 1/2	3.88	0.62		
3 1/2					5.25	5.00	0.56	0.50	1 1/2	3.88	0.62		
4					5.50	6.00	0.62	0.50	2	4.25	0.75		
5					6.25	7.00	0.69	0.62	2 1/2	5.50	0.75		
6					7.00	7.00	0.69	0.62	2 1/2	5.50	0.75		
8					8.75	9.00	0.94	0.88	4	7.50	0.75		
10					9.75	9.00	0.94	0.88	4	7.50	0.75		
12					11.25	11.00	1.00	1.00	6	9.50	0.88		
14					12.50	11.00	1.00	1.00	6	9.50	0.88		
16					13.75	11.00	1.00	1.00	6	9.50	0.88		
18	8	25.0	1.0	27.5	15.00	13.50	1.12	1.12	8	11.75	0.88		
20	10	27.0	1.0	29.5	16.00	13.50	1.12	1.12	8	11.75	0.88		
24	12	31.5	0.5	34.5	18.50	13.50	1.12	1.12	8	11.75	0.88		
30	14	39.0	0	42.0									

All reducing lateral sizes 16 in. and smaller, shall have same center-to-face dimensions as straight size fittings corresponding to size of the largest opening.

# CUSTOM PIPE & COUPLING INC.

## AMERICAN NATIONAL STANDARD CAST IRON PIPE FLANGES AND FLANGED FITTINGS

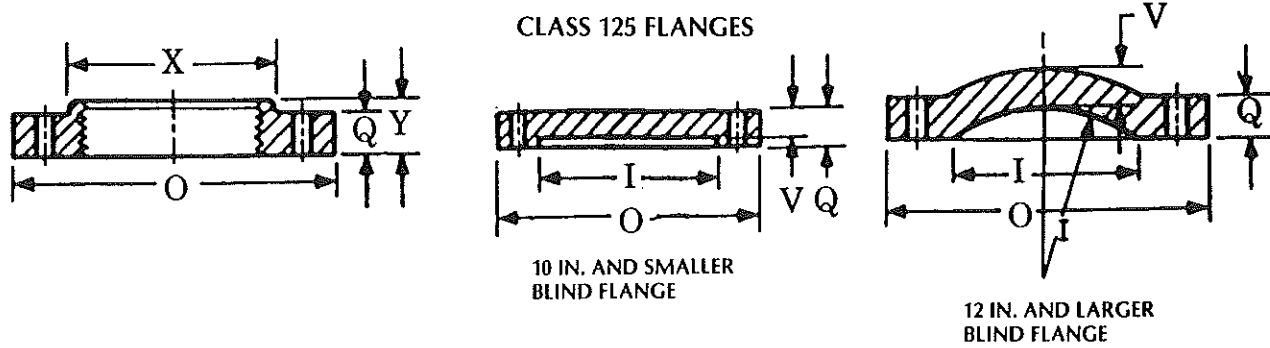
**TABLE 1.4 DIMENSIONS OF ANCHORAGE BASES FOR STRAIGHT AND REDUCING CLASS 125 TEES**

Nominal Pipe Size	Common to Both Straight Sizes and Reducing Sizes								Straight Sizes						Reducing Tees (Short Body Pattern)					
	Center to Base	Thick-ness of Base	Dia of Bolts	Thick-ness of Ribs	Width and Length of Square Base	Trans-verse Bolt Centers	Number of Bolt Holes on Each Side of Base	Number of Ribs	Centers of Ribs and Inside Bolt Holes	Longi-tudinal Centers from End Bolt to 2nd End	NPS Outlet Sizes and Smaller	Length of Base	Number of Ribs	Centers of Ribs	Dia of Bolts	Longi-tudinal Center from End Bolt to 2nd Bolt	Trans-verse Bolt Centers	Number of Bolt Holes on Each Side of Base	Width of Base	
																				A
2½	4.50	0.69	0.62	0.44	7.00	4.50	2	1	-	4.50	12	19.00	3	5.25	1.25	5.12	21.50	4	24.75	
3	4.88	0.75	0.62	0.44	7.50	5.00	2	1	-	5.00	14	21.00	3	6.00	1.25	5.38	23.75	4	26.75	
3½	5.25	0.81	0.62	0.44	8.50	6.00	2	1	-	6.00	16	23.50	3	7.00	1.38	6.25	28.00	4	31.62	
4	5.50	0.94	0.62	0.50	9.00	6.50	3	2	4.25	3.25	20	27.50	3	9.00	1.50	7.25	34.25	4	39.00	
5	6.25	0.94	0.88	0.50	10.00	7.50	3	2	5.00	3.25	24	32.00	3	10.75	1.50	8.38	41.50	4	46.25	
6	7.00	1.00	0.88	0.56	11.00	8.75	3	2	6.00	4.38	24	36.50	4	8.50	1.62	7.50	48.50	5	54.75	
8	8.38	1.12	1.00	0.62	13.50	11.00	3	2	8.00	5.50	30	41.75	4	9.75	1.62	8.25	53.75	5	60.00	
10	9.25	1.19	1.12	0.75	16.00	13.38	4	3	4.88	4.25	30	41.75	4	11.25	1.88	9.12	60.00	5	66.00	
12	11.25	1.25	1.12	0.81	19.00	15.50	4	3	5.75	4.88	30	41.75	4	13.00	2.00	10.38	66.00	5	72.00	
14	12.50	1.38	1.25	0.88	21.00	17.75	4	3	6.75	5.50	30	41.75	4	14.88	2.25	11.75	72.00	5	78.00	
16	13.75	1.44	1.38	1.00	23.50	19.75	4	3	7.75	6.00	30	41.75	4	16.88	2.38	12.88	78.00	5	84.00	
18	15.00	1.56	1.38	1.06	25.00	21.75	4	3	8.50	6.62	30	41.75	4	18.88	2.50	14.12	84.00	5	90.00	
20	16.00	1.69	1.50	1.12	27.50	24.00	4	3	9.50	7.25	30	41.75	4	21.00	2.62	15.38	90.00	5	96.00	
24	18.50	1.88	1.62	1.25	32.00	28.38	4	3	11.38	8.50	30	41.75	4	24.00	3.00	17.62	96.00	5	108.00	
30	22.00	2.12	1.75	1.44	38.75	34.50	5	4	9.38	7.88	30	41.75	4	28.00	3.50	20.88	108.00	5	132.00	
36	25.50	2.38	1.88	1.62	46.00	40.75	5	4	11.25	9.12	30	41.75	4	32.00	4.00	23.88	132.00	5	156.00	
42	29.25	2.62	2.00	1.81	53.00	46.75	5	4	13.00	10.38	30	41.75	4	36.50	4.50	27.12	156.00	5	180.00	
48	32.75	2.75	2.25	2.00	59.50	53.25	5	4	14.88	11.75	30	41.75	4	41.75	5.00	30.62	180.00	5	204.00	

Reducing tee 16 in. and smaller shall have the same base (B) dimensions as a straight size tee corresponding to size of the largest opening.

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ANSI B16.1-1975



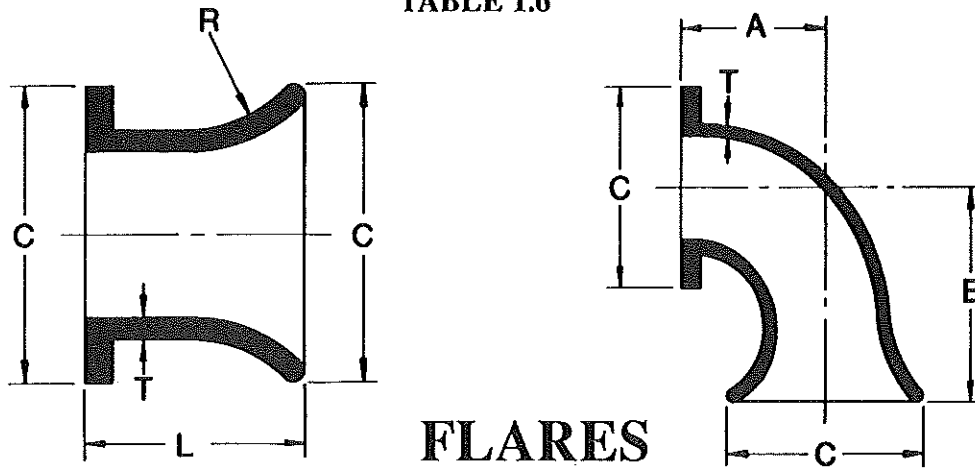
**TABLE 1.5 FLANGE, BOLT HOLES AND BOLTING DIMENSIONS  
FOR CLASS 125 CAST IRON FLANGES**

Dimensions in Inches

Nominal Pipe Size	Flanges		Hub		Blind Flanges		Bolt Holes		Bolting			
	Dia of Flange O	Thick-ness of Flange (Min) Q	Dia Hub (Min) X	Length of Hub Y	Dia of Port I	Wall <sup>5</sup> Thick-ness V	Dia of Bolt Circle	Dia of Bolt Holes	Number of Bolts	Dia of Bolts	Length of Bolts	Length of Bolt-Stud With Two Nuts
1	4.25	0.44	1.94	0.69	1.00	0.38	3.12	0.62	4	0.50	1.75	-
1¼	4.62	0.50	2.31	0.81	1.25	0.44	3.50	0.62	4	0.50	2.00	-
1½	5.00	0.56	2.56	0.88	1.50	0.50	3.88	0.62	4	0.50	2.00	-
2	6.00	0.62	3.06	1.00	2.00	0.56	4.75	0.75	4	0.62	2.25	-
2½	7.00	0.69	3.56	1.12	2.50	0.63	5.50	0.75	4	0.62	2.50	-
3	7.50	0.75	4.25	1.19	3.00	0.69	6.00	0.75	4	0.62	2.50	-
3½	8.50	0.81	4.81	1.25	3.50	0.75	7.00	0.75	8	0.62	2.75	-
4	9.00	0.94	5.31	1.31	4.00	0.88	7.50	0.75	8	0.62	3.00	-
5	10.00	0.94	6.44	1.44	5.00	0.88	8.50	0.88	8	0.75	3.00	-
6	11.00	1.00	7.56	1.56	6.00	0.94	9.50	0.88	8	0.75	3.25	-
8	13.50	1.12	9.69	1.75	8.00	1.06	11.75	0.88	8	0.75	3.50	-
10	16.00	1.19	11.94	1.94	10.00	1.12	14.25	1.00	12	0.88	3.75	-
12	19.00	1.25	14.06	2.19	12.00	0.81	17.00	1.00	12	0.88	3.75	-
14	21.00	1.38	15.38	2.25	14.00	0.88	18.75	1.12	12	1.00	4.25	-
16	23.50	1.44	17.50	2.50	16.00	1.00	21.25	1.12	16	1.00	4.50	-
18	25.00	1.56	19.62	2.69	18.00	1.06	22.75	1.25	16	1.12	4.75	-
20	27.50	1.69	21.75	2.88	20.00	1.12	25.00	1.25	20	1.12	5.00	-
24	32.00	1.88	26.00	3.25	24.00	1.25	29.50	1.38	20	1.25	5.50	-
30	38.75	2.12	-	-	30.00	1.44	36.00	1.38	28	1.25	6.25	-
36	46.00	2.38	-	-	36.00	1.62	42.75	1.62	32	1.50	7.00	8.75
42	53.00	2.62	-	-	42.00	1.81	49.50	1.62	36	1.50	7.50	9.25
48	59.50	2.75	-	-	48.00	2.00	56.00	1.62	44	1.50	7.75	9.50

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TABLE 1.6

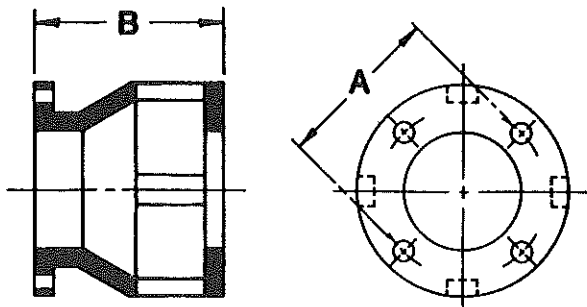


## FLARES

Dimensions in Inches

Size	Straight Flare				Weight	90° Standard Flare		Weight	Long Radius Flare		Weight
	T	C	L	R		A	B		A	B	
3	.40	7.50	8	6	20	5.5	11	25	7.75	13.25	30
4	.40	9.00	8	6	30	6.5	12	40	9.00	14.50	50
6	.45	11.00	8	6	40	8.0	12	70	11.50	15.50	85
8	.53	13.50	10	8	70	9.0	14	110	14.00	19.00	145
10	.55	16.00	10	10	95	11.0	17	175	16.50	22.50	225
12	.60	19.00	12	12	155	12.0	18	245	19.00	25.00	330
14	.65	21.00	12	14	165	14.0	20	340	21.50	27.50	440
16	.70	23.50	16	16	240	15.0	21	460	24.00	30.00	620
18	.75	25.00	16	18	275	16.5	22.5	560	26.50	32.50	800
20	.80	27.50	18	20	355	18.0	24	700	29.00	35.00	1000
24	.90	32.00	18	24	480	22.0	28	1100	34.00	40.00	1400
30	1.07	38.75	24	30	1100	25.0	32	1840	41.50	48.50	2190
36	1.19	46.00	24	36	1460	28.0	35	2700	49.00	56.00	3465
42	1.32	53.00	30	42	1900	31.0	38	3250	56.50	63.50	5150
48	1.44	59.50	30	48	2350	34.0	41	4215	64.00	71.00	6725

## FLANGED SLUDGE SHOES



Size	A Bolt Circle	Bolt Hole Dia.	B	Weight
3	5.75	7/8	12	25
4	7.0	7/8	12	35
6	8.0	7/8	12	45
8	10.0	7/8	12	65
10	12.25	1	12	85

# CUSTOM PIPE & COUPLING INC.

## MECHANICAL JOINT FITTINGS

### GENERAL

Unless otherwise specified mechanical joint fittings shall be provided in accordance with ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 where applicable.

TABLE 2.1

Size	Working Pressure	Material	Standard
3"-12"	250 psi	CI	AWWA C110
	350 psi	DI	AWWA C110
	350 psi	DI	AWWA C153
14"-16"	150 psi	CI	AWWA C110
	260 psi	CI	AWWA C110
	350 psi	DI	AWWA C110
	350 psi	DI	AWWA C153
18"-24"	150 psi	CI	AWWA C110
	250 psi	DI	AWWA C110
	350 psi	DI	AWWA C110
30"-48"	150 psi	CI	AWWA C110
	250 p8i	DI	AWWA C110
	250 p8i	DI	AWWA C110

### SPECIAL MECHANICAL JOINT FITTINGS

Cast fittings not covered by the AWWA C110 or AWWA C153 standard shall be produced in accordance with the manufacturers standard. However, where applicable and practical, wall thickness and bell end dimensions shall be in accordance with AWWA C110 or AWWA C153. Some common fittings in the category are:

MJ Laterals	MJ Eccentric Reducers
MJ x Flange Bends	MJ Tees With Flange Branch
MJ Swivel Hydrant Tees	MJ Swivel Hydrant 90° Bends
MJ Swivel Hydrant Coupling	

Dimensions are normally interpolated from AWWA C110 (ANSI A21.10), AWWA C153 (ANSI 21.53), and ANSI B16.1 where applicable and/or practical. Cast fittings not covered by an existing standard are normally produced in accordance with the intent of the above standards.

**CAUTION:** The manufacturer should be consulted for actual dimensional and utilization details, whenever in doubt. Dimensional differences may exist between different producers.



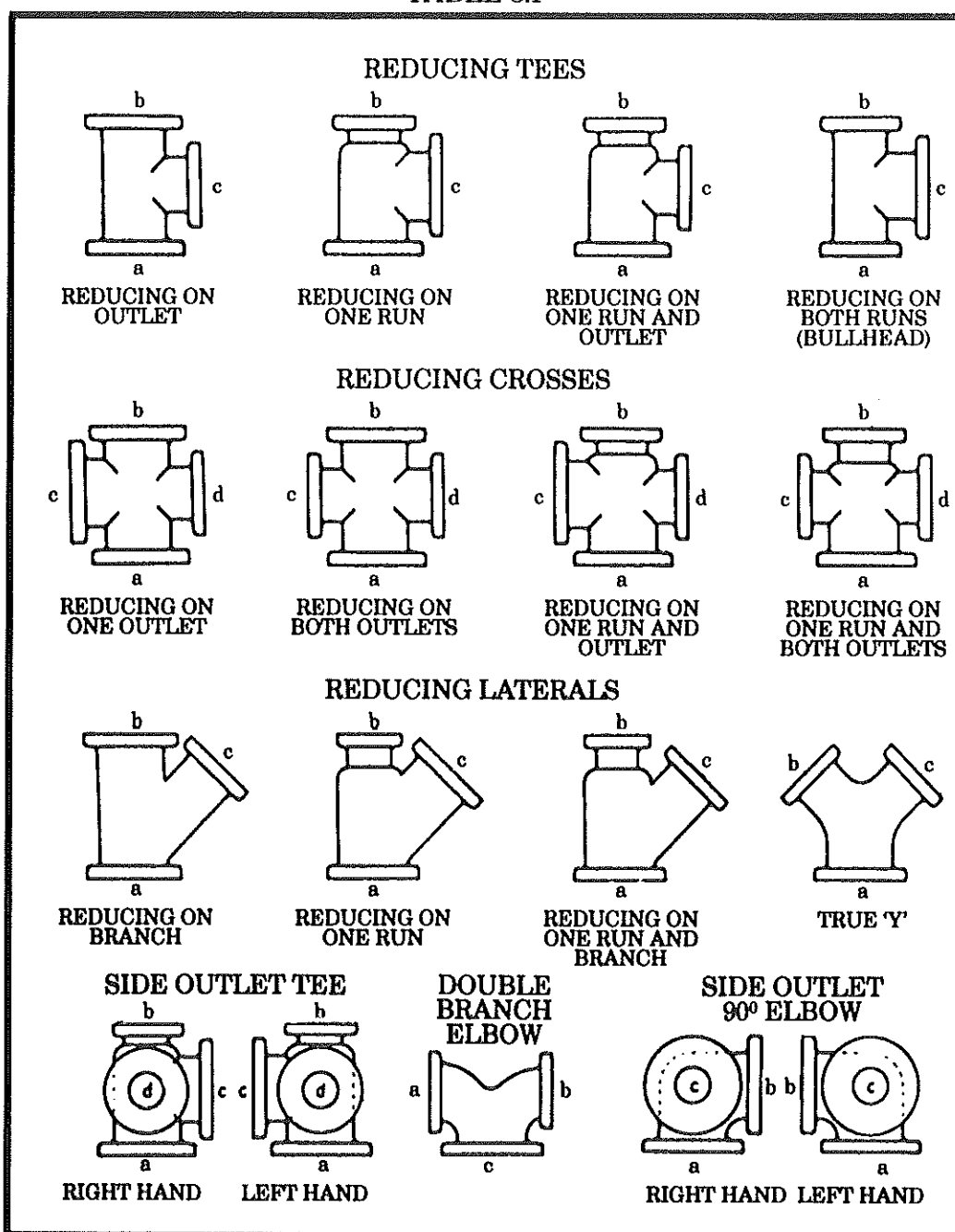
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## DESIGNATION OF OUTLETS (IN ACCORDANCE WITH ANSI B16.1)

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 for 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 reducing fittings, the side outlet is named last. In the case of the cross, which is not shown, the side outlet is designated by the letter e.

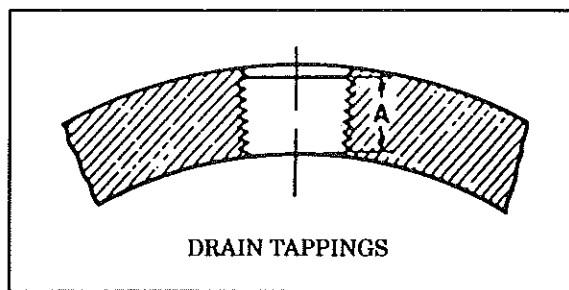
TABLE 3.1



**TAPPING AND BOSSES**

Holes may be drilled and tapped in the wall of fittings if the wall thickness will provide effective thread length as shown in table 4.1.

**TABLE 4.1**



**Table 1 and A1 Minimum Thread Length**

Size of Tapping	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Length of Thread "A"	0.41 in (10.3 mm)	0.53 in (13.5mm)	0.55 in (13.9mm)	0.68 in (17.5mm)
Size of Tapping	$1\frac{1}{4}$	$1\frac{1}{2}$	2	
Length of Thread "A"	0.71 in (17.9 mm)	0.72 in (18.3mm)	0.76 in (19.4mm)	

These lengths are in accordance with the effective thread length as required in ANSI B2.1. If the tapped hole required is too large to be accommodated by the standard fitting wall thickness, an integrally cast boss may be required to provide the necessary thickness for tapping.

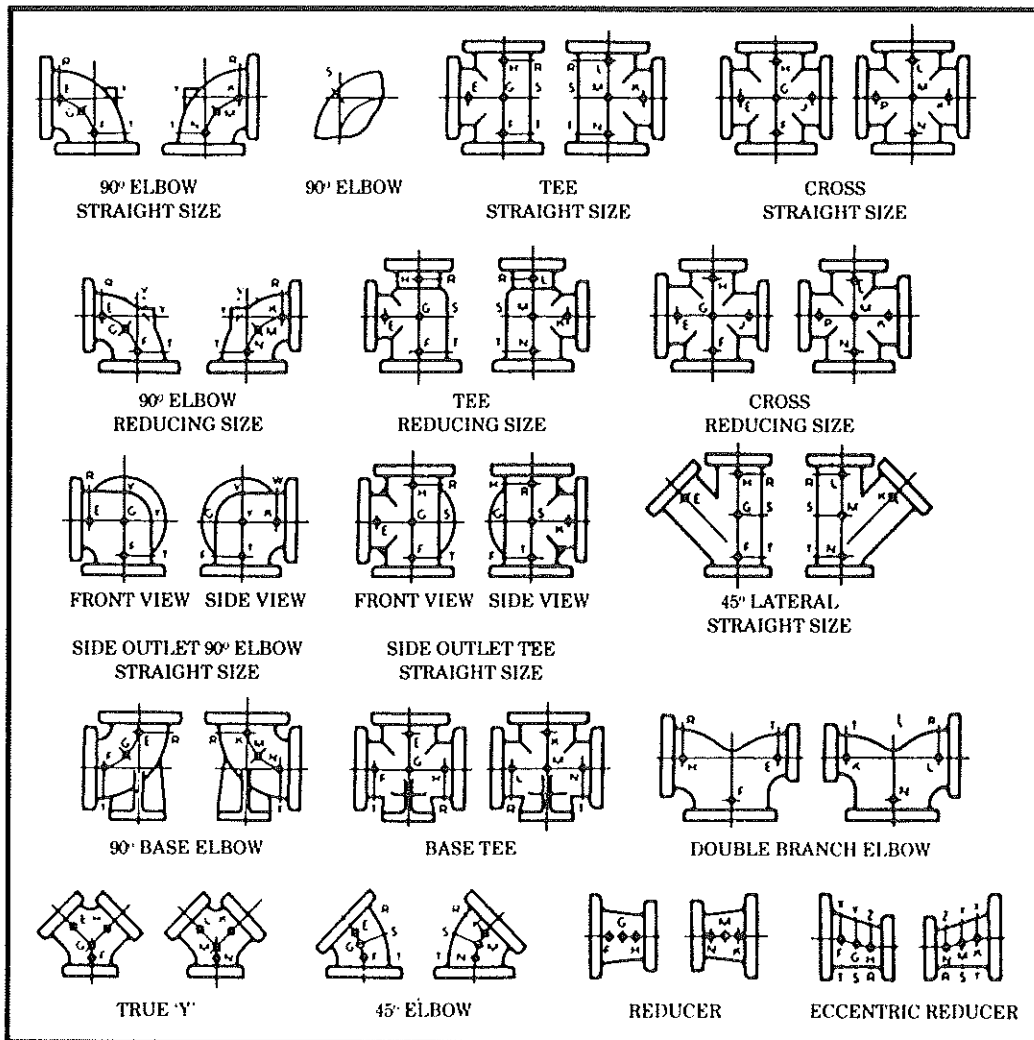
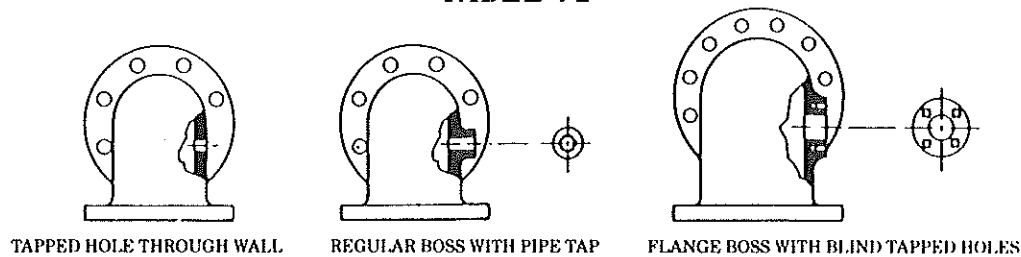
In addition, it may be necessary to integrally cast a flanged boss to accommodate larger sized holes that are impractical to thread. In this case a boss the size of a flange shall be integrally cast. The hole shall be cored or drilled at the manufacturers option. The flange boss shall be faced and bolt holes will be drilled and tapped. The bolt holes shall be blind tapped as to not interfere with the fitting wall thickness (see table 4.2).

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## BOSS AND TAP LOCATIONS

A general method has been developed to designate the location of tapped holes and/or bosses in pipe fittings. These designated locations can also be helpful in specifying the location of bases on certain unobvious conditions eg. reducing 90° bends. Refer to table 4.2.

TABLE 4 2



The 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.

When a cast iron flanged fitting is wanted with a tapped connection, give the size of the tapping required, and designate its location by means of a letter selected from the correct view of the fitting in question.

## **LININGS AND COATINGS**

Fittings are normally lined with bituminous or cement lined and sealed with bituminous in accordance with ANSI/AWWA C104/A 21.4. Flanged exteriors are normally coated with a rust inhibitive primer or with bituminous coating. Mechanical joint fittings are normally coated with bituminous. However, many additional types of coatings and linings are available.