

# FIBERBOND®

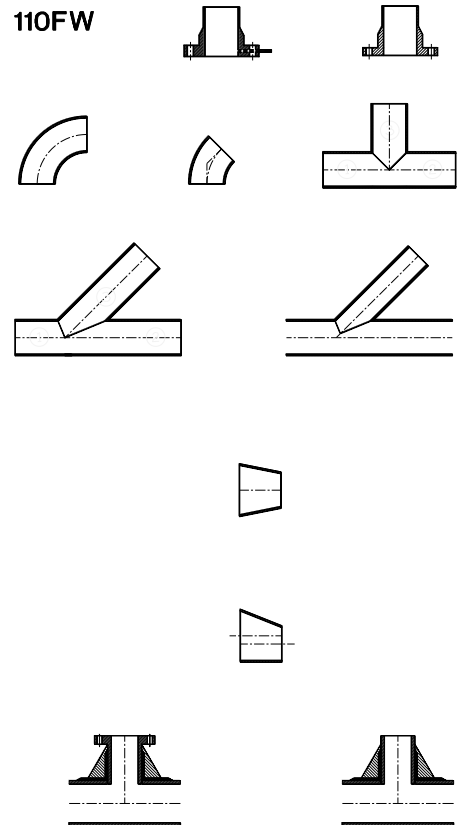
ENGINEERED COMPOSITE PIPING SYSTEMS

## SERIES 110FW FITTINGS GUIDE

FIBERBOND® SERIES

•110FW

110FW



**FPI**  
FUTURE PIPE INDUSTRIES

April 2016 Edition

[www.fiberbond.com](http://www.fiberbond.com)  
[www.futurepipe.com](http://www.futurepipe.com)

---

## FIBERBOND® Fittings Guide - Series 110FW

### PIPE SERIES:

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

110FW	10.3bar up to 24", 6.9bar up to 36", and 3.4bar up to 60"). Up to 121c (250F) depending on the fluid being conveyed. 2.8mm (0.110") liner for corrosive chemical environments.
-------	--

### GASKETS:

1. In systems hydrotesting above 225psig (15.5bar), gaskets with better sealing properties, such as Garlock's "Stress Saver" gasket ([www.garlock.com](http://www.garlock.com)), CTG's "ET Energizer" gasket ([www.ctgasket.com](http://www.ctgasket.com)) or Asahi's "Low Torque" gasket ([www.asahi-america.com](http://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.

### 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.

---

### **NUTS, BOLTS, & WASHERS:**

1. There are no special requirements for bolting materials except that ANSI B18.22.1 Type A Narrow "SAE" series washers must be used. ANSI B18.22.1 Type A Wide "USS" washers will not fit on FRP flanges.

### **LATERAL WELDS AND FITTINGS:**

1. Lateral welds are currently only rated for design pressures up to 100psig (6.9bar) up to 16in. (400mm) diameter and 50psig (3.4bar) for larger sizes. If higher pressures are required, please consult with Specialty Plastics.

### **ANSI DIMENSION FITTINGS:**

ANSI dimension flanged fittings are available upon request, but are rated only to 150psig (10.3bar). Please consult Specialty Plastics for information on these fittings.

### **VICTAULIC CONNECTIONS:**

For most pipes up to 12in. nominal diameter, ends can be machined to fit a victaulic coupling. Please consult Specialty Plastics for information on these fittings.

### **VPDMS, PDS, and AutoCAD CATALOGS:**

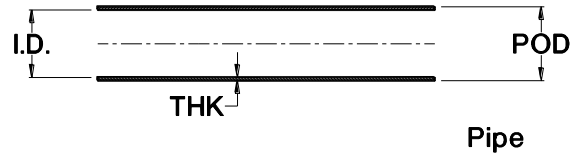
A catalog for Aveva Inc.'s 3D modeling software VPDMS is available by contacting Specialty Plastics ([www.fiberbond.com](http://www.fiberbond.com)). A 2-D catalog is also available for Autodesk's AutoCAD. A general catalog is also available for Intergraph's PDS.

### **SPECIAL NOTES ON DRAIN SYSTEMS:**

Slopes can be fabricated in FIBERBOND® systems at any angle. When shop prefabrication work is performed by Specialty Plastics, laterals can be fabricated at special angles, such as 45.9 degrees (for a 3/16" sloped header). This eliminates the need for any special dimensioning. The same is true for tees and reducing tees. In sloped systems, elbows are normally kept at their full sweep for 45 or 90 degrees and the pipe is mitered to maintain the slope in the header.

## 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	110FW									
	Rating		I.D.		THK		P.O.D.		Weight	
	(psig)	(bar)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb/ft)	(kg/m)
1"	150	10.3	1.00"	25.4	0.25"	6.4	1.50"	38.1	0.9	1.3
1.5"	150	10.3	1.50"	38.1	0.25"	6.4	2.00"	50.8	1.2	1.8
2"	150	10.3	2.00"	50.8	0.25"	6.4	2.50"	63.5	1.6	2.4
2.5"	150	10.3	2.50"	63.5	0.25"	6.4	3.00"	76.2	1.9	2.9
3"	150	10.3	3.00"	76.2	0.25"	6.4	3.50"	88.9	2.3	3.4
4"	150	10.3	4.00"	101.6	0.25"	6.4	4.50"	114.3	3.0	4.5
5"	150	10.3	5.00"	127.0	0.25"	6.4	5.50"	139.7	3.7	5.5
6"	150	10.3	6.00"	152.4	0.31"	7.9	6.63"	168.3	5.4	8.0
8"	150	10.3	8.00"	203.2	0.38"	9.5	8.75"	222.3	8.3	12.3
10"	150	10.3	10.00"	254.0	0.44"	11.1	10.88"	276.2	11.8	17.6
12"	150	10.3	12.00"	304.8	0.50"	12.7	13.00"	330.2	15.9	23.7
14"	150	10.3	14.25"	362.0	0.56"	14.3	15.38"	390.5	20.9	31.2
16"	150	10.3	16.25"	412.8	0.63"	15.9	17.50"	444.5	26.2	39.1
18"	150	10.3	18.25"	463.6	0.69"	17.5	19.63"	498.5	32.1	47.9
20"	150	10.3	20.25"	514.4	0.75"	19.1	21.75"	552.5	38.6	57.5
24"	150	10.3	24.25"	616.0	0.88"	22.2	26.00"	660.4	53.3	79.4
30"	100	6.9	30.25"	768.4	0.75"	19.1	31.75"	806.5	57.0	84.9
36"	100	6.9	36.25"	920.8	0.88"	22.2	38.00"	965.2	78.7	117.3
42"	50	3.4	42.25"	1073.2	0.56"	14.3	43.38"	1101.7	60.5	90.2
48"	50	3.4	48.25"	1225.6	0.63"	15.9	49.50"	1257.3	76.0	113.2
54"	50	3.4	54.25"	1378.0	0.69"	17.5	55.63"	1412.9	93.2	138.8
60"	50	3.4	60.25"	1530.4	0.75"	19.1	61.75"	1568.5	112.1	167.0

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

---

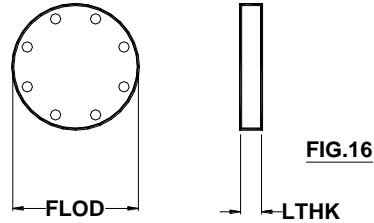
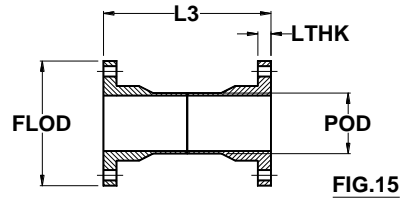
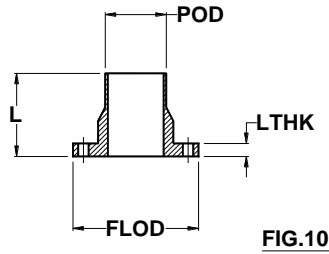
## **CHANGES FROM THE PREVIOUS EDITION**

April 2016: Revised statement about  $\leq 2$ " 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: Separated 110FW from 20C and 20HV-D. This is the first release separate from those documents.

# 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"	12"	304.8	18"	457.2	24"	609.6	11"	279.4		
20"	15"	381.0	18"	457.2	30"	762.0	12"	304.8		
24"	15"	381.0	24"	609.6	30"	762.0	15"	381.0		
30"	18"	457.2	24"	609.6	36"	914.4				
36"	24"	609.6	24"	609.6	48"	1219.2				
42"	24"	609.6	24"	609.6	48"	1219.2				
48"	24"	609.6	24"	609.6	48"	1219.2				
54"	24"	609.6	24"	609.6	48"	1219.2				
60"	30"	762.0	30"	762.0	60"	1524.0				

# 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"	1.25"	31.8	13.50"	342.9				
10"	1.44"	36.5	16.00"	406.4				
12"	1.75"	44.5	19.00"	482.6				
14"	1.75"	44.5	21.00"	533.4				
16"	1.94"	49.2	23.50"	596.9				
18"	2.00"	50.8	25.00"	635.0				
20"	2.13"	54.0	27.50"	698.5				
24"	2.38"	60.3	32.00"	812.8				
30"	2.38"	60.3	38.75"	984.3				
36"	3.19"	81.0	46.00"	1168.4				
42"	2.38"	60.3	53.00"	1346.2				
48"	2.63"	66.7	59.50"	1511.3				
54"	3.25"	82.6	66.25"	1682.8				
60"	4.06"	103.2	73.00"	1854.2				

# FLANGES & BLINDS (cont'd)

## Flange Weights

Size	Fig.10		Fig.15		Fig.16			
	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)		
1"	1.4	0.6	2.8	1.3	0.9	0.4		
1.5"	1.6	0.7	3.2	1.5	1.0	0.4		
2"	2.2	1.0	4.5	2.0	1.5	0.7		
2.5"	2.9	1.3	5.9	2.7	2.0	0.9		
3"	3.4	1.5	6.8	3.1	2.3	1.1		
4"	4.7	2.1	9.4	4.3	3.3	1.5		
5"	5.7	2.6	11.4	5.2	3.9	1.8		
6"	8.6	3.9	17.2	7.8	5.3	2.4		
8"	14.2	6.4	28.4	12.9	8.5	3.9		
10"	22.2	10.1	44.5	20.2	12.5	5.7		
12"	32.3	14.7	64.6	29.3	19.4	8.8		
14"	43.4	19.7	86.7	39.4	23.7	10.7		
16"	58.1	26.4	116.1	52.7	31.8	14.5		
18"	69.9	31.8	139.9	63.5	38.4	17.4		
20"	85.8	39.0	171.6	77.9	48.4	22.0		
24"	124.4	56.5	248.7	112.9	71.1	32.3		
30"	169.8	77.1	339.5	154.2	100.5	45.6		
36"	276.5	125.5	553.0	251.1	183.1	83.1		
42"	246.3	111.8	492.6	223.6	174.4	79.2		
48"	356.8	162.0	713.7	324.0	241.8	109.8		
54"	510.3	231.7	1020.7	463.4	371.7	168.8		
60"	780.9	354.5	1561.8	709.0	561.8	255.1		



# 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"	4.75"	121	4.50"	114			
10"	(12) 7/8"	5.25"	133	5.00"	127			
12"	(12) 7/8"	6.00"	152	5.50"	140			
14"	(12) 1"	6.25"	159	5.75"	146			
16"	(16) 1"	6.50"	165	6.00"	152			
18"	(16) 1 1/8"	7.00"	178	6.50"	165			
20"	(20) 1 1/8"	7.50"	191	6.75"	171			
24"	(20) 1 1/4"	8.25"	210	7.50"	191			
30"	(28) 1 1/4"	8.25"	210	7.75"	197			
36"	(32) 1 1/2"	10.25"	260	9.25"	235			
42"	(36) 1 1/2"	8.75"	222	8.75"	222			
48"	(44) 1 1/2"	9.25"	235	9.00"	229			
54"	(44) 1 3/4"	11.00"	279	10.50"	267			
60"	(52) 1 3/4"	12.50"	318	11.50"	292			

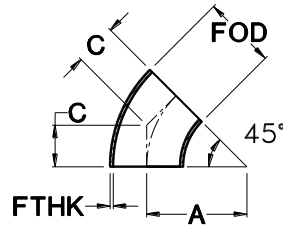
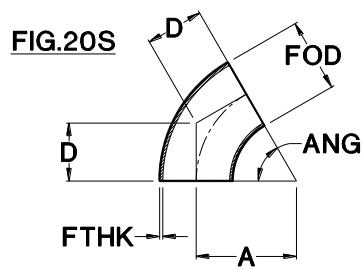
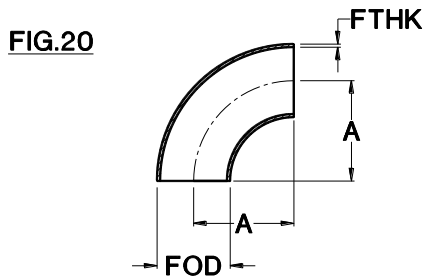
1. The F/F column is for FRP to FRP flange connections. The F/S column is for FRP to 150# alloy flange connections.

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.				0.25"	6	1.50"	38
1.5"	2.25"	57					0.25"	6	2.00"	51
2"	3.00"	76			1.25"	32	0.25"	6	2.50"	64
2.5"	3.75"	95			1.56"	40	0.25"	6	3.00"	76
3"	4.50"	114			1.88"	48	0.25"	6	3.50"	89
4"	6.00"	152			2.50"	64	0.31"	8	4.63"	117
5"	7.50"	191			3.13"	79	0.31"	8	5.63"	143
6"	9.00"	229			3.75"	95	0.38"	10	6.75"	171
8"	12.00"	305			5.00"	127	0.44"	11	8.88"	225
10"	15.00"	381			6.25"	159	0.50"	13	11.00"	279
12"	18.00"	457			7.50"	191	0.56"	14	13.13"	333
14"	21.00"	533					8.75"	222	0.63"	16
16"	24.00"	610			10.00"	254	0.69"	17	17.63"	448
18"	27.00"	686			11.25"	286	0.75"	19	19.75"	502
20"	30.00"	762			12.50"	318	0.88"	22	22.00"	559
24"	36.00"	914			15.00"	381	1.00"	25	26.25"	667
30"	45.00"	1143			18.75"	476	0.81"	21	31.88"	810
36"	54.00"	1372			22.50"	572	1.00"	25	38.25"	972
42"										
48"										
54"										
60"										

# ELBOWS (cont'd)

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

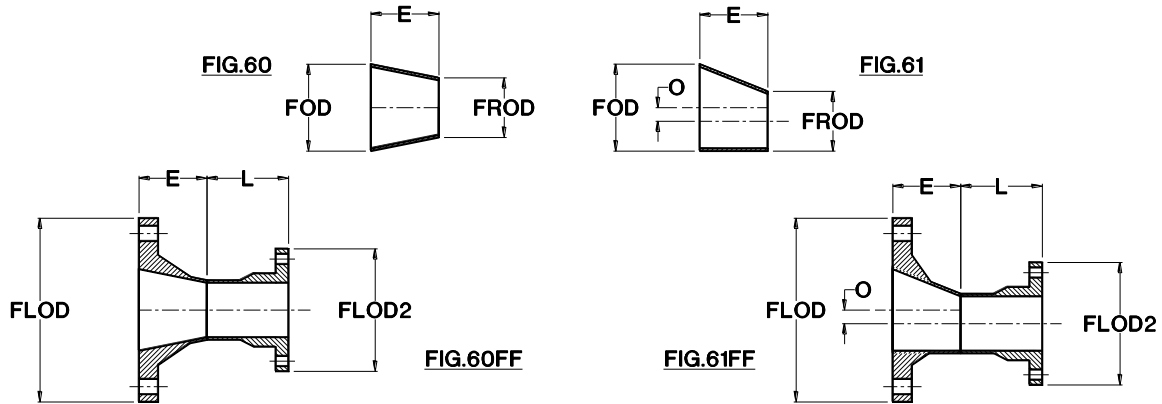
## Elbow Ratings and Weights

Size	Rating		Fig.20		Fig.30	
	(psig)	(bar)	Weight		Weight	
			(lb)	(kg)	(lb)	(kg)
1"	150	10.3	0.2	0.1		
1.5"	150	10.3	0.4	0.2		
2"	150	10.3	0.6	0.3	0.3	0.1
2.5"	150	10.3	0.7	0.3	0.4	0.2
3"	150	10.3	1.3	0.6	0.7	0.3
4"	150	10.3	3.0	1.4	1.5	0.7
5"	150	10.3	3.7	1.7	1.8	0.8
6"	150	10.3	7.4	3.4	3.7	1.7
8"	150	10.3	15.8	7.2	7.9	3.6
10"	150	10.3	28.8	13.1	14.4	6.5
12"	150	10.3	44.4	20.1	22.2	10.1
14"	150	10.3	68.5	31.1	34.3	15.6
16"	150	10.3	94.6	43.0	47.3	21.5
18"	150	10.3	133.3	60.5	66.6	30.3
20"	150	10.3	190.0	86.2	95.0	43.1
24"	150	10.3	309.1	140.3	154.5	70.2
30"	100	6.9	401.9	182.4	200.9	91.2
36"	100	6.9	686.2	311.5	343.1	155.8
42"	50	3.4				
48"	50	3.4				
54"	50	3.4				
60"	50	3.4				

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". The FRP FNPTs (Fig.97 and 95F) are only rated to 150psig up to the 2" NPT size.

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	2.00"	51	1.50"	38	0.25"	6
2"x1.5"	1.25"	32	7.25"	184	2.50"	64	2.00"	51	0.25"	6
2"x1"	2.50"	64	8.50"	216	2.50"	64	1.50"	38	0.50"	13
2.5"x2"	1.25"	32	7.25"	184	3.00"	76	2.50"	64	0.25"	6
3"x2.5"	1.25"	32	7.25"	184	3.50"	89	3.00"	76	0.25"	6
3"x2"	2.50"	64	8.50"	216	3.50"	89	2.50"	64	0.50"	13
3"x1.5"	3.75"	95	9.75"	248	3.50"	89	2.00"	51	0.75"	19
3"x1"	5"	127	11"	279	3.50"	89	1.50"	38	1.00"	25
4"x3"	2.50"	64	8.50"	216	4.50"	114	3.50"	89	0.50"	13
4"x2.5"	3.75"	95	9.75"	248	4.50"	114	3.00"	76	0.75"	19
4"x2"	5"	127	11"	279	4.50"	114	2.50"	64	1.00"	25
4"x1.5"	6.25"	159	12.25"	311	4.50"	114	2.00"	51	1.25"	32
4"x1"	7.50"	191	13.50"	343	4.50"	114	1.50"	38	1.50"	38
5"x4"	2.50"	64	8.50"	216	5.50"	140	4.50"	114	0.50"	13
6"x5"	2.50"	64	8.50"	216	6.63"	168	5.50"	140	0.56"	14
6"x4"	5"	127	11"	279	6.63"	168	4.50"	114	1.06"	27
6"x3"	7.50"	191	13.50"	343	6.63"	168	3.50"	89	1.56"	40
6"x2.5"	8.75"	222	14.75"	375	6.63"	168	3.00"	76	1.81"	46
6"x2"	10"	254	16"	406	6.63"	168	2.50"	64	2.06"	52
8"x6"	5"	127	13"	330	8.88"	225	6.63"	168	1.13"	29
8"x5"	7.50"	191	13.50"	343	8.88"	225	5.50"	140	1.69"	43
8"x4"	10"	254	16"	406	8.88"	225	4.50"	114	2.19"	56
8"x3"	12.50"	318	18.50"	470	8.88"	225	3.50"	89	2.69"	68

# 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	11.00"	279	8.88"	225	1.06"	27
10"x6"	10"	254	18"	457	11.00"	279	6.63"	168	2.19"	56
10"x5"	12.50"	318	18.50"	470	11.00"	279	5.50"	140	2.75"	70
10"x4"	15"	381	21"	533	11.00"	279	4.50"	114	3.25"	83
12"x10"	5"	127	15"	381	13.13"	333	11.00"	279	1.06"	27
12"x8"	10"	254	18"	457	13.13"	333	8.88"	225	2.13"	54
12"x6"	15"	381	23"	584	13.13"	333	6.63"	168	3.25"	83
14"x12"	5"	127	15"	381	15.50"	394	13.13"	333	1.19"	30
14"x10"	10"	254	20"	508	15.50"	394	11.00"	279	2.25"	57
14"x8"	15"	381	23"	584	15.50"	394	8.88"	225	3.31"	84
16"x14"	5"	127	17"	432	17.63"	448	15.50"	394	1.06"	27
16"x12"	10"	254	20"	508	17.63"	448	13.13"	333	2.25"	57
16"x10"	15"	381	25"	635	17.63"	448	11.00"	279	3.31"	84
18"x16"	5"	127	17"	432	19.75"	502	17.63"	448	1.06"	27
18"x14"	10"	254	22"	559	19.75"	502	15.50"	394	2.13"	54
18"x12"	15"	381	25"	635	19.75"	502	13.13"	333	3.31"	84
20"x18"	5"	127	17"	432	22.00"	559	19.75"	502	1.13"	29
20"x16"	10"	254	22"	559	22.00"	559	17.63"	448	2.19"	56
20"x14"	15"	381	27"	686	22.00"	559	15.50"	394	3.25"	83
24"x20"	10"	254	25"	635	26.25"	667	22.00"	559	2.13"	54
24"x18"	15"	381	27"	686	26.25"	667	19.75"	502	3.25"	83
30"x24"	15"	381	30"	762	31.88"	810	26.25"	667	2.81"	71
36"x30"	15"	381	33"	838	38.25"	972	31.88"	810	3.19"	81
42"x36"	15"	381	39"	991	43.50"	1105	38.25"	972	2.63"	67
48"x42"	15"	381	39"	991	49.63"	1260	43.50"	1105	3.06"	78
54"x48"	15"	381	39"	991	55.75"	1416	49.63"	1260	3.06"	78
60"x54"	15"	381	39"	991	61.88"	1572	55.75"	1416	3.06"	78

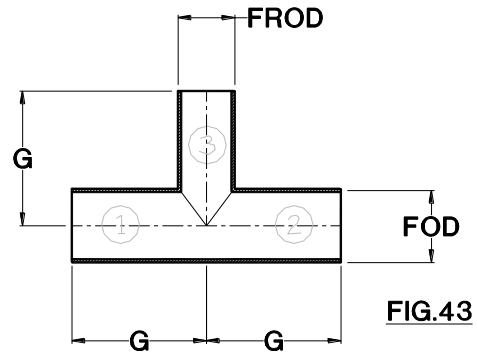
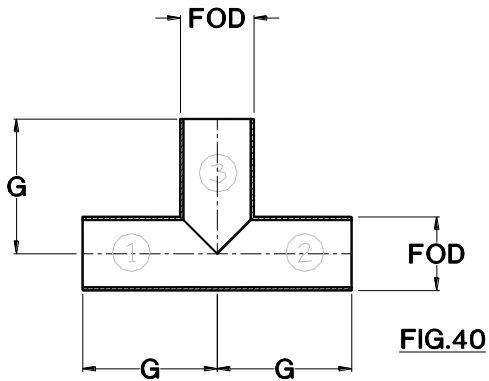
# REDUCERS (cont'd)

## Reducer Weights

Size	Fig.60, 61		Fig.60FF, 61FF	
	(lb)	(kg)	(lb)	(kg)
1.5"x1"	0.1	0.0	2.7	1.2
2"x1.5"	0.2	0.1	3.7	1.7
2"x1"	0.2	0.1	3.4	1.5
2.5"x2"	0.1	0.1	4.8	2.2
3"x2.5"	0.3	0.2	6.1	2.8
3"x2"	0.3	0.2	5.3	2.4
3"x1.5"	0.7	0.3	5.0	2.2
3"x1"	0.7	0.3	4.6	2.1
4"x3"	0.6	0.3	7.9	3.6
4"x2.5"	1.2	0.5	7.9	3.6
4"x2"	1.2	0.5	7.1	3.2
4"x1.5"	1.8	0.8	7.0	3.2
4"x1"	1.8	0.8	6.7	3.0
5"x4"	0.7	0.3	10.7	4.9
6"x5"	1.0	0.4	13.6	6.2
6"x4"	2.0	0.9	13.3	6.0
6"x3"	3.0	1.3	12.2	5.6
6"x2.5"	3.9	1.8	12.7	5.7
6"x2"	3.9	1.8	11.9	5.4
8"x6"	3.1	1.4	22.9	10.4
8"x5"	4.7	2.1	20.6	9.3
8"x4"	6.3	2.9	20.8	9.5
8"x3"	7.9	3.6	20.4	9.3
10"x8"	4.6	2.1	36.3	16.5
10"x6"	9.2	4.2	32.9	15.0
10"x5"	11.5	5.2	31.3	14.2
10"x4"	13.8	6.3	32.3	14.7

Size	Fig.60, 61		Fig.60FF, 61FF	
	(lb)	(kg)	(lb)	(kg)
12"x10"	5.9	2.7	56.0	25.4
12"x8"	11.8	5.3	50.4	22.9
12"x6"	17.6	8.0	48.3	21.9
14"x12"	7.8	3.5	73.2	33.2
14"x10"	15.6	7.1	69.9	31.8
14"x8"	23.4	10.6	66.2	30.1
16"x14"	9.4	4.3	98.5	44.7
16"x12"	18.8	8.5	92.4	41.9
16"x10"	28.2	12.8	90.8	41.2
18"x16"	11.8	5.4	126.7	57.5
18"x14"	23.6	10.7	119.2	54.1
18"x12"	35.4	16.1	115.4	52.4
20"x18"	15.1	6.9	158.7	72.1
20"x16"	30.2	13.7	155.2	70.4
20"x14"	45.4	20.6	151.0	68.6
24"x20"	41.0	18.6	235.7	107.0
24"x18"	61.5	27.9	227.8	103.4
30"x24"	64.0	29.0	351.7	159.7
36"x30"	91.0	41.3	497.0	225.6
42"x36"	68.1	30.9	614.9	279.2
48"x42"	82.4	37.4	615.0	279.2
54"x48"	103.2	46.9	894.3	406.0
60"x54"	126.2	57.3	1284.0	583.0

# EQUAL SIZE & REDUCING TEES



Size	Fig.40					
	G		FOD		Weight	
	(in.)	(mm)	(lb)	(kg)	(lb)	(kg)
1"	5"	127	1.50"	38	1.8	0.8
1.5"	5.5"	140	2.00"	51	2.7	1.2
2"	6"	152	2.50"	64	1.7	0.8
2.5"	6.5"	165	3.00"	76	2.1	1.0
3"	7"	178	3.50"	89	2.9	1.3
4"	8"	203	4.63"	117	5.7	2.6
5"	9"	229	5.63"	143	7.1	3.2
6"	10"	254	6.75"	171	11.8	5.4
8"	12"	305	8.88"	225	22.6	10.3
10"	14"	356	11.00"	279	38.6	17.5
12"	16"	406	13.13"	333	56.5	25.6
14"	18"	457	15.50"	394	84.2	38.2
16"	20"	508	17.63"	448	112.9	51.3
18"	21"	533	19.75"	502	242.9	110.3
20"	22"	559	22.00"	559	328.6	149.2
24"	24"	610	26.25"	667	498.5	226.3
30"	30"	762	31.88"	810	560.5	254.5
36"	33"	838	38.25"	972	879.8	399.4
42"	36"	914	43.50"	1105	678.4	308.0
48"	45"	1143	49.63"	1260	1040.9	472.6
54"	54"	1372	55.75"	1416	1401.6	636.3
60"	54"	1372	61.88"	1572	1763.2	800.5

# 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	8.88"	225	6.63"	168	19.0	8.6
10"x8"	14"	356	11.00"	279	8.88"	225	33.2	15.1
10"x6"	14"	356	11.00"	279	6.63"	168	29.6	13.5
12"x10"	16"	406	13.13"	334	11.00"	279	50.5	22.9
12"x8"	16"	406	13.13"	334	8.88"	225	45.2	20.5
14"x12"	18"	457	15.50"	394	13.13"	334	74.9	34.0
14"x10"	18"	457	15.50"	394	11.00"	279	69.0	31.3
16"x14"	20"	508	17.63"	448	15.38"	391	103.3	46.9
16"x12"	20"	508	17.63"	448	13.13"	334	94.1	42.7





# 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	2.1	1.0
2"x1.5"	7.00"	178	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
2"x1"	7.00"	178	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
2.5"x2"	7.50"	191	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
3"x2.5"	7.50"	191	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
3"x2"	7.50"	191	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
3"x1.5"	7.50"	191	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
3"x1"	7.50"	191	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
4"x3"	8.00"	203	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
4"x2.5"	8.00"	203	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
4"x2"	8.00"	203	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
4"x1.5"	8.00"	203	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
4"x1"	8.00"	203	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
5"x4"	9.00"	229	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
6"x5"	11.00"	279	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
6"x4"	9.00"	229	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
6"x3"	9.00"	229	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
6"x2.5"	9.00"	229	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
6"x2"	9.00"	229	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
6"x1.5"	9.00"	229	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
6"x1"	9.00"	229	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
8"x6"	12.00"	305	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
8"x5"	12.00"	305	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
8"x4"	10.00"	254	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
8"x3"	10.00"	254	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
8"x2.5"	10.00"	254	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
8"x2"	10.00"	254	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
8"x1.5"	10.00"	254	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
8"x1"	10.00"	254	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
10"x8"	13.00"	330	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
10"x6"	13.00"	330	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
10"x5"	13.00"	330	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
10"x4"	11.00"	279	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
10"x3"	11.00"	279	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
10"x2.5"	11.00"	279	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
10"x2"	11.00"	279	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
10"x1.5"	11.00"	279	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
10"x1"	11.00"	279	6.00"	152	0.50"	13	4.25"	108	2.1	1.0

# OLETS, PLAIN AND FLANGED (cont'd)

## Flanged End Olet Dimensions (cont'd)

Size	LS		A2		LTHK		FLOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
12"x10"	16.00"	406	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
12"x8"	14.00"	356	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
12"x6"	14.00"	356	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
12"x5"	14.00"	356	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
12"x4"	12.00"	305	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
12"x3"	12.00"	305	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
12"x2.5"	12.00"	305	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
12"x2"	12.00"	305	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
12"x1.5"	12.00"	305	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
12"x1"	12.00"	305	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
14"x12"	17.00"	432	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
14"x10"	17.00"	432	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
14"x8"	15.00"	381	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
14"x6"	15.00"	381	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
14"x5"	15.00"	381	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
14"x4"	13.00"	330	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
14"x3"	13.00"	330	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
14"x2.5"	13.00"	330	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
14"x2"	13.00"	330	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
14"x1.5"	13.00"	330	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
14"x1"	13.00"	330	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
16"x14"	22.00"	559	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
16"x12"	18.00"	457	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
16"x10"	18.00"	457	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
16"x8"	16.00"	406	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
16"x6"	16.00"	406	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
16"x5"	16.00"	406	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
16"x4"	14.00"	356	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
16"x3"	14.00"	356	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
16"x2.5"	14.00"	356	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
16"x2"	14.00"	356	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
16"x1.5"	14.00"	356	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
16"x1"	14.00"	356	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
18"x16"	23.00"	584	20.00"	508	1.94"	49	23.50"	597	125.5	57.0
18"x14"	23.00"	584	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
18"x12"	19.00"	483	16.00"	406	1.75"	44	19.00"	483	64.2	29.1

# OLETS, PLAIN AND FLANGED (cont'd)

## Flanged End Olet Dimensions (cont'd)

Size	LS		A2		LTHK		FLOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
18"x10"	19.00"	483	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
18"x8"	17.00"	432	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
18"x6"	17.00"	432	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
18"x5"	17.00"	432	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
18"x4"	15.00"	381	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
18"x3"	15.00"	381	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
18"x2.5"	15.00"	381	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
18"x2"	15.00"	381	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
18"x1.5"	15.00"	381	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
18"x1"	15.00"	381	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
20"x18"	25.00"	635	21.00"	533	2.00"	51	25.00"	635	154.3	70.1
20"x16"	24.00"	610	20.00"	508	1.94"	49	23.50"	597	125.5	57.0
20"x14"	24.00"	610	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
20"x12"	20.00"	508	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
20"x10"	20.00"	508	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
20"x8"	18.00"	457	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
20"x6"	18.00"	457	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
20"x5"	18.00"	457	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
20"x4"	16.00"	406	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
20"x3"	16.00"	406	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
20"x2.5"	16.00"	406	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
20"x2"	16.00"	406	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
20"x1.5"	16.00"	406	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
20"x1"	16.00"	406	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
24"x20"	28.00"	711	22.00"	559	2.13"	54	27.50"	699	220.4	100.1
24"x18"	27.00"	686	21.00"	533	2.00"	51	25.00"	635	154.3	70.1
24"x16"	26.00"	660	20.00"	508	1.94"	49	23.50"	597	125.5	57.0
24"x14"	26.00"	660	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
24"x12"	22.00"	559	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
24"x10"	22.00"	559	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
24"x8"	20.00"	508	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
24"x6"	20.00"	508	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
24"x5"	20.00"	508	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
24"x4"	18.00"	457	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
24"x3"	18.00"	457	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
24"x2.5"	18.00"	457	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
24"x2"	18.00"	457	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
24"x1.5"	18.00"	457	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
24"x1"	18.00"	457	6.00"	152	0.50"	13	4.25"	108	2.1	1.0



# OLETS, PLAIN AND FLANGED (cont'd)

## Flanged End Olet Dimensions (cont'd)

Size	LS		A2		LTHK		FLOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
42"x36"	45.00"	1143	33.00"	838	3.19"	81	46.00"	1168	565.2	256.6
42"x30"	41.00"	1041	30.00"	762	2.38"	60	38.75"	984	328.1	149.0
42"x24"	41.00"	1041	24.00"	610	2.38"	60	32.00"	813	320.3	145.4
42"x20"	37.00"	940	22.00"	559	2.13"	54	27.50"	699	220.4	100.1
42"x18"	36.00"	914	21.00"	533	2.00"	51	25.00"	635	154.3	70.1
42"x16"	35.00"	889	20.00"	508	1.94"	49	23.50"	597	125.5	57.0
42"x14"	35.00"	889	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
42"x12"	31.00"	787	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
42"x10"	31.00"	787	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
42"x8"	29.00"	737	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
42"x6"	29.00"	737	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
42"x5"	29.00"	737	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
42"x4"	27.00"	686	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
42"x3"	27.00"	686	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
42"x2.5"	27.00"	686	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
42"x2"	27.00"	686	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
42"x1.5"	27.00"	686	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
42"x1"	27.00"	686	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
48"x42"	48.00"	1219	36.00"	914	2.38"	60	53.00"	1346	374.9	170.2
48"x36"	48.00"	1219	33.00"	838	3.19"	81	46.00"	1168	565.2	256.6
48"x30"	44.00"	1118	30.00"	762	2.38"	60	38.75"	984	328.1	149.0
48"x24"	44.00"	1118	24.00"	610	2.38"	60	32.00"	813	320.3	145.4
48"x20"	40.00"	1016	22.00"	559	2.13"	54	27.50"	699	220.4	100.1
48"x18"	39.00"	991	21.00"	533	2.00"	51	25.00"	635	154.3	70.1
48"x16"	38.00"	965	20.00"	508	1.94"	49	23.50"	597	125.5	57.0
48"x14"	38.00"	965	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
48"x12"	34.00"	864	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
48"x10"	34.00"	864	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
48"x8"	32.00"	813	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
48"x6"	32.00"	813	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
48"x5"	32.00"	813	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
48"x4"	30.00"	762	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
48"x3"	30.00"	762	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
48"x2.5"	30.00"	762	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
48"x2"	30.00"	762	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
48"x1.5"	30.00"	762	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
48"x1"	30.00"	762	6.00"	152	0.50"	13	4.25"	108	2.1	1.0

# OLETS, PLAIN AND FLANGED (cont'd)

## Flanged End Olet Dimensions (cont'd)

Size	LS		A2		LTHK		FLOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
54"x48"	51.00"	1295	45.00"	1143	2.63"	67	59.50"	1511	551.7	250.5
54"x42"	51.00"	1295	36.00"	914	2.38"	60	53.00"	1346	374.9	170.2
54"x36"	51.00"	1295	33.00"	838	3.19"	81	46.00"	1168	565.2	256.6
54"x30"	47.00"	1194	30.00"	762	2.38"	60	38.75"	984	328.1	149.0
54"x24"	47.00"	1194	24.00"	610	2.38"	60	32.00"	813	320.3	145.4
54"x20"	43.00"	1092	22.00"	559	2.13"	54	27.50"	699	220.4	100.1
54"x18"	42.00"	1067	21.00"	533	2.00"	51	25.00"	635	154.3	70.1
54"x16"	41.00"	1041	20.00"	508	1.94"	49	23.50"	597	125.5	57.0
54"x14"	41.00"	1041	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
54"x12"	37.00"	940	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
54"x10"	37.00"	940	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
54"x8"	35.00"	889	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
54"x6"	35.00"	889	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
54"x5"	35.00"	889	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
54"x4"	33.00"	838	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
54"x3"	33.00"	838	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
54"x2.5"	33.00"	838	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
54"x2"	33.00"	838	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
54"x1.5"	33.00"	838	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
54"x1"	33.00"	838	6.00"	152	0.50"	13	4.25"	108	2.1	1.0
60"x54"	54.00"	1372	54.00"	1372	3.25"	83	66.25"	1683	754.5	342.5
60"x48"	54.00"	1372	45.00"	1143	2.63"	67	59.50"	1511	551.7	250.5
60"x42"	54.00"	1372	36.00"	914	2.38"	60	53.00"	1346	374.9	170.2
60"x36"	54.00"	1372	33.00"	838	3.19"	81	46.00"	1168	565.2	256.6
60"x30"	50.00"	1270	30.00"	762	2.38"	60	38.75"	984	328.1	149.0
60"x24"	50.00"	1270	24.00"	610	2.38"	60	32.00"	813	320.3	145.4
60"x20"	46.00"	1168	22.00"	559	2.13"	54	27.50"	699	220.4	100.1
60"x18"	45.00"	1143	21.00"	533	2.00"	51	25.00"	635	154.3	70.1
60"x16"	44.00"	1118	20.00"	508	1.94"	49	23.50"	597	125.5	57.0
60"x14"	44.00"	1118	18.00"	457	1.75"	44	21.00"	533	87.8	39.9
60"x12"	40.00"	1016	16.00"	406	1.75"	44	19.00"	483	64.2	29.1
60"x10"	40.00"	1016	14.00"	356	1.44"	37	16.00"	406	51.4	23.3
60"x8"	38.00"	965	12.00"	305	1.25"	32	13.50"	343	29.7	13.5
60"x6"	38.00"	965	10.00"	254	1.19"	30	11.00"	279	18.2	8.3
60"x5"	38.00"	965	10.00"	254	1.06"	27	10.00"	254	11.6	5.3
60"x4"	36.00"	914	8.00"	203	1.00"	25	9.00"	229	9.5	4.3
60"x3"	36.00"	914	7.00"	178	0.81"	21	7.50"	191	5.2	2.4
60"x2.5"	36.00"	914	7.00"	178	0.75"	19	7.00"	178	4.4	2.0
60"x2"	36.00"	914	6.00"	152	0.69"	17	6.00"	152	3.5	1.6
60"x1.5"	36.00"	914	6.00"	152	0.50"	13	5.00"	127	2.6	1.2
60"x1"	36.00"	914	6.00"	152	0.50"	13	4.25"	108	2.1	1.0

# 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	2.00"	51	1.50"	38	1.0	0.5
2"x1.5"	6.00"	152	6.00"	152	2.50"	64	2.00"	51	1.3	0.6
2"x1"	6.00"	152	6.00"	152	2.50"	64	1.50"	38	1.0	0.5
2.5"x2"	7.00"	178	6.00"	152	3.00"	76	2.50"	64	1.6	0.7
3"x2.5"	7.00"	178	7.00"	178	3.50"	89	3.00"	76	2.0	0.9
3"x2"	7.00"	178	6.00"	152	3.50"	89	2.50"	64	1.6	0.7
3"x1.5"	7.00"	178	6.00"	152	3.50"	89	2.00"	51	1.3	0.6
3"x1"	7.00"	178	6.00"	152	3.50"	89	1.50"	38	1.0	0.5
4"x3"	8.00"	203	7.00"	178	4.50"	114	3.50"	89	2.4	1.1
4"x2.5"	8.00"	203	7.00"	178	4.50"	114	3.00"	76	2.0	0.9
4"x2"	8.00"	203	6.00"	152	4.50"	114	2.50"	64	1.6	0.7
4"x1.5"	8.00"	203	6.00"	152	4.50"	114	2.00"	51	1.3	0.6
4"x1"	8.00"	203	6.00"	152	4.50"	114	1.50"	38	1.0	0.5
5"x4"	10.00"	254	8.00"	203	5.50"	140	4.50"	114	4.8	2.2
6"x5"	10.00"	254	10.00"	254	6.63"	168	5.50"	140	5.9	2.7
6"x4"	10.00"	254	8.00"	203	6.63"	168	4.50"	114	4.8	2.2
6"x3"	10.00"	254	7.00"	178	6.63"	168	3.50"	89	2.4	1.1
6"x2.5"	10.00"	254	7.00"	178	6.63"	168	3.00"	76	2.0	0.9
6"x2"	10.00"	254	6.00"	152	6.63"	168	2.50"	64	1.6	0.7
6"x1.5"	10.00"	254	6.00"	152	6.63"	168	2.00"	51	1.3	0.6
6"x1"	10.00"	254	6.00"	152	6.63"	168	1.50"	38	1.0	0.5
8"x6"	12.00"	305	10.00"	254	8.75"	222	6.63"	168	10.0	4.5
8"x5"	12.00"	305	10.00"	254	8.75"	222	5.50"	140	5.9	2.7
8"x4"	12.00"	305	8.00"	203	8.75"	222	4.50"	114	4.8	2.2
8"x3"	12.00"	305	7.00"	178	8.75"	222	3.50"	89	2.4	1.1
8"x2.5"	12.00"	305	7.00"	178	8.75"	222	3.00"	76	2.0	0.9
8"x2"	12.00"	305	6.00"	152	8.75"	222	2.50"	64	1.6	0.7
8"x1.5"	12.00"	305	6.00"	152	8.75"	222	2.00"	51	1.3	0.6
8"x1"	12.00"	305	6.00"	152	8.75"	222	1.50"	38	1.0	0.5
10"x8"	14.00"	356	12.00"	305	10.88"	276	8.75"	222	16.4	7.4
10"x6"	14.00"	356	10.00"	254	10.88"	276	6.63"	168	10.0	4.5
10"x5"	14.00"	356	10.00"	254	10.88"	276	5.50"	140	5.9	2.7
10"x4"	14.00"	356	8.00"	203	10.88"	276	4.50"	114	4.8	2.2
10"x3"	14.00"	356	7.00"	178	10.88"	276	3.50"	89	2.4	1.1
10"x2.5"	14.00"	356	7.00"	178	10.88"	276	3.00"	76	2.0	0.9
10"x2"	14.00"	356	6.00"	152	10.88"	276	2.50"	64	1.6	0.7
10"x1.5"	14.00"	356	6.00"	152	10.88"	276	2.00"	51	1.3	0.6
10"x1"	14.00"	356	6.00"	152	10.88"	276	1.50"	38	1.0	0.5



# OLETS, PLAIN AND FLANGED (cont'd)

## Plain End Olet Dimensions (cont'd)

Size	H		A2		POD		PBOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
12"x10"	16.00"	406	14.00"	356	13.00"	330	10.88"	276	29.8	13.5
12"x8"	16.00"	406	12.00"	305	13.00"	330	8.75"	222	16.4	7.4
12"x6"	16.00"	406	10.00"	254	13.00"	330	6.63"	168	10.0	4.5
12"x5"	16.00"	406	10.00"	254	13.00"	330	5.50"	140	5.9	2.7
12"x4"	16.00"	406	8.00"	203	13.00"	330	4.50"	114	4.8	2.2
12"x3"	16.00"	406	7.00"	178	13.00"	330	3.50"	89	2.4	1.1
12"x2.5"	16.00"	406	7.00"	178	13.00"	330	3.00"	76	2.0	0.9
12"x2"	16.00"	406	6.00"	152	13.00"	330	2.50"	64	1.6	0.7
12"x1.5"	16.00"	406	6.00"	152	13.00"	330	2.00"	51	1.3	0.6
12"x1"	16.00"	406	6.00"	152	13.00"	330	1.50"	38	1.0	0.5
14"x12"	18.00"	457	16.00"	406	15.13"	384	13.00"	330	42.1	19.1
14"x10"	18.00"	457	14.00"	356	15.13"	384	10.88"	276	29.8	13.5
14"x8"	18.00"	457	12.00"	305	15.13"	384	8.75"	222	16.4	7.4
14"x6"	18.00"	457	10.00"	254	15.13"	384	6.63"	168	10.0	4.5
14"x5"	18.00"	457	10.00"	254	15.13"	384	5.50"	140	5.9	2.7
14"x4"	18.00"	457	8.00"	203	15.13"	384	4.50"	114	4.8	2.2
14"x3"	18.00"	457	7.00"	178	15.13"	384	3.50"	89	2.4	1.1
14"x2.5"	18.00"	457	7.00"	178	15.13"	384	3.00"	76	2.0	0.9
14"x2"	18.00"	457	6.00"	152	15.13"	384	2.50"	64	1.6	0.7
14"x1.5"	18.00"	457	6.00"	152	15.13"	384	2.00"	51	1.3	0.6
14"x1"	18.00"	457	6.00"	152	15.13"	384	1.50"	38	1.0	0.5
16"x14"	20.00"	508	18.00"	457	17.25"	438	15.38"	391	60.4	27.4
16"x12"	20.00"	508	16.00"	406	17.25"	438	13.00"	330	42.1	19.1
16"x10"	20.00"	508	14.00"	356	17.25"	438	10.88"	276	29.8	13.5
16"x8"	20.00"	508	12.00"	305	17.25"	438	8.75"	222	16.4	7.4
16"x6"	20.00"	508	10.00"	254	17.25"	438	6.63"	168	10.0	4.5
16"x5"	20.00"	508	10.00"	254	17.25"	438	5.50"	140	5.9	2.7
16"x4"	20.00"	508	8.00"	203	17.25"	438	4.50"	114	4.8	2.2
16"x3"	20.00"	508	7.00"	178	17.25"	438	3.50"	89	2.4	1.1
16"x2.5"	20.00"	508	7.00"	178	17.25"	438	3.00"	76	2.0	0.9
16"x2"	20.00"	508	6.00"	152	17.25"	438	2.50"	64	1.6	0.7
16"x1.5"	20.00"	508	6.00"	152	17.25"	438	2.00"	51	1.3	0.6
16"x1"	20.00"	508	6.00"	152	17.25"	438	1.50"	38	1.0	0.5
18"x16"	21.00"	533	20.00"	508	19.38"	492	17.50"	445	87.9	39.9
18"x14"	21.00"	533	18.00"	457	19.38"	492	15.38"	391	60.4	27.4
18"x12"	21.00"	533	16.00"	406	19.38"	492	13.00"	330	42.1	19.1

# OLETS, PLAIN AND FLANGED (cont'd)

## Plain End Olet Dimensions (cont'd)

Size	H		A2		POD		PBOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
18"x10"	21.00"	533	14.00"	356	19.38"	492	10.88"	276	29.8	13.5
18"x8"	21.00"	533	12.00"	305	19.38"	492	8.75"	222	16.4	7.4
18"x6"	21.00"	533	10.00"	254	19.38"	492	6.63"	168	10.0	4.5
18"x5"	21.00"	533	10.00"	254	19.38"	492	5.50"	140	5.9	2.7
18"x4"	21.00"	533	8.00"	203	19.38"	492	4.50"	114	4.8	2.2
18"x3"	21.00"	533	7.00"	178	19.38"	492	3.50"	89	2.4	1.1
18"x2.5"	21.00"	533	7.00"	178	19.38"	492	3.00"	76	2.0	0.9
18"x2"	21.00"	533	6.00"	152	19.38"	492	2.50"	64	1.6	0.7
18"x1.5"	21.00"	533	6.00"	152	19.38"	492	2.00"	51	1.3	0.6
18"x1"	21.00"	533	6.00"	152	19.38"	492	1.50"	38	1.0	0.5
20"x18"	22.00"	559	21.00"	533	21.50"	546	19.63"	499	108.7	49.3
20"x16"	22.00"	559	20.00"	508	21.50"	546	17.50"	445	87.9	39.9
20"x14"	22.00"	559	18.00"	457	21.50"	546	15.38"	391	60.4	27.4
20"x12"	22.00"	559	16.00"	406	21.50"	546	13.00"	330	42.1	19.1
20"x10"	22.00"	559	14.00"	356	21.50"	546	10.88"	276	29.8	13.5
20"x8"	22.00"	559	12.00"	305	21.50"	546	8.75"	222	16.4	7.4
20"x6"	22.00"	559	10.00"	254	21.50"	546	6.63"	168	10.0	4.5
20"x5"	22.00"	559	10.00"	254	21.50"	546	5.50"	140	5.9	2.7
20"x4"	22.00"	559	8.00"	203	21.50"	546	4.50"	114	4.8	2.2
20"x3"	22.00"	559	7.00"	178	21.50"	546	3.50"	89	2.4	1.1
20"x2.5"	22.00"	559	7.00"	178	21.50"	546	3.00"	76	2.0	0.9
20"x2"	22.00"	559	6.00"	152	21.50"	546	2.50"	64	1.6	0.7
20"x1.5"	22.00"	559	6.00"	152	21.50"	546	2.00"	51	1.3	0.6
20"x1"	22.00"	559	6.00"	152	21.50"	546	1.50"	38	1.0	0.5
24"x20"	24.00"	610	22.00"	559	25.75"	654	21.75"	552	160.3	72.8
24"x18"	24.00"	610	21.00"	533	25.75"	654	19.63"	499	108.7	49.3
24"x16"	24.00"	610	20.00"	508	25.75"	654	17.50"	445	87.9	39.9
24"x14"	24.00"	610	18.00"	457	25.75"	654	15.38"	391	60.4	27.4
24"x12"	24.00"	610	16.00"	406	25.75"	654	13.00"	330	42.1	19.1
24"x10"	24.00"	610	14.00"	356	25.75"	654	10.88"	276	29.8	13.5
24"x8"	24.00"	610	12.00"	305	25.75"	654	8.75"	222	16.4	7.4
24"x6"	24.00"	610	10.00"	254	25.75"	654	6.63"	168	10.0	4.5
24"x5"	24.00"	610	10.00"	254	25.75"	654	5.50"	140	5.9	2.7
24"x4"	24.00"	610	8.00"	203	25.75"	654	4.50"	114	4.8	2.2
24"x3"	24.00"	610	7.00"	178	25.75"	654	3.50"	89	2.4	1.1
24"x2.5"	24.00"	610	7.00"	178	25.75"	654	3.00"	76	2.0	0.9
24"x2"	24.00"	610	6.00"	152	25.75"	654	2.50"	64	1.6	0.7
24"x1.5"	24.00"	610	6.00"	152	25.75"	654	2.00"	51	1.3	0.6
24"x1"	24.00"	610	6.00"	152	25.75"	654	1.50"	38	1.0	0.5



# OLETS, PLAIN AND FLANGED (cont'd)

## Plain End Olet Dimensions (cont'd)

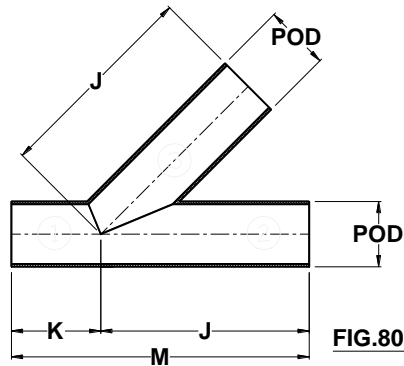
Size	H		A2		POD		PBOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
42"x36"	36.00"	914	33.00"	838	43.13"	1095	38.00"	965	357.0	162.1
42"x30"	36.00"	914	30.00"	762	43.13"	1095	31.75"	806	214.0	97.2
42"x24"	36.00"	914	24.00"	610	43.13"	1095	26.00"	660	232.1	105.4
42"x20"	36.00"	914	22.00"	559	43.13"	1095	21.75"	552	160.3	72.8
42"x18"	36.00"	914	21.00"	533	43.13"	1095	19.63"	499	108.7	49.3
42"x16"	36.00"	914	20.00"	508	43.13"	1095	17.50"	445	87.9	39.9
42"x14"	36.00"	914	18.00"	457	43.13"	1095	15.38"	391	60.4	27.4
42"x12"	36.00"	914	16.00"	406	43.13"	1095	13.00"	330	42.1	19.1
42"x10"	36.00"	914	14.00"	356	43.13"	1095	10.88"	276	29.8	13.5
42"x8"	36.00"	914	12.00"	305	43.13"	1095	8.75"	222	16.4	7.4
42"x6"	36.00"	914	10.00"	254	43.13"	1095	6.63"	168	10.0	4.5
42"x5"	36.00"	914	10.00"	254	43.13"	1095	5.50"	140	5.9	2.7
42"x4"	36.00"	914	8.00"	203	43.13"	1095	4.50"	114	4.8	2.2
42"x3"	36.00"	914	7.00"	178	43.13"	1095	3.50"	89	2.4	1.1
42"x2.5"	36.00"	914	7.00"	178	43.13"	1095	3.00"	76	2.0	0.9
42"x2"	36.00"	914	6.00"	152	43.13"	1095	2.50"	64	1.6	0.7
42"x1.5"	36.00"	914	6.00"	152	43.13"	1095	2.00"	51	1.3	0.6
42"x1"	36.00"	914	6.00"	152	43.13"	1095	1.50"	38	1.0	0.5
48"x42"	45.00"	1143	36.00"	914	49.25"	1251	43.38"	1102	189.6	86.1
48"x36"	45.00"	1143	33.00"	838	49.25"	1251	38.00"	965	357.0	162.1
48"x30"	45.00"	1143	30.00"	762	49.25"	1251	31.75"	806	214.0	97.2
48"x24"	45.00"	1143	24.00"	610	49.25"	1251	26.00"	660	232.1	105.4
48"x20"	45.00"	1143	22.00"	559	49.25"	1251	21.75"	552	160.3	72.8
48"x18"	45.00"	1143	21.00"	533	49.25"	1251	19.63"	499	108.7	49.3
48"x16"	45.00"	1143	20.00"	508	49.25"	1251	17.50"	445	87.9	39.9
48"x14"	45.00"	1143	18.00"	457	49.25"	1251	15.38"	391	60.4	27.4
48"x12"	45.00"	1143	16.00"	406	49.25"	1251	13.00"	330	42.1	19.1
48"x10"	45.00"	1143	14.00"	356	49.25"	1251	10.88"	276	29.8	13.5
48"x8"	45.00"	1143	12.00"	305	49.25"	1251	8.75"	222	16.4	7.4
48"x6"	45.00"	1143	10.00"	254	49.25"	1251	6.63"	168	10.0	4.5
48"x5"	45.00"	1143	10.00"	254	49.25"	1251	5.50"	140	5.9	2.7
48"x4"	45.00"	1143	8.00"	203	49.25"	1251	4.50"	114	4.8	2.2
48"x3"	45.00"	1143	7.00"	178	49.25"	1251	3.50"	89	2.4	1.1
48"x2.5"	45.00"	1143	7.00"	178	49.25"	1251	3.00"	76	2.0	0.9
48"x2"	45.00"	1143	6.00"	152	49.25"	1251	2.50"	64	1.6	0.7
48"x1.5"	45.00"	1143	6.00"	152	49.25"	1251	2.00"	51	1.3	0.6
48"x1"	45.00"	1143	6.00"	152	49.25"	1251	1.50"	38	1.0	0.5

# OLETS, PLAIN AND FLANGED (cont'd)

## Plain End Olet Dimensions (cont'd)

Size	H		A2		POD		PBOD		Weight	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(lb)	(kg)
54"x48"	54.00"	1372	45.00"	1143	55.38"	1407	49.50"	1257	293.2	133.1
54"x42"	54.00"	1372	36.00"	914	55.38"	1407	43.38"	1102	189.6	86.1
54"x36"	54.00"	1372	33.00"	838	55.38"	1407	38.00"	965	357.0	162.1
54"x30"	54.00"	1372	30.00"	762	55.38"	1407	31.75"	806	214.0	97.2
54"x24"	54.00"	1372	24.00"	610	55.38"	1407	26.00"	660	232.1	105.4
54"x20"	54.00"	1372	22.00"	559	55.38"	1407	21.75"	552	160.3	72.8
54"x18"	54.00"	1372	21.00"	533	55.38"	1407	19.63"	499	108.7	49.3
54"x16"	54.00"	1372	20.00"	508	55.38"	1407	17.50"	445	87.9	39.9
54"x14"	54.00"	1372	18.00"	457	55.38"	1407	15.38"	391	60.4	27.4
54"x12"	54.00"	1372	16.00"	406	55.38"	1407	13.00"	330	42.1	19.1
54"x10"	54.00"	1372	14.00"	356	55.38"	1407	10.88"	276	29.8	13.5
54"x8"	54.00"	1372	12.00"	305	55.38"	1407	8.75"	222	16.4	7.4
54"x6"	54.00"	1372	10.00"	254	55.38"	1407	6.63"	168	10.0	4.5
54"x5"	54.00"	1372	10.00"	254	55.38"	1407	5.50"	140	5.9	2.7
54"x4"	54.00"	1372	8.00"	203	55.38"	1407	4.50"	114	4.8	2.2
54"x3"	54.00"	1372	7.00"	178	55.38"	1407	3.50"	89	2.4	1.1
54"x2.5"	54.00"	1372	7.00"	178	55.38"	1407	3.00"	76	2.0	0.9
54"x2"	54.00"	1372	6.00"	152	55.38"	1407	2.50"	64	1.6	0.7
54"x1.5"	54.00"	1372	6.00"	152	55.38"	1407	2.00"	51	1.3	0.6
54"x1"	54.00"	1372	6.00"	152	55.38"	1407	1.50"	38	1.0	0.5
60"x54"	54.00"	1372	54.00"	1372	61.50"	1562	55.63"	1413	361.8	164.3
60"x48"	54.00"	1372	45.00"	1143	61.50"	1562	49.50"	1257	293.2	133.1
60"x42"	54.00"	1372	36.00"	914	61.50"	1562	43.38"	1102	189.6	86.1
60"x36"	54.00"	1372	33.00"	838	61.50"	1562	38.00"	965	357.0	162.1
60"x30"	54.00"	1372	30.00"	762	61.50"	1562	31.75"	806	214.0	97.2
60"x24"	54.00"	1372	24.00"	610	61.50"	1562	26.00"	660	232.1	105.4
60"x20"	54.00"	1372	22.00"	559	61.50"	1562	21.75"	552	160.3	72.8
60"x18"	54.00"	1372	21.00"	533	61.50"	1562	19.63"	499	108.7	49.3
60"x16"	54.00"	1372	20.00"	508	61.50"	1562	17.50"	445	87.9	39.9
60"x14"	54.00"	1372	18.00"	457	61.50"	1562	15.38"	391	60.4	27.4
60"x12"	54.00"	1372	16.00"	406	61.50"	1562	13.00"	330	42.1	19.1
60"x10"	54.00"	1372	14.00"	356	61.50"	1562	10.88"	276	29.8	13.5
60"x8"	54.00"	1372	12.00"	305	61.50"	1562	8.75"	222	16.4	7.4
60"x6"	54.00"	1372	10.00"	254	61.50"	1562	6.63"	168	10.0	4.5
60"x5"	54.00"	1372	10.00"	254	61.50"	1562	5.50"	140	5.9	2.7
60"x4"	54.00"	1372	8.00"	203	61.50"	1562	4.50"	114	4.8	2.2
60"x3"	54.00"	1372	7.00"	178	61.50"	1562	3.50"	89	2.4	1.1
60"x2.5"	54.00"	1372	7.00"	178	61.50"	1562	3.00"	76	2.0	0.9
60"x2"	54.00"	1372	6.00"	152	61.50"	1562	2.50"	64	1.6	0.7
60"x1.5"	54.00"	1372	6.00"	152	61.50"	1562	2.00"	51	1.3	0.6
60"x1"	54.00"	1372	6.00"	152	61.50"	1562	1.50"	38	1.0	0.5

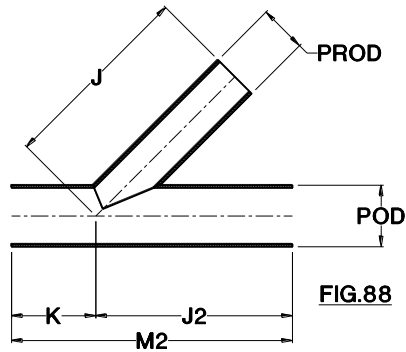
# LATERALS



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	2.50"	64	4.2	1.9
2.5"	12"	305	6"	152	18"	457	3.00"	76	5.1	2.3
3"	12"	305	6"	152	18"	457	3.50"	89	6.7	3.1
4"	14"	356	6"	152	20"	508	4.50"	114	11.5	5.2
5"	16"	406	8"	203	24"	610	5.50"	140	14.1	6.4
6"	16"	406	8"	203	24"	610	6.63"	168	23.2	10.5
8"	20"	508	10"	254	30"	762	8.75"	222	46.0	20.9
10"	24"	610	10"	254	34"	864	10.88"	276	76.8	34.9
12"	26"	660	12"	305	38"	965	13.00"	330	111.8	50.7
14"	30"	762	12"	305	42"	1067	15.38"	391	158.8	72.1
16"	32"	813	14"	356	46"	1168	17.50"	445	232.1	105.4
18"	36"	914	14"	356	50"	1270	19.63"	498	303.4	137.8
20"	38"	965	16"	406	54"	1372	21.75"	552	409.7	186.0
24"	42"	1067	18"	457	60"	1524	26.00"	660	631.7	286.8
30"	52"	1321	20"	508	72"	1829	31.75"	806	717.6	325.8
36"	62"	1575	22"	559	84"	2134	38.00"	965	1172.4	532.3
42"	72"	1829	24"	610	96"	2438	43.38"	1102	922.8	419.0
48"										
54"										
60"										

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

# REDUCING LATERAL OLETS



		K										
		6"	6"	6"	8"	10"	10"	12"	12"			
		Branch Diameter										
		1", 1.5", 2"	2.5", 3"	4"	5", 6"	8"	10"	12"	14"			
		J2										
J	Header Diameter	1"										
		1.5"										
10"	2"											
12"	2.5"											
12"	3"											
14"	4"				10"	12"						
16"	5"				10"	12"	14"					
16"	6"				10"	12"	14"	15"				
20"	8"				10"	12"	14"	16"				
24"	10"				12"	13"	14"	16"	20"			
26"	12"				14"	15"	16"	18"	20"	24"		
30"	14"				16"	17"	18"	20"	22"	24"	26"	
32"	16"				18"	19"	20"	22"	24"	26"	28"	30"
36"	18"				20"	21"	22"	24"	26"	28"	30"	32"
38"	20"				22"	23"	24"	26"	28"	30"	32"	34"
42"	24"				26"	27"	28"	30"	32"	34"	36"	38"
52"	30"				32"	33"	34"	36"	38"	40"	42"	44"
62"	36"				38"	39"	40"	42"	44"	46"	48"	50"
72"	42"				44"	45"	46"	48"	50"	52"	54"	56"
	48"											
	54"											
	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. 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	2.50"	64	2.00"	51
2"x1"	10"	254	6"	152	10"	254	2.50"	64	1.50"	38
2.5"x2"	12"	305	6"	152	10"	254	3.00"	76	2.50"	64
3"x2.5"	12"	305	6"	152	12"	305	3.50"	89	3.00"	76
3"x2"	12"	305	6"	152	10"	254	3.50"	89	2.50"	64
3"x1.5"	12"	305	6"	152	10"	254	3.50"	89	2.00"	51
3"x1"	12"	305	6"	152	10"	254	3.50"	89	1.50"	38
4"x3"	14"	356	6"	152	12"	305	4.50"	114	3.50"	89
4"x2.5"	14"	356	6"	152	12"	305	4.50"	114	3.00"	76
4"x2"	14"	356	6"	152	10"	254	4.50"	114	2.50"	64
4"x1.5"	14"	356	6"	152	10"	254	4.50"	114	2.00"	51
4"x1"	14"	356	6"	152	10"	254	4.50"	114	1.50"	38
5"x4"	16"	406	6"	152	14"	356	5.50"	140	4.50"	114
6"x5"	16"	406	8"	203	15"	381	6.63"	168	5.50"	140
6"x4"	16"	406	6"	152	14"	356	6.63"	168	4.50"	114
6"x3"	16"	406	6"	152	12"	305	6.63"	168	3.50"	89
6"x2.5"	16"	406	6"	152	12"	305	6.63"	168	3.00"	76
6"x2"	16"	406	6"	152	10"	254	6.63"	168	2.50"	64
6"x1.5"	16"	406	6"	152	10"	254	6.63"	168	2.00"	51
6"x1"	16"	406	6"	152	10"	254	6.63"	168	1.50"	38
8"x6"	20"	508	8"	203	16"	406	8.75"	222	6.63"	168
8"x5"	20"	508	8"	203	16"	406	8.75"	222	5.50"	140
8"x4"	20"	508	6"	152	14"	356	8.75"	222	4.50"	114
8"x3"	20"	508	6"	152	12"	305	8.75"	222	3.50"	89
8"x2.5"	20"	508	6"	152	12"	305	8.75"	222	3.00"	76
8"x2"	20"	508	6"	152	10"	254	8.75"	222	2.50"	64
8"x1.5"	20"	508	6"	152	10"	254	8.75"	222	2.00"	51
8"x1"	20"	508	6"	152	10"	254	8.75"	222	1.50"	38



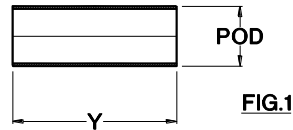
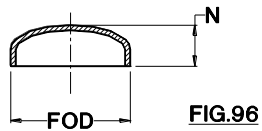
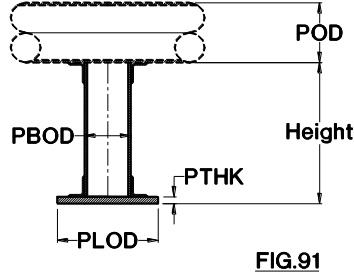
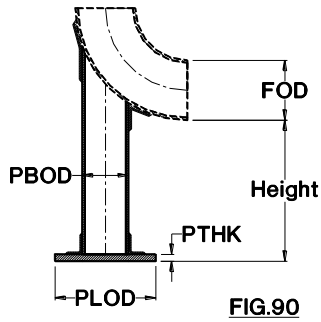
# REDUCING LATERAL OLETS (cont'd)

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	10.88"	276	8.75"	222
10"x6"	24"	610	8"	203	16"	406	10.88"	276	6.63"	168
10"x5"	24"	610	8"	203	16"	406	10.88"	276	5.50"	140
10"x4"	24"	610	6"	152	14"	356	10.88"	276	4.50"	114
10"x3"	24"	610	6"	152	13"	330	10.88"	276	3.50"	89
10"x2.5"	24"	610	6"	152	13"	330	10.88"	276	3.00"	76
10"x2"	24"	610	6"	152	12"	305	10.88"	276	2.50"	64
10"x1.5"	24"	610	6"	152	12"	305	10.88"	276	2.00"	51
10"x1"	24"	610	6"	152	12"	305	10.88"	276	1.50"	38
12"x10"	26"	660	10"	254	24"	610	13.00"	330	10.88"	276
12"x8"	26"	660	10"	254	20"	508	13.00"	330	8.75"	222
12"x6"	26"	660	8"	203	18"	457	13.00"	330	6.63"	168
12"x5"	26"	660	8"	203	18"	457	13.00"	330	5.50"	140
12"x4"	26"	660	6"	152	16"	406	13.00"	330	4.50"	114
12"x3"	26"	660	6"	152	15"	381	13.00"	330	3.50"	89
12"x2.5"	26"	660	6"	152	15"	381	13.00"	330	3.00"	76
12"x2"	26"	660	6"	152	14"	356	13.00"	330	2.50"	64
12"x1.5"	26"	660	6"	152	14"	356	13.00"	330	2.00"	51
12"x1"	26"	660	6"	152	14"	356	13.00"	330	1.50"	38
14"x12"	30"	762	12"	305	26"	660	15.38"	391	13.00"	330
16"x14"	32"	813	12"	305	30"	762	17.50"	445	15.38"	391
18"x16"	36"	914	14"	356	34"	864	19.63"	498	17.50"	445
20"x18"	38"	965	14"	356	38"	965	21.75"	552	19.63"	498
24"x20"	42"	1067	16"	406	44"	1118	26.00"	660	21.75"	552
30"x24"	52"	1321	18"	457	54"	1372	31.75"	806	26.00"	660
36"x30"	62"	1575	20"	508	66"	1676	38.00"	965	31.75"	806
42"x36"	72"	1829	22"	559	78"	1981	43.38"	1102	38.00"	965
48"x42"										
54"x48"										
60"x54"										



# 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	2.50"	64	5.3	2.4
2.5"	2"	51	5"	127	0.50"	13	2.50"	64	5.3	2.4
3"	2"	51	5"	127	0.50"	13	2.50"	64	5.3	2.4
4"	3"	76	6"	152	0.50"	13	3.50"	89	7.8	3.5
5"	3"	76	6"	152	0.50"	13	3.50"	89	7.8	3.5
6"	4"	102	7"	178	0.50"	13	4.50"	114	10.3	4.7
8"	6"	152	9"	229	0.50"	13	6.63"	168	15.5	7.0
10"	6"	152	9"	229	0.50"	13	6.63"	168	15.5	7.0
12"	8"	203	12"	305	0.50"	13	8.75"	222	28.1	12.8
14"	10"	254	14"	356	0.50"	13	10.88"	276	39.4	17.9
16"	12"	305	16"	406	0.50"	13	13.00"	330	57.2	26.0
18"	14"	356	18"	457	0.50"	13	15.38"	391	72.9	33.1
20"	18"	457	22"	559	0.50"	13	19.63"	498	116.8	53.0
24"	18"	457	22"	559	0.50"	13	19.63"	498	116.8	53.0
30"	24"	610	28"	711	0.75"	19	26.00"	660	210.1	95.4
36"	24"	610	28"	711	0.75"	19	26.00"	660	210.1	95.4
42"	36"	914	40"	1016	0.75"	19	38.00"	965	332.7	151.0
48"	36"	914	40"	1016	0.75"	19	38.00"	965	332.7	151.0
54"	48"	1219	52"	1321	0.75"	19	49.50"	1257	432.1	196.2
60"	48"	1219	52"	1321	0.75"	19	49.50"	1257	432.1	196.2

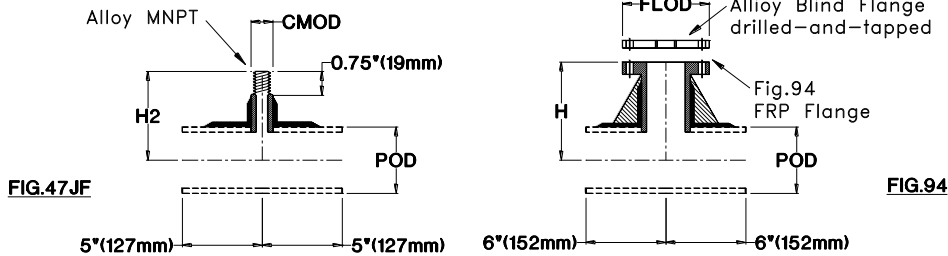
# DUMMY LEGS, CAPS, PUP PIECES (cont'd)

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 shop 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)	(in.)	(mm)
1"			1.50"	0.7			4"	1.8	1.50"	38
1.5"			2.00"	0.9			4"	1.8	2.00"	51
2"	1.5"	38	2.50"	64	0.1	0.0	4"	102	2.50"	64
2.5"	1.5"	38	3.00"	76	0.1	0.1	4"	102	3.00"	76
3"	2.0"	51	3.50"	89	0.2	0.1	4"	102	3.50"	89
4"	2.5"	64	4.63"	117	0.5	0.2	6"	152	4.50"	114
5"	3.0"	76	5.63"	143	0.6	0.3	6"	152	5.50"	140
6"	3.5"	89	6.75"	171	1.2	0.5	6"	152	6.63"	168
8"	4.0"	102	8.88"	225	2.5	1.1	8"	203	8.75"	222
10"	5.0"	127	11.00"	279	4.6	2.1	10"	254	10.88"	276
12"	6.0"	152	13.13"	333	7.1	3.2	12"	305	13.00"	330
14"	6.5"	165	15.50"	394	10.9	5.0	14"	356	15.38"	391
16"	7.0"	178	17.63"	448	15.1	6.8	16"	406	17.50"	445
18"	8.0"	203	19.75"	502	21.2	9.6	18"	457	19.63"	498
20"	9.0"	229	22.00"	559	30.2	13.7	19"	483	21.75"	552
24"	10.5"	267	26.25"	667	49.2	22.3	22"	559	26.00"	660
30"	10.5"	267	31.88"	810	64.0	29.0	19"	483	31.75"	806
36"	10.5"	267	38.25"	972	109.2	49.6	22"	559	38.00"	965
42"	12.0"	305	43.50"	1105	95.4	43.3	15"	381	43.38"	1102
48"	13.5"	343	49.63"	1260	131.8	59.8	15"	381	49.50"	1257
54"										
60"	16.5"	419	61.88"	1572	252.5	114.6	20"	508	61.75"	1568

# THREADED CONNECTIONS



For Series 110FW, 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)

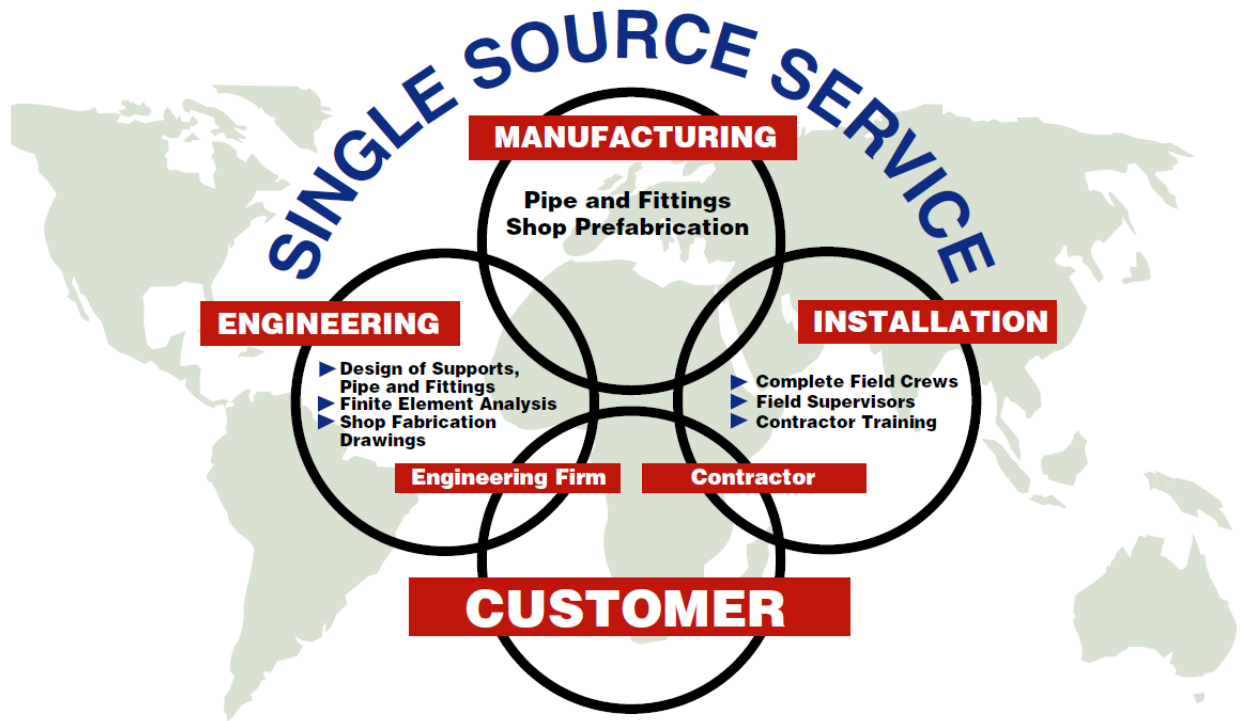
Size	Fig.47JF,94	
	POD	
	(in.)	(mm)
0.5"		
0.75"		
1.0"	1.50"	38
1.5"	2.00"	51
2"	2.50"	64
2.5"	3.00"	76
3"	3.50"	89
4"	4.50"	114
5"	5.50"	140
6"	6.63"	168
8"	8.75"	222
10"	10.88"	276
12"	13.00"	330
14"	15.38"	391
16"	17.50"	445
18"	19.63"	498
20"	21.75"	552
24"	26.00"	660
30"	31.75"	806
36"	38.00"	965
42"	43.38"	1102
48"	49.50"	1257
54"		
60"	61.75"	1568

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
13.69"	348	15.00"	381
14.56"	370	16.00"	406
16.63"	422	18.00"	457
19.75"	502	21.00"	533
22.88"	581	24.00"	610
25.56"	649	27.00"	686
28.63"	727	30.00"	762
34.63"	879	36.00"	914

## Threaded Connection Weights

Size
1"x1/2", 1.5"x1/2", ..., 60"x1/2"
1"x3/4", 1.5"x3/4", ..., 60"x3/4"
1.5"x1", 2"x1", ..., 60"x1"
1.5"x1.25", 2"x1.25", ..., 60"x1.25"
2"x1.5", 2.5"x1.5", ..., 60"x1.5"
2.5"x2", 3"x2", ..., 60"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



**OVER 40 YEARS EXPERIENCE IN SUCCESSFUL APPLICATIONS OF FIBERGLASS PIPE SYSTEMS.**

**FIBERBOND®**



Phone  
+1 (225) 752-2705

Toll Free (U.S.A.)  
800-752-7473

Manufactured by  
Future Pipe Industries, Inc.  
An ISO9001 Certified Company

15915 Perkins Road  
Baton Rouge, LA 70810 U.S.A.  
[www.fiberbond.com](http://www.fiberbond.com)