

FIBERBOND®

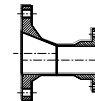
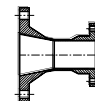
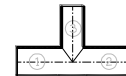
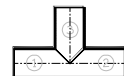
ENGINEERED COMPOSITE PIPING SYSTEMS

SERIES 20JF FITTINGS GUIDE

FIBERBOND® SERIES

- 20JF
- 20JF-C

20JF
20JF-C



April 2018 Edition

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FIBERBOND® Fittings Guide - Series 20JF and 20JF-C

PIPE SERIES:

The fittings contained in this book are available in the following series (unless otherwise noted):

- | | |
|--------|---|
| 20JF | 13.8bar rated product for dry deluge systems and for systems requiring jet-fire resistance. |
| 20JF-C | Identical to 20JF, except it has an electrically conductive exterior for use where grounding is required. |

GASKETS:

1. In systems hydrotesting above 225psig (15.5bar), gaskets with better sealing properties, such as Garlock's "Stress Saver" gasket (www.garlock.com), CTG's "ET Energizer" gasket (www.ctgasket.com) or Asahi's "Low Torque" gasket (www.asahi-america.com), are recommended for sizes 2" (50NB) and larger.
2. O-ring gaskets may also be used, but they do require a special o-ring groove to be machined in one face (and only one face) of the mating pair of flanges. O-ring gaskets have no takeout. Shore "A" hardness values are typically between 55 and 75. A typical material is Buna-N (NBR). For higher temperatures and resistance to certain acids and solvents, Viton® is also available. Viton® is a fluoroelastomer manufactured by DuPont Dow.
3. In systems hydrotesting between 150psig (10.3bar) and 225psig (15.5bar), either full-face 1/8" thick flat rubber gaskets (neoprene, red rubber, etc.) or gaskets with better sealing properties may be used in sizes 2" (50NB) and larger.
4. In systems hydrotesting only up to 150psig (10.3bar), full-face 1/8" thick rubber gaskets are recommended. Shore "A" hardness values can range from 60 to 80, although values down to 50 may be suitable as well as higher values.
5. These gasket recommendations do not take into account the required corrosion resistance of the systems. Make sure that gasket materials are suitable for the intended services. CR (neoprene) is normally good for water and seawater and has excellent weathering resistance. SBR (red rubber) is normally good for water, seawater, alcohol, glycol, and weak acids. NBR (Buna-N) is normally good for water, seawater, dilute acids, and aliphatic hydrocarbons (propane, butane, petroleum oil, mineral oil, grease, diesel fuel). EPDM (ethylene-propylene-diene rubber) is a good choice for hot water service, many solvents and many acid services.

RULES FOR O-RING GASKETS:

1. Takeout of the gasket is essentially zero inches. The gasket is 3/16" (0.1875", 4.8mm) nominal diameter and the groove is 0.15" (3.8mm). With compression of the gasket, the takeout is zero.
2. A groove is only provided in one face of each mating pair of flanges. The #1 situation to avoid with the o-ring gasket is a grooved flange mated directly to another grooved flange. The only solution to this situation is 1) remove one of the grooved flanges and replace with a flat-face flange, 2) fill one of the grooved flanges with a putty

material to obtain a flat-face, or 3) insert a rubber gasket or harder material between the two grooved flanges along with an o-ring gasket in each groove to provide a suitable seal.

3. Other general rules that are usually followed with o-ring gaskets:

A. For FRP to FRP flange connection, the groove is placed in one of the FIBERBOND® flanges at the discretion of the fabricator. For convenience during installation, if the flange is in the vertical, the groove is normally placed in the lower flange.

B. For connections to alloy flanges, the groove is applied to the FIBERBOND® flange. There is only one exception to this rule and that is when the alloy flange is a drilled-and-tapped blind flange supplied by the fabricator. In this case, the groove is applied to the alloy blind flange.

C. For connections to full-face flanged valves, lug type valves, or wafer valves that do not have an integral seal, a groove is applied to the FIBERBOND® flange.

D. For connections to valves with integral seals (not seats), as is typical with many butterfly valves, no groove is applied to the FIBERBOND® flange as no gasket is used.

E. For connections to raised face flanges, an o-ring groove is not needed. A full-face 1/8" (3mm) thick rubber gasket, such as red rubber "SBR" can be used. The takeout for the gasket is 1/8" (3mm).

F. O-ring grooves are not applied to FIBERBOND® flanges smaller than 2" (50mm) diameter. If the connection is not to an alloy blind flange that can be "grooved" by the fabricator, then a full-face 1/8" (3mm) thick rubber gasket can be used.

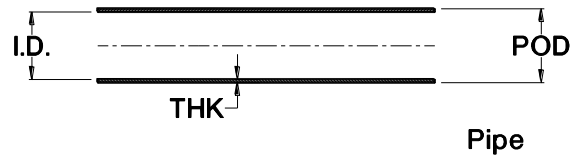
G. For flange to blind flange connections, normally the groove is placed in the blind flange. Blind flanges are usually slightly less expensive to "groove" than flanges.

FLANGES:

1. All flanges are flat face and should be bolted to flat face flanges. FIBERBOND® flanges can be bolted to raised-face flanges, however, care should be taken when torquing these flanges. Over-torquing can cause cracking in the flange.
2. The flange thickness will differ from ANSI B16.5 150#.
3. The outside diameter and bolt pattern will match 150#. Other bolt patterns, such as 300# and BS4504 PN10 & PN16, can be provided. The flange will still be limited to its standard pressure and temperature rating.
4. Reducing flanges are also available.

WALL THICKNESSES & OUTSIDE DIAMETERS:

All FIBERBOND® Fiberglass Piping Series are manufactured with a fixed inside diameter. As the pressure rating of the pipe series increases, the wall thickness and outer diameter also increase.



Ratings, Wall Thicknesses, and Outside Diameters

Size	20JF and 20JF-C									
	Rating		I.D.		THK		P.O.D.		Weight	
	(psig)	(bar)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb/ft)	(kg/m)
1"	200	13.8	1.00"	25.4	0.56"	14.2	2.12"	53.8	2.6	3.8
1.5"	200	13.8	1.50"	38.1	0.56"	14.2	2.62"	66.5	3.1	4.6
2"	200	13.8	2.00"	50.8	0.56"	14.2	3.12"	79.2	3.5	5.2
2.5"	200	13.8	2.50"	63.5	0.56"	14.2	3.62"	91.9	4.2	6.2
3"	200	13.8	3.00"	76.2	0.56"	14.2	4.12"	104.6	4.9	7.3
4"	200	13.8	4.00"	101.6	0.56"	14.2	5.12"	130.0	6.3	9.3
5"	200	13.8	5.00"	127.0	0.56"	14.2	6.12"	155.4	7.6	11.4
6"	200	13.8	6.00"	152.4	0.56"	14.2	7.12"	180.8	9.0	13.4
8"	200	13.8	8.00"	203.2	0.56"	14.3	9.13"	231.8	11.7	17.4
10"	200	13.8	10.00"	254.0	0.63"	15.9	11.25"	285.8	17.2	25.6
12"	200	13.8	12.00"	304.8	0.69"	17.5	13.38"	339.7	22.1	32.9
14"	200	13.8	14.25"	362.0	0.81"	20.6	15.88"	403.2	29.5	43.9
16"	200	13.8	16.25"	412.8	0.88"	22.2	18.00"	457.2	37.8	56.3
18"										
20"										
24"										
30"										
36"										
42"										
48"										
54"										
60"										

1. Sizes 2.5", 5", and 54" are non-standard and are not as readily available as the standard sizes.

CHANGES FROM THE PREVIOUS EDITION

April 2018: Clarified note on when it is acceptable to use 1" as the minimum pup length.

April 2016: Revised statement about ≤ 2 " gaskets at 435psig (30 bar) hydrotests in the Gaskets section to match the Gasket Selection document. No other changes made.

January 2015: Combined flanges and blinds into one section. Moved bleed rings, vanstone flanges and Fig.19MH/MC blinds to the Special Fittings Guide. Removed Fig.80F3.

January 2013: Added note on flange neck lengths. Added note on the pigmented exterior of fittings and flanges (in the Elbows section). Updated FOD for the 2" size.

January 2012: Changed layout of information for the threaded connections; added note on gaskets.

May 2011: Moved the information on thread-o-lets to be located in one section. Updated sketch of the reducing laterals (to show that it consists of the branch fitting only).

April 2010: Updated the available sizes of reducing tees.

March 2010: Clarified that the Fig.46 and Fig.48 olets consist of the branch fitting only.

February 2010: Updated wall thicknesses, O.D.s and weights in sizes 2" thru 6" to reflect the nominal dimensions of the actual product. Corrected the LTHK2 and L2 lengths for the Fig.10-O orifice flanges.

July 2009: Removed Fig.95F and Fig.97.

April 2009: Changed wording on gasket recommendations.

August 2008: Changed wording on material choices for the Fig.47JF MNPT olet and Fig.94 threaded blind flange. Changed "metallic" to "alloy" throughout the document.

January 2006: Corrected the LS dimension from 8" to 9" for the 6"x3" and smaller flanged end olets (only the detailed table was corrected).

June 2005: This is the first release of this stand-alone guide for 20JF and 20JF-C. Information was previously contained in our general Fittings Guide. Added weights and SI units to all the tables. Updated letter designations in the figures so that all are unique (e.g. changed "A" to "G" for Fig.40, Fig.43 tees and changed "A" to "H" for Fig.48 olets). Changed hemicap to cap. Added reducing tees.

December 2004: Added new note on gaskets. Added thicknesses and O.D.s for fittings. Added note for Fig.47JF MNPT olets.

August 2003: No dimensional changes were made. Additional information was added about the threaded connections, rules for o-rings, and selection of gaskets in the preceding pages.

April 2003: Details of the Figure 47 FNPT alloy saddle have been removed from the Fittings Guide. Details of the Figure 47JF MNPT alloy saddle have been added. The "C" dimension of the Figure 88 Reducing Lateral was corrected. The thicknesses of the Figure 17 Bleed Ring were changed to 1.5" for sizes up to 12". Changed dummy leg size for Figure 90 for elbow sizes 6", 14", 16", and 18".

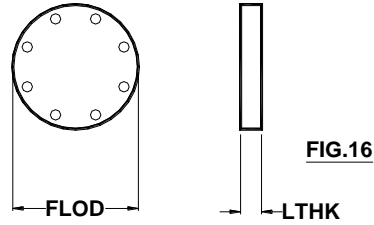
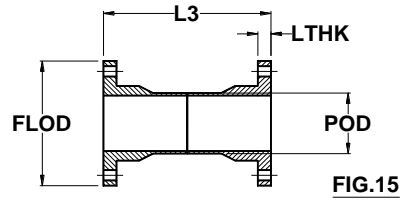
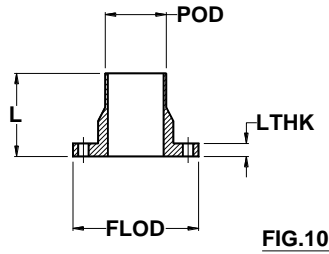
May 2002: Quantity and size of bolts and capscrew data was added to the Bolt Lengths table. Added a "Blinds & Bleed Rings" section with Figures 16, 17, 19H, and 19C. Information on "pup" lengths was added to the Dummy Legs & Hemicaps section. Information on the availability of reducing flanges was added to the Flanges section.

March 2002: The "C" and "C+L" dimensions for the 3" and 6" Figure 30 elbows were corrected. The "C" dimension was changed from 1 5/8" to 1 7/8" for 3" diameter and 3 3/8" to 3 3/4" for 6" diameter. Other minor text changes were made.

January 2002: Only minor changes have been made. The lettering terminology for the Figure 20, 20PF, and 20FF elbows were corrected so that the table matched the figure. No values changed.

April 2001: The "B" dimension in the table for Figures 46 and 48 was changed to "LS" to match the figure. The "E" and "E+L" dimensions for a 6" x 2" reducer (Fig.60 & 61) were changed to 10" and 16", respectively. The previous dimensions were incorrect. A great deal of new information is included in this edition of the Fittings Guide.

FLANGES & BLINDS



Size	Fig.10 and Fig.11				Fig.15			
	L		Max.L		L3		Min. L3	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
1"	6"	152.4	6"	152.4	12"	304.8	6"	152.4
1.5"	6"	152.4	6"	152.4	12"	304.8	6"	152.4
2"	6"	152.4	12"	304.8	12"	304.8	7"	177.8
2.5"	6"	152.4	12"	304.8	12"	304.8	7"	177.8
3"	6"	152.4	12"	304.8	12"	304.8	7"	177.8
4"	6"	152.4	12"	304.8	12"	304.8	7"	177.8
5"	6"	152.4	12"	304.8	12"	304.8	8"	203.2
6"	8"	203.2	12"	304.8	16"	406.4	8"	203.2
8"	8"	203.2	12"	304.8	16"	406.4	8"	203.2
10"	10"	254.0	18"	457.2	20"	508.0	9"	228.6
12"	10"	254.0	18"	457.2	20"	508.0	10"	254.0
14"	12"	304.8	18"	457.2	24"	609.6	10"	254.0
16"	12"	304.8	18"	457.2	24"	609.6	11"	279.4
18"								
20"								
24"								
30"								
36"								
42"								
48"								
54"								
60"								

FLANGES & BLINDS (cont'd)

1. Flanges that are shipped loose for site installation are normally manufactured with a neck length up to 3" longer than the "L" and "L2" values specified in this table.
2. For Fig.15, the minimum L length for the Fig.15 flange requires special fabrication techniques and normally requires additional time for delivery.

Flange Thicknesses and Flange O.D.s

Size	LTHK		FLOD					
	(in.)	(mm)	(in.)	(mm)				
	Fig.10, 15, 16							
1"	0.50"	12.7	4.25"	108.0				
1.5"	0.50"	12.7	5.00"	127.0				
2"	0.69"	17.5	6.00"	152.4				
2.5"	0.75"	19.1	7.00"	177.8				
3"	0.81"	20.6	7.50"	190.5				
4"	1.00"	25.4	9.00"	228.6				
5"	1.06"	27.0	10.00"	254.0				
6"	1.19"	30.2	11.00"	279.4				
8"	1.38"	34.9	13.50"	342.9				
10"	1.63"	41.3	16.00"	406.4				
12"	1.88"	47.6	19.00"	482.6				
14"	1.94"	49.2	21.00"	533.4				
16"	2.13"	54.0	23.50"	596.9				
18"								
20"								
24"								
30"								
36"								
42"								
48"								
54"								
60"								

FLANGES & BLINDS (cont'd)

Flange Weights

Size	Fig.10		Fig.15		Fig.16			
	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)		
1"	1.9	0.9	3.8	1.7	0.9	0.4		
1.5"	2.2	1.0	4.4	2.0	1.0	0.4		
2"	2.9	1.3	5.7	2.6	1.5	0.7		
2.5"	3.7	1.7	7.4	3.3	2.0	0.9		
3"	4.2	1.9	8.3	3.8	2.2	1.0		
4"	6.0	2.7	12.0	5.4	3.5	1.6		
5"	7.2	3.3	14.4	6.5	4.2	1.9		
6"	11.5	5.2	22.9	10.4	6.0	2.7		
8"	17.4	7.9	34.8	15.8	9.5	4.3		
10"	28.9	13.1	57.8	26.3	14.6	6.6		
12"	39.6	18.0	79.2	36.0	21.3	9.6		
14"	56.5	25.7	113.0	51.3	27.0	12.3		
16"	73.1	33.2	146.2	66.4	35.3	16.0		
18"								
20"								
24"								
30"								
36"								
42"								
48"								
54"								
60"								

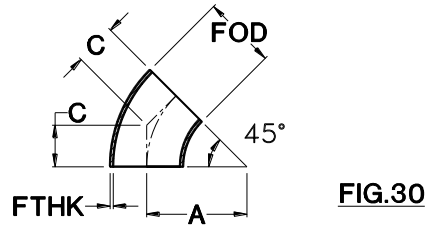
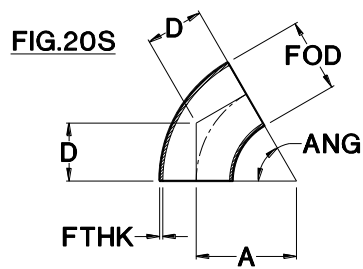
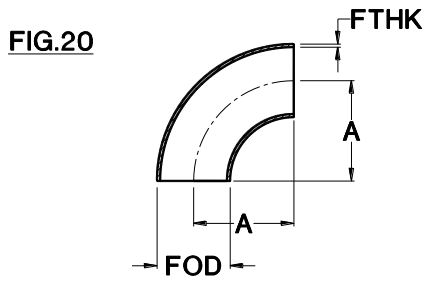
FLANGES & BLINDS (cont'd)

Recommended Stud Bolt Length (LSSB)

Size	No./Size	Fig.10, 15			
		F/F		F/S	
1"	(4) 1/2"	2.75"	70	2.75"	70
1.5"	(4) 1/2"	2.75"	70	3.00"	76
2"	(4) 5/8"	3.25"	83	3.50"	89
2.5"	(4) 5/8"	3.50"	89	3.50"	89
3"	(4) 5/8"	3.50"	89	3.75"	95
4"	(8) 5/8"	4.00"	102	4.00"	102
5"	(8) 3/4"	4.25"	108	4.25"	108
6"	(8) 3/4"	4.50"	114	4.50"	114
8"	(8) 3/4"	5.00"	127	4.75"	121
10"	(12) 7/8"	5.75"	146	5.25"	133
12"	(12) 7/8"	6.25"	159	5.50"	140
14"	(12) 1"	6.50"	165	6.00"	152
16"	(16) 1"	7.00"	178	6.25"	159
18"	(16) 1 1/8"				
20"	(20) 1 1/8"				
24"	(20) 1 1/4"				
30"	(28) 1 1/4"				
36"	(32) 1 1/2"				
42"	(36) 1 1/2"				
48"	(44) 1 1/2"				
54"	(44) 1 3/4"				
60"	(52) 1 3/4"				

1. The F/F column is for FRP to FRP flange connections. The F/S column is for FRP to 150# alloy flange connections.
2. For FRP to FRP flange connections, $LSSB = 2 * (\text{Flange Thickness} + \text{PTOL} + \text{Nut Thickness}) + 1/8" + (2 * 1/8")$.
3. For FRP to 150# alloy flange connections, $LSSB = \text{Flange Thickness} + \text{PTOL} + 150\# \text{ Flange Thickness} + \text{PTOL} + (2 * \text{Nut Thickness}) + 1/8" + (2 * 1/8")$.
4. PTOL = 1/8" up to 18" nominal size and 3/16" above 18" nominal size. 1/8" accounts for the gasket. (2 * 1/8") accounts for two washers.

ELBOWS



Size	Fig.20,20S,30		Fig.20S		Fig.30		Fig.20, 20S, 30			
	A		D	ANG	C		FTHK		FOD	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
1"	1.50"	38	ANG can be from 20 to 89degrees. $D = 1.5 * \text{Size} * \text{TAN}(\text{ANG}/2)$. Smaller angles can be mitered.				0.56"	14	2.12"	54
1.5"	2.25"	57					0.56"	14	2.62"	67
2"	3.00"	76			1.25"	32	0.56"	14	3.12"	79
2.5"	3.75"	95			2.56"	65	0.56"	14	3.62"	92
3"	4.50"	114			1.88"	48	0.56"	14	4.12"	105
4"	6.00"	152			2.50"	64	0.56"	14	5.12"	130
5"	7.50"	191			3.13"	79	0.56"	14	6.12"	155
6"	9.00"	229			3.75"	95	0.56"	14	7.12"	181
8"	12.00"	305			5.00"	127	0.63"	16	9.25"	235
10"	15.00"	381			6.25"	159	0.69"	17	11.38"	289
12"	18.00"	457			7.50"	191	0.81"	21	13.63"	346
14"	21.00"	533					8.75"	222	0.88"	22
16"	24.00"	610			10.00"	254	1.00"	25	18.25"	464
18"										
20"										
24"										
30"										
36"										
42"										
48"										
54"										
60"										

ELBOWS (cont'd)

1. 42" and larger elbows are mitered, all other sizes are full sweep.

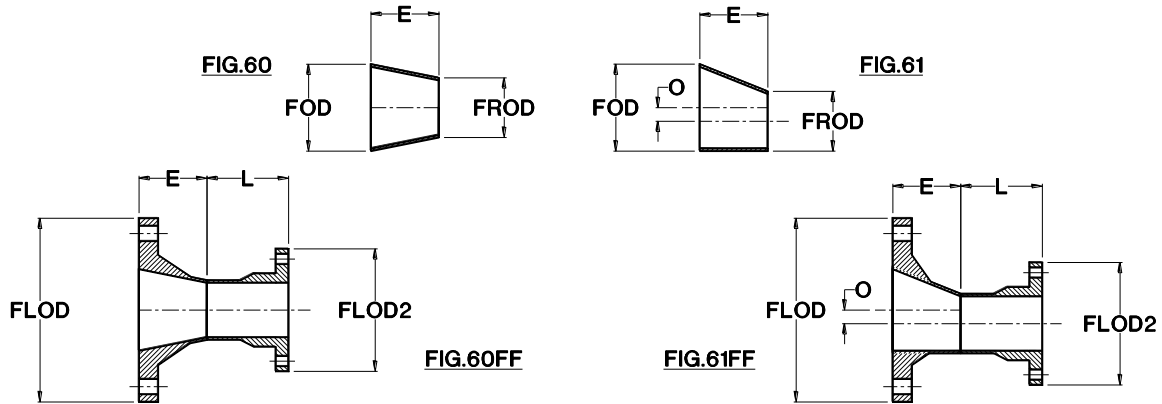
Elbow Ratings and Weights

Size	Rating		Fig.20		Fig.30	
	(psig)	(bar)	Weight		Weight	
			(lb)	(kg)	(lb)	(kg)
1"	200	13.8	0.3	0.2		
1.5"	200	13.8	0.7	0.3		
2"	200	13.8	1.1	0.5	0.6	0.3
2.5"	200	13.8	1.4	0.6	0.7	0.3
3"	200	13.8	2.4	1.1	1.2	0.6
4"	200	13.8	4.2	1.9	2.1	1.0
5"	200	13.8	5.1	2.3	2.6	1.2
6"	200	13.8	10.8	4.9	5.4	2.5
8"	200	13.8	23.3	10.6	11.7	5.3
10"	200	13.8	38.3	17.4	19.1	8.7
12"	200	13.8	64.5	29.3	32.2	14.6
14"	200	13.8	95.8	43.5	47.9	21.8
16"	200	13.8	141.8	64.4	70.9	32.2
18"						
20"						
24"						
30"						
36"						
42"						
48"						
54"						
60"						

1. These ratings are also valid for flanges (Fig.10, Fig.10O, Fig.11, & Fig.15), blind flanges (Fig.16, Fig.19MC, Fig.19MH), bleed rings (Fig.17), tees (Fig.40, Fig.40PPF, & Fig.40F3), saddles (Fig.46 & Fig.48), reducers (Fig.60 & Fig.61), caps (Fig.96), MNPT saddles (Fig.47JF), and "dummy legs" (Fig.90 & Fig.91). Laterals (Fig.80 & Fig.80F3) and reducing laterals (Fig.88) are only rated to 100psig up to 16" and 50psig up to 60".

2. Fittings and flanges that are shipped loose for site installation are typically shipped without any pigmented gelcoat. This is due to the fact that the gelcoat would have to be removed during the bonding process.

REDUCERS



Size	E		E+L		FOD		FROD		O	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
1.5"x1"	1.25"	32	7.25"	184	2.63"	67	2.13"	54	0.25"	6
2"x1.5"	1.25"	32	7.25"	184	3.13"	79	2.63"	67	0.25"	6
2"x1"	2.50"	64	8.50"	216	3.13"	79	2.13"	54	0.50"	13
2.5"x2"	1.25"	32	7.25"	184	3.63"	92	3.13"	79	0.25"	6
3"x2.5"	1.25"	32	7.25"	184	4.13"	105	3.63"	92	0.25"	6
3"x2"	2.50"	64	8.50"	216	4.13"	105	3.13"	79	0.50"	13
3"x1.5"	3.75"	95	9.75"	248	4.13"	105	2.63"	67	0.75"	19
3"x1"	5"	127	11"	279	4.13"	105	2.13"	54	1.00"	25
4"x3"	2.50"	64	8.50"	216	5.13"	130	4.13"	105	0.50"	13
4"x2.5"	3.75"	95	9.75"	248	5.13"	130	3.63"	92	0.75"	19
4"x2"	5"	127	11"	279	5.13"	130	3.13"	79	1.00"	25
4"x1.5"	6.25"	159	12.25"	311	5.13"	130	2.63"	67	1.25"	32
4"x1"	7.50"	191	13.50"	343	5.13"	130	2.13"	54	1.50"	38
5"x4"	2.50"	64	8.50"	216	6.13"	156	5.13"	130	0.50"	13
6"x5"	2.50"	64	8.50"	216	7.13"	181	6.13"	156	0.50"	13
6"x4"	5"	127	11"	279	7.13"	181	5.13"	130	1.00"	25
6"x3"	7.50"	191	13.50"	343	7.13"	181	4.13"	105	1.50"	38
6"x2.5"	8.75"	222	14.75"	375	7.13"	181	3.63"	92	1.75"	44
6"x2"	10"	254	16"	406	7.13"	181	3.13"	79	2.00"	51
8"x6"	5"	127	13"	330	9.25"	235	7.13"	181	1.06"	27
8"x5"	7.50"	191	13.50"	343	9.25"	235	6.13"	156	1.56"	40
8"x4"	10"	254	16"	406	9.25"	235	5.13"	130	2.06"	52
8"x3"	12.50"	318	18.50"	470	9.25"	235	4.13"	105	2.56"	65

REDUCERS (cont'd)

1. Offset dimension for eccentric reducers is 0.5" x (FOD - FROD).
2. Reducers may be available in other sizes than those shown above. Min. E+L dimensions are also available.
3. The FLOD and FLOD2 dimensions match ASME B16.5 150# and B16.1 125# O.D.s.

Reducer Dimensions (cont'd)

Size	E		E+L		FOD		FROD		O	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
10"x8"	5"	127	13"	330	11.38"	289	9.25"	235	1.06"	27
10"x6"	10"	254	18"	457	11.38"	289	7.13"	181	2.13"	54
10"x5"	12.50"	318	18.50"	470	11.38"	289	6.13"	156	2.63"	67
10"x4"	15"	381	21"	533	11.38"	289	5.13"	130	3.13"	79
12"x10"	5"	127	15"	381	13.63"	346	11.38"	289	1.13"	29
12"x8"	10"	254	18"	457	13.63"	346	9.25"	235	2.19"	56
12"x6"	15"	381	23"	584	13.63"	346	7.13"	181	3.25"	83
14"x12"	5"	127	15"	381	16.00"	406	13.63"	346	1.19"	30
14"x10"	10"	254	20"	508	16.00"	406	11.38"	289	2.31"	59
14"x8"	15"	381	23"	584	16.00"	406	9.25"	235	3.38"	86
16"x14"	5"	127	17"	432	18.25"	464	16.00"	406	1.13"	29
16"x12"	10"	254	20"	508	18.25"	464	13.63"	346	2.31"	59
16"x10"	15"	381	25"	635	18.25"	464	11.38"	289	3.44"	87
18"x16"										
18"x14"										
18"x12"										
20"x18"										
20"x16"										
20"x14"										
24"x20"										
24"x18"										
30"x24"										
36"x30"										
42"x36"										
48"x42"										
54"x48"										
60"x54"										

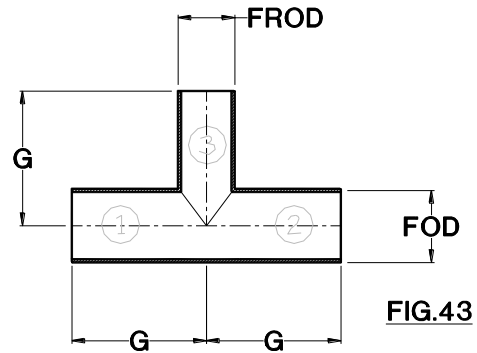
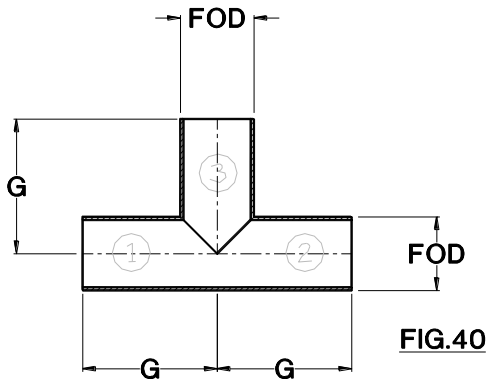
REDUCERS (cont'd)

Reducer Weights

Size	Fig.60, 61		Fig.60FF, 61FF	
	(lb)	(kg)	(lb)	(kg)
1.5"x1"	0.2	0.1	3.0	1.4
2"x1.5"	0.5	0.2	4.1	1.9
2"x1"	0.5	0.2	3.8	1.7
2.5"x2"	0.3	0.1	5.2	2.4
3"x2.5"	0.6	0.3	6.6	3.0
3"x2"	0.6	0.3	5.8	2.6
3"x1.5"	1.3	0.6	5.7	2.6
3"x1"	1.3	0.6	5.4	2.5
4"x3"	0.8	0.4	8.5	3.9
4"x2.5"	1.7	0.8	8.8	4.0
4"x2"	1.7	0.8	8.0	3.6
4"x1.5"	2.5	1.1	8.2	3.7
4"x1"	2.5	1.1	7.9	3.6
5"x4"	1.0	0.5	11.2	5.1
6"x5"	1.4	0.6	14.7	6.7
6"x4"	2.9	1.3	14.9	6.8
6"x3"	4.3	1.9	14.5	6.6
6"x2.5"	5.7	2.6	15.4	7.0
6"x2"	5.7	2.6	14.6	6.6
8"x6"	4.6	2.1	25.6	11.6
8"x5"	7.0	3.2	23.8	10.8
8"x4"	9.3	4.2	24.8	11.3
8"x3"	11.6	5.3	25.3	11.5
10"x8"	6.1	2.8	38.1	17.3
10"x6"	12.2	5.5	38.3	17.4
10"x5"	15.2	6.9	37.1	16.9
10"x4"	18.3	8.3	38.9	17.7

Size	Fig.60, 61		Fig.60FF, 61FF	
	(lb)	(kg)	(lb)	(kg)
12"x10"	8.6	3.9	58.7	26.7
12"x8"	17.1	7.8	55.8	25.3
12"x6"	25.7	11.6	75.8	34.4
14"x12"	10.9	4.9	77.5	35.2
14"x10"	21.8	9.9	77.8	35.3
14"x8"	32.7	14.8	77.1	35.0
16"x14"	14.1	6.4	105.9	48.1
16"x12"	28.2	12.8	103.1	46.8
16"x10"	42.3	19.2	106.5	48.4
18"x16"				
18"x14"				
18"x12"				
20"x18"				
20"x16"				
20"x14"				
24"x20"				
24"x18"				
30"x24"				
36"x30"				
42"x36"				
48"x42"				
54"x48"				
60"x54"				

EQUAL SIZE & REDUCING TEES



Size	Fig.40					
	G		FOD		Weight	
	(in.)	(mm)	(lb)	(kg)	(lb)	(kg)
1"	5"	127	2.13"	54	3.8	1.7
1.5"	5.5"	140	2.63"	67	5.4	2.5
2"	6"	152	3.13"	80	3.3	1.5
2.5"	6.5"	165	3.63"	92	4.0	1.8
3"	7"	178	4.13"	105	5.4	2.5
4"	8"	203	5.13"	130	8.0	3.6
5"	9"	229	6.13"	156	9.8	4.4
6"	10"	254	7.13"	181	17.2	7.8
8"	12"	305	9.25"	235	33.4	15.2
10"	14"	356	11.38"	289	51.2	23.2
12"	16"	406	13.63"	346	82.1	37.3
14"	18"	457	16.00"	406	117.7	53.4
16"	20"	508	18.25"	464	169.3	76.9
18"						
20"						
24"						
30"						
36"						
42"						
48"						
54"						
60"						

EQUAL SIZE & REDUCING TEES (cont'd)

Size	Fig.43							
	G		FOD		FROD		Weight	
	(in.)	(mm)	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)
8"x6"	12"	305	9.25"	235	7.00"	178	29.6	13.4
10"x8"	14"	356	11.38"	289	9.25"	235	47.8	21.7
10"x6"	14"	356	11.38"	289	7.00"	178	42.8	19.4
12"x10"	16"	406	13.63"	346	5.00"	127	75.1	34.1
12"x8"	16"	406	13.63"	346	9.25"	235	70.4	32.0
14"x12"	18"	457	16.00"	406	13.63"	346	110.4	50.1
14"x10"	18"	457	16.00"	406	11.38"	289	101.5	46.1
16"x14"	20"	508	18.25"	464	16.00"	406	158.0	71.7
16"x12"	20"	508	18.25"	464	13.63"	346	148.5	67.4

OLETS, PLAIN AND FLANGED

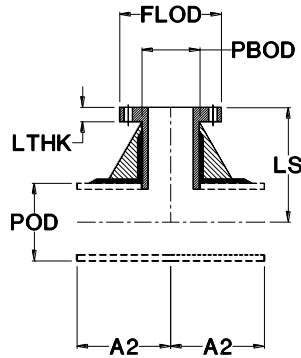


FIG.46

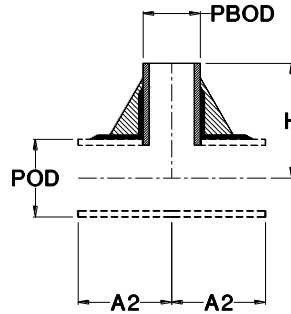


FIG.48

A2							
6"	7"	8"	10"	12"	14"	16"	18"

Branch Diameter							
1", 1.5", 2"	2.5", 3"	4"	5", 6"	8"	10"	12"	14"

		LS																		
H	6"	Header Diameter	1"																	
	6"		1.5"																	
	6"		2"																	
	6"		2.5"																	
	7"		3"																	
	8"		4"																	
	10"		5"																	
	10"		6"																	
	12"		8"																	
	14"		10"																	
	16"		12"																	
	18"		14"																	
	20"		16"																	
	21"		18"																	
	22"		20"																	
	24"		24"																	
	30"		30"																	
	33"		36"																	
	36"		42"																	
	45"		48"																	
54"	54"																			
54"	60"																			

1. The 'H' dimension is based on header size. The 'A2' dimension is based on branch size. The 'LS' dimension is based on both header and branch size; e.g. 3" on 6" Fig. 46 has LS = 9", A2 = 7"
2. An outlet fitting includes only the branch components. Unless purchased as part of a pre-fabricated (pre-assembled) system, it does require some assembly and bonding work.

OLETS, PLAIN AND FLANGED (cont'd)

Flanged End Olet Dimensions

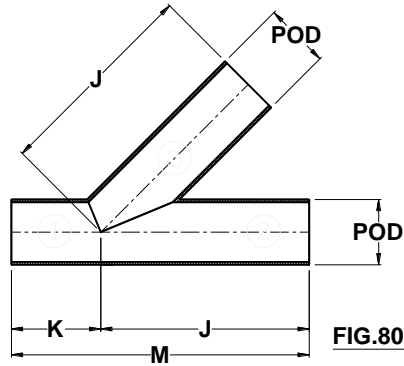
Size	LS		A2		LTHK		FLOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
1.5"x1"	7.00"	178	6.00"	152	0.50"	13	4.25"	108	3.6	1.6
2"x1.5"	7.00"	178	6.00"	152	0.50"	13	5.00"	127	4.6	2.1
2"x1"	7.00"	178	6.00"	152	0.50"	13	4.25"	108	3.6	1.6
2.5"x2"	7.50"	191	6.00"	152	0.69"	17	6.00"	152	5.8	2.7
3"x2.5"	7.50"	191	7.00"	178	0.75"	19	7.00"	178	7.2	3.3
3"x2"	7.50"	191	6.00"	152	0.69"	17	6.00"	152	5.8	2.7
3"x1.5"	7.50"	191	6.00"	152	0.50"	13	5.00"	127	4.6	2.1
3"x1"	7.50"	191	6.00"	152	0.50"	13	4.25"	108	3.6	1.6
4"x3"	8.00"	203	7.00"	178	0.81"	21	7.50"	191	8.3	3.8
4"x2.5"	8.00"	203	7.00"	178	0.75"	19	7.00"	178	7.2	3.3
4"x2"	8.00"	203	6.00"	152	0.69"	17	6.00"	152	5.8	2.7
4"x1.5"	8.00"	203	6.00"	152	0.50"	13	5.00"	127	4.6	2.1
4"x1"	8.00"	203	6.00"	152	0.50"	13	4.25"	108	3.6	1.6
5"x4"	9.00"	229	8.00"	203	1.00"	25	9.00"	229	11.3	5.2
6"x5"	11.00"	279	10.00"	254	1.06"	27	10.00"	254	13.8	6.3
6"x4"	9.00"	229	8.00"	203	1.00"	25	9.00"	229	11.3	5.2
6"x3"	9.00"	229	7.00"	178	0.81"	21	7.50"	191	8.3	3.8
6"x2.5"	9.00"	229	7.00"	178	0.75"	19	7.00"	178	7.2	3.3
6"x2"	9.00"	229	6.00"	152	0.69"	17	6.00"	152	5.8	2.7
6"x1.5"	9.00"	229	6.00"	152	0.50"	13	5.00"	127	4.6	2.1
6"x1"	9.00"	229	6.00"	152	0.50"	13	4.25"	108	3.6	1.6
8"x6"	12.00"	305	10.00"	254	1.19"	30	11.00"	279	24.6	11.1
8"x5"	12.00"	305	10.00"	254	1.06"	27	10.00"	254	13.8	6.3
8"x4"	10.00"	254	8.00"	203	1.00"	25	9.00"	229	11.3	5.2
8"x3"	10.00"	254	7.00"	178	0.81"	21	7.50"	191	8.3	3.8
8"x2.5"	10.00"	254	7.00"	178	0.75"	19	7.00"	178	7.2	3.3
8"x2"	10.00"	254	6.00"	152	0.69"	17	6.00"	152	5.8	2.7
8"x1.5"	10.00"	254	6.00"	152	0.50"	13	5.00"	127	4.6	2.1
8"x1"	10.00"	254	6.00"	152	0.50"	13	4.25"	108	3.6	1.6
10"x8"	13.00"	330	12.00"	305	1.38"	35	13.50"	343	43.3	19.6
10"x6"	13.00"	330	10.00"	254	1.19"	30	11.00"	279	24.6	11.1
10"x5"	13.00"	330	10.00"	254	1.06"	27	10.00"	254	13.8	6.3
10"x4"	11.00"	279	8.00"	203	1.00"	25	9.00"	229	11.3	5.2
10"x3"	11.00"	279	7.00"	178	0.81"	21	7.50"	191	8.3	3.8
10"x2.5"	11.00"	279	7.00"	178	0.75"	19	7.00"	178	7.2	3.3
10"x2"	11.00"	279	6.00"	152	0.69"	17	6.00"	152	5.8	2.7
10"x1.5"	11.00"	279	6.00"	152	0.50"	13	5.00"	127	4.6	2.1
10"x1"	11.00"	279	6.00"	152	0.50"	13	4.25"	108	3.6	1.6

OLETS, PLAIN AND FLANGED (cont'd)

Plain End Olet Dimensions

Size	H		A2		POD		PBOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
1.5"x1"	6.00"	152	6.00"	152	2.63"	67	2.13"	54	2.1	1.0
2"x1.5"	6.00"	152	6.00"	152	3.13"	80	2.63"	67	2.9	1.3
2"x1"	6.00"	152	6.00"	152	3.13"	80	2.13"	54	2.1	1.0
2.5"x2"	7.00"	178	6.00"	152	3.63"	92	3.13"	80	3.5	1.6
3"x2.5"	7.00"	178	7.00"	178	4.13"	105	3.63"	92	4.2	1.9
3"x2"	7.00"	178	6.00"	152	4.13"	105	3.13"	80	3.5	1.6
3"x1.5"	7.00"	178	6.00"	152	4.13"	105	2.63"	67	2.9	1.3
3"x1"	7.00"	178	6.00"	152	4.13"	105	2.13"	54	2.1	1.0
4"x3"	8.00"	203	7.00"	178	5.13"	130	4.13"	105	4.9	2.2
4"x2.5"	8.00"	203	7.00"	178	5.13"	130	3.63"	92	4.2	1.9
4"x2"	8.00"	203	6.00"	152	5.13"	130	3.13"	80	3.5	1.6
4"x1.5"	8.00"	203	6.00"	152	5.13"	130	2.63"	67	2.9	1.3
4"x1"	8.00"	203	6.00"	152	5.13"	130	2.13"	54	2.1	1.0
5"x4"	10.00"	254	8.00"	203	6.13"	156	5.13"	130	6.3	2.8
6"x5"	10.00"	254	10.00"	254	7.13"	181	6.13"	156	7.7	3.5
6"x4"	10.00"	254	8.00"	203	7.13"	181	5.13"	130	6.3	2.8
6"x3"	10.00"	254	7.00"	178	7.13"	181	4.13"	105	4.9	2.2
6"x2.5"	10.00"	254	7.00"	178	7.13"	181	3.63"	92	4.2	1.9
6"x2"	10.00"	254	6.00"	152	7.13"	181	3.13"	80	3.5	1.6
6"x1.5"	10.00"	254	6.00"	152	7.13"	181	2.63"	67	2.9	1.3
6"x1"	10.00"	254	6.00"	152	7.13"	181	2.13"	54	2.1	1.0
8"x6"	12.00"	305	10.00"	254	9.25"	235	7.13"	181	14.5	6.6
8"x5"	12.00"	305	10.00"	254	9.25"	235	6.13"	156	7.7	3.5
8"x4"	12.00"	305	8.00"	203	9.25"	235	5.13"	130	6.3	2.8
8"x3"	12.00"	305	7.00"	178	9.25"	235	4.13"	105	4.9	2.2
8"x2.5"	12.00"	305	7.00"	178	9.25"	235	3.63"	92	4.2	1.9
8"x2"	12.00"	305	6.00"	152	9.25"	235	3.13"	80	3.5	1.6
8"x1.5"	12.00"	305	6.00"	152	9.25"	235	2.63"	67	2.9	1.3
8"x1"	12.00"	305	6.00"	152	9.25"	235	2.13"	54	2.1	1.0
10"x8"	14.00"	356	12.00"	305	11.38"	289	9.25"	235	25.7	11.6
10"x6"	14.00"	356	10.00"	254	11.38"	289	7.13"	181	14.5	6.6
10"x5"	14.00"	356	10.00"	254	11.38"	289	6.13"	156	7.7	3.5
10"x4"	14.00"	356	8.00"	203	11.38"	289	5.13"	130	6.3	2.8
10"x3"	14.00"	356	7.00"	178	11.38"	289	4.13"	105	4.9	2.2
10"x2.5"	14.00"	356	7.00"	178	11.38"	289	3.63"	92	4.2	1.9
10"x2"	14.00"	356	6.00"	152	11.38"	289	3.13"	80	3.5	1.6
10"x1.5"	14.00"	356	6.00"	152	11.38"	289	2.63"	67	2.9	1.3
10"x1"	14.00"	356	6.00"	152	11.38"	289	2.13"	54	2.1	1.0

LATERALS



Size	Fig.80									
	J		K		M (J+K)		POD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
1"										
1.5"										
2"	10"	254	6"	152	16"	406	3.13"	80	8.0	3.6
2.5"	12"	305	6"	152	18"	457	3.63"	92	9.7	4.4
3"	12"	305	6"	152	18"	457	4.13"	105	12.6	5.7
4"	14"	356	6"	152	20"	508	5.13"	130	17.9	8.1
5"	16"	406	8"	203	24"	610	6.13"	156	21.9	9.9
6"	16"	406	8"	203	24"	610	7.13"	181	36.1	16.4
8"	20"	508	10"	254	30"	762	9.25"	235	66.7	30.3
10"	24"	610	10"	254	34"	864	11.38"	289	113.8	51.7
12"	26"	660	12"	305	38"	965	13.63"	346	166.5	75.6
14"	30"	762	12"	305	42"	1067	16.00"	406	249.2	113.1
16"	32"	813	14"	356	46"	1168	18.25"	464	348.2	158.1
18"										
20"										
24"										
30"										
36"										
42"										
48"										
54"										
60"										

1. Standard laterals are limited to a 100psig design pressure up to 16" and 50psig up to 60".

REDUCING LATERAL OLETS (cont'd)

1. The 'J' dimension is based on header size. The 'K' dimension is based on branch size. The 'J2' dimension is based on header and branch size; e.g. 3" on 6" Fig. 88 has J=16", K=12", J2=12".
2. An outlet fitting includes only the branch components. Unless purchased as part of a pre-fabricated (pre-assembled) system, it does require some assembly and bonding work.
3. Standard reducing laterals are limited to a 100psig design pressure up to 16" and 50psig up to 60".

Reducing Lateral Olet Dimensions

Size	Fig.88									
	J		K		J2		POD		PROD	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
1.5"x1"										
2"x1.5"	10"	254	6"	152	10"	254	3.13"	80	2.63"	67
2"x1"	10"	254	6"	152	10"	254	3.13"	80	2.13"	54
2.5"x2"	12"	305	6"	152	10"	254	3.63"	92	3.13"	80
3"x2.5"	12"	305	6"	152	12"	305	4.13"	105	3.63"	92
3"x2"	12"	305	6"	152	10"	254	4.13"	105	3.13"	80
3"x1.5"	12"	305	6"	152	10"	254	4.13"	105	2.63"	67
3"x1"	12"	305	6"	152	10"	254	4.13"	105	2.13"	54
4"x3"	14"	356	6"	152	12"	305	5.13"	130	4.13"	105
4"x2.5"	14"	356	6"	152	12"	305	5.13"	130	3.63"	92
4"x2"	14"	356	6"	152	10"	254	5.13"	130	3.13"	80
4"x1.5"	14"	356	6"	152	10"	254	5.13"	130	2.63"	67
4"x1"	14"	356	6"	152	10"	254	5.13"	130	2.13"	54
5"x4"	16"	406	6"	152	14"	356	6.13"	156	5.13"	130
6"x5"	16"	406	8"	203	15"	381	7.13"	181	6.13"	156
6"x4"	16"	406	6"	152	14"	356	7.13"	181	5.13"	130
6"x3"	16"	406	6"	152	12"	305	7.13"	181	4.13"	105
6"x2.5"	16"	406	6"	152	12"	305	7.13"	181	3.63"	92
6"x2"	16"	406	6"	152	10"	254	7.13"	181	3.13"	80
6"x1.5"	16"	406	6"	152	10"	254	7.13"	181	2.63"	67
6"x1"	16"	406	6"	152	10"	254	7.13"	181	2.13"	54
8"x6"	20"	508	8"	203	16"	406	9.25"	235	7.13"	181
8"x5"	20"	508	8"	203	16"	406	9.25"	235	6.13"	156
8"x4"	20"	508	6"	152	14"	356	9.25"	235	5.13"	130
8"x3"	20"	508	6"	152	12"	305	9.25"	235	4.13"	105
8"x2.5"	20"	508	6"	152	12"	305	9.25"	235	3.63"	92
8"x2"	20"	508	6"	152	10"	254	9.25"	235	3.13"	80
8"x1.5"	20"	508	6"	152	10"	254	9.25"	235	2.63"	67
8"x1"	20"	508	6"	152	10"	254	9.25"	235	2.13"	54

REDUCING LATERAL OLETS (cont'd)

Reducing Lateral Olet Dimensions

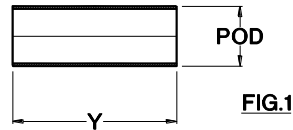
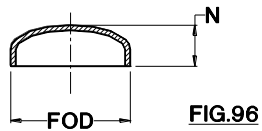
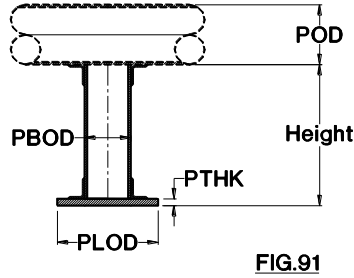
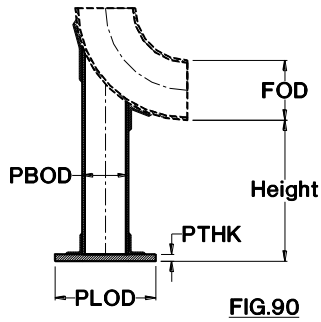
Size	Fig.88									
	J		K		J2		POD		PROD	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
10"x8"	24"	610	10"	254	20"	508	11.38"	289	9.25"	235
10"x6"	24"	610	8"	203	16"	406	11.38"	289	7.13"	181
10"x5"	24"	610	8"	203	16"	406	11.38"	289	6.13"	156
10"x4"	24"	610	6"	152	14"	356	11.38"	289	5.13"	130
10"x3"	24"	610	6"	152	13"	330	11.38"	289	4.13"	105
10"x2.5"	24"	610	6"	152	13"	330	11.38"	289	3.63"	92
10"x2"	24"	610	6"	152	12"	305	11.38"	289	3.13"	80
10"x1.5"	24"	610	6"	152	12"	305	11.38"	289	2.63"	67
10"x1"	24"	610	6"	152	12"	305	11.38"	289	2.13"	54
12"x10"	26"	660	10"	254	24"	610	13.63"	346	11.38"	289
12"x8"	26"	660	10"	254	20"	508	13.63"	346	9.25"	235
12"x6"	26"	660	8"	203	18"	457	13.63"	346	7.13"	181
12"x5"	26"	660	8"	203	18"	457	13.63"	346	6.13"	156
12"x4"	26"	660	6"	152	16"	406	13.63"	346	5.13"	130
12"x3"	26"	660	6"	152	15"	381	13.63"	346	4.13"	105
12"x2.5"	26"	660	6"	152	15"	381	13.63"	346	3.63"	92
12"x2"	26"	660	6"	152	14"	356	13.63"	346	3.13"	80
12"x1.5"	26"	660	6"	152	14"	356	13.63"	346	2.63"	67
12"x1"	26"	660	6"	152	14"	356	13.63"	346	2.13"	54
14"x12"	30"	762	12"	305	26"	660	16.00"	406	13.63"	346
16"x14"	32"	813	12"	305	30"	762	18.25"	464	16.00"	406
18"x16"										
20"x18"										
24"x20"										
30"x24"										
36"x30"										
42"x36"										
48"x42"										
54"x48"										
60"x54"										

REDUCING LATERAL OLETS (cont'd)

Reducing Lateral Olet Weights

Size	Fig.88		Size	Fig.88		Size	Fig.88	
	(lb)	(kg)		(lb)	(kg)		(lb)	(kg)
1.5" x 1"			8" x 6"	26.6	12.1	14" x 12"	112.1	50.9
			8" x 5"	16.7	7.6			
2" x 1.5"	4.8	2.2	8" x 4"	13.7	6.2	16" x 14"	167.5	76.0
2" x 1"	3.7	1.7	8" x 3"	10.6	4.8			
			8" x 2.5"	9.1	4.1	18" x 16"		
2.5" x 2"	5.7	2.6	8" x 2"	7.5	3.4			
			8" x 1.5"	6.4	2.9	20" x 18"		
3" x 2.5"	6.9	3.1	8" x 1"	5.0	2.3			
3" x 2"	5.7	2.6				24" x 20"		
3" x 1.5"	4.8	2.2	10" x 8"	49.3	22.4			
3" x 1"	3.7	1.7	10" x 6"	29.3	13.3	30" x 24"		
			10" x 5"	18.7	8.5			
4" x 3"	8.7	3.9	10" x 4"	15.3	7.0	36" x 30"		
4" x 2.5"	7.4	3.4	10" x 3"	11.9	5.4			
4" x 2"	6.2	2.8	10" x 2.5"	10.2	4.6	42" x 36"		
4" x 1.5"	5.2	2.3	10" x 2"	8.4	3.8			
4" x 1"	4.0	1.8	10" x 1.5"	7.2	3.3	48" x 42"		
			10" x 1"	5.7	2.6			
5" x 4"	12.0	5.4				54" x 48"		
			12" x 10"	82.1	37.3			
6" x 5"	14.7	6.7	12" x 8"	51.3	23.3	60" x 54"		
6" x 4"	12.0	5.4	12" x 6"	30.6	13.9			
6" x 3"	9.3	4.2	12" x 5"	19.8	9.0			
6" x 2.5"	8.0	3.6	12" x 4"	16.1	7.3			
6" x 2"	6.6	3.0	12" x 3"	12.5	5.7			
6" x 1.5"	5.6	2.5	12" x 2.5"	10.7	4.9			
6" x 1"	4.4	2.0	12" x 2"	8.9	4.0			
			12" x 1.5"	7.6	3.4			
			12" x 1"	6.0	2.7			

DUMMY LEGS, CAPS, PUP PIECES



Size	Fig.90, 91									
	Dummy Leg Size		PLOD		PTHK		PBOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
1"										
1.5"										
2"	2"	51	5"	127	0.50"	13	3.13"	80	10.3	4.7
2.5"	2"	51	5"	127	0.50"	13	3.13"	80	10.3	4.7
3"	2"	51	5"	127	0.50"	13	3.13"	80	10.3	4.7
4"	3"	76	6"	152	0.50"	13	4.13"	105	14.5	6.6
5"	3"	76	6"	152	0.50"	13	4.13"	105	14.5	6.6
6"	4"	102	7"	178	0.50"	13	5.13"	130	18.7	8.5
8"	6"	152	9"	229	0.50"	13	7.13"	181	33.4	15.2
10"	6"	152	9"	229	0.50"	13	7.13"	181	33.4	15.2
12"	8"	203	12"	305	0.50"	13	9.13"	232	53.0	24.1
14"	10"	254	14"	356	0.50"	13	11.25"	286	82.3	37.4
16"	12"	305	16"	406	0.50"	13	13.38"	340	114.9	52.2
18"										
20"										
24"										
30"										
36"										
42"										
48"										
54"										
60"										

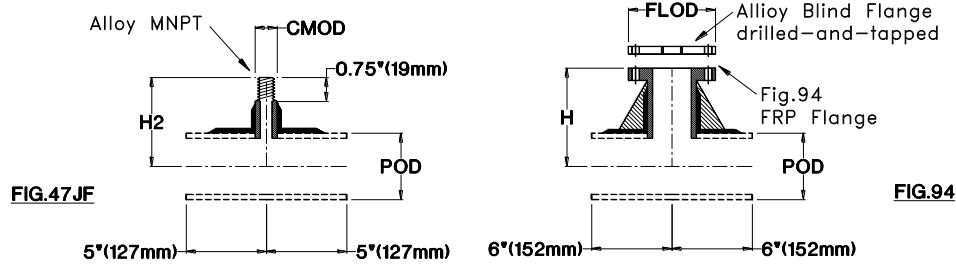
DUMMY LEGS, CAPS, PUP PIECES (cont'd)

1. Fig. 90 and Fig. 91 include the dummy leg only, not the elbow nor pipe. Dummy legs can also be placed under tees and reducers.
2. Maximum dummy leg length is 3'-0". Specify the required leg length with the figure number.
3. Plate to be shipped loose and field installed. 6" of trim to be provided on dummy leg.
4. In prefabricated systems, the Fig.1 'Y' dimension can be as short as 1".

Caps and Pup Pieces

Size	Fig.96						Fig.1			
	N		FOD		Weight		Y		POD	
	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)	(in.)	(mm)	(lb)	(kg)
1"							4"	1.8	1.88"	48
1.5"							4"	1.8	2.38"	60
2"	1.5"	38	3.13"	80	0.2	0.1	4"	102	2.88"	73
2.5"	1.5"	38	3.63"	92	0.2	0.1	4"	102	3.38"	86
3"	2.0"	51	4.13"	105	0.4	0.2	4"	102	3.88"	98
4"	2.5"	64	5.13"	130	0.7	0.3	6"	152	4.88"	124
5"	3.0"	76	6.13"	156	0.8	0.4	6"	152	5.88"	149
6"	3.5"	89	7.13"	181	1.7	0.8	6"	152	7.00"	178
8"	4.0"	102	9.13"	232	3.7	1.7	8"	203	9.13"	232
10"	5.0"	127	11.25"	286	6.1	2.8	10"	254	11.25"	286
12"	6.0"	152	13.38"	340	10.3	4.7	12"	305	13.38"	340
14"	6.5"	165	15.88"	403	15.3	6.9	14"	356	15.88"	403
16"	7.0"	178	18.00"	457	22.6	10.3	16"	406	18.00"	457
18"										
20"										
24"										
30"										
36"										
42"										
48"										
54"										
60"										

THREADED CONNECTIONS



For Series 20JF and 20JF-C, the threaded options are: 1) the Figure 94 Flanged Saddle with drilled-and-tapped alloy blind flange and 2) the Figure 47JF threaded alloy MNPT. The Figure 97 threaded FRP FNPT is no longer a standard product.

1. Fig.94: The most reliable and heavy-duty solution for threaded connections is to use an FRP flange and bolt an alloy (316SS, 90/10 Cu-Ni, Gr. 2 Ti, etc.) blind flange that is drilled-and-tapped for the NPT size. This type of connection has been used for many years and is the most durable and toughest solution.
2. Fig.47JF: To eliminate the need for a bolted connection, the Figure 47JF MNPT alloy saddle is available. Alloy material choices include 316SS, 90/10 Cu-Ni, Titanium, and Monel. Other alloy materials may be available. This alloy MNPT is designed for connections to spray nozzles in deluge systems and can also be used for connecting to vents, drains, and instruments. Due to the large bending moment that could be applied, it is not recommended that the Fig.47JF MNPT be used to connect directly to long runs of threaded alloy piping. Note: the alloy MNPT is permanently bonded to the FRP piping.

Notes:

1. The Fig.47JF sizes are 0.50", 0.75", 1.0", 1.25", and 1.5" MNPT. The 'H2' dimension is approximate and will vary based on the pipe wall thickness. Material choices include 316SS, 90/10 Cu-Ni, Titanium, Monel, and others.
2. The Fig.47JF outlet fitting includes only the branch components. Unless purchased as part of a pre-fabricated (pre-assembled) system, it does require some assembly and bonding work.
3. The Fig.94 threaded alloy blind includes the drilled-and-tapped alloy blind flange only. The branch size is 2" diameter, standard. Other branch sizes are available upon request. Material choices for the alloy blind flange include 316SS, 90/10 Cu-Ni and others.
4. For Fig.47JF, CMODs are: 0.56" (14.3mm) for 1/2", 0.81" (20.6mm) for 3/4", 1.06" (27.0mm) for 1", 1.31" (33.3mm) for 1 1/4", and 1.56" (39.7mm) for 1 1/2" MNPTs.

THREADED CONNECTIONS (cont'd)

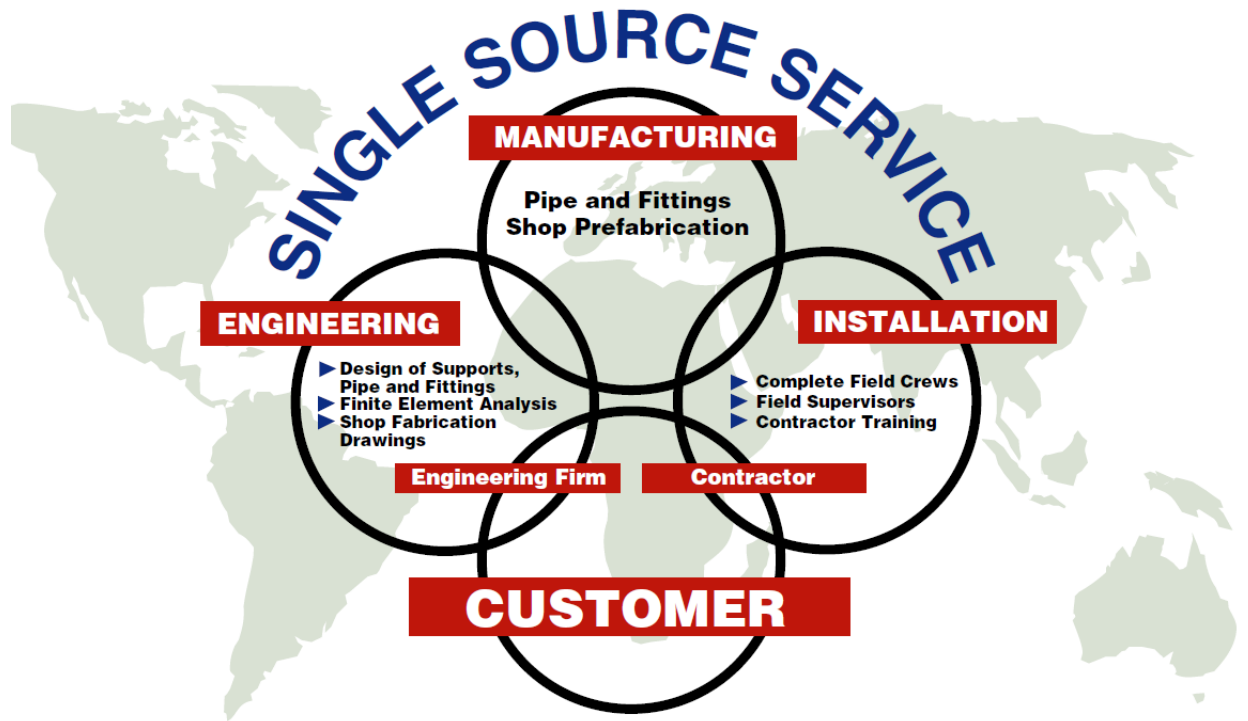
Size	Fig.47JF,94	
	POD	
	(in.)	(mm)
0.5"		
0.75"		
1.0"	1.88"	48
1.5"	2.38"	60
2"	2.88"	73
2.5"	3.38"	86
3"	3.88"	98
4"	4.88"	124
5"	5.88"	149
6"	7.00"	178
8"	9.13"	232
10"	11.25"	286
12"	13.38"	340
14"	15.88"	403
16"	18.00"	457
18"		
20"		
24"		

Fig.47JF		Fig.94	
H2		H	
(in.)	(mm)	(in.)	(mm)
4.75"	121		
5.00"	127		
5.25"	133	7.00"	178
5.50"	140	7.25"	184
5.75"	146	7.50"	191
6.25"	159	8.00"	203
6.75"	171	8.50"	216
7.31"	186	9.00"	229
8.38"	213	10.00"	254
9.44"	240	11.00"	279
10.50"	267	12.00"	305
11.56"	294	13.00"	330
12.63"	321	14.00"	356

Threaded Connection Weights

Size
1"x1/2", 1.5"x1/2", ..., 16"x1/2"
1"x3/4", 1.5"x3/4", ..., 16"x3/4"
1.5"x1", 2"x1", ..., 16"x1"
1.5"x1.25", 2"x1.25", ..., 16"x1.25"
2"x1.5", 2.5"x1.5", ..., 16"x1.5"
2.5"x2", 3"x2", ..., 16"x2"

Fig.47JF		Fig.94	
(lb)	(kg)	(lb)	(kg)
1.6	0.7		
1.7	0.8		
2.5	1.2		
2.6	1.2		
2.7	1.2		
		6.1	2.8



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