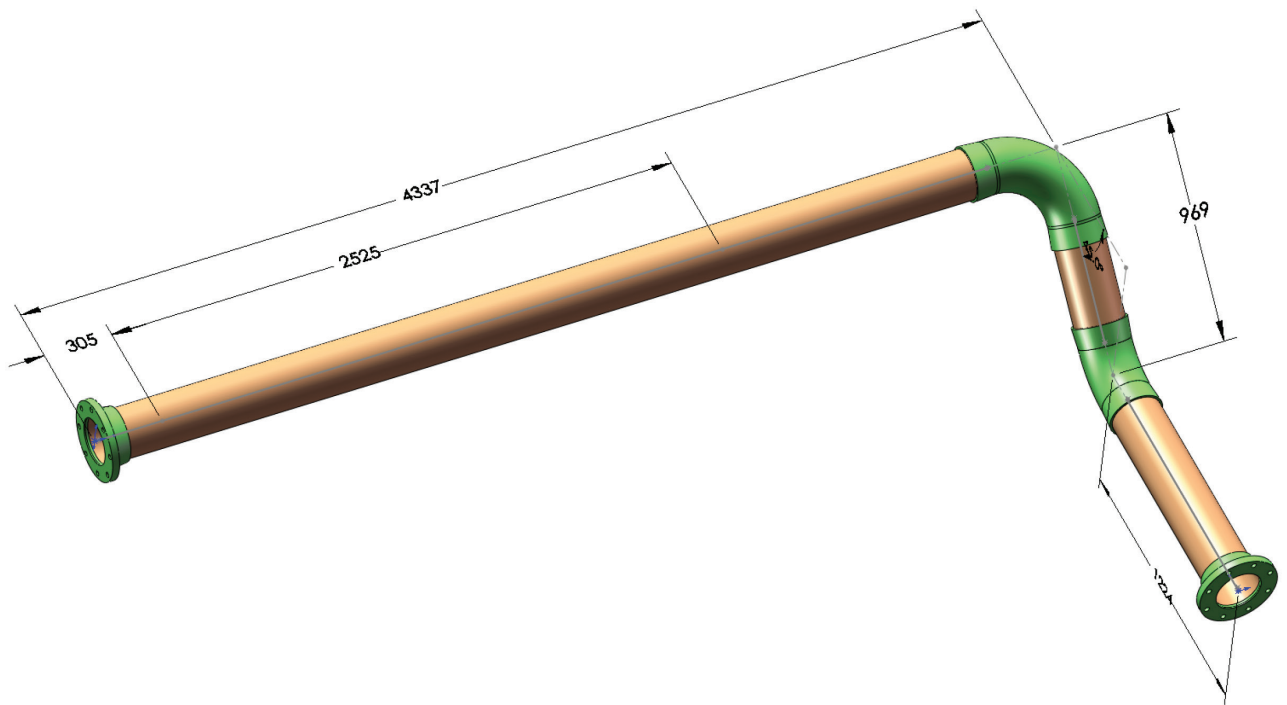


RPS Pipe Fitting & Dimensions



Engineered Composite Solutions

HPPE P-150 Corrosion Resistant FRP

HPPE A-150 Corrosion and Abrasion Resistant FRP

HPPE H-150 Corrosion Resistant and High Temperature Resistant FRP



Fitting and Dimensions

PURPOSE & INTENDED USE

This Dimensional Catalogue has been prepared by RPS and is supplied for the purchaser's assistance. It should be used by all those designing or installing RPS HPPE FRP products.* Please note that dimensions can be changed without notice. Contact RPS for current information.

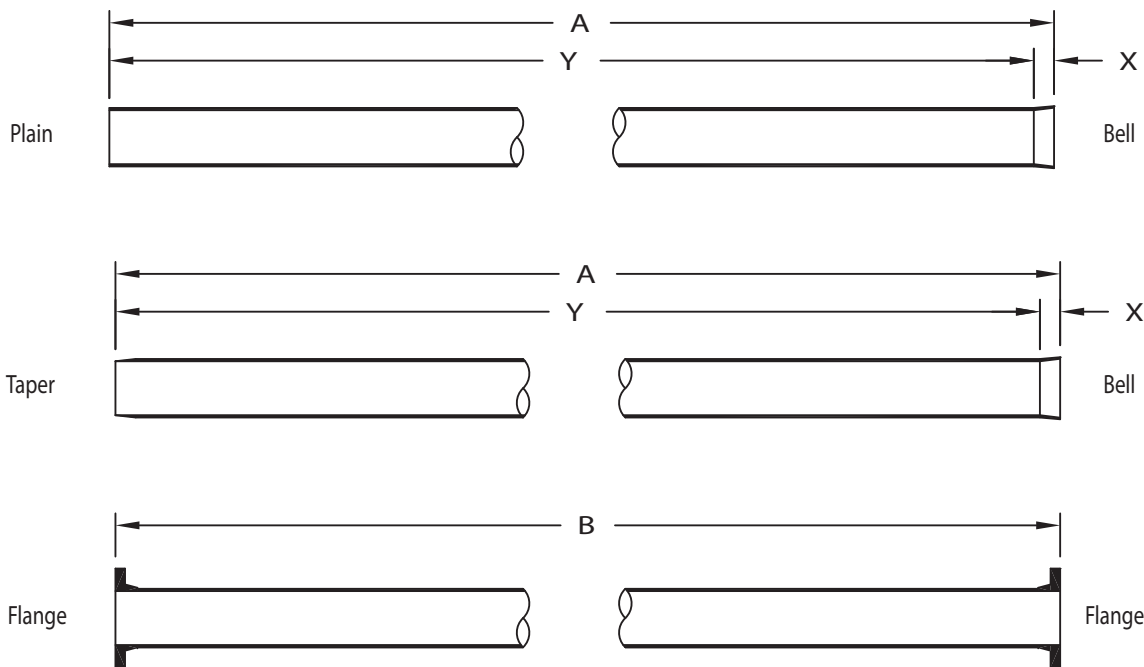
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* HPPE P-150, HPPE A-150, and HPPE H-150 only. For dimensions of Dual Laminate (DL) piping, refer to DL Product Bulletins; for dimensions of custom piping, please contact your RPS advisor.

Fitting and Dimensions

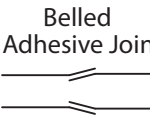
BELLED PIPE



Pipe Dia.	I.D.	A	B	Y	X	WEIGHT (lb./ft.)
1"	1.00"	8'-6"	8'-6"	8'-4 5/8"	1 3/8"	0.5
1 1/2"	1.50"	11'-6"	10'-0"	11'-4 5/8"	1 3/8"	0.7
2"	2.00"	21'-6"	20'-0"	21'-4 5/8"	1 3/8"	1.0
3"	3.00"	21'-6"	20'-0"	21'-4 5/8"	1 3/8"	1.4
4"	4.00"	21'-6"	20'-0"	21'-4 5/8"	1 3/8"	1.9
5"	5.00"	20'-6"	20'-0"	20'-4 1/4"	1 3/4"	2.7
6"	6.00"	21'-6"	20'-0"	21'-4 1/4"	1 3/4"	3.5
8"	8.00"	24'-6"	20'-0"	24'-2 7/16"	3 9/16"	5.6
10"	10.00"	20'-6"	20'-0"	20'-1 7/8"	4 1/8"	8.2
12"	12.00"	21'-6"	20'-0"	21'-1 1/8"	4 7/8"	11.2

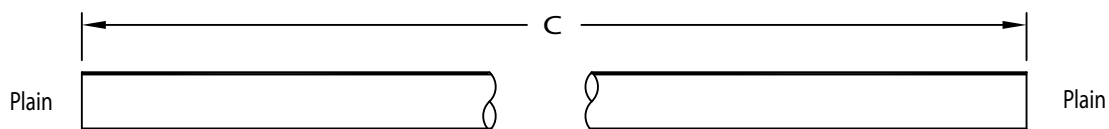
Pipe orders will be shipped as a combination of standard and random lengths. Shipments will consist of at least 80% standard lengths and up to 20% random lengths. Random lengths will not deviate from standard by more than 20%.

Standard and random length will be shipped with Bell x Plain ends, except the last "make-up" length which will be shipped with plain ends.



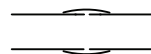
Fitting and Dimensions

PLAIN END PIPE



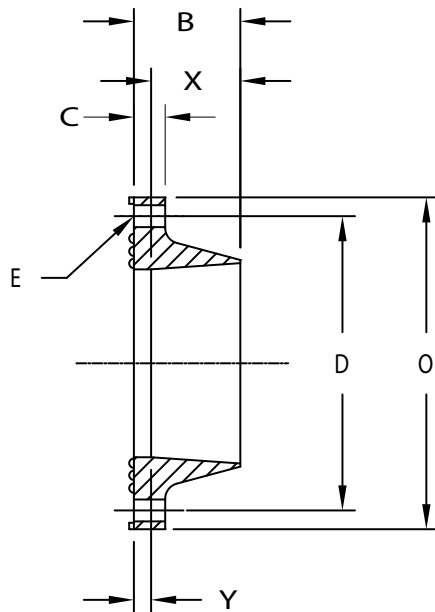
Pipe Dia.	I.D.	C	WEIGHT (lb./ft.)
1"	1.00"	8'-6"	0.5
1 1/2"	1.50"	11'-6"	0.7
2"	2.00"	21'-6"	1.0
3"	3.00"	21'-6"	1.4
4"	4.00"	21'-6"	1.9
5"	5.00"	20'-6"	2.7
6"	6.00"	21'-6"	3.5
8"	8.00"	24'-6"	5.6
10"	10.00"	20'-6"	8.2
12"	12.00"	21'-6"	11.2
14"	14.00"	23'-0"	13.3
16"	16.25"	20'-0" / 39'-4"	17.2
18"	18.25"	20'-0"	21.2
20"	20.25"	20'-0"	25.5
24"	24.00"	39'-2"	34.8
30"	29.53"	39'-3"	51.0
36"	35.43"	39'-3"	71.8
40"	39.37"	39'-4"	87.6
42"	42.00"	39'-4"	99.0
48"	48.25"	39'-1"	128.9
54"	54.00"	39'-8"	159.9
60"	60.00"	39'-8"	195.8
72"	72.00"	20'-0"	278.5
78"	78.00"	40'-0"	325.3
90"	90.00"	40'-0"	429.8
96"	96.00"	60'-0"	487.5
120"	120.00"	40'-0"	754.6

Butt Joint

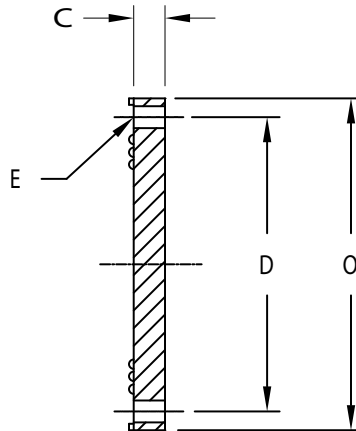


Fitting and Dimensions

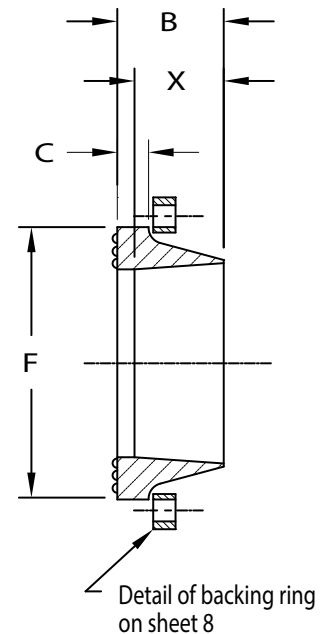
BELLED FLANGES



Flange
(Also available with backing ring - see note)



Blind Flange

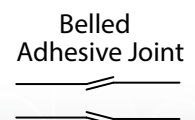


Lap Joint Flange

Pipe Dia	I.D.	B	C	Y	X	D	O	E # holes	E hole Ø	F
1"	1.00"	1 5/8"	7/8"	1/4"	1 3/8"	3 1/8"	4 1/4"	4	5/8"	2 1/2"
1 1/2"	1.50"	1 5/8"	7/8"	1/4"	1 3/8"	3 7/8"	5"	4	5/8"	3 1/4"
2"	2.00"	1 11/16"	7/8"	5/16"	1 3/8"	4 3/4"	6"	4	3/4"	4"
3"	3.00"	1 13/16"	7/8"	7/16"	1 3/8"	6"	7 1/2"	4	3/4"	5 1/4"
4"	4.00"	1 15/16"	15/16"	9/16"	1 3/8"	7 1/2"	9"	8	3/4"	6 3/4"
5"	5.00"	2 3/8"	1 1/16"	5/8"	1 3/4"	8 1/2"	10"	8	7/8"	7 5/8"
6"	6.00"	2 7/16"	1 1/16"	11/16"	1 3/4"	9 1/2"	11"	8	7/8"	8 5/8"
8"	8.00"	4 1/4"	1 1/4"	11/16"	3 9/16"	11 3/4"	13 3/4"	8	7/8"	10 7/8"
10"	10.00"	5"	1 7/16"	7/8"	4 1/8"	14 1/4"	16 1/4"	12	1"	13 1/4"
12"	12.00"	5 3/4"	1 3/4"	7/8"	4 7/8"	17"	19 1/4"	12	1"	16"

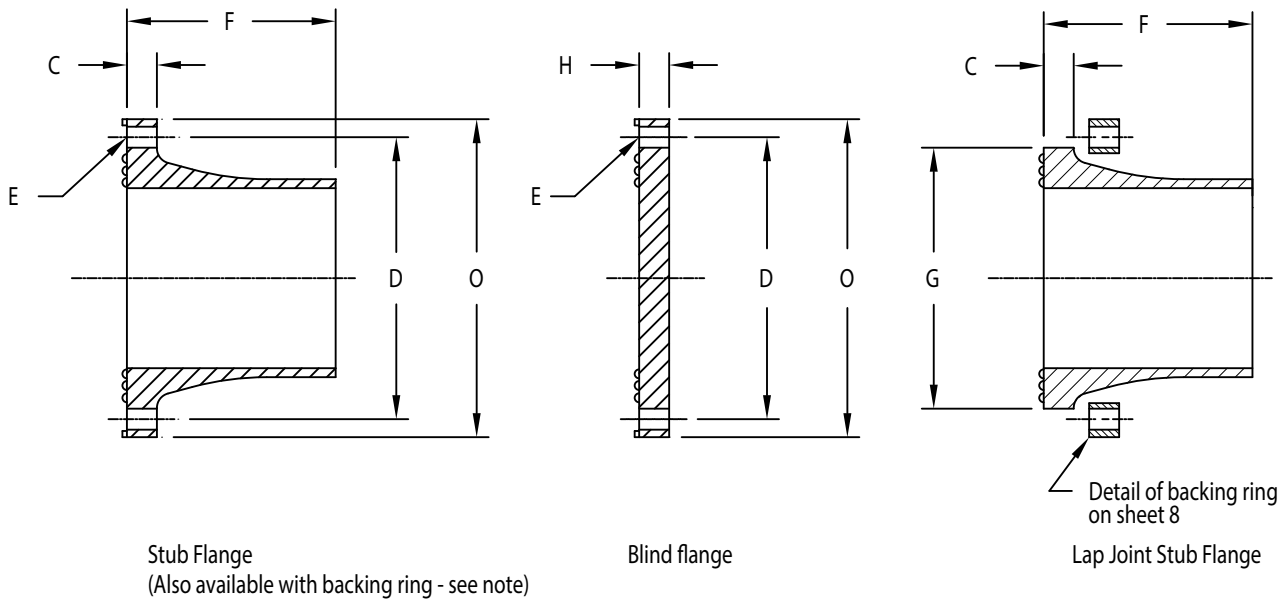
Note: When bolting FRP flanges to expansion joints with tie rods a steel backing ring is recommended behind the full face flange (see pg 8.). For 8"-12" flanges a back-faced flange must be specified (Standard 8"-12" flanges are spot faced for washers).

When attaching flange plate supports to flanges, back-faced flanges must be specified for 8"-12".



Fitting and Dimensions

PLAIN END FLANGES



Pipe Dia	I.D.	D	O	E # holes	E hole Ø	F	G	C	H
1"	1.00"	3 1/8"	4 1/4"	4	5/8"	6"	2 1/2"	7/8"	7/8"
1 1/2"	1.50"	3 7/8"	5"	4	5/8"	6"	3 1/4"	7/8"	7/8"
2"	2.00"	4 3/4"	6"	4	3/4"	6"	4"	7/8"	7/8"
3"	3.00"	6"	7 1/2"	4	3/4"	6"	5 1/4"	7/8"	7/8"
4"	4.00"	7 1/2"	9"	8	3/4"	6"	6 3/4"	15/16"	15/16"
5"	5.00"	8 1/2"	10"	8	7/8"	8"	7 5/8"	1 1/16"	1 1/16"
6"	6.00"	9 1/2"	11"	8	7/8"	8"	8 5/8"	1 1/16"	1 1/16"
8"	8.00"	11 3/4"	13 3/4"	8	7/8"	8"	10 7/8"	1 1/4"	1 1/4"
10"	10.00"	14 1/4"	16 1/4"	12	1"	10"	13 1/4"	1 7/16"	1 7/16"
12"	12.00"	17"	19 1/4"	12	1"	10"	16"	1 3/4"	1 3/4"
14"	14.00"	18 3/4"	21"	12	1 1/8"	12"	17 5/8"	1 7/8"	1 7/8"
16"	16.25"	21 1/4"	23 1/2"	16	1 1/8"	12"	20 1/8"	2 1/4"	2 1/4"
18"	18.00"	22 3/4"	25"	16	1 1/4"	14"	21 1/2"	2 1/4"	2 1/4"
20"	20.25"	25"	27 1/2"	20	1 1/4"	14"	23 3/4"	2 3/8"	2 3/8"
24"	24.00"	29 1/2"	32"	20	1 3/8"	16"	28 1/8"	2 3/4"	2 3/4"
30"	29.53"	36"	38 3/4"	28	1 3/8"	20"	34 5/8"	3 1/8"	3 1/2"
36"	35.43"	42 3/4"	46"	32	1 5/8"	22"	41 1/8"	3 5/8"	4 1/8"
42"	42.00"	49 1/2"	53"	36	1 5/8"	24"	47 7/8"	4 1/8"	4 3/4"
48"	48.25"	56"	59 1/2"	44	1 5/8"	26"	54 3/8"	4 5/8"	5 1/2"
54"	54.00"	62 3/4"	66 1/4"	44	1 7/8"	30"	60 3/4"	5 1/16"	6"
60"	60.00"	69 1/4"	73"	52	1 7/8"	32"	67 1/4"	5 5/8"	6 3/4"

Note: When bolting FRP flanges to expansion joints with tie rods a steel backing ring is recommended behind the full face flange (see pg. 8). In this case a back-faced flange must be specified. (Standard stub flanges are spot faced for washers).

When attaching flange plate supports to flanges, back-faced flanges must be specified.

Butt Joint



Fitting and Dimensions

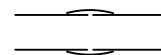
MINIMUM FLANGE THICKNESS FOR PLAIN END FLANGES

Pipe Dia	Minimum Flange Thickness at Design Pressure (inches)					
	25 PSI	50 PSI	75 PSI	100 PSI	125 PSI	150 PSI
8"	0.56	0.75	0.88	1.00	1.13	1.25
10"	0.69	0.88	1.06	1.19	1.31	1.44
12"	0.75	1.00	1.25	1.44	1.63	1.75
14"	0.81	1.06	1.31	1.50	1.75	1.88
16"	0.88	1.19	1.44	1.63	1.88	2.25
18"	0.94	1.25	1.50	1.75	2.00	2.25
20"	1.00	1.31	1.63	1.88	2.25	2.38
24"	1.13	1.50	1.88	2.31	2.50	2.75
30"	1.38	1.88	2.38	2.63	2.94	3.13
36"	1.75	2.13	2.63	2.88	3.25	3.63
42"	2.00	2.63	3.13	3.50	3.88	4.13
48"	2.25	2.94	3.44	3.81	4.25	4.63
54"	2.50	3.00	3.75	4.13	4.63	5.06
60"	2.75	3.31	4.00	4.63	5.13	5.63

Notes:

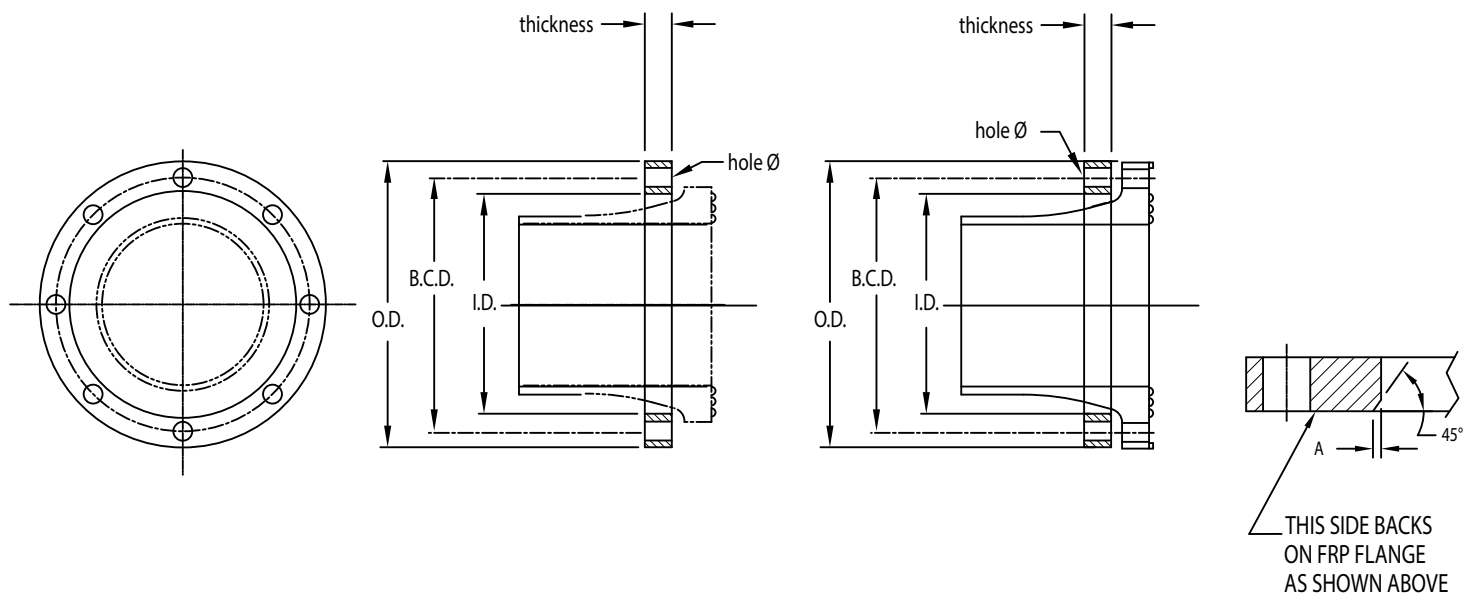
- 1) Flange thickness only suitable when drilling is according ASME B16.5 for Class 150 steel flanges (sizes 8" thru 24") or ASME B16.47 Series A Class 150 for 26" and larger.
- 2) Thickness does not include sealing rings.
- 3) Washer type required 8" thru 48" inclusive, use ANSI B18.22 1-1965, R1975 TYPE A, plain washer, narrow series (SAE) 54" thru 60" inclusive, use ANSI B18.22.1-1965, R1975 TYPE B, plain washer, narrow series.

Butt Joint



Fitting and Dimensions

LAP JOINT AND FULL FACE FLANGE BACKING RINGS



Pipe Dia	thk	O.D.	I.D.	B.C.D.	# hole	hole Ø	A
1"	0.50	4.25	2.13	3.13	4	0.63	-
1 1/2"	0.63	5.00	2.88	3.88	4	0.63	-
2"	0.69	6.00	3.35	4.75	4	0.75	-
3"	0.88	7.50	4.50	6.00	4	0.75	-
4"	0.88	9.00	5.63	7.50	8	0.75	-
5"	0.88	10.00	7.13	8.50	8	0.88	-
6"	0.94	11.00	8.13	9.50	8	0.88	-
8"	1.06	13.50	10.00	11.75	8	0.88	0.25
10"	1.13	16.00	12.25	14.25	12	1.00	0.13
12"	1.19	19.00	14.75	17.00	12	1.00	0.25
14"	1.31	21.00	16.75	18.75	12	1.13	0.13
16"	1.38	23.50	19.38	21.25	16	1.13	0.25
18"	1.50	25.00	20.75	22.75	16	1.25	0.13
20"	1.63	27.50	23.00	25.00	20	1.25	0.13
24"	1.81	32.00	27.38	29.50	20	1.38	0.19
30"	2.88	38.75	33.81	36.00	28	1.38	0.13
36"	3.50	46.00	40.25	42.75	32	1.63	0.25
42"	3.75	53.00	47.00	49.50	36	1.63	0.13
48"	4.19	59.50	53.38	56.00	44	1.63	0.13
54"	4.69	66.25	59.63	62.75	44	1.88	0.13
60"	5.13	73.00	66.00	69.25	52	1.88	0.13

For full face backing rings only. (See note)

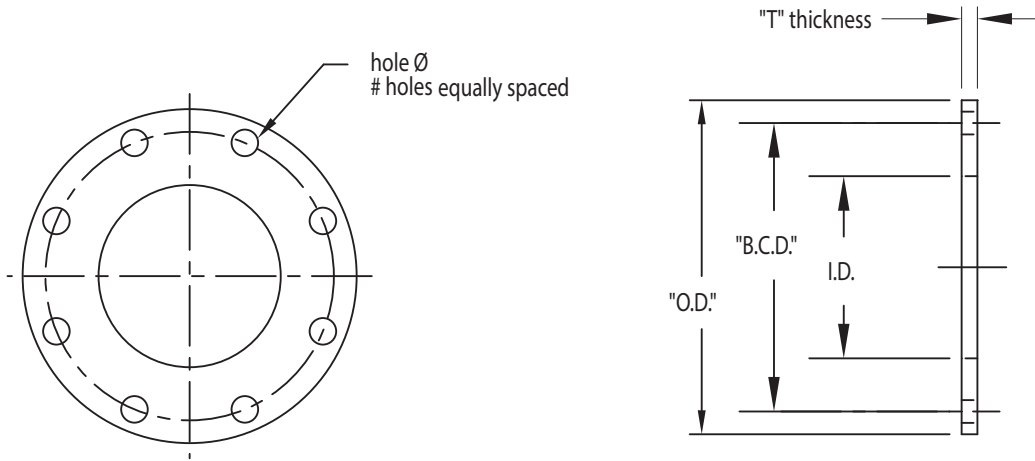
Thickness is suitable for 150 psi

Material: ASTM A-105, CSA G40.21 44W or Ductile Iron (Add 0.06 to thickness if Ductile Iron)

Note: See notes pages 5 & 6 for requirements for flange back-face when using full face flanges with backing ring

Fitting and Dimensions

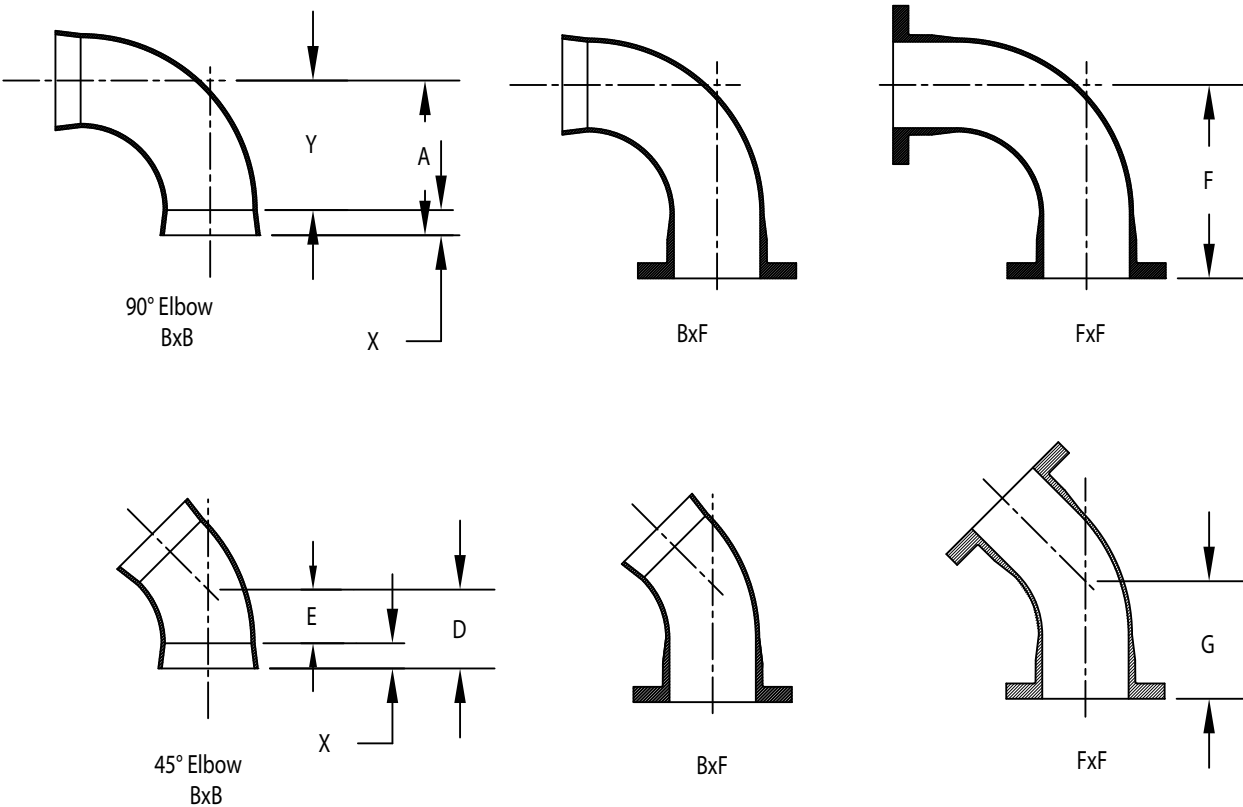
FLANGE GASKET



Pipe Dia	I.D.	O.D.	B.C.D.	# holes	hole Ø	"T"
1"	1.25"	4.25	3.125	4	0.625	0.125
1 1/2"	1.75	5.00	3.875	4	0.625	0.125
2"	2.25	6.00	4.75	4	0.75	0.125
3"	3.25	7.50	6.00	4	0.75	0.125
4"	4.25	9.00	7.50	8	0.75	0.125
5"	5.25	10.00	8.50	8	0.875	0.125
6"	6.25	11.00	9.50	8	0.875	0.125
8"	8.25	13.50	11.75	8	0.875	0.188
10"	10.25	16.00	14.25	12	1.000	0.188
12"	12.25	19.00	17.00	12	1.000	0.188
14"	14.25	21.00	18.75	12	1.125	0.188
16"	16.50	23.50	21.25	16	1.125	0.188
18"	18.25	25.00	22.75	16	1.250	0.188
20"	20.50	27.50	25.00	20	1.250	0.250
24"	24.25	32.00	29.50	20	1.375	0.250
30"	29.75	38.75	36.00	28	1.375	0.250
36"	35.75	46.00	42.75	32	1.625	0.250
42"	42.25	53.00	49.50	36	1.625	0.250
48"	48.50	59.50	56.00	44	1.625	0.250
54"	54.25	66.25	62.75	44	1.875	0.250
60"	60.25	73.00	69.25	52	1.875	0.250

Fitting and Dimensions

BELLED ELBOWS



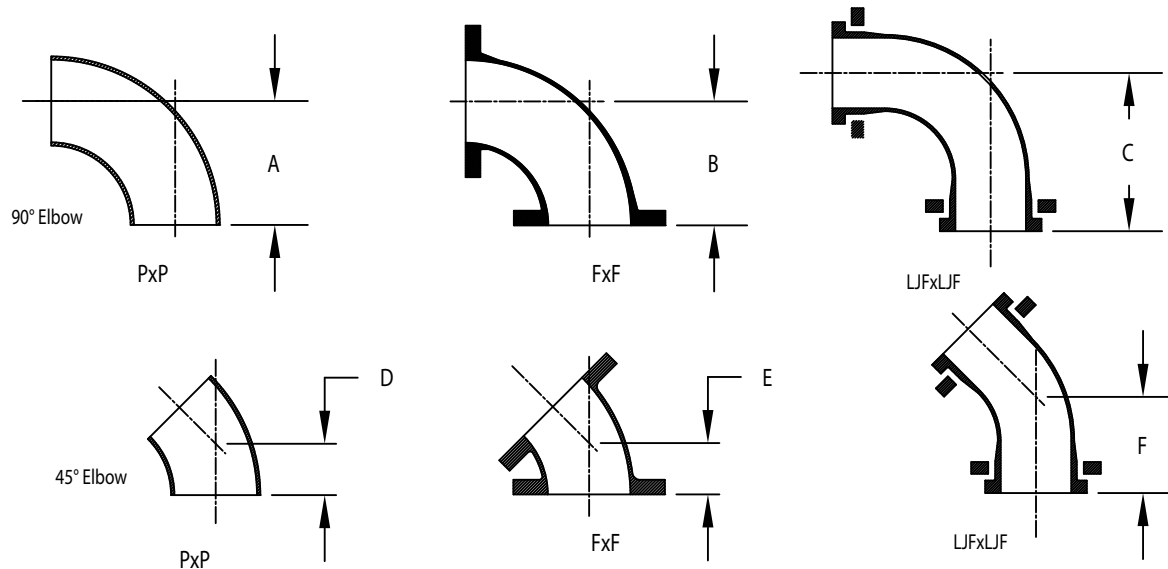
Pipe Dia	A	D	Y	E	X	F	G
2"	5 1/2"	2 3/4"	4 1/8"	1 3/8"	1 3/8"	7 7/16"	4 11/16"
3"	7 1/2"	3 1/2"	6 1/8"	2 1/8"	1 3/8"	9 9/16"	5 9/16"
4"	7 1/2"	3 3/8"	6 1/8"	2"	1 3/8"	9 11/16"	5 9/16"
5"	9 1/2"	4 15/16"	7 3/4"	3 3/16"	1 3/4"	12 1/8"	7 13/16"
6"	10 3/4"	5"	9"	3 1/4"	1 3/4"	13 7/16"	7 11/16"
8"	16"	9"	12 7/16"	5 7/16"	3 9/16"	20 3/4"	13 3/4"
10"	19 1/2"	10 3/4"	15 3/8"	6 5/8"	4 1/8"	25"	16 1/4"
12"	23 1/4"	12 3/4"	18 3/8"	7 7/8"	4 7/8"	29 1/2"	19"

Dimensions also apply to lap joint flanged elbows
Refer to Page 12 for 1" and 1 1/2" elbows

Belled
Adhesive Joint

Fitting and Dimensions

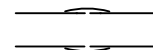
PLAIN END ELBOWS



Pipe Dia	A	B	C	D	E	F
1"	4"	4"	4"	4"	4"	4"
1 1/2"	4"	4"	4"	4"	4"	4"
2"	4"	4 7/8"	5 9/16"	1 5/8"	2 1/2"	3 3/16"
3"	6"	6 7/8"	7 3/4"	2 1/2"	3 3/8"	4 1/4"
4"	6"	6 15/16"	7 13/16"	2 1/2"	3 7/16"	4 5/16"
5"	7 1/2"	8 9/16"	9 7/16"	2 15/16"	4"	4 7/8"
6"	9"	10 1/16"	11"	3 3/4"	4 13/16"	5 3/4"
8"	12"	13 1/4"	14 5/16"	5"	6 1/4"	7 5/16"
10"	15"	16 7/16"	17 9/16"	6 1/4"	7 11/16"	8 13/16"
12"	18"	19 3/4"	20 15/16"	7 1/2"	9 1/4"	10 7/16"
14"	21"	22 7/8"	24 3/16"	8 3/4"	10 5/8"	11 15/16"
16"	24"	26 1/4"	27 5/8"	10"	12 1/4"	13 5/8"
18"	27"	29 1/4"	30 3/4"	11 1/4"	13 1/2"	15"
20"	30"	32 3/8"	34"	12 1/2"	14 7/8"	16 1/2"
24"	36"	38 3/4"	40 9/16"	15"	17 3/4"	19 9/16"
30"	44 5/16"	47 7/16"	50 5/16"	18 3/8"	21 1/2"	24 3/8"
36"	53 1/8"	56 3/4"	60 1/4"	22"	25 5/8"	29 1/8"
42"	63"	67 1/8"	70 7/8"	26"	30 1/8"	33 7/8"
48"	72"	76 5/8"	80 13/16"	30"	34 5/8"	38 13/16"
54"	81"	86 1/16"	90 3/4"	33 9/16"	38 5/8"	43 5/16"
60"	90"	95 5/8"	100 3/4"	37 1/4"	42 7/8"	48"

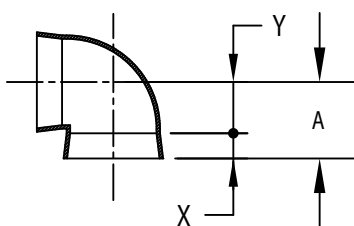
1" & 1 1/2" elbows do not have an inside radius
 Combinations of plain and flanged ends available as required

Butt Joint

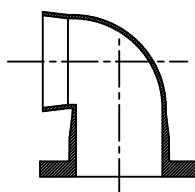


Fitting and Dimensions

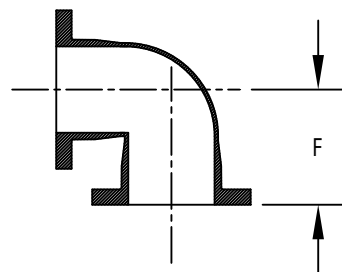
BELLED SHORT RADIUS ELBOWS



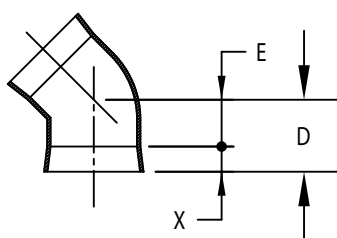
90° Elbow
BxB



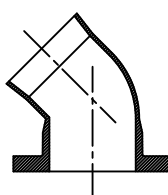
BxF



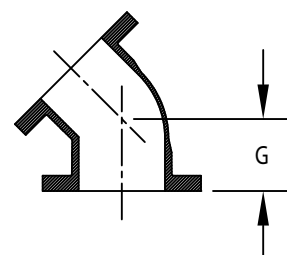
FxF



45° Elbow
BxB



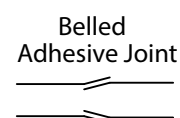
BxF



FxF

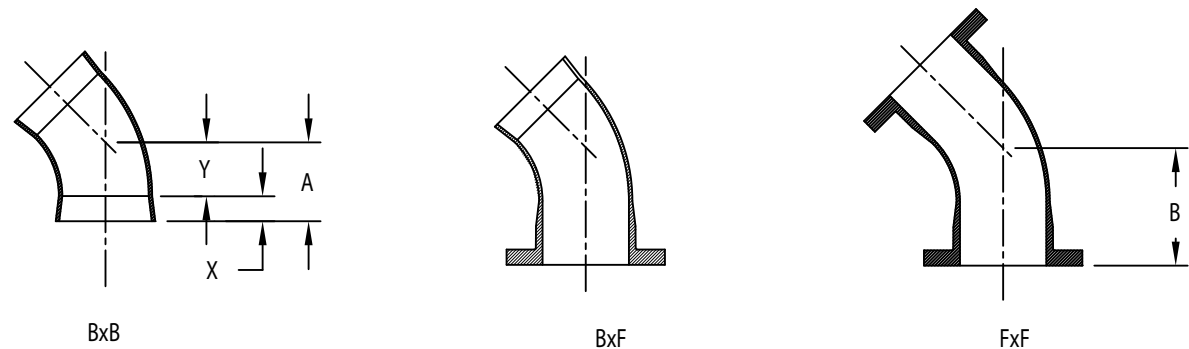
Pipe Dia	A	D	Y	E	X	F	G
1"	2 1/4"	2"	7/8"	5/8"	1 3/8"	4"	3 3/4"
1 1/2"	2 5/8"	2 1/4"	1 1/4"	7/8"	1 3/8"	4 1/2"	4 1/8"
2"	2 9/16"	2 3/4"	1 3/16"	1 3/8"	1 3/8"	4 1/2"	4 11/16"
3"	3 7/16"	3 1/2"	2 1/16"	2 1/8"	1 3/8"	5 1/2"	3"
4"	4 5/16"	3 3/8"	2 15/16"	2"	1 3/8"	6 1/2"	4"
6"	5 5/16"	5"	3 9/16"	3 1/4"	1 3/4"	8"	5"

Elbows do not have an inside radius
 Short radius elbows not recommended for slurry service
 Short radius belled elbows are not available for field installation
 Lap joint flanged elbows are not available



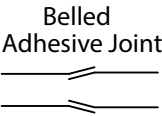
Fitting and Dimensions

BELLED 30° & 60° ELBOWS



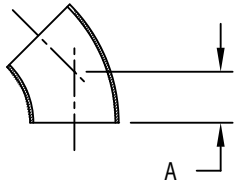
Pipe Dia	Angle	'A'	'B'	'X'	'Y'
1"	30°	4"	4"	1 3/8"	2 5/8"
	60°	4"	4"	1 3/8"	2 5/8"
1 1/2"	30°	4"	4"	1 3/8"	2 5/8"
	60°	4"	4"	1 3/8"	2 5/8"
2"	30°	2 9/16"	4 1/2"	1 3/8"	1 3/16"
	60°	3 13/16"	5 3/4"	1 3/8"	2 7/16"
3"	30°	3 1/8"	5 3/16"	1 3/8"	1 3/4"
	60°	5"	7"	1 3/8"	3 5/8"
4"	30°	3 1/8"	5 5/16"	1 3/8"	1 3/4"
	60°	5"	7 3/16"	1 3/8"	3 5/8"
5"	30°	3 13/16"	6 7/16"	1 3/4"	2 1/16"
	60°	6 3/16"	8 13/16"	1 3/4"	4 7/16"
6"	30°	4 3/16"	6 7/8"	1 3/4"	2 7/16"
	60°	6 15/16"	9 5/8"	1 3/4"	5 3/16"
8"	30°	7 3/16"	11 15/16"	3 9/16"	3 5/8"
	60°	10 15/16"	15 11/16"	3 9/16"	7 3/8"
10"	30°	8 1/2"	14"	4 1/8"	4 3/8"
	60°	13 3/16"	18 11/16"	4 1/8"	9 1/16"
12"	30°	10 1/16"	16 5/16"	4 7/8"	5 3/16"
	60°	15 5/8"	21 7/8"	4 7/8"	10 3/4"

1" & 1 1/2" elbows do not have an inside radius
Dimensions also apply to lap joint flanged elbows

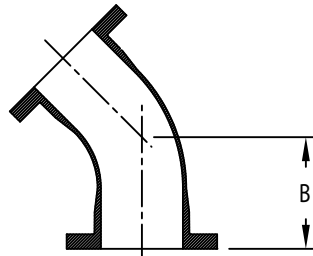


Fitting and Dimensions

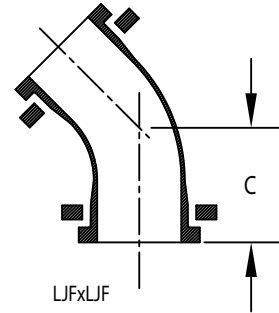
PLAIN END 30° & 60° ELBOWS



PxP



FxF



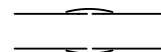
LJFxF

Pipe Dia	Angle	`A'	`B'	`C'
1"	30°	4"	4"	4"
	60°	4"	4"	4"
1 1/2"	30°	4"	4"	4"
	60°	4"	4"	4"
2"	30°	1 1/16"	1 15/16"	2 5/8"
	60°	2 5/16"	3 3/16"	3 7/8"
3"	30°	1 5/8"	2 1/2"	3 3/8"
	60°	3 7/16"	4 5/16"	5 3/16"
4"	30°	1 5/8"	2 9/16"	3 7/16"
	60°	3 7/16"	4 3/8"	5 1/4"
5"	30°	2"	3 1/16"	3 15/16"
	60°	4 5/16"	5 3/8"	6 1/4"
6"	30°	2 7/16"	3 1/2"	4 7/16"
	60°	5 3/16"	6 1/4"	7 3/16"
8"	30°	3 1/4"	4 1/2"	5 9/16"
	60°	6 15/16"	8 3/16"	9 1/4"
10"	30°	4"	5 7/16"	6 9/16"
	60°	8 11/16"	10 1/8"	11 1/4"
12"	30°	4 13/16"	6 9/16"	7 3/4"
	60°	10 3/8"	12 1/8"	13 5/16"

Pipe Dia	Angle	`A'	`B'	`C'
14"	30°	5 5/8"	7 1/2"	8 13/16"
	60°	12 1/8"	14"	15 5/16"
16"	30°	6 7/16"	8 11/16"	10 1/16"
	60°	13 7/8"	16 1/8"	17 1/2"
18"	30°	7 1/4"	9 1/2"	11"
	60°	15 9/16"	17 13/16"	19 5/16"
20"	30°	8 1/16"	10 7/16"	12 1/16"
	60°	17 5/16"	19 11/16"	21 5/16"
24"	30°	9 5/8"	12 3/8"	14 3/16"
	60°	20 13/16"	23 9/16"	25 3/8"
30"	30°	11 7/8"	15"	17 7/8"
	60°	25 9/16"	28 11/16"	31 9/16"
36"	30°	14 1/4"	17 7/8"	21 3/8"
	60°	30 11/16"	34 5/16"	37 13/16"
42"	30°	16 7/8"	21"	24 3/4"
	60°	36 3/8"	40 1/2"	44 1/4"
48"	30°	19 5/16"	23 15/16"	28 1/8"
	60°	41 9/16"	46 3/16"	50 3/8"
54"	30°	21 11/16"	26 3/4"	31 7/16"
	60°	46 3/4"	51 13/16"	56 1/2"
60"	30°	24 1/8"	29 3/4"	34 7/8"
	60°	51 15/16"	57 9/16"	62 11/16"

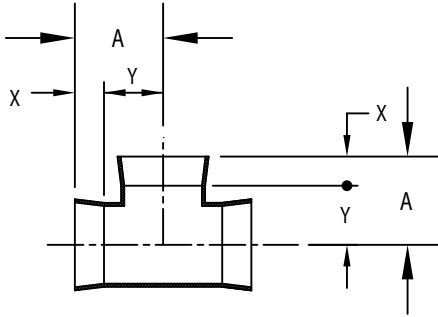
1" & 1 1/2" elbows do not have an inside radius.
Combinations of plain and flanged ends available as required.

Butt Joint

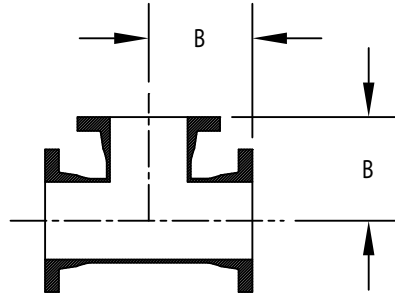


Fitting and Dimensions

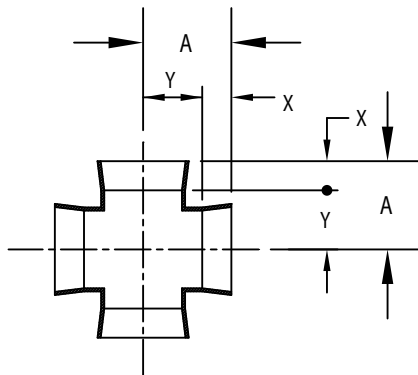
BELLED TEES & CROSSES



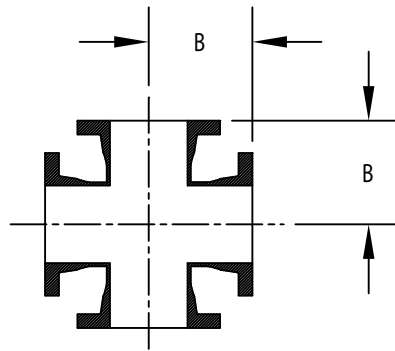
Tee BxBxB



FxFxF



Cross BxBxBxB

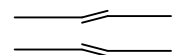


FxFxFxF

Pipe Dia	A	B	Y	X
1"	2 1/4"	4"	7/8"	1 3/8"
1 1/2"	2 5/8"	4 1/2"	1 1/4"	1 3/8"
2"	2 9/16"	4 1/2"	1 3/16"	1 3/8"
3"	3 7/16"	5 1/2"	2 1/16"	1 3/8"
4"	4 5/16"	6 1/2"	2 15/16"	1 3/8"
5"	6 9/16"	9 3/16"	4 13/16"	1 3/4"
6"	6 13/16"	9 1/2"	5 1/16"	1 3/4"
8"	10"	14 3/4"	6 7/16"	3 9/16"
10"	11 3/4"	17 1/4"	7 5/8"	4 1/8"
12"	13 3/4"	20"	8 7/8"	4 7/8"

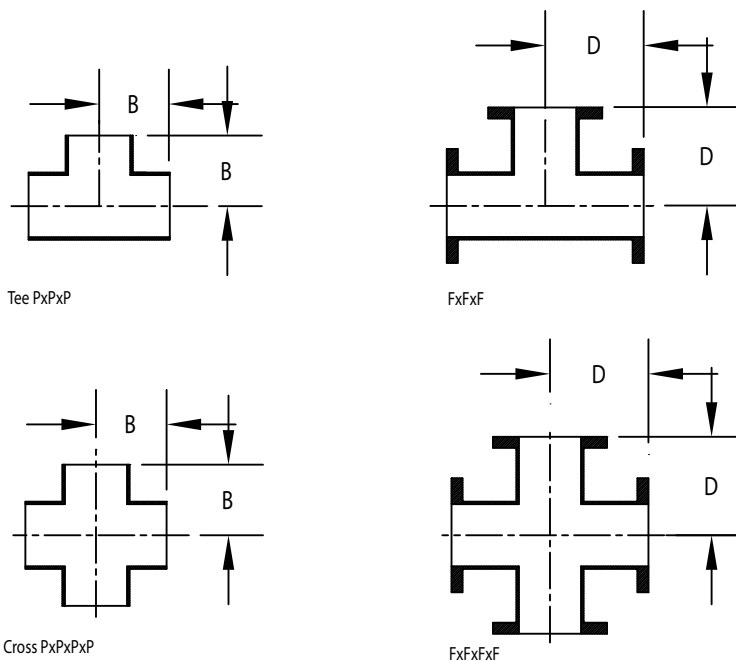
Dimensions also apply to lap joint flanged tees & crosses
Combinations of belled ends & flanged ends available as required

Belled
Adhesive Joint



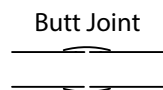
Fitting and Dimensions

PLAIN END TEES & CROSSES



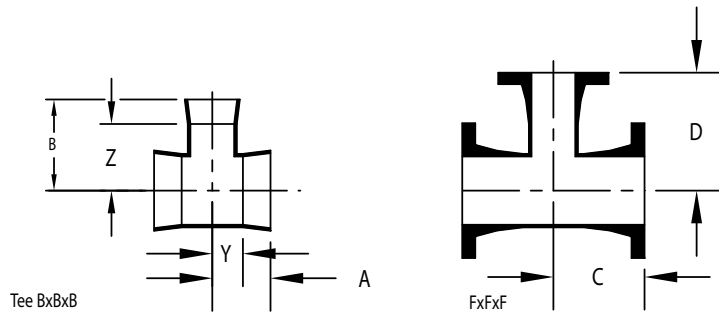
Pipe Dia	B	D
1"	6"	6"
1 1/2"	6"	6"
2"	6"	6"
3"	7"	7"
4"	8"	8"
5"	10"	10"
6"	10"	10"
8"	12"	12"
10"	14"	14"
12"	16"	16"
14"	18"	18 5/16"
16"	20"	20 7/8"
18"	21"	22 5/8"
20"	22"	25"
24"	24"	29 1/8"
30"	30"	36 1/4"
36"	36"	42 1/2"
42"	40"	46 7/8"
48"	46"	56 1/2"
54"	52"	65 3/8"
60"	56"	74 1/4"

Dimensions also apply to lap joint flanged tees & crosses
 Combinations of plain ends & flanged ends available as required



Fitting and Dimensions

BELLED REDUCING TEES* (MOLDED) AND REDUCING BRANCHES* (MOLDED)



Pipe Dia	A	B	C	D	Y	Z
1 1/2" x 1 1/2" x 1"	2 5/8"	4 1/8"	4 1/2"	5 7/8"	1 1/4"	2 3/4"
2" x 2" x 1 1/2"	2 9/16"	4 3/8"	4 1/2"	6 1/4"	1 3/16"	3"
2" x 2" x 1"	2 9/16"	4 3/8"	4 1/2"	6 1/8"	1 3/16"	3"
3" x 3" x 2"	3 7/16"	4 7/8"	5 1/2"	6 13/16"	2 1/16"	3 1/2"
3" x 3" x 1 1/2"	3 7/16"	4 7/8"	5 1/2"	6 3/4"	2 1/16"	3 1/2"
3" x 3" x 1"	3 7/16"	4 7/8"	5 1/2"	6 5/8"	2 1/16"	3 1/2"
4" x 4" x 3"	4 5/16"	5 7/8"	6 1/2"	7 15/16"	2 15/16"	4 1/2"
4" x 4" x 2"	4 5/16"	5 3/8"	6 1/2"	7 5/16"	2 15/16"	4"
4" x 4" x 1 1/2"	4 5/16"	5 3/8"	6 1/2"	7 1/4"	2 15/16"	4"
4" x 4" x 1"	4 5/16"	5 3/8"	6 1/2"	7 1/8"	2 15/16"	4"
5" x 5" x 4"	6 9/16"	6 3/8"	9 3/16"	8 9/16"	4 13/16"	5"
5" x 5" x 3"	6 9/16"	6 3/8"	9 3/16"	8 7/16"	4 13/16"	5"
5" x 5" x 2"	6 9/16"	6"	9 3/16"	7 15/16"	4 13/16"	4 5/8"
5" x 5" x 1 1/2"	6 9/16"	6"	9 3/16"	7 7/8"	4 13/16"	4 5/8"
5" x 5" x 1"	6 9/16"	5 7/8"	9 3/16"	7 5/8"	4 13/16"	4 1/2"
6" x 6" x 4"	6 13/16"	6 7/8"	9 1/2"	9 1/16"	5 1/16"	5 1/2"
6" x 6" x 3"	6 13/16"	6 7/8"	9 1/2"	8 15/16"	5 1/16"	5 1/2"
6" x 6" x 2"	6 13/16"	6 3/8"	9 1/2"	8 5/16"	5 1/16"	5"
6" x 6" x 1 1/2"	6 13/16"	6 3/8"	9 1/2"	8 1/4"	5 1/16"	5"
6" x 6" x 1"	6 13/16"	6 3/8"	9 1/2"	8 1/8"	5 1/16"	5"
8" x 8" x 6"	10"	7 13/16"	14 3/4"	10 1/2"	6 7/16"	6 1/16"
8" x 8" x 4"	10"	7 13/16"	14 3/4"	10"	6 7/16"	6 7/16"
8" x 8" x 3"	10"	7 7/8"	14 3/4"	9 15/16"	6 7/16"	6 1/2"
8" x 8" x 2"	10"	7 5/8"	14 3/4"	9 9/16"	6 7/16"	6 1/4"
8" x 8" x 1 1/2"	10"	7 9/16"	14 3/4"	9 7/16"	6 7/16"	6 3/16"
8" x 8" x 1"	10"	7 7/16"	14 3/4"	9 3/16"	6 7/16"	6 1/16"
10" x 10" x 8"	11 3/4"	9 3/4"	17 1/4"	14 1/2"	7 5/8"	6 3/16"
10" x 10" x 6"	11 3/4"	9 3/4"	17 1/4"	12 7/16"	7 5/8"	8"
10" x 10" x 4"	11 3/4"	8 7/8"	17 1/4"	11 1/16"	7 5/8"	7 1/2"
10" x 10" x 3"	11 3/4"	8 7/8"	17 1/4"	10 15/16"	7 5/8"	7 1/2"
10" x 10" x 2"	11 3/4"	8 5/8"	17 1/4"	10 9/16"	7 5/8"	8 1/4"
10" x 10" x 1 1/2"	11 3/4"	8 9/16"	17 1/4"	10 7/16"	7 5/8"	8 3/16"
10" x 10" x 1"	11 3/4"	8 3/8"	17 1/4"	10 1/8"	7 5/8"	7"
12" x 12" x 10"	13 3/4"	13 3/4"	20"	19 1/4"	8 7/8"	9 5/8"
12" x 12" x 8"	13 3/4"	11 3/4"	20"	16 1/2"	8 7/8"	8 3/16"
12" x 12" x 6"	13 3/4"	10 3/4"	20"	13 7/16"	8 7/8"	9"
12" x 12" x 4"	13 3/4"	9 7/8"	20"	12 1/16"	8 7/8"	8 1/2"
12" x 12" x 3"	13 3/4"	9 7/8"	20"	11 15/16"	8 7/8"	8 1/2"
12" x 12" x 2"	13 3/4"	9 11/16"	20"	11 5/8"	8 7/8"	8 5/16"
12" x 12" x 1 1/2"	13 3/4"	9 5/8"	20"	11 1/2"	8 7/8"	8 1/4"
12" x 12" x 1"	13 3/4"	9 1/2"	20"	11 1/4"	8 7/8"	8 1/8"

Belled
Adhesive Joint

Dimensions also apply lap joint flanged tees

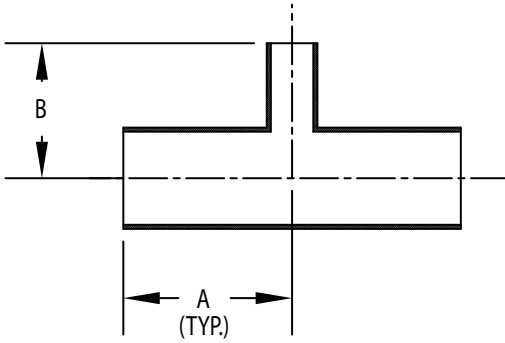
Combinations of belled ends & flanged ends available as required

*Reducing Tee = Ratio of branch diameter to run pipe diameter ≥ 0.66

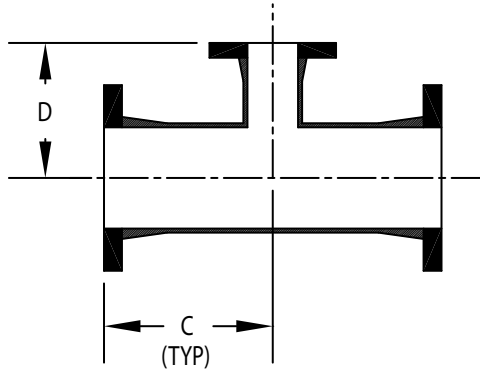
Reducing Branch = Ratio of branch diameter to run pipe diameter < 0.66

Fitting and Dimensions

PLAIN END REDUCING TEE* (FABRICATED)



Reducing Tee P x P x P



F x F x F

Pipe Dia	A	B	C	D
1 1/2"x1 1/2"x1"	6"	6"	6"	6"
2"x2"x1 1/2"	6"	6"	6"	6"
3"x3"x2"	7"	6"	7"	6"
4"x4"x3"	8"	7"	8"	7"
6"x6"x4"	10"	8"	10"	8"
8"x8"x6"	12"	10"	12"	10"
10"x10"x8"	14"	12"	14"	12"
12"x12"x10"	16"	15"	16"	15"
12"x12"x8"	16"	13"	16"	13"

Dimensions also apply to lap joint flanged tees

Combinations of plain ends & flanged ends available as required

Refer to Page 19 for Reducing Branches

*Reducing Tee = Ratio of branch diameter to run pipe diameter ≥ 0.66

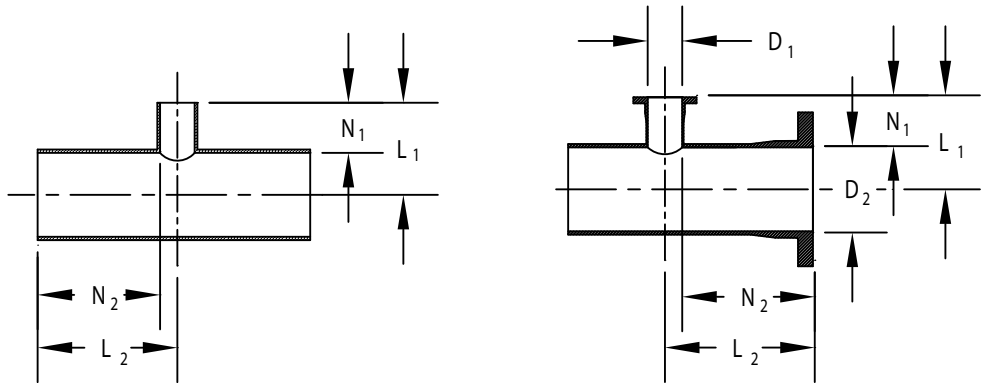
Reducing Branch = Ratio of branch diameter to run pipe diameter < 0.66

Butt Joint



Fitting and Dimensions

STANDARD LENGTH FOR FABRICATED REDUCING BRANCHES (STUB-IN BRANCHES)



To calculate L_1
Read nozzle length N_1 for nozzle inside diameter D_1
then $L_1 = N_1 + 0.5 D_2$
Read mainline length N_2 for mainline inside diameter D_2
The same procedure is used for calculating L_2
 $L_2 = N_2 + 0.5 D_1$

Inside Diameter	Nozzle Length
D	N
1"	5"
1 1/2"	5"
2"	5"
3"	5 1/2"
4"	6"
5"	7 1/2"
6"	7 1/2"
8"	9"
10"	10 1/2"
12"	12"
14"	15"
16"	16"
18"	16 1/2"
20"	18"
24"	21"
30"	24 1/2"
36"	28 1/2"
40"	32"
42"	33 1/2"
48"	38"
54"	42 1/2"
60"	47"

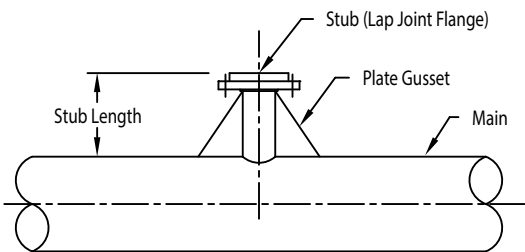
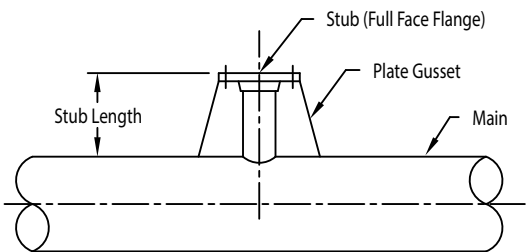
* Add 2" to N when stub-in is on a thick laminate.

Belled
Adhesive Joint

Applies to belled, plain & flanged ends
For a Lap Joint end, add backing ring thickness, per Page 8

Fitting and Dimensions

GUSSETS



Standard gussets are supplied only for Flanged stubs as defined in the following table:

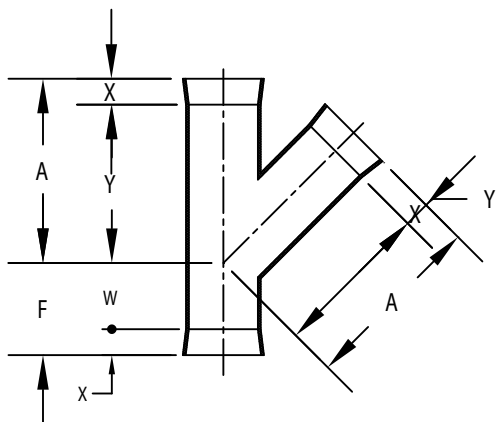
		Main Diameter										
		1"	1 1/2"	2"	3"	4"	5"	6"	8"	10"	12"	≥ 14"
Branch Diameter	1"	Gussets Required										
	1 1/2"											
	2"											
	3"											
	4"	Gussets not Required										
	5"											
	6"											
		≥ 8"										

Note: Standard gussets are not supplied for stubs exceeding the lengths stated below.
Stubs in excess of these lengths should be supported independently.
Molded reducing branches do not have gussets.
Stub-in branches with gussets are recommended for instrument branches.

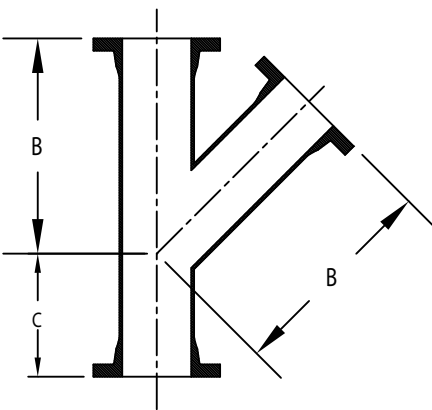
Stub Diameter	1"	1 1/2"	2"	3"	4"	5"	6"
Stub Length	6"	6"	6"	6 1/2"	7"	8 1/2"	8 1/2"

Fitting and Dimensions

BELLED LATERALS



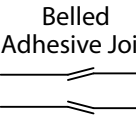
Lateral BxBxB



FxFxF

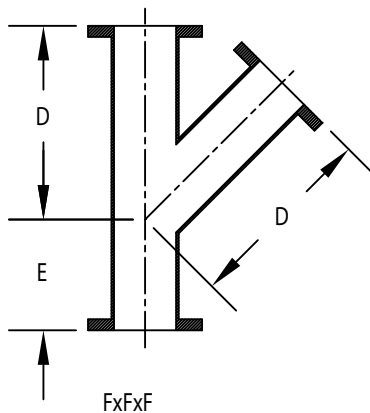
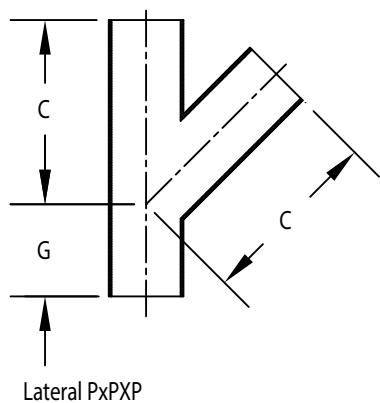
Pipe Dia	A	F	B	C	Y	W	X
1"	10"	6"	11 7/8"	7 7/8"	8 5/8"	4 5/8"	1 3/8"
1 1/2"	10"	6"	11 7/8"	7 7/8"	8 5/8"	4 5/8"	1 3/8"
2"	10"	6"	11 15/16"	7 15/16"	8 5/8"	4 5/8"	1 3/8"
3"	12"	6"	14 1/16"	8 1/16"	10 5/8"	4 5/8"	1 3/8"
4"	14"	6"	16 3/16"	8 3/16"	12 5/8"	4 5/8"	1 3/8"
5"	16"	8"	18 5/8"	10 5/8"	14 1/4"	6 1/4"	1 3/4"
6"	16"	8"	18 11/16"	10 11/16"	14 1/4"	6 1/4"	1 3/4"
8"	20"	10"	24 3/4"	14 3/4"	16 7/16"	6 7/16"	3 9/16"
10"	24"	10"	29 1/2"	15 1/2"	19 7/8"	5 7/8"	4 1/8"
12"	26"	12"	32 1/4"	18 1/4"	21 1/8"	7 1/8"	4 7/8"

Dimensions also apply to lap joint flanged laterals
Combinations of belled ends & flanged ends available as required



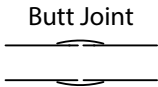
Fitting and Dimensions

PLAIN END LATERALS



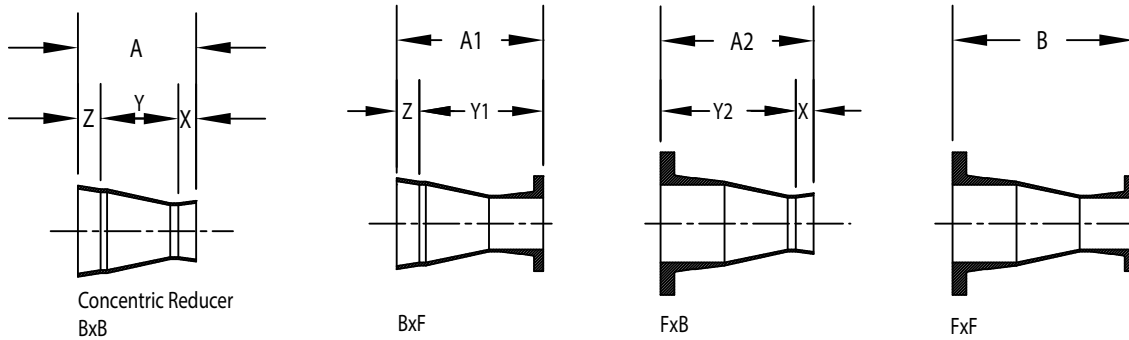
Pipe Dia	C	G	D	E
1"	10"	6"	10"	6"
1 1/2"	10"	6"	10"	6"
2"	10"	6"	10"	6"
3"	12"	6"	12"	6"
4"	14"	6"	14"	6"
5"	16"	8"	16"	8"
6"	16"	8"	16"	8"
8"	20"	10"	20"	10"
10"	24"	10"	24"	10"
12"	26"	12"	26"	12"
14"	30"	12"	30"	12"
16"	32"	14"	32"	14"
18"	36"	14"	36"	14"
20"	38"	16"	38"	16"
24"	42"	18"	42"	18"
30"	52"	20"	52"	20"
36"	62"	22"	62"	22"
42"	72"	24"	72"	24"
48"	82"	26"	82"	26"
54"	96"	30"	96"	30"
60"	114"	36"	114"	36"

Dimensions also apply to lap joint flanged laterals
Combinations of plain ends & flanged ends available as required



Fitting and Dimensions

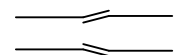
BELLED CONCENTRIC REDUCERS



Pipe Dia	A	A1	A2	B	Y	Y1	Y2	Z	X
1 1/2"x1"	4 3/4"	6 1/2"	6 5/8"	8 3/8"	2"	5 1/8"	5 1/4"	1 3/8"	1 3/8"
2"x1"	6"	7 3/4"	7 15/16"	9 11/16"	3 1/4"	6 3/8"	6 9/16"	1 3/8"	1 3/8"
2"x1 1/2"	5"	6 7/8"	6 15/16"	8 13/16"	2 1/4"	5 1/2"	5 9/16"	1 3/8"	1 3/8"
3"x1"	8 5/8"	10 3/8"	10 11/16"	12 7/16"	5 7/8"	9"	9 5/16"	1 3/8"	1 3/8"
3"x1 1/2"	7 1/2"	9 3/8"	9 9/16"	11 7/16"	4 3/4"	8"	8 3/16"	1 3/8"	1 3/8"
3"x2"	6 1/4"	8 3/16"	8 5/16"	10 1/4"	3 1/2"	6 13/16"	6 15/16"	1 3/8"	1 3/8"
4"x1"	11 1/4"	13"	13 7/16"	15 3/16"	8 1/2"	11 5/8"	12 1/16"	1 3/8"	1 3/8"
4"x1 1/2"	10"	11 7/8"	12 3/16"	14 1/16"	7 1/4"	10 1/2"	10 13/16"	1 3/8"	1 3/8"
4"x2"	8 3/4"	10 11/16"	10 15/16"	12 7/8"	6"	9 5/16"	9 9/16"	1 3/8"	1 3/8"
4"x3"	6 1/4"	8 5/16"	8 7/16"	10 1/2"	3 1/2"	6 15/16"	7 1/16"	1 3/8"	1 3/8"
5"x3"	9 1/8"	11 3/16"	11 3/4"	13 13/16"	6"	9 7/16"	10 3/8"	1 3/4"	1 3/8"
5"x4"	6 3/16"	8 3/8"	8 13/16"	11"	3 1/16"	6 5/8"	7 7/16"	1 3/4"	1 3/8"
6"x2"	14 1/8"	16 1/16"	16 13/16"	18 3/4"	11"	14 5/16"	15 7/16"	1 3/4"	1 3/8"
6"x3"	11 5/8"	13 11/16"	14 5/16"	16 3/8"	8 1/2"	11 15/16"	12 15/16"	1 3/4"	1 3/8"
6"x4"	9 1/8"	11 5/16"	11 13/16"	14"	6"	9 9/16"	10 7/16"	1 3/4"	1 3/8"
6"x5"	6 9/16"	9 3/16"	9 1/4"	11 7/8"	3 1/16"	7 7/16"	7 1/2"	1 3/4"	1 3/4"
8"x4"	17 1/2"	19 11/16"	22 1/4"	24 7/16"	12 9/16"	16 1/8"	20 7/8"	3 9/16"	1 3/8"
8"x5"	14 1/2"	17 1/8"	19 1/4"	21 7/8"	9 3/16"	13 9/16"	17 1/2"	3 9/16"	1 3/4"
8"x6"	12 7/8"	15 9/16"	17 5/8"	20 5/16"	7 9/16"	12"	15 7/8"	3 9/16"	1 3/4"
10"x6"	17 7/8"	20 9/16"	23 3/8"	26 1/16"	12"	16 7/16"	21 5/8"	4 1/8"	1 3/4"
10"x8"	15"	19 3/4"	20 1/2"	25 1/4"	7 5/16"	15 5/8"	16 15/16"	4 1/8"	3 9/16"
12"x8"	20"	24 3/4"	26 1/4"	31"	11 9/16"	19 7/8"	22 11/16"	4 7/8"	3 9/16"
12"x10"	15 1/2"	21"	21 3/4"	27 1/4"	6 1/2"	16 1/8"	17 5/8"	4 7/8"	4 1/8"

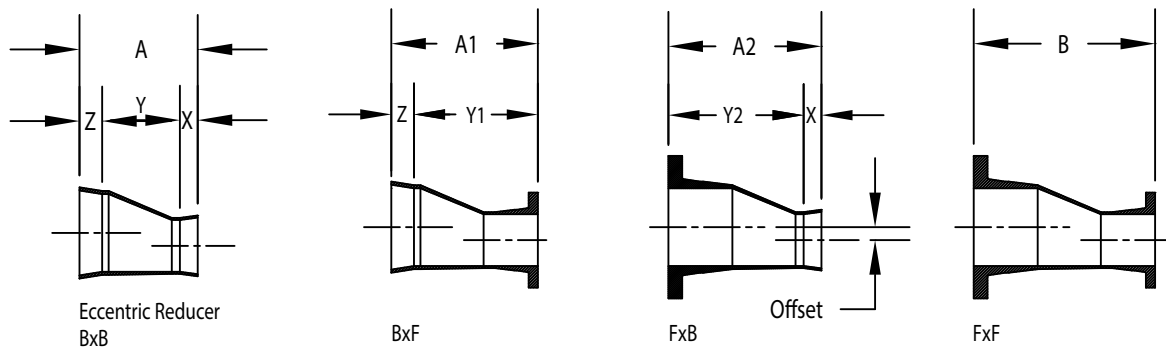
Reducing section length = 2.5 x (large dia - small dia)
 Dimensions also apply to lap joint flanged reducers
 Reducing angle = 11.3°

Belled
Adhesive Joint



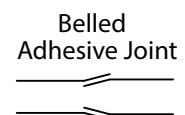
Fitting and Dimensions

BELLED ECCENTRIC REDUCERS



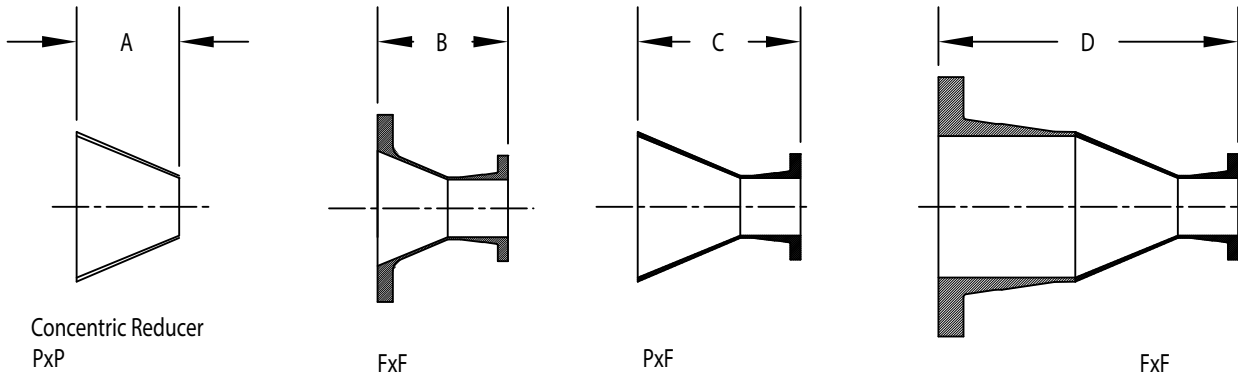
Pipe Dia	A	A1	A2	B	Y	Y1	Y2	Z	X	Offset
1 1/2"x1"	5"	6 3/4"	6 7/8"	8 5/8"	2 1/4"	5 3/8"	5 1/2"	1 3/8"	1 3/8"	1/4"
2"x1"	6"	7 3/4"	7 15/16"	9 11/16"	3 1/4"	6 3/8"	6 9/16"	1 3/8"	1 3/8"	1/2"
2"x1 1/2"	5"	6 7/8"	6 15/16"	8 13/16"	2 1/4"	5 1/2"	5 9/16"	1 3/8"	1 3/8"	1/4"
3"x1"	8 5/8"	10 3/8"	10 11/16"	12 7/16"	5 7/8"	9"	9 5/16"	1 3/8"	1 3/8"	1"
3"x1 1/2"	7 1/2"	9 3/8"	9 9/16"	11 7/16"	4 3/4"	8"	8 3/16"	1 3/8"	1 3/8"	3/4"
3"x2"	6 1/4"	8 3/16"	8 5/16"	10 1/4"	3 1/2"	6 13/16"	6 15/16"	1 3/8"	1 3/8"	1/2"
4"x1"	11 1/4"	13"	13 7/16"	15 3/16"	8 1/2"	11 5/8"	12 1/16"	1 3/8"	1 3/8"	1 1/2"
4"x1 1/2"	10"	11 7/8"	12 3/16"	14 1/16"	7 1/4"	10 1/2"	10 13/16"	1 3/8"	1 3/8"	1 1/4"
4"x2"	8 3/4"	10 11/16"	10 15/16"	12 7/8"	6"	9 5/16"	9 9/16"	1 3/8"	1 3/8"	1"
4"x3"	6 1/4"	8 5/16"	8 7/16"	10 1/2"	3 1/2"	6 15/16"	7 1/16"	1 3/8"	1 3/8"	1/2"
6"x2"	14 1/8"	16 1/16"	16 13/16"	18 3/4"	11"	14 5/16"	15 7/16"	1 3/4"	1 3/8"	2"
6"x3"	11 5/8"	13 11/16"	14 5/16"	16 3/8"	8 1/2"	11 15/16"	12 15/16"	1 3/4"	1 3/8"	1 1/2"
6"x4"	9 1/8"	11 5/16"	11 13/16"	14"	6"	9 9/16"	10 7/16"	1 3/4"	1 3/8"	1"
6"x5"	7"	9 5/8"	9 11/16"	12 5/16"	3 1/2"	7 7/8"	7 15/16"	1 3/4"	1 3/4"	1/2"
8"x4"	16 3/4"	18 15/16"	21 1/2"	23 11/16"	11 13/16"	15 3/8"	20 1/8"	3 9/16"	1 3/8"	2"
8"x5"	14 1/2"	17 1/8"	19 1/4"	21 7/8"	9 3/16"	13 9/16"	17 1/2"	3 9/16"	1 3/4"	1 1/2"
8"x6"	12"	14 11/16"	16 3/4"	19 7/16"	6 11/16"	11 1/8"	15"	3 9/16"	1 3/4"	1"
10"x6"	18"	20 11/16"	23 1/2"	26 3/16"	12 1/8"	16 9/16"	21 3/4"	4 1/8"	1 3/4"	2"
10"x8"	15 1/2"	20 1/4"	21"	25 3/4"	7 13/16"	16 1/8"	17 7/16"	4 1/8"	3 9/16"	1"
12"x8"	20 3/4"	25 1/2"	27"	31 3/4"	12 5/16"	20 5/8"	23 7/16"	4 7/8"	3 9/16"	2"
12"x10"	16 3/4"	22 1/4"	23"	28 1/2"	7 3/4"	17 3/8"	18 7/8"	4 7/8"	4 1/8"	1"

Reducing section length = 2.5 x (large dia - small dia)
 Dimensions also apply to lap joint flanged reducers
 Reducing angle = 21.8°



Fitting and Dimensions

PLAIN END CONCENTRIC REDUCERS



Pipe Dia	A	B	C	D
1 1/2" x 1"	1 1/4"		7 1/4"	13 1/2"
2" x 1"	2 1/2"		9 1/2"	15 1/2"
2" x 1 1/2"	1 1/4"		7 1/4"	13 1/2"
3" x 1"	5"	11"	11"	17"
3" x 1 1/2"	3 3/4"	9 3/4"	9 3/4"	15 3/4"
3" x 2"	2 1/2"		8 1/2"	14 1/2"
4" x 1"	7 1/2"	13 1/2"	13 1/2"	19 1/2"
4" x 1 1/2"	6 1/4"	12 1/4"	12 1/4"	18 1/4"
4" x 2"	5"	11"	11"	17"
4" x 3"	2 1/2"		8 1/2"	14 1/2"
6" x 2"	10"	16"	16"	24"
6" x 3"	7 1/2"	13 1/2"	13 1/2"	21 1/2"
6" x 4"	5"	11"	11"	19"
6" x 5"	2 1/2"		10 1/2"	18 1/2"
8" x 4"	10"	16"	16"	24"
8" x 5"	7 1/2"	15 1/2"	15 1/2"	23 1/2"
8" x 6"	5"		13"	21"
10" x 6"	10"	18"	18"	25"
10" x 8"	5"		13"	23"
12" x 10"	5"		15"	25"

Pipe Dia	A	B	C	D
14"x10"	10"	20"	20"	32"
14"x12"	5"		15"	27"
16"x12"	10"	20"	20"	32"
16"x14"	5"		17"	29"
18"x14"	10"	22"	22"	36"
18"x16"	5"		17"	31"
20"x16"	10"	22"	22"	36"
20"x18"	5"		19"	33"
24"x18"	15"	29"	29"	45"
24"x20"	10"	24"	24"	40"
30"x20"	25"	39"	39"	59"
30"x24"	15"	31"	31"	51"
36"x24"	30"	46"	46"	68"
36"x30"	15"	35"	35"	57"

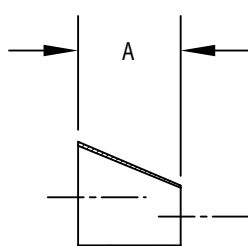
Butt Joint



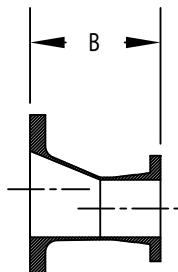
Reducing angle = 11.3°

Fitting and Dimensions

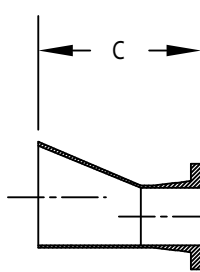
PLAIN END ECCENTRIC REDUCERS



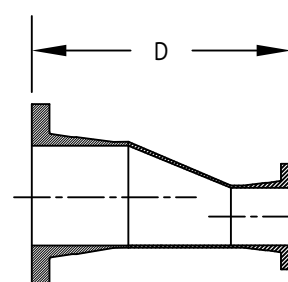
Eccentric Reducer
P x P



F x F



P x F



F x F

Pipe Dia	A	B	C	D
1 1/2" x 1"	1 1/4"		7 1/4"	13 1/2"
2" x 1"	2 1/2"		9 1/2"	15 1/2"
2" x 1 1/2"	1 1/4"		7 1/4"	13 1/2"
3" x 1"	5"	11"	11"	17"
3" x 1 1/2"	3 3/4"	9 3/4"	9 3/4"	15 3/4"
3" x 2"	2 1/2"		8 1/2"	14 1/2"
4" x 1"	7 1/2"	13 1/2"	13 1/2"	19 1/2"
4" x 1 1/2"	6 1/4"	12 1/4"	12 1/4"	18 1/4"
4" x 2"	5"	11"	11"	17"
4" x 3"	2 1/2"		8 1/2"	14 1/2"
6" x 2"	10"	16"	16"	24"
6" x 3"	7 1/2"	13 1/2"	13 1/2"	21 1/2"
6" x 4"	5"	11"	11"	19"
6" x 5"	2 1/2"		10 1/2"	18 1/2"
8" x 4"	10"	16"	16"	24"
8" x 5"	7 1/2"	15 1/2"	15 1/2"	23 1/2"
8" x 6"	5"		13"	21"
10" x 6"	10"	18"	18"	25"
10" x 8"	5"		13"	23"
12" x 10"	5"		15"	25"

Pipe Dia	A	B	C	D
14"x10"	10"	20"	20"	32"
14"x12"	5"		15"	27"
16"x12"	10"	20"	20"	32"
16"x14"	5"		17"	29"
18"x14"	10"	22"	22"	36"
18"x16"	5"		17"	31"
20"x16"	10"	22"	22"	36"
20"x18"	5"		19"	33"
24"x18"	15"	29"	29"	45"
24"x20"	10"	24"	24"	40"
30"x20"	25"	39"	39"	59"
30"x24"	15"	31"	31"	51"
36"x24"	30"	46"	46"	68"
36"x30"	15"	35"	35"	57"

Butt Joint

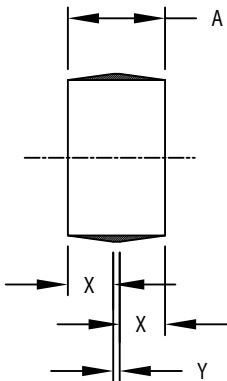


Reducing angle = 21.8°

Fitting and Dimensions

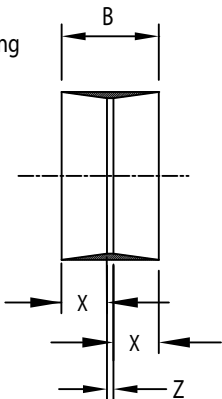
BELLED FITTINGS

Nipple



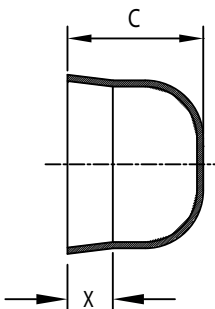
Pipe Dia	A	Y	X
1"	2 7/8"	1/8"	1 3/8"
1 1/2"	3"	1/4"	1 3/8"
2"	3"	1/4"	1 3/8"
3"	3"	1/4"	1 3/8"
4"	3"	1/4"	1 3/8"
5"	3 3/4"	1/4"	1 3/4"
6"	3 3/4"	1/4"	1 3/4"
8"	7 5/8"	1/2"	3 9/16"
10"	8 3/4"	1/2"	4 1/8"
12"	10 1/4"	1/2"	4 7/8"

Coupling



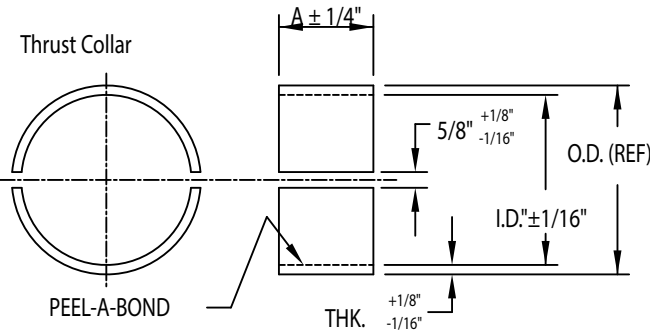
Pipe Dia	B	Z	X
1"	4"	1 1/4"	1 3/8"
1 1/2"	4"	1 1/4"	1 3/8"
2"	4"	1 1/4"	1 3/8"
3"	4"	1 1/4"	1 3/8"
4"	4"	1 1/4"	1 3/8"
5"	5"	1 1/2"	1 3/4"
6"	5"	1 1/2"	1 3/4"
8"	8 1/2"	1 3/8"	3 9/16"
10"	10"	1 3/4"	4 1/8"
12"	11"	1 1/4"	4 7/8"

End Cap

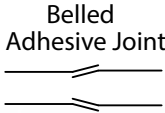


Pipe Dia	C	X
1"	2 1/16"	1 3/8"
1 1/2"	3"	1 3/8"
2"	4"	1 3/8"
3"	4"	1 3/8"
4"	4"	1 3/8"
5"	5"	1 3/4"
6"	5"	1 3/4"
8"	8"	3 9/16"
10"	10"	4 1/8"
12"	12"	4 7/8"

Thrust Collar

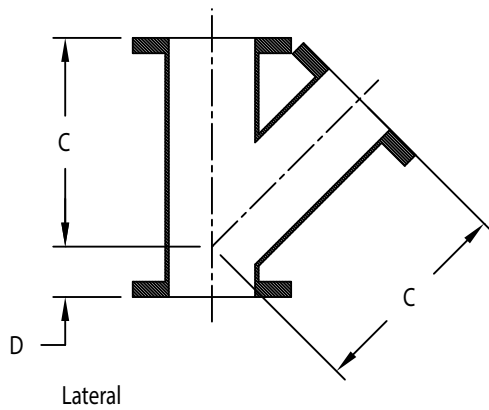
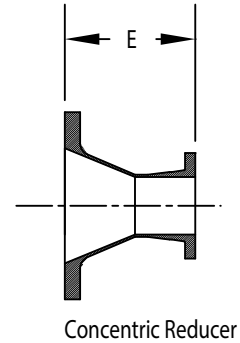
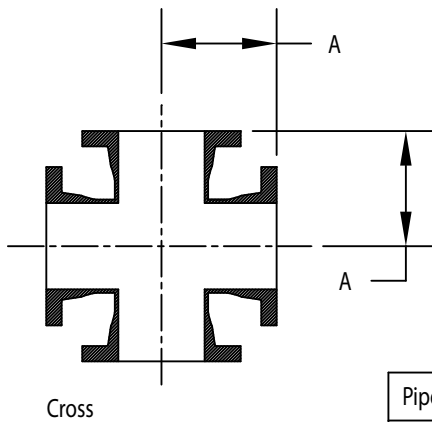
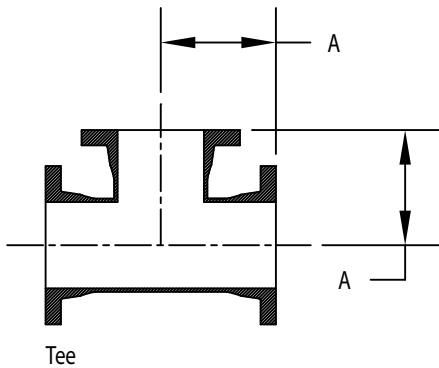


PIPE DIA.	DIM 'A'	I.D.	O.D.(REF)	THK.
1"	3"	1 1/2"	2 1/8"	5/16"
1 1/2"	3"	2"	2 5/8"	5/16"
2"	3"	2 5/8"	3 1/4"	5/16"
3"	3"	3 5/8"	4 1/4"	5/16"
4"	3"	4 5/8"	5 1/4"	5/16"
5"	3 1/2"	5 11/16"	6 7/16"	3/8"
6"	3 1/2"	6 3/4"	7 1/2"	3/8"
8"	4"	8 13/16"	9 9/16"	3/8"
10"	5"	10 7/8"	11 3/4"	7/16"
12"	5 1/2"	13"	14"	1/2"



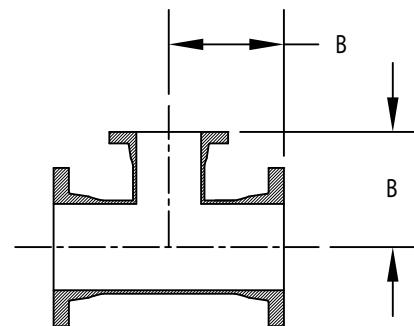
Fitting and Dimensions

ANSI TEE, REDUCING TEE, CROSS, LATERAL & CONCENTRIC REDUCERS



Pipe Dia	E	Pipe Dia	E
1 1/2" x 1"	5"	6" x 4"	9"
2" x 1 1/2"	5"	8" x 4"	11"
3" x 1 1/2"	6"	8" x 6"	11"
3" x 2"	6"	10" x 6"	12"
4" x 2"	7"	10" x 8"	12"
4" x 3"	7"	12" x 8"	14"
6" x 3"	9"	12" x 10"	14"

Pipe Dia	A	C	D
1"	3 1/2"	5 3/4"	1 3/4"
1 1/2"	4"	7"	2"
2"	4 1/2"	8"	2 1/2"
3"	5 1/2"	10"	3"
4"	6 1/2"	12"	3"
5"	7 1/2"	13 1/2"	3 1/2"
6"	8"	14 1/2"	3 1/2"
8"	9"	17 1/2"	4 1/2"
10"	11"	20 1/2"	5"
12"	12"	24 1/2"	5 1/2"



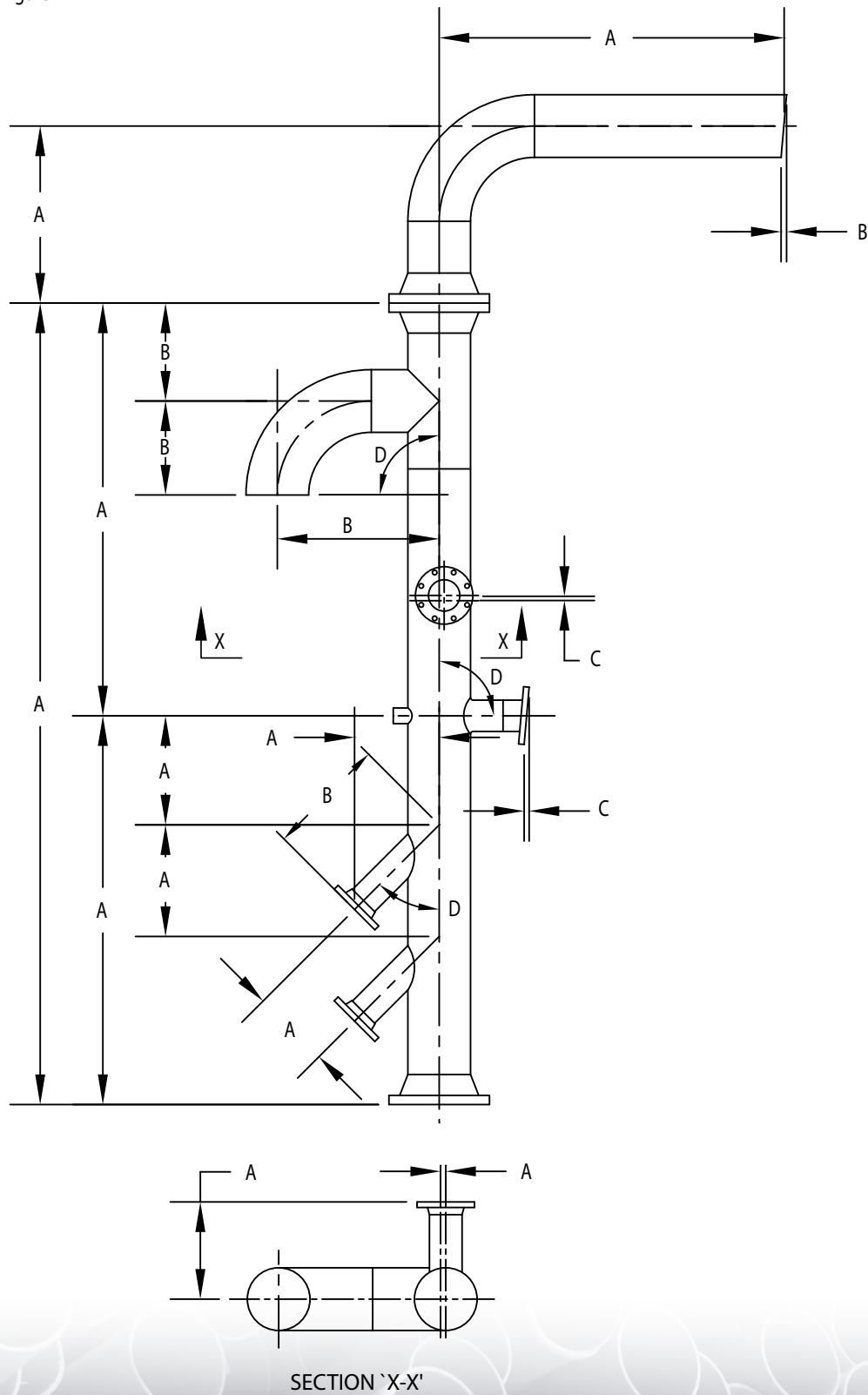
Pipe Dia	B
1 1/2" x 1 1/2" x 1"	4"
2" x 2" x 1 1/2"	4 1/2"
3" x 3" x 2"	5 1/2"
4" x 4" x 3"	6 1/2"
6" x 6" x 4"	8"
8" x 8" x 6"	9"
10" x 10" x 8"	11"
12" x 12" x 10"	12"

Lap joint flanges are not available for ANSI fittings
Fitting dimensions per ASME B16.5 Class 150

Fitting and Dimensions

APPLICATION OF PIPE FABRICATION TOLERANCES

Figure 1



FABRICATION TOLERANCES

Scope

This standard covers general pipe shop fabricating tolerances for prefabricated piping assemblies

A. Linear Tolerances

- A.1 The tolerances on linear dimensions (intermediate or overall) apply to the face to face, face to end, and end to end measurements of fabricated straight pipe and headers; center to end or center to face of nozzles or other attachments; or center to face of bends as illustrated on fig. 1. These tolerances are not cumulative.
- A.2 Linear tolerances on 'A' are $\pm 1/8"$ for sizes 10" and under and $\pm 3/16"$ for sizes 12" thru 36".
- A.3 Linear tolerances on 'A' for sizes over 36" are subject to tolerances of $\pm 1/4"$, increasing by $\pm 1/16"$ for each 12" in diameter over 36".
- A.4 Due to the cumulative effects of tolerances on fittings or flanges, when joined without intervening pipe segment, deviations in excess of those specified in paragraphs A.2 and A.3 may occur

B. Center Line Tolerances

For fittings that must conform to face-to-centerline dimensions, the allowable tolerance is:

$\pm 1/8"$ up to and including 12"Ø

$\pm 3/16"$ for 14"Ø and larger

C. Flange Tolerances

- C.1 The flange face shall be perpendicular to the axis of the fitting within $1/2^\circ$ and shall be flat to within $1/32"$ up to and including 24"Ø. For diameters greater than 24"Ø, the flange face shall be perpendicular to the axis of the fitting within $1/4^\circ$, and shall be flat with $1/16"$.
- C.2 Rotation of flanges from the indicated position measured as shown in fig. 1, $1/16"$ maximum.

D. Angles

$\pm 1/2^\circ$ up to and including 24"Ø

$\pm 1/4^\circ$ for larger than 24"Ø

Fitting and Dimensions

MANUFACTURING TOLERANCES

Component	Item	Diameter	Tolerance
Pipe	Inside Diameter:	1" to 12" Greater than ½"	+0.060" / -0.060" +0.120" / -0.120" or 1%, whichever is greater
	Wall Thickness: Liner	All Sizes	+0.030" / -0.000"
	Total Thickness	1" to 6" Greater Than 6"	+0.30" / -0.010" +0.030" + 5% F/W Thickness -(0.010" + 5% F/W Thickness)
	Length:	1" to 12" 14" to 36" Greater than 36"	+0.125" / -0.125" +0.188" / -0.188" +0.250" / -0.250"
	Straightness:	All Sizes	Deviation of straightness of I.D. of pipe shall not exceed 0.3% of effective length or 0.75", whichever is smaller
	Winding Angle:	All Sizes	+2° / -2°
Fittings	Inside Diameter	1" to 12" Greater than 12"	+0.120" / -0.060" +0.120" / -0.120" or 1%, whichever is greater
	Wall Thickness	Minimum thickness, except for pre-tapered ends: same as pipe. No maximum thickness can be stated, as reinforcement required to give the necessary strength varies substantially over the surface of the fittings (reference individual manufacturing specifications for part thickness).	
	Ends:	1" to 24" Greater than 24" 1" to 12" Greater than 12"	+1° / -1° +0.5° / -0.5° +0.120" / -0.120" or 1%, whichever is greater +0.250" / -0.250" or 1%, whichever is greater
	Nipples:	1" to 6"	+0.188" / -0.000"

Fitting and Dimensions

MANUFACTURING TOLERANCES

Component	Item	Diameter	Tolerance
Flanges	Inside Diameter	1" to 12" 12" or greater	+0.060" / -0.060" +0.120" / -0.120" or 0.5%, whichever is greater
	Thickness	All Sizes	+0.120" / -0.000"
	Flatness	1" to 18 ¼" Greater than 24"	+0.030" / -0.030" +0.060" / -0.060"
	Perpendicularity (to Axis)	1" to 24" Greater than 24"	+0.5° / -0.5° +0.25° / -0.25°
	Bolt Hole Diameter	All Sizes	±5% of hole diameter, or ±0.125", whichever is smaller
Adhesive Joints	Spigot Edge Thickness	1" to 12"	+0.030" / -0.015"
	Insertion Depth	1" to 12"	+0.120" / -0.060"
	Angular Misalignment	1" to 12"	±0.5°
Butt Joints	Axial Gaps	1" to 12"	+0.125"
		14" to 24"	+0.188"
		Greater than 24"	+0.250"
	Radial Offset	1" to 12" 14" to 24" Greater than 24"	+0.125" / -0.125" +0.188" / -0.188" +0.250" / -0.250"
	Angularity	All Sizes	±0.5°
Assembly		Per Pipe Fabrication Institute Standard ES-3. (Ref. Page 52). Note: Dimensions with 2" or more trim allowance at field joint locations shall have a tolerance of +1 / -0.5" unless otherwise noted.	

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