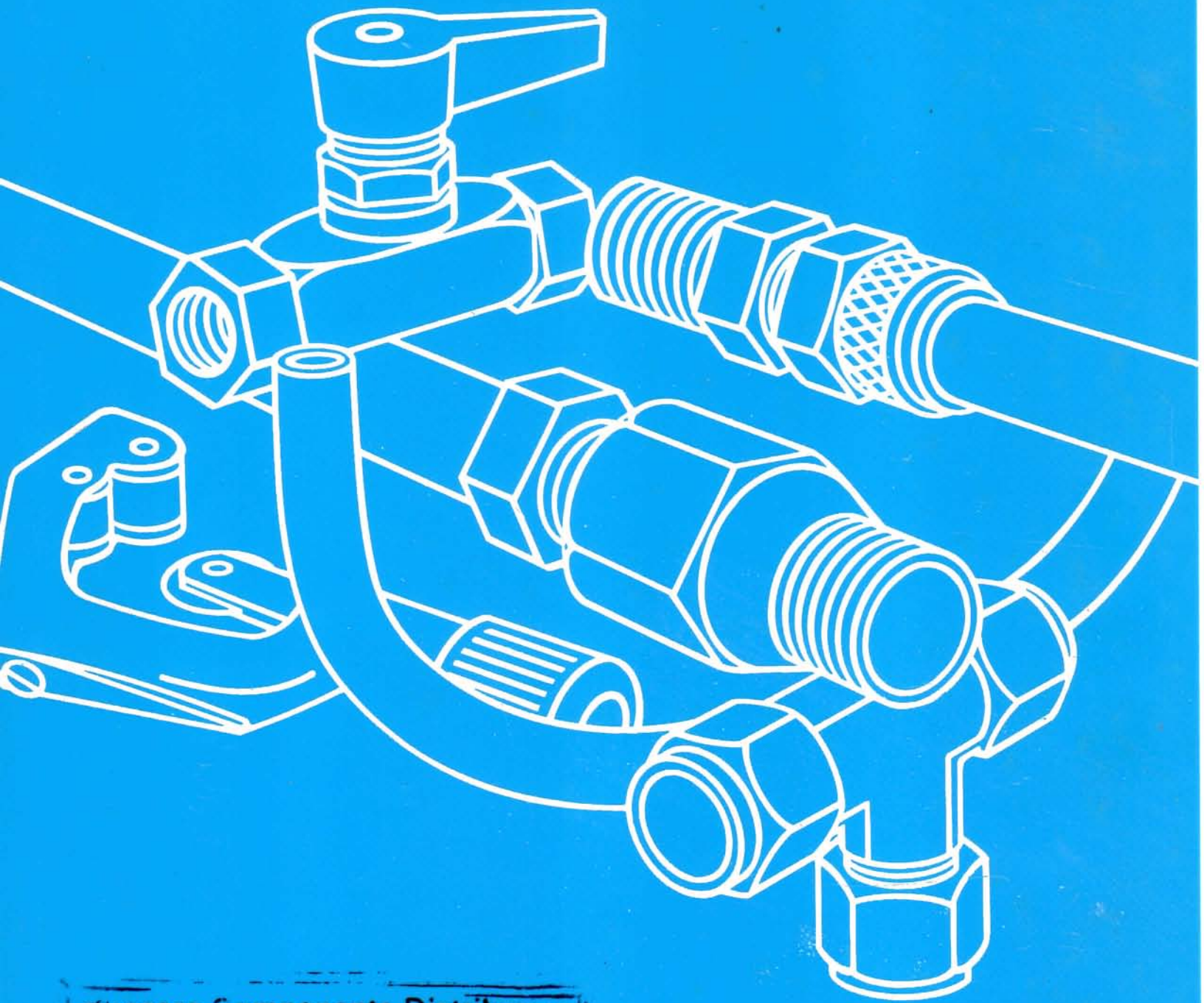


# Gould Imperial-Eastman Valves and Fittings



Process Components Distribution  
42 Edgeboro Road  
East Brunswick, N.J. 08816  
(800) 352-4993



**GOULD**

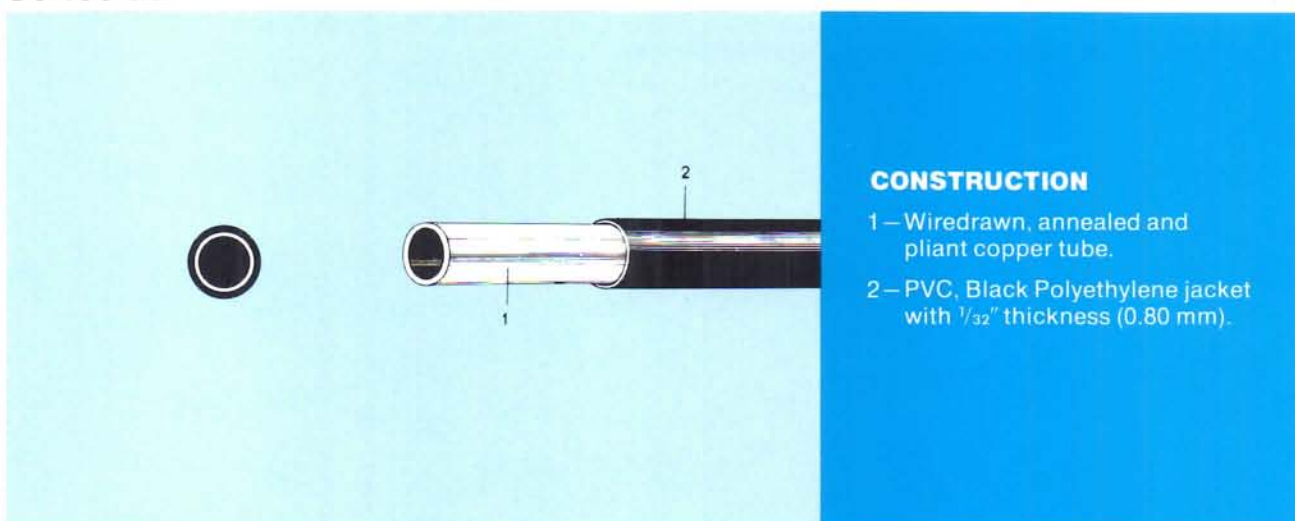
**BUNDLED  
TUBING**

**BUNDLED  
TUBING**

# Gould Imperial-Eastman Jacketed Copper Tubing

Combines the high chemical resistance of thermoplastic with the performance characteristics of metal.

## Series 80



### CONSTRUCTION

- 1 – Wiredrawn, annealed and pliant copper tube.
- 2 – PVC, Black Polyethylene jacket with  $\frac{1}{32}$ " thickness (0.80 mm).

### FEATURES

- **RESISTANCE** – Excellent protection from harmful effects of chemicals, solvents and environmental corrosion.
- **PREVENTS METAL AGAINST METAL CONTACT** – Jacket cushions tubing from metal against metal contact, largely encountered in power plants and other areas where tubing is subjected to vibration.
- **BLENDS INTO PLANT INSTRUMENT SYSTEM** – Dark jacket gives tubing appearance similar to insulated wire, enabling it to color-coordinate well with the plant instrument system.
- **ECONOMICAL** – Costs less than stainless steel tubes or superior alloys, while affording practically the same protection against rust. Installation cost is lower too since it's easier to work with than stainless steel.

### INSTALLATION SUGGESTIONS

- The longest possible continuous runs should be used to avoid the additional cost of junction points. However, when junctions are required, the Gould Hi-Seal tube fittings are recommended. Simply peel back the jacket and connect the fitting. Tape the exposed tube and fitting with splicing tape to insure maximum corrosion protection.

# Specifications

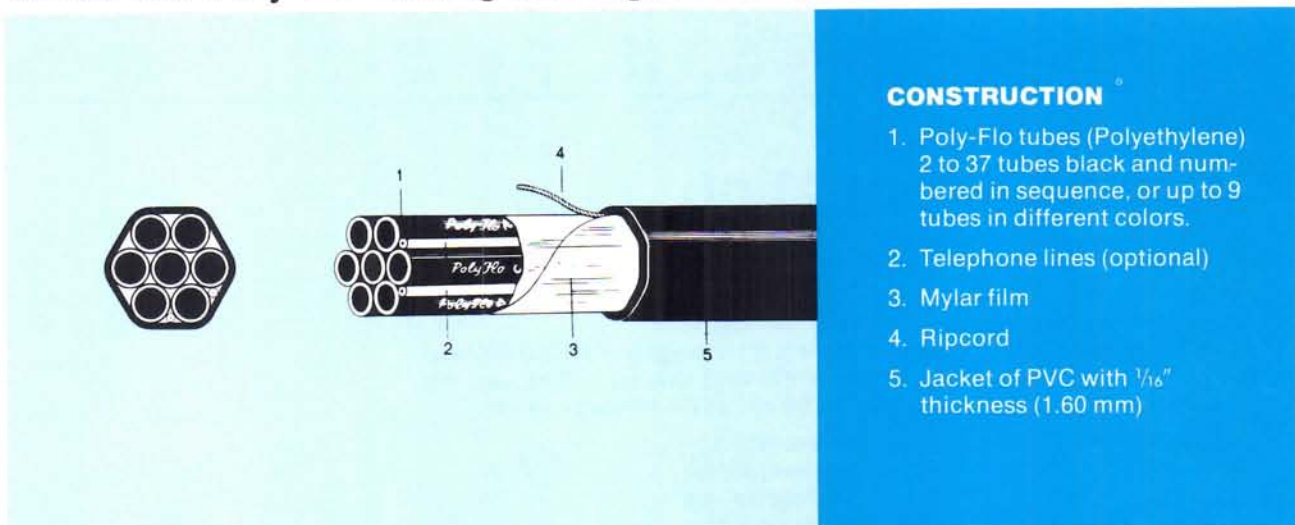
Tube In.	O.D. (mm)	Jacket Material	Catalog Number	Coil Length		Shpg. Wt. Per Coil		Min. Bend Radius		Max. Rec. Pulling Tension	
				Ft.	(m)	Lbs.	(Kg.)	In.	(mm)	Lbs.	(Kg.)
1/4"	(6.35)	PVC	80-44-CVC-100	100	(30.5)	10	(4.5)	1"	(26)	110	(50)
			80-44-CVC-500	500	(152.4)	50	(22.7)				
			80-44-CVC-1000	1000	(304.8)	100	(45.4)				
1/4"	(6.35)	Poly-ethylene	80-44-CPE-100	100	(30.5)	10	(4.5)	1"	(26)	110	(50)
			80-44-CPE-500	500	(152.4)	50	(22.7)				
			80-44-CPE-1000	1000	(304.8)	100	(45.4)				
3/8"	(9.53)	PVC	80-66-CVC-100	100	(30.5)	16	(7.3)	1 1/4"	(32)	232	(105)
			80-66-CVC-500	500	(152.4)	80	(36.3)				
3/8"	(9.53)	Poly-ethylene	80-66-CPE-100	100	(30.5)	16	(7.3)	1 1/4"	(32)	232	(105)
			80-66-CPE-500	500	(152.4)	80	(36.3)				
1/2"	(12.7)	PVC	80-88-CVC-100	100	(30.5)	23.4	(10.6)	1 1/2"	(38.5)	314	(142)
1/2"	(12.7)	Poly-ethylene	80-88-CPE-100	100	(30.5)	23.4	(10.6)	1 1/2"	(38.5)	314	(142)

- Working pressures up to 2,500 psi and temperatures up to 176°F. (80°C.).
- Copper tubing conforms to ASTM Specifications B68-B75 and ABNT EB-219, EB-584, DHP type.
- For lengths greater than listed contact our local representative.

# Gould Imperial-Eastman Multi-Cor™ Bundled Tubing

Permits use of multi-tubes within the confines of a single cover for a wide range of instrumentation applications.

## Series 160 Poly-Flo® Tubing with Light PVC Jacket



### CONSTRUCTION

1. Poly-Flo tubes (Polyethylene) 2 to 37 tubes black and numbered in sequence, or up to 9 tubes in different colors.
2. Telephone lines (optional)
3. Mylar film
4. Ripcord
5. Jacket of PVC with  $\frac{1}{16}$ " thickness (1.60 mm)

### FEATURES

- **VERY LIGHT**— About 40% lighter than aluminum and 75% lighter than copper bundles of a similar design.
- **ECONOMICAL**— Low initial cost (50% to 70% less than aluminum bundles and 70% to 80% less than copper bundles of a similar design). Lower installed cost than metal tubing bundles. Since it can usually be bent and pulled into place by hand, less equipment and preparation time is required.
- **CHOICE OF LENGTHS**— Made in continuous lengths up to 3,000 feet (914 m). (Consult factory for longer lengths.)
- **FLEXIBILITY**— Extremely flexible; not subject to work hardening.
- **RESISTANCE**— Very resistant to most chemicals (organic and inorganic) and weathering. Also, affords optimal resistance to ultra-violet radiation when exposed to the sun. Tested for heat aging and long-term dimensional stability. Can function at temperatures up to 176°F. (80°C.) with 30 psi, or up to 72°F. (23°C.) with 100 psi.
- Core tubes are manufactured to close tolerances for compatibility with Gould Poly-Flo fittings. Reliable connections can be made without tools.

- Ripcord simplifies stripping back the jacket.
- Color coding of core tubes is available.

### INSTALLATION SUGGESTIONS

- Multi-Cor Series 160 is designed to be pulled in conduit or a closed cable tray when used in most industrial installations. If severe physical abuse is *not* anticipated, the Series 160 can be installed in an open cable tray. However, where damage from welding, cutting torch splatter, or fire is probable, the Gould Series 730 bundled tubing is recommended.
- When pulling Gould Multi-Cor, apply grips over jacket. *Do not* pull on core tubes alone.
- Allow one foot per 100 feet of length per 100°F. (38°C.) to compensate for thermal expansion and contraction.

# Specifications

No. of Tubes	Catalog Number	Max. Inches	O.D. mm	Jacket Thickness		Min. Rec. Bend Radius		Net Weight		Max. Rec. Pulling Tension	
				Inches	mm	Inches	mm	Lbs/C'	Kg/m	Lbs	Kg
<b>1/4" O.D. x .040" Wall (6.35 mm O.D. x 1.00 mm Wall) Poly-Flo Tube</b>											
2	160-44-PO2	5/8"	16	1/16"	1.6	1 1/2"	38	8.4	.125	95	43.1
3	160-44-PO3	5/8"	16	1/16"	1.6	1 1/2"	38	10.8	.160	110	49.9
4	160-44-PO4	13/16"	21	1/16"	1.6	2"	51	12.8	.190	140	63.5
7	160-44-PO7	7/8"	22	1/16"	1.6	2 1/2"	64	18.2	.270	195	88.4
8	160-44-PO8	1 1/32"	26	1/16"	1.6	2 1/2"	64	19.5	.290	235	106.6
10	160-44-P10	1 1/8"	29	1/16"	1.6	3"	76	24.9	.370	260	117.9
12	160-44-P12	1 1/8"	29	1/16"	1.6	3 1/2"	89	28.2	.420	300	136.1
14	160-44-P14	1 1/4"	32	1/16"	1.6	4"	102	32.9	.490	340	154.2
19	160-44-P19	1 3/8"	35	1/16"	1.6	5"	127	41.7	.620	425	192.7
37	250-44-P37	1 31/32"	50	7/64"	2.5	9"	230	80.7	1.200	880	399.1
<b>3/8" O.D. x .062" Wall (9.52 mm O.D. x 1.57 mm Wall) Poly-Flo Tube</b>											
2	160-66-PO2	7/8"	22	1/16"	1.6	2"	51	14.1	.210	160	72.6
3	160-66-PO3	7/8"	22	1/16"	1.6	2"	51	18.8	.280	195	88.4
7	160-66-PO7	1 1/4"	32	1/16"	1.6	4"	102	30.9	.460	365	165.5
12	250-66-P12	1 21/32"	42	7/64"	2.5	6"	153	62.5	.930	685	310.7

## Ordering Information

- When specifying telephone lines, add the letter "T" to the end of the catalog number.  
Example: 160-44-PO7 = 160-44-PO7-T.

- The Multi-Cor supplied on reels in variable factory lengths of up to 3,000 feet (914 m). Reels can be supplied with pre-established lengths. In that case, the corresponding letter should be added to the end of the catalog number.

Example: 160-44-PO7-T-B "A" — 500 Feet (152.5 m)  
 "B" — 1000 Feet (305 m)  
 "C" — 2000 Feet (610 m)  
 "D" — Specify length

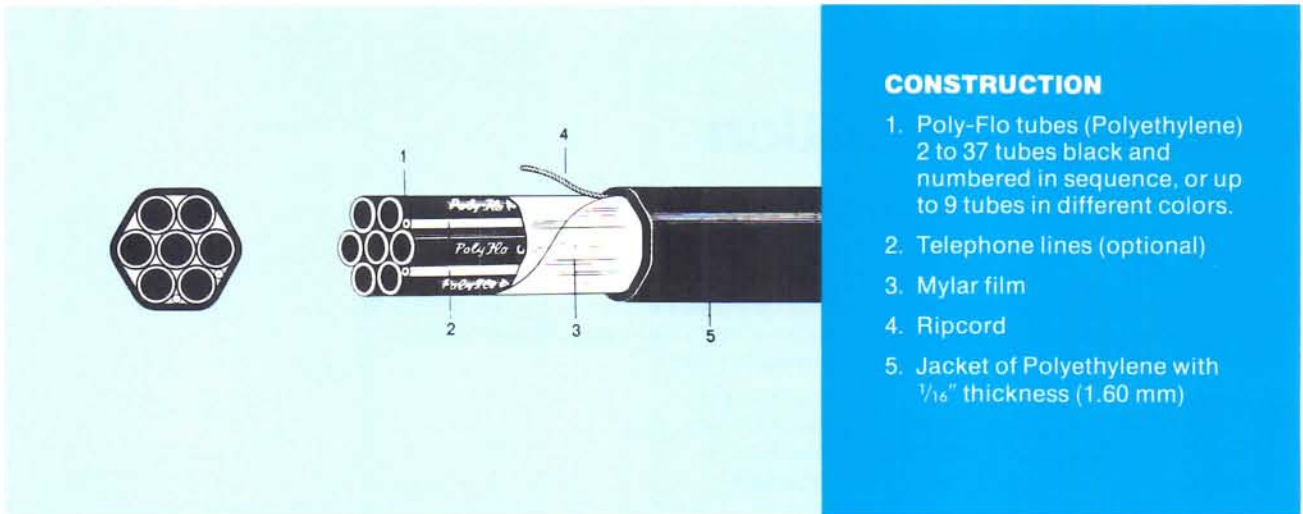
- When a variety of up to nine colors are required, simply specify the colors desired:

Blue	Red	Green
Natural white	Orange	
Gray	Yellow	
Black	Violet	

# Gould Imperial-Eastman Multi-Cor™ Bundled Tubing

All-polyethylene construction assures outstanding resistance to chemicals and adverse weather conditions. Exceptional low temperature flexibility to  $-70^{\circ}\text{F}$ .

## Series 161 Poly-Flo® Tubing with Light Polyethylene Jacket



### CONSTRUCTION

1. Poly-Flo tubes (Polyethylene) 2 to 37 tubes black and numbered in sequence, or up to 9 tubes in different colors.
2. Telephone lines (optional)
3. Mylar film
4. Ripcord
5. Jacket of Polyethylene with  $\frac{1}{16}$ " thickness (1.60 mm)

### FEATURES

- **VERY LIGHT** – About 40% lighter than aluminum and 75% lighter than copper bundles of a similar design.
- **ECONOMICAL** – Low initial cost (50% to 70% less than aluminum bundles and 70% to 80% less than copper bundles of a similar design). Lower installed cost than metal tubing bundles. Since it can usually be bent and pulled into place by hand, less equipment and preparation time is required.
- **CHOICE OF LENGTHS** – Made in continuous lengths up to 3,000 feet (914 m). (Consult factory for longer lengths.)
- **FLEXIBILITY** – Extremely flexible; not subject to work hardening.
- **RESISTANCE** – Very resistant to most chemicals (organic and inorganic) and weathering. Also, affords optimal resistance to ultra-violet radiation when exposed to the sun. Tested for heat aging and long-term dimensional stability. Can function at temperatures up to  $176^{\circ}\text{F}$ . ( $80^{\circ}\text{C}$ .) with 30 psi, or up to  $72^{\circ}\text{F}$ . ( $23^{\circ}\text{C}$ .) with 100 psi.
- Core tubes are manufactured to close tolerances for compatibility with Gould Poly-Flo fittings. Reliable connections can be made without tools.
- Ripcord simplifies stripping back the jacket.
- Color coding of core tubes is available.

### INSTALLATION SUGGESTIONS

- Multi-Cor Series 161 is designed to be pulled in conduit or a closed cable tray when used in most industrial installations. If severe physical abuse is *not* anticipated, the Series 161 can be installed in an open cable tray. However, where damage from welding, cutting torch splatter, or fire is probable, the Gould Series 730 bundled tubing is recommended.
- When pulling Gould Multi-Cor, apply grips over jacket. *Do not* pull on core tubes alone.
- Allow one foot per 100 feet of length per  $100^{\circ}\text{F}$ . ( $38^{\circ}\text{C}$ .) to compensate for thermal expansion and contraction.



# Specifications

No. of Tubes	Catalog Number	Max. Inches	O.D. mm	Jacket Thickness		Min. Rec. Bend Radius		Net Weight		Max. Rec. Pulling Tension	
				Inches	mm	Inches	mm	Lbs/C'	Kg/m	Lbs	Kg
<b>1/4" O.D. x .040" Wall (6.35 mm O.D. x 1.00 mm Wall) Poly-Flo Tube</b>											
2	161-44-PO2	5/8"	16	1/16"	1.6	1 1/2"	38	8.4	.125	95	43.1
3	161-44-PO3	5/8"	16	1/16"	1.6	1 1/2"	38	10.8	.160	110	49.9
4	161-44-PO4	13/16"	21	1/16"	1.6	2"	51	12.8	.190	140	63.5
7	161-44-PO7	7/8"	22	1/16"	1.6	2 1/2"	64	18.2	.270	195	88.4
8	161-44-PO8	1 1/32"	26	1/16"	1.6	2 1/2"	64	19.5	.290	235	106.6
10	161-44-P10	1 1/8"	29	1/16"	1.6	3"	76	24.9	.370	260	117.9
12	161-44-P12	1 1/8"	29	1/16"	1.6	3 1/2"	89	28.2	.420	300	136.1
14	161-44-P14	1 1/4"	32	1/16"	1.6	4"	102	32.9	.490	340	154.2
19	161-44-P19	1 3/8"	35	1/16"	1.6	5"	127	41.7	.620	425	192.7
37	251-44-P37	1 3/32"	50	7/64"	2.5	9"	230	80.7	1.200	880	399.1
<b>3/8" O.D. x .062" Wall (9.52 mm O.D. x 1.57 mm Wall) Poly-Flo Tube</b>											
2	161-66-PO2	7/8"	22	1/16"	1.6	2"	51	14.1	.210	160	72.6
3	161-66-PO3	7/8"	22	1/16"	1.6	2"	51	18.8	.280	195	88.4
7	161-66-PO7	1 1/4"	32	1/16"	1.6	4"	102	30.9	.460	365	165.5
12	251-66-P12	1 21/32"	42	7/64"	2.5	6"	153	62.5	.930	685	310.7

## Ordering Information

- When specifying telephone lines, add the letter "T" to the end of the catalog number.

Example: 161-44-PO7 = 161-44-PO7-T.

- The tubing is supplied on reels in variable factory lengths of up to 2,000 feet (610 m). Reels can be supplied with pre-established lengths. In that case, the corresponding letter should be added to the end of the catalog number.

Example: 161-44-PO7-T-B "A" – 500 Feet (152.5 m)  
 "B" – 1000 Feet (305 m)  
 "C" – 2000 Feet (610 m)  
 "D" – Specify length

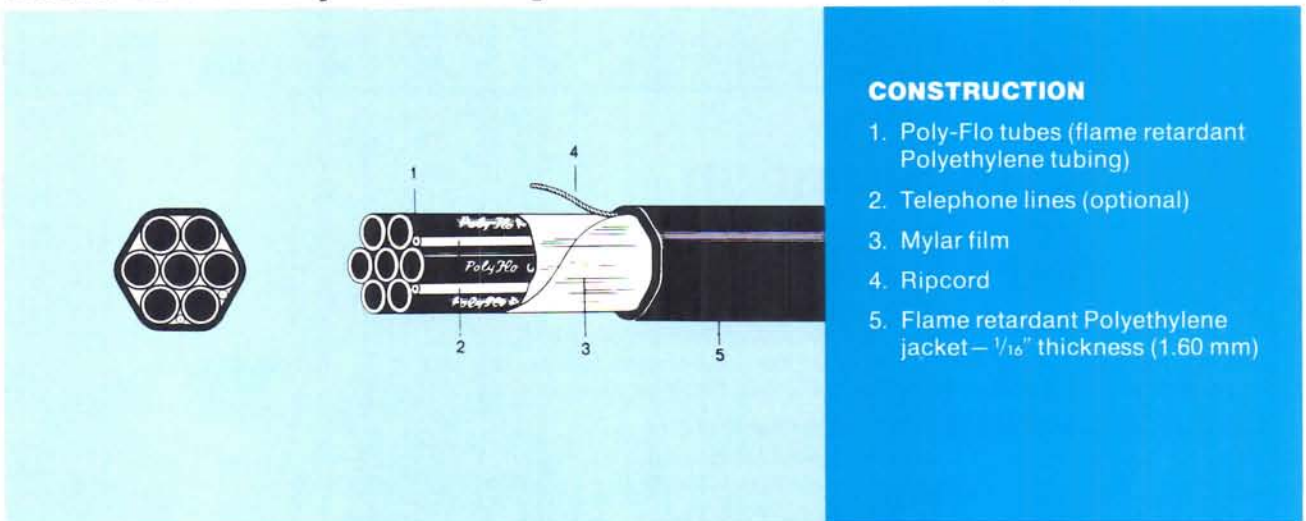
- When a variety of up to nine colors are required, simply specify the colors desired:

Blue	Red	Green
Natural white	Orange	
Gray	Yellow	
Black	Violet	

# Gould Imperial-Eastman Multi-Cor™ Bundled Tubing

A superior flame resistant tubing bundle that can be used under the most severe corrosive and weather conditions.

## Series 161FR Poly-Flo® Tubing with Flame Retardant Polyethylene Jacket



### CONSTRUCTION

1. Poly-Flo tubes (flame retardant Polyethylene tubing)
2. Telephone lines (optional)
3. Mylar film
4. Ripcord
5. Flame retardant Polyethylene jacket— $\frac{1}{16}$ " thickness (1.60 mm)

### FEATURES

- **SELF-EXTINGUISHING**— Will not independently support flame, even after repeated ignition.
- **VERY LIGHT**— About 40% lighter than aluminum and 75% lighter than copper bundles of a similar design.
- **ECONOMICAL**— Low initial cost (50% to 70% less than aluminum bundles and 70% to 80% less than copper bundles of a similar design). Lower installed cost than metal tubing bundles. Since it can usually be bent and pulled into place by hand, less equipment and preparation time is required.
- **CHOICE OF LENGTHS**— Made in continuous lengths up to 3,000 feet (914 m). (Consult factory for longer lengths.)
- **FLEXIBILITY**— Extremely flexible; not subject to work hardening.
- **RESISTANCE**— Very resistant to most chemicals (organic and inorganic) and weathering. Also, affords optimal resistance to ultra-violet radiation when exposed to the sun. Tested for heat aging and long-term dimensional stability. Can function at temperatures up to 176°F. (80°C.) with 30 psi, or up to 72°F. (23°C.) with 100 psi.
- Core tubes are manufactured to close tolerances for compatibility with Gould Poly-Flo fittings. Reliable connections can be made without tools.
- Ripcord simplifies stripping back the jacket.
- Color coding of core tubes is available.

### INSTALLATION SUGGESTIONS

- Multi-Cor Series 161FR is designed to be pulled in conduit or a closed cable tray when used in most industrial installations. If severe physical abuse is *not* anticipated, the Series 161FR can be installed in an open cable tray. However, where damage from welding, cutting torch splatter, or fire is probable, the Gould Series 730 bundled tubing is recommended.
- When pulling Gould Multi-Cor, apply grips over jacket. *Do not* pull on core tubes alone.
- Allow one foot per 100 feet of length per 100°F. (38°C.) to compensate for thermal expansion and contraction.

# Specifications

No. of Tubes	Catalog Number	Max. Inches	O.D. mm	Jacket Thickness		Min. Rec. Bend Radius		Net Weight		Max. Rec. Pulling Tension	
				Inches	mm	Inches	mm	Lbs/C'	Kg/m	Lbs	Kg
<b>1/4" O.D. x .040" Wall (6.35 mm O.D. x 1.00 mm Wall) Poly-Flo Tube</b>											
2	161FR-44-PO2	5/8"	16	1/16"	1.6	1 1/2"	38	8.4	.125	95	43.1
3	161FR-44-PO3	5/8"	16	1/16"	1.6	1 1/2"	38	10.8	.160	110	49.9
4	161FR-44-PO4	13/16"	21	1/16"	1.6	2"	51	12.8	.190	140	63.5
7	161FR-44-PO7	7/8"	22	1/16"	1.6	2 1/2"	64	18.2	.270	195	88.4
8	161FR-44-PO8	1 1/32"	26	1/16"	1.6	2 1/2"	64	19.5	.290	235	106.6
10	161FR-44-P10	1 1/8"	29	1/16"	1.6	3"	76	24.9	.370	260	117.9
12	161FR-44-P12	1 1/8"	29	1/16"	1.6	3 1/2"	89	28.2	.420	300	136.1
14	161FR-44-P14	1 1/4"	32	1/16"	1.6	4"	102	32.9	.490	340	154.2
19	161FR-44-P19	1 3/8"	35	1/16"	1.6	5"	127	41.7	.620	425	192.7
37	251FR-44-P37	1 31/32"	50	7/64"	2.5	9"	230	80.7	1.200	880	399.1
<b>3/8" O.D. x .062" Wall (9.52 mm O.D. x 1.57 mm Wall) Poly-Flo Tube</b>											
2	161FR-66-PO2	7/8"	22	1/16"	1.6	2"	51	14.1	.210	160	72.6
3	161FR-66-PO3	7/8"	22	1/16"	1.6	2"	51	18.8	.280	195	88.4
7	161FR-66-PO7	1 1/4"	32	1/16"	1.6	4"	102	30.9	.460	365	165.5
12	251FR-66-P12	1 21/32"	42	7/64"	2.5	6"	153	62.5	.930	685	310.7

## Ordering Information

- When specifying telephone lines, add the letter "T" to the end of the catalog number.  
Example: 161FR-44-PO7 = 161FR-44-PO7-T.

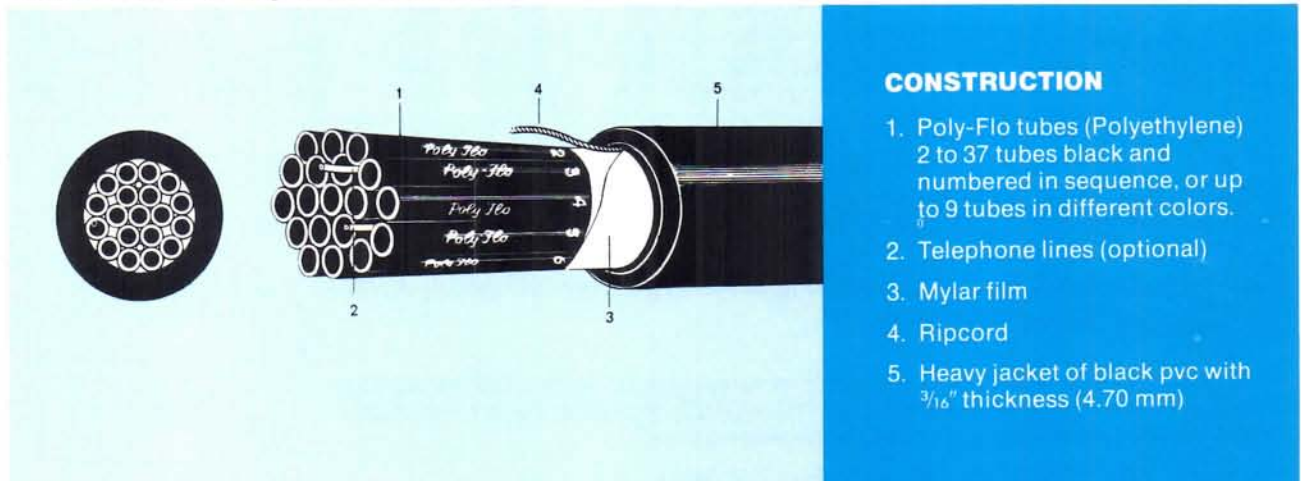
- The Multi-Cor supplied on reels in variable factory lengths of up to 3,000 feet (914 m). Reels can be supplied with pre-established lengths. In that case, the corresponding letter should be added to the end of the catalog number.

Example: 161FR-44-PO7-T-B "A" – 500 Feet (152.5 m)  
 "B" – 1000 Feet (305 m)  
 "C" – 2000 Feet (610 m)  
 "D" – Specify length

# Gould Imperial-Eastman Multi-Cor™ Bundled Tubing

Heavy pvc jacket provides tubes with added protection from mechanical damage.

## Series 470 Poly-Flo® Tubing with Heavy PVC Jacket



### CONSTRUCTION

1. Poly-Flo tubes (Polyethylene) 2 to 37 tubes black and numbered in sequence, or up to 9 tubes in different colors.
2. Telephone lines (optional)
3. Mylar film
4. Ripcord
5. Heavy jacket of black pvc with  $\frac{3}{16}$ " thickness (4.70 mm)

### FEATURES

- **FLEXIBILITY** – Extremely flexible; not subject to work hardening.
- **LIGHT WEIGHT** – Weighs up to 50% less than comparable copper tube bundles.
- **ECONOMICAL** – About one-third the cost of a comparable copper bundle. Lower installed cost than metal tubing bundles.
- **RESISTANCE** – Resists: (1) most chemicals and hydrocarbons; (2) mechanical abuse; (3) sparks and solder drops; (4) ultra-violet radiation when exposed to the sun; (5) when tested for heat aging and long-term dimensional stability the tubing can function at temperatures up to 176°F. (80°C.) with 30 psi, or up to 72°F. (23°C.) with 100 psi.
- **CHOICE OF LENGTHS** – Made in continuous lengths up to 2000 feet (610 m). (Consult factory for longer lengths.)
- **CLOSE TOLERANCES** – Core tubes are manufactured to close tolerances for compatibility with Gould Poly-Flo tube fittings and extra-reliable connections without hand tools.
- **SIMPLIFIED STRIPPING** – The readily accessible ripcord assures simplified and easy stripping of the outer jacket for tube access.

- **COLOR CODING** – Tubes are available in up to nine different colors for rapid line identification.
- **EASY HOOK UP** – Optional communication wires permit use of sound powered phones for tube hook up or instrument calibration.

### INSTALLATION SUGGESTIONS

- When pulling Gould Multi-Cor, apply grips over jacket. *Do not* pull on core tubes alone.
- Allow one foot per 100 feet of length per 100°F. (38°C.) to compensate for thermal expansion and contraction.

# Specifications

No. of Tubes	Catalog Number	Max. Inches	O.D. mm	Jacket Thickness		Min. Rec. Bend Radius		Net Weight		Max. Rec. Pulling Tension	
				Inches	mm	Inches	mm	Lbs/C'	Kg/m	Lbs.	Kg.
<b>1/4" O.D. x .040" Wall (6.35 mm O.D. x 1.00 mm Wall) Poly-Flo Tube</b>											
2	470-44-PO2	7/8"	22.0	3/16"	4.7	3 1/2"	89	23.5	.35	94	42.6
3	470-44-PO3	7/8"	22.0	3/16"	4.7	3 1/2"	89	28.2	.42	110	49.9
4	470-44-PO4	1 1/16"	27.0	3/16"	4.7	4"	102	34.9	.52	145	65.8
7	470-44-PO7	1 1/8"	29.0	3/16"	4.7	4"	102	40.3	.60	196	88.9
8	470-44-PO8	1 5/16"	33.5	3/16"	4.7	4 1/2"	114	44.4	.66	212	96.1
10	470-44-P10	1 3/8"	35.0	3/16"	4.7	5"	127	53.1	.79	256	116.1
12	470-44-P12	1 3/8"	35.0	3/16"	4.7	6"	152	56.5	.84	296	134.2
14	470-44-P14	1 1/2"	38.0	3/16"	4.7	7"	178	61.2	.91	342	155.1
19	470-44-P19	1 5/8"	41.5	3/16"	4.7	9"	228	71.9	1.07	429	194.6
37	470-44-P37	2 1/8"	54.0	3/16"	4.7	12"	305	108.2	1.61	755	342.4
<b>3/8" O.D. x .062" Wall (9.52 mm O.D. x 1.57 mm Wall) Poly-Flo Tube</b>											
2	470-66-PO2	1 1/8"	29	3/16"	4.7	5"	127	32.9	.49	155	70.3
3	470-66-PO3	1 1/8"	29	3/16"	4.7	5"	127	40.3	.60	191	86.3
7	470-66-PO7	1 1/2"	38	3/16"	4.7	7"	178	63.2	.94	371	168.3
12	470-66-P12	1 7/8"	48	3/16"	4.7	10"	254	88.1	1.31	574	260.3

## Ordering Information

- When specifying telephone lines, add the letter "T" to the end of the catalog number.

Example: 470-44-PO7 = 470-44-PO7-T.

- The tubing is supplied on reels in variable factory lengths of up to 2,000 feet (610 m). Reels can be supplied with pre-established lengths. In that case, the corresponding letter should be added to the end of the catalog number.

Example: 470-44-PO7-T-B "A" — 500 Feet (152.5 m)  
 "B" — 1000 Feet (305 m)  
 "C" — 2000 Feet (610 m)  
 "D" — Specify length

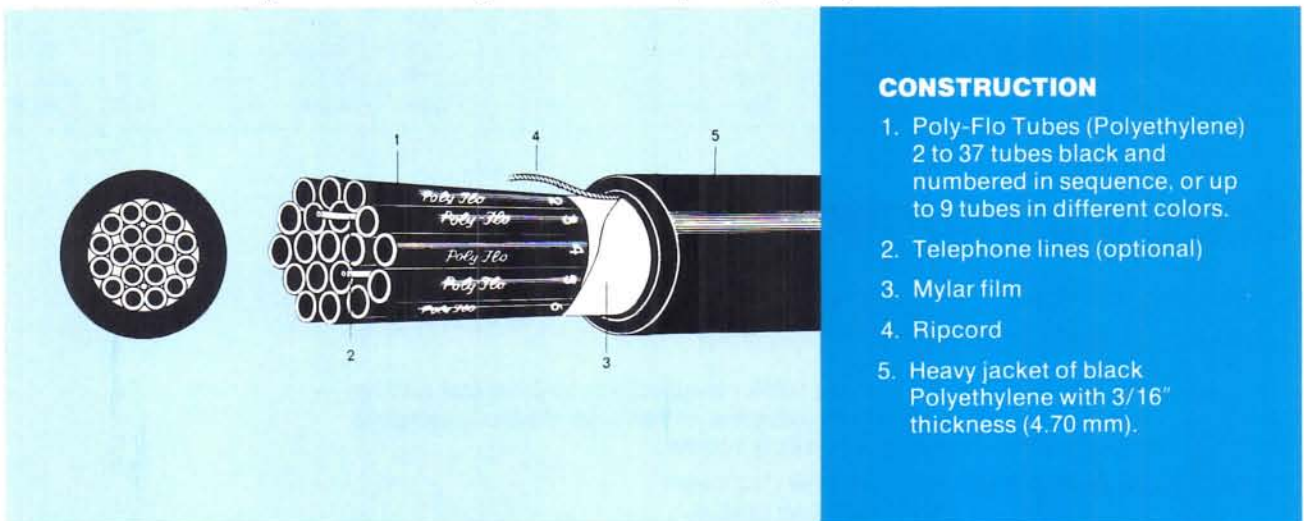
- When a variety of up to nine colors are required, simply specify the colors desired:

Blue	Red	Green
Natural white	Orange	
Gray	Yellow	
Black	Violet	

# Gould Imperial-Eastman Multi-Cor™ Bundled Tubing

Ideally suited for instrument applications that require external protection from mechanical abuse or solder.

## Series 471 Poly-Flo® Tubing with Heavy Polyethylene Jacket



### CONSTRUCTION

1. Poly-Flo Tubes (Polyethylene) 2 to 37 tubes black and numbered in sequence, or up to 9 tubes in different colors.
2. Telephone lines (optional)
3. Mylar film
4. Ripcord
5. Heavy jacket of black Polyethylene with 3/16" thickness (4.70 mm).

### FEATURES

- **FLEXIBILITY** – Extremely flexible; not subject to work hardening.
- **LIGHTWEIGHT** – Weighs up to 50% less than comparable copper tube bundles.
- **ECONOMICAL** – About one-third the cost of a comparable copper bundle. Lower installed cost than metal tubing bundles.
- **RESISTANCE** – Resists: (1) most chemicals and hydrocarbons; (2) mechanical abuse; (3) sparks and solder drops; (4) ultra-violet radiation when exposed to the sun; (5) when tested for heat aging and long-term dimensional stability the tubing can function at temperatures up to 176°F. (80°C.) with 30 psi, or up to 72°F. (23°C.) with 100 psi.
- **CHOICE OF LENGTHS** – made in continuous lengths up to 2000 feet (610 m). (Consult factory for longer lengths.)
- **CLOSE TOLERANCES** – Core tubes are manufactured to close tolerances for compatibility with Gould Poly-Flo tube fittings and extra-reliable connections without hand tools.
- **SIMPLIFIED STRIPPING** – The readily accessible ripcord assures simplified and easy stripping of the outer jacket for tube access.

- **COLOR CODING** – Tubes are available in up to nine different colors for rapid line identification.
- **EASY HOOK UP** – Optional communication wires permit use of sound powered phones for tube hook up or instrument calibration.

### INSTALLATION SUGGESTIONS

- When pulling Gould Multi-Cor, apply grips over jacket. *Do not* pull on core tubes alone.
- Allow one foot per 100 feet of length per 100°F. (38°C.) to compensate for thermal expansion and contraction.

# Specifications

No. of Tubes	Catalog Number	Max. Inches	O.D. mm	Jacket Thickness		Min. Rec. Bend Radius		Net Weight		Max. Rec. Pulling Tension	
				Inches	mm	Inches	mm	Lbs/C'	Kg/m	Lbs.	Kg.
<b>1/4" O.D. x .040" Wall (6.35 mm O.D. x 1.00 mm Wall) Poly-Flo Tube</b>											
2	471-44-PO2	7/8"	22.0	3/16"	4.7	3 1/2"	89	23.5	.35	94	42.6
3	471-44-PO3	7/8"	22.0	3/16"	4.7	3 1/2"	89	28.2	.42	110	49.9
4	471-44-PO4	1 1/16"	27.0	3/16"	4.7	4"	102	34.9	.52	145	65.8
7	471-44-PO7	1 1/8"	29.0	3/16"	4.7	4"	102	40.3	.60	196	88.9
8	471-44-PO8	1 5/16"	33.5	3/16"	4.7	4 1/2"	114	44.4	.66	212	96.1
10	471-44-P10	1 3/8"	35.0	3/16"	4.7	5"	127	53.1	.79	256	116.1
12	471-44-P12	1 3/8"	35.0	3/16"	4.7	6"	152	56.5	.84	296	134.2
14	471-44-P14	1 1/2"	38.0	3/16"	4.7	7"	178	61.2	.91	342	155.1
19	471-44-P19	1 5/8"	41.5	3/16"	4.7	9"	228	71.9	1.07	429	194.6
37	471-44-P37	2 1/8"	54.0	3/16"	4.7	12"	305	108.2	1.61	755	342.4
<b>3/8" O.D. x .062" Wall (9.52 mm O.D. x 1.57 mm Wall) Poly-Flo Tube</b>											
2	471-66-PO2	1 1/8"	29	3/16"	4.7	5"	127	32.9	.49	155	70.3
3	471-66-PO3	1 1/8"	29	3/16"	4.7	5"	127	40.3	.60	191	86.3
7	471-66-PO7	1 1/2"	38	3/16"	4.7	7"	178	63.2	.94	371	168.3
12	471-66-P12	1 7/8"	48	3/16"	4.7	10"	254	88.1	1.31	574	260.3

## Ordering Information

- When specifying telephone lines, add the letter "T" to the end of the catalog number.

Example: 471-44-PO7 = 471-44-PO7-T.

- The tubing is supplied on reels in variable factory lengths of up to 2,000 feet (610 m). Reels can be supplied with pre-established lengths. In that case, the corresponding letter should be added to the end of the catalog number.

Example: 471-44-PO7-T-B "A" — 500 Feet (152.5 m)  
 "B" — 1000 Feet (305 m)  
 "C" — 2000 Feet (610 m)  
 "D" — Specify length

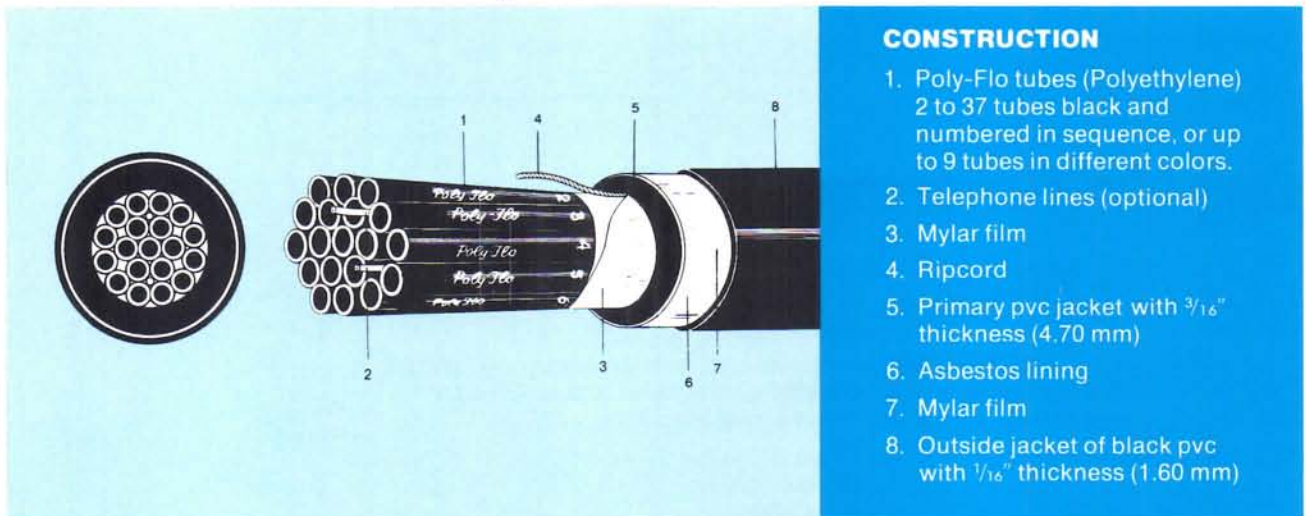
- When a variety of up to nine colors are required, simply specify the colors desired:

Blue	Red	Green
Natural white	Orange	
Gray	Yellow	
Black	Violet	

# Gould Imperial-Eastman Multi-Cor™ Bundled Tubing

Combines high quality polyethylene tubes with thick protective core for high heat and fire resistant applications.

## Series 730 Poly-Flo® Tubing with Asbestos Protection



### CONSTRUCTION

1. Poly-Flo tubes (Polyethylene) 2 to 37 tubes black and numbered in sequence, or up to 9 tubes in different colors.
2. Telephone lines (optional)
3. Mylar film
4. Ripcord
5. Primary pvc jacket with  $\frac{3}{16}$ " thickness (4.70 mm)
6. Asbestos lining
7. Mylar film
8. Outside jacket of black pvc with  $\frac{1}{16}$ " thickness (1.60 mm)

### FEATURES

- **FLEXIBILITY** – Extremely flexible; not subject to work hardening.
- **LIGHTWEIGHT** – Weighs up to 50% less than comparable copper bundles.
- **ECONOMICAL** – About one-third the cost of a comparable copper bundle. Lower installed cost than metal tubing bundles.
- **RESISTANCE** – Resists: (1) most chemicals and hydrocarbons; (2) mechanical abuse; (3) sparks and solder drops; (4) ultra-violet radiation when exposed to the sun; (5) when tested for heat aging and long-term dimensional stability the tubing can function at temperatures up to 176°F. (80°C.) with 30 psi, or up to 72°F. (23°C.) with 100 psi.
- With the additional protection of asbestos, the internal tubes will not be affected if touched accidentally by non-continuous fire, welding slag or cutting torch splatter.
- Can be installed directly in trenches.
- **CLOSE TOLERANCES** – Core tubes are manufactured to close tolerances for compatibility with Gould Poly-Flo tube fittings and extra-reliable connections without hand tools.
- **SIMPLIFIED STRIPPING** – The readily accessible ripcord assures simplified and easy stripping of the outer jacket for tube access.
- **COLOR CODING** – Tubes are available in up to nine different colors for rapid line identification.
- **EASY HOOK UP** – Optional communication wires permit use of sound powered phones for tube hook up or instrument calibration.

### INSTALLATION SUGGESTIONS

- When pulling Gould Multi-Cor, apply grips over jacket. *Do not* pull on core tubes alone.
- Allow one foot per 100 feet of length per 100°F. (38°C.) to compensate for thermal expansion and contraction.



# Specifications

No. of Tubes	Catalog Number	Max. Inches	O.D. mm	Min. Bend Inches	Rec. Radius mm	Net Weight		Max. Pulling Lbs	Rec. Tension Kg	Bundle Area Based on O.D.	
						Lbs/C <sup>1</sup>	Kg/m			Sq. In.	CM <sup>2</sup>
<b>1/4" O.D. x .040" Wall (6.35 mm O.D. x 1.00 mm Wall) Poly-Flo Tube</b>											
2	730-44-PO2	1 1/16"	27	5 1/4"	135	41.7	.62	30	13.6	.880	5.68
3	730-44-PO3	1 1/16"	27	5 15/16"	150	42.3	.63	50	22.7	.880	5.68
4	730-44-PO4	1 3/16"	30	6 3/8"	162	45.0	.67	60	27.2	1.108	7.15
7	730-44-PO7	1 1/4"	32	6 3/4"	172	59.8	.89	105	47.6	1.227	7.92
8	730-44-PO8	1 3/8"	35	7 11/16"	195	63.8	.95	120	54.4	1.485	9.58
10	730-44-P10	1 7/16"	40	8 1/4"	210	70.6	1.05	150	68.0	1.947	12.56
12	730-44-P12	1 9/16"	40	8 1/4"	210	73.9	1.10	180	81.6	1.947	12.56
14	730-44-P14	1 11/16"	43	9"	229	78.0	1.16	210	95.2	2.234	14.41
19	730-44-P19	1 13/16"	46	9 3/4"	248	92.1	1.37	285	129.3	2.576	16.62
37	730-44-P37	2 5/16"	59	12 3/4"	324	137.8	2.05	555	251.7	4.560	29.42
<b>3/8" O.D. x .062" Wall (9.52 mm O.D. x 1.57 mm Wall) Poly-Flo Tube</b>											
2	730-66-PO2	1 5/16"	33.5	6 3/4"	172	56.5	.84	30	13.6	1.382	8.92
3	730-66-PO3	1 5/16"	33.5	7 1/2"	190	59.8	.89	50	22.7	1.382	8.92
7	730-66-PO7	1 3/4"	44.5	9"	229	69.2	1.03	105	47.6	2.278	14.70
12	730-66-P12	2 1/16"	52.5	11 1/4"	286	127.7	1.90	180	81.6	3.334	21.51

## Ordering Information

- When specifying telephone lines, add the letter "T" to the end of the catalog number.

Example: 730-44-PO7 = 730-44-PO7-T.

- The multitubes are supplied on reels in variable factory lengths of up to 1,000 feet (305 m). Reels can be supplied with pre-established lengths. In that case, the corresponding letter should be added to the end of the catalog number.

Example: 730-44-PO7-T-A "A" – 500 Feet (152.5 m)  
 "B" – 1000 Feet (305 m)  
 "D" – Specify length

- When required up to nine color-coded tubes can be ordered. Simply specify colors desired:

Blue	Red	Green
Natural white	Orange	
Gray	Yellow	
Black	Lilac	

**INSTRUMENT  
VALVES**

# SERIES 100

**Imperial-Eastman**

BULLETIN NO. 1053

## PLUG-TYPE INSTRUMENT AIR VALVE



Available in Panel-Mounted or In-Line Styles  
 Developed Especially for Instrumentation Service  
 Solid Bottom • O-Ring Stem Seal

Working Pressures up to 100 psi • Excellent for Vacuum

Plug-type valves which provide quick, positive control of flow. Developed especially for instrumentation service. Easy to operate. Have extra deep lever handles for secure grip.

Valves with tubing connections have Hi-Seal ends—providing all the advantages of the Hi-Seal fitting. Long Dryseal Pipe Threads are furnished on pipe ends.

3-way valves available with a choice of "T" drilling (Nos. 108-C and 108-CP) or "L" drilling (Nos. 109-C and 109-CP) through plugs.

With "T" drilling, 3 ports or any 2 ports are open simultaneously. There is no by-pass when switching from one port to another. Handles on Nos. 108-C and 108-CP are marked to indicate port openings. Pointer handle indicates direction of flow.

Nos. 109-C and 109-CP have plugs with "L" drilling which provides connection between 2 ports only.

Plugs are made of brass. Bodies are made from brass forgings. O-Ring stem seal and solid bottom prevent leakage to or from atmosphere.

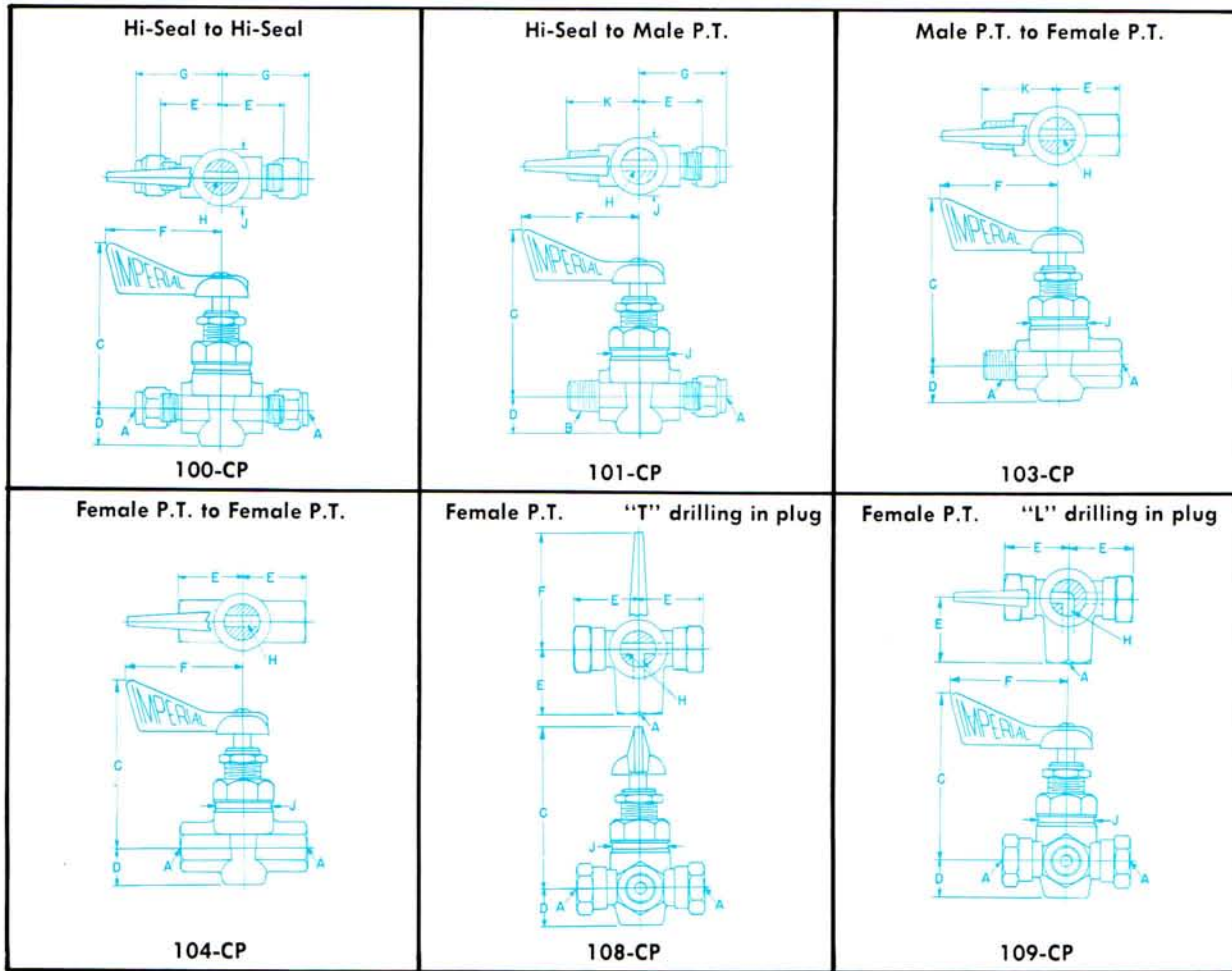
The special synthetic grease used in these valves is non-drying and lasts up to 100 times longer than ordinary grease. It is especially suitable for air service, and also provides resistance to gasoline, solvents and water.

### IN-LINE VALVES

<p>Hi-Seal to Hi-Seal</p> <p>100-C</p>	<p>Hi-Seal to Male P.T.</p> <p>101-C</p>	<p>Male P.T. to Female P.T.</p> <p>103-C</p>
<p>Female P.T. to Female P.T.</p> <p>104-C</p>	<p>Female P.T. "T" drilling in plug</p> <p>108-C</p>	<p>Female P.T. "L" drilling in plug</p> <p>109-C</p>

# SERIES 100

## PANEL MOUNT VALVES



## IN-LINE VALVES

### TWO-WAY TYPE

Valve Type	Cat No.	A	B	C	D	E	F	G	H Port Hole	J	K
Hi-seal to Hi-seal	100-C-04	1/4" Hi-seal		2 23/32	2 1/32	1 1/8	2 1/8	1 25/64	3/16	1 1/16	
	100-C-06	3/8" Hi-seal		2 23/32	2 1/32	1 1/8	2 1/8	1 1/16	3/16	1 1/16	
Hi-seal to Male P.T.	101-C-04x04	1/4" Hi-seal	1/4" Male P.T.	2 23/32	2 1/32	1 1/8	2 1/8	1 25/64	3/16	1 1/16	1 11/32
Male P.T. to Fem. P.T.	103-C-04	1/4" Pipe Thread		2 23/32	2 1/32	1 1/8	2 1/8		3/16	1 1/16	1 11/32
Fem. P.T. to Fem. P.T.	104-C-04	1/4" Fem. P.T.		2 23/32	2 1/32	1 1/8	2 1/8		3/16	1 1/16	

### THREE-WAY TYPE

Fem P.T. on All Connections	108-C-04 109-C-04	1/4" Fem. P.T. 1/4" Fem. P.T.		2 23/32 2 23/32	2 1/32 2 1/32	1 1/8 1 1/8	2 1/8 2 1/8		3/16 3/16	1 1/16 1 1/16	
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No. 108-C has "T" drilling through plug; 3 ports or any 2 ports are open simultaneously. Handle is marked to indicate port openings.  
No. 109-C has "L" drilling through plug; only 2 ports are open simultaneously.

## PANEL MOUNT VALVES

### TWO-WAY TYPE

Valve Type	Cat No.	A	B	C	D	E	F	G	H Port Hole	J	K
Hi-seal to Hi-seal	100-CP-04	1/4" Hi-seal		2 29/32	2 1/32	1 1/8	2 1/8	1 25/64	3/16	1 1/16	
	100-CP-06	3/8" Hi-seal		2 29/32	2 1/32	1 1/8	2 1/8	1 1/16	3/16	1 1/16	
Hi-seal to Male P.T.	101-CP-04x04	1/4" Hi-seal	1/4" Male P.T.	2 29/32	2 1/32	1 1/8	2 1/8	1 25/64	3/16	1 1/16	1 11/32
Male P.T. to Fem. P.T.	103-CP-04	1/4" Pipe Thread		2 29/32	2 1/32	1 1/8	2 1/8		3/16	1 1/16	1 11/32
Fem. P.T. to Fem. P.T.	104-CP-04	1/4" Fem. P.T.		2 29/32	2 1/32	1 1/8	2 1/8		3/16	1 1/16	

### THREE-WAY TYPE

Fem P.T. on All Connections	108-CP-04 109-CP-04	1/4" Fem. P.T. 1/4" Fem. P.T.		2 29/32 2 29/32	2 1/32 2 1/32	1 1/8 1 1/8	2 1/8 2 1/8		3/16 3/16	1 1/16 1 1/16	
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No. 108-CP has "T" drilling through plug; 3 ports or any 2 ports are open simultaneously. Handle is marked to indicate port openings.  
No. 109-CP has "L" drilling through plug; only 2 ports are open simultaneously.

Diameter Panel Hole—2 1/32". Maximum Bulkhead Thickness—1 11/32".

# SERIES 300

## MEDIUM PRESSURE NEEDLE VALVES

**Globe and Angle Types**—Furnished in brass

**Stems**—Made of brass

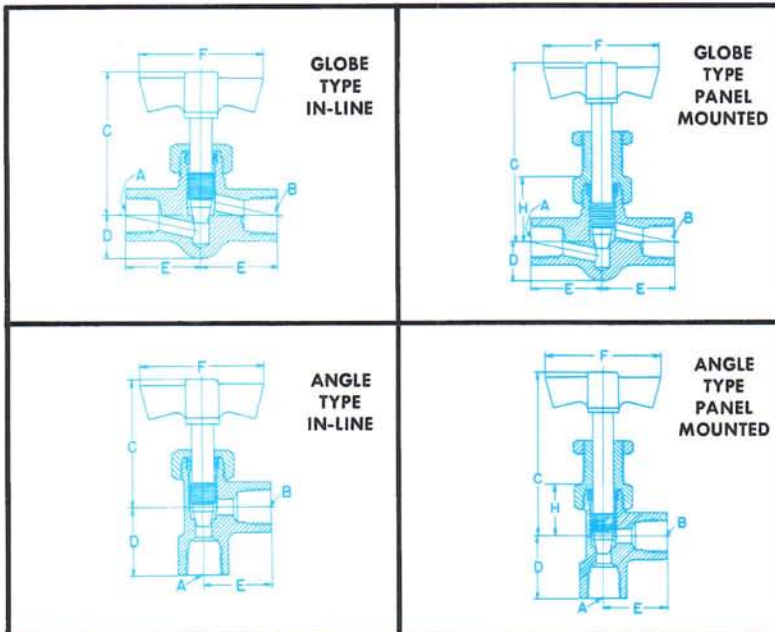
**Working Pressure**—1500 psi

**Connections**— $\frac{1}{8}$ " and  $\frac{1}{4}$ " pipe thread;  $\frac{1}{4}$ " tube (Hi-Duty)

**Removable Handles on All Types**—Permits repacking or interchanging tee handles with round metal or plastic handles

Valve stems are single point precision machined to a 15° angle to allow for a slight wedging action of the stem into the seat. This design assures easy operation and positive closure.

Fine 32 to the inch, single lead thread on brass valve stems, combined with the 15° point, provides accurate control of flow. Bodies are made of forged brass. Buna N O-ring packing is suitable for use at temperatures up to 200°F.



Valve Type	Catalog No.	A Inlet	B Outlet	Orifice	C		D	E*	F	H	Max. Bulk-Head	Dia. Panel Hole
					Open	Closed						
Globe Type In-Line	394-C-02	$\frac{1}{8}$ Fem. P. T.	$\frac{1}{8}$ Fem. P. T.	.170	1 $\frac{11}{16}$	1 $\frac{1}{16}$	$\frac{15}{32}$	$\frac{27}{32}$	1 $\frac{3}{8}$			
	394-C-04	$\frac{1}{4}$ Fem. P. T.	$\frac{1}{4}$ Fem. P. T.	.218	1 $\frac{23}{32}$	1 $\frac{19}{32}$	$\frac{15}{32}$	1	1 $\frac{3}{8}$			
	396-C-02	$\frac{1}{8}$ Male P. T.	$\frac{1}{8}$ Male P. T.	.140	1 $\frac{11}{16}$	1 $\frac{1}{16}$	$\frac{15}{32}$	$\frac{27}{32}$	1 $\frac{3}{8}$			
	396-C-04	$\frac{1}{4}$ Male P. T.	$\frac{1}{4}$ Male P. T.	.170	1 $\frac{11}{16}$	1 $\frac{1}{16}$	$\frac{15}{32}$	$\frac{27}{32}$	1 $\frac{3}{8}$			
	392-C-04	$\frac{1}{4}$ Male P. T.	$\frac{1}{4}$ Fem. P. T.	.218	1 $\frac{23}{32}$	1 $\frac{19}{32}$	$\frac{15}{32}$	1	1 $\frac{3}{8}$			
	378-C-04x04	$\frac{1}{4}$ Male P. T.	$\frac{1}{4}$ O.D. Hi-Duty	.170	1 $\frac{11}{16}$	1 $\frac{1}{16}$	$\frac{15}{32}$	$\frac{27}{32}$	1 $\frac{3}{8}$			
Panel Mounted	394-CP-02	$\frac{1}{8}$ Fem. P. T.	$\frac{1}{8}$ Fem. P. T.	.170	2 $\frac{1}{4}$	2 $\frac{1}{8}$	$\frac{15}{32}$	$\frac{27}{32}$	1 $\frac{3}{8}$	2 $\frac{5}{32}$	$\frac{3}{8}$	1 $\frac{7}{32}$
Angle Type In-Line	388-C-02	$\frac{1}{8}$ Fem. P. T.	$\frac{1}{8}$ Fem. P. T.	.170	1 $\frac{1}{16}$	1 $\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{3}{8}$			
	389-C-02	$\frac{1}{8}$ Male P. T.	$\frac{1}{8}$ Male P. T.	.170	1 $\frac{1}{16}$	1 $\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{3}{8}$			
	389-C-04	$\frac{1}{4}$ Male P. T.	$\frac{1}{4}$ Male P. T.	.170	1 $\frac{1}{16}$	1 $\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{3}{8}$			
	390-C-02	$\frac{1}{8}$ Male P. T.	$\frac{1}{8}$ Fem. P. T.	.170	1 $\frac{1}{16}$	1 $\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{3}{8}$			
	381-C-04	$\frac{1}{4}$ O.D. Hi-Duty	$\frac{1}{4}$ O.D. Hi-Duty	.170	1 $\frac{1}{16}$	1 $\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{3}{8}$			
Panel Mounted	388-CP-02	$\frac{1}{8}$ Fem. P. T.	$\frac{1}{8}$ Fem. P. T.	.170	2 $\frac{1}{8}$	2	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{3}{8}$	2 $\frac{1}{32}$	$\frac{3}{8}$	1 $\frac{7}{32}$
	381-CP-04	$\frac{1}{4}$ O.D. Hi-Duty	$\frac{1}{4}$ O.D. Hi-Duty	.170	2 $\frac{1}{8}$	2	$\frac{3}{4}$	$\frac{3}{4}$	1 $\frac{3}{8}$	2 $\frac{1}{32}$	$\frac{3}{8}$	1 $\frac{7}{32}$

\* Add  $\frac{3}{8}$ " for overall with Hi-Duty Nut.



# SERIES 600

Bulletin No. 1046-A  
**Gould Imperial-Eastman**

HIGH PRESSURE NON-CORROSIVE NEEDLE VALVES



All 316 stainless steel construction guarantees maximum corrosion resistance.

**MAXIMUM WORKING PRESSURE**  
10,000 # (w.o.g.)

**TYPES AVAILABLE**  
Globe and Angle Types

**PANEL MOUNTING**  
Standard

**CONNECTIONS**  
1/4" to 1" Female NPTF  
1/4" to 1/2" Hi-Seal tube fitting  
Braze Seal optional

**MATERIALS**  
Body — 316 Stainless Steel  
Bonnet — 316 Stainless Steel  
Stem — 310 Stainless Steel  
Handle — Forged Stainless Steel

**PACKING**  
Teflon (standard) to 450°F.  
Asbestos, John Crane 187-I (optional) to 850°F.  
Grafoil (optional) to 1250°F.

**TEMPERATURE**  
-60 to 450°F. standard  
-60 to 1250°F. w/optional packing

## HIGH PRESSURE AND CORROSION RESISTANT CAPABILITY

Heavy duty, one piece 316 stainless steel body and union bonnet construction permit working pressures up to 10,000 # (w.o.g.) and guarantee resistance to corrosive atmospheres. Ideal for applications where higher pressures in a corrosive environment are required.

Same sturdy union bonnet design found in the 1700 series valve assures complete safety because danger from valve stem loosening is completely eliminated. Excessive hand torque when opening or backseating the valve cannot back the stem out accidentally.

A 5° bonnet seat angle insures positive seating of bonnet to valve body to increase leakproof dependability. This also permits easy and low-torque make up with the assurance of positive seat and seal.

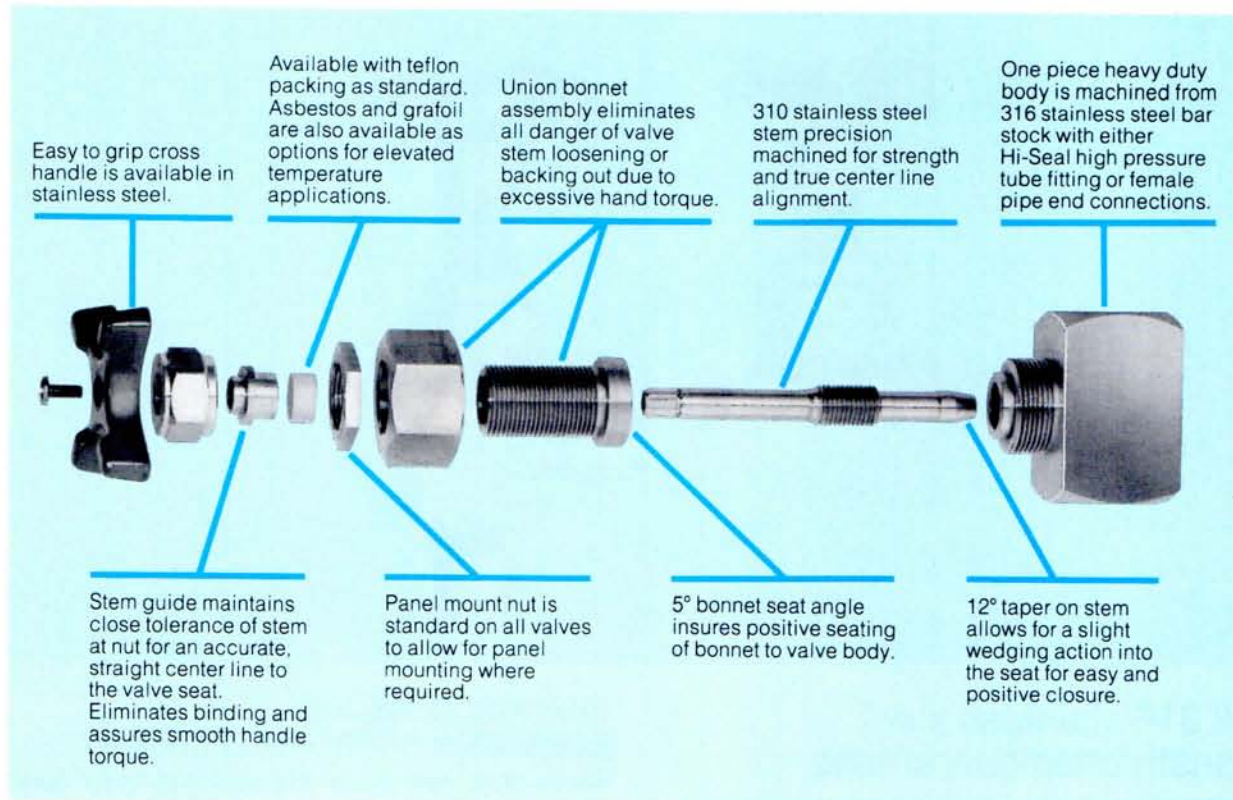
## SMOOTH HANDLE TORQUE

Stem binding is eliminated with use of the bonnet stem guide which provides close tolerances to control the stem at the nut and seating point. Results are a smooth and easy handle torque even under higher pressures.

The 12° taper on stem provides a smooth and positive wedging action between the seat and stem for a sure, leaktight, effortless closure. Dissimilar metals of body and stem also eliminate any galling action and assure long valve life. All valves are panel mountable as standard and all parts are interchangeable with the 1700 series valve.

# SERIES 600

HIGH PRESSURE NON-CORROSIVE NEEDLE VALVES

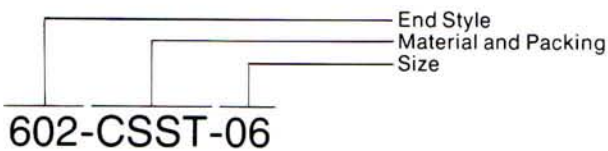


## ORDERING INFORMATION

To order, simply specify complete catalog number indicated for end configuration and size. Standard teflon packing.

EXAMPLE:

3/8 Female x 3/8 Female In Line Globe Valve  
602-CSST-06



To order asbestos or grafoil substitute:

A – Asbestos or G – Grafoil in material code

EXAMPLE: 602-CSSA-06

## STAINLESS STEEL IN-LINE GLOBE VALVES

Catalog Number	End Configuration
600-CSS-04	1/4 Hi-Seal x 1/4 Hi-Seal
600-CSS-06	3/8 Hi-Seal x 3/8 Hi-Seal
600-CSS-08	1/2 Hi-Seal x 1/2 Hi-Seal
602-CSS-04	1/4 Female x 1/4 Female
602-CSS-06	3/8 Female x 3/8 Female
602-CSS-08	1/2 Female x 1/2 Female
602-CSS-12	3/4 Female x 3/4 Female
602-CSS-16	1 Female x 1 Female

## STAINLESS STEEL ANGLE VALVES

Catalog Number	End Configuration
601-CSS-04	1/4 Hi-Seal x 1/4 Hi-Seal
601-CSS-06	3/8 Hi-Seal x 3/8 Hi-Seal
601-CSS-08	1/2 Hi-Seal x 1/2 Hi-Seal
603-CSS-04	1/4 Female x 1/4 Female
603-CSS-06	3/8 Female x 3/8 Female
603-CSS-08	1/2 Female x 1/2 Female
603-CSS-12	3/4 Female x 3/4 Female
603-CSS-16	1 Female x 1 Female

Options: Grafoil and asbestos optional; All SS handles



# SERIES 700

## HIGH PRESSURE NEEDLE VALVES

### NEW DESIGN PROVIDES IMPROVED FEATURES

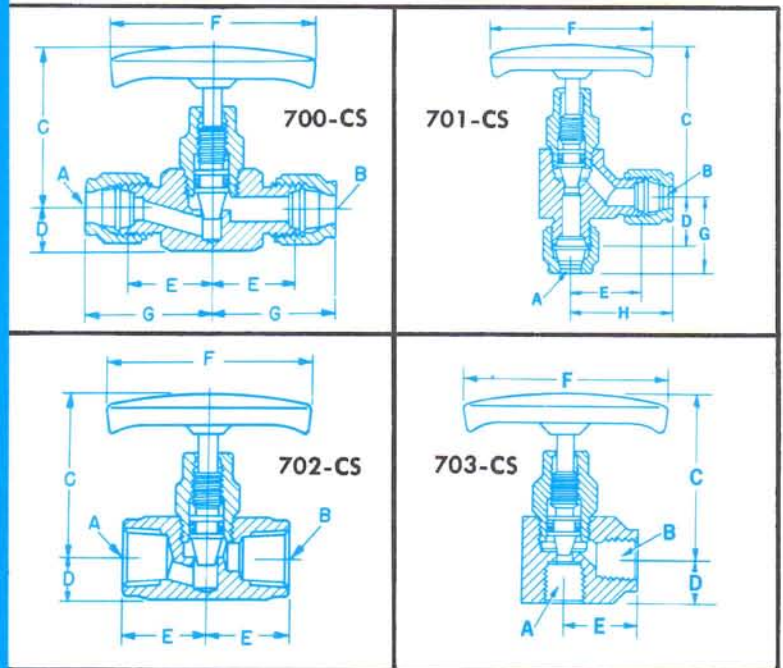
- Working Pressure—5000 psi
- Temperature Range -60° to 200°F.
- Stems—Stainless Steel
- Bodies—Steel Bar Stock with Black Finish\*
- 2-1/2" Handle for Easy Grip
- 1/4, 3/8, 1/2" Hi-Seal Tubing Connections  
1/4, 3/8, 1/2, 3/4, 1" Pipe Threads
- Globe and Angle Types

Stem threads are above O-ring seal—threads never contact fluid flow. This feature prevents deposits on threads, assures long life lubrication, practically eliminates galling and wear. O-ring is backed up with Teflon washer to prevent extrusion of O-ring.

Stainless steel stem has fine pitch, single lead thread. Stem is precision machined to 15° angle to allow slight wedging action of stem into seat. Provides accurate flow control and minimum torque for operation.

Used in differential pressure transmitters, instrumentation, refineries, processing plants, laboratories, etc.

Valve bodies made from steel bar stock, black finish. Stainless steel valves can be furnished on special order at special pricing.



Valve Type	Catalog No.	A Inlet	B Outlet	Orifice	C		D	E	F	G	H
					Open	Closed					
Globe Type	700-CS-04	1/4 Hi-Seal	1/4 Hi-Seal	.185	2.344	2.094	.438	1.000	2.500	1.438	
	700-CS-06	3/8 Hi-Seal	3/8 Hi-Seal	.242	2.344	2.094	.500	1.000	2.500	1.500	
	700-CS-08	1/2 Hi-Seal	1/2 Hi-Seal	.302	2.750	2.438	.625	1.250	3.000	1.875	
	702-CS-04	1/4 Fem. P. T.	1/4 Fem. P. T.	.185	2.344	2.094	.438	.938	2.500		
	702-CS-06	3/8 Fem. P. T.	3/8 Fem. P. T.	.242	2.344	2.094	.500	1.000	2.500		
	702-CS-08	1/2 Fem. P. T.	1/2 Fem. P. T.	.302	2.750	2.438	.625	1.250	3.000		
	702-CS-12	3/4 Fem. P. T.	3/4 Fem. P. T.	.500	3.812	3.562	.750	1.500	2.750		
	702-CS-16	1" Fem. P. T.	1" Fem. P. T.	.562	4.094	3.750	.875	1.750	2.750		
Angle Type	701-CS-04	1/4 Hi-Seal	1/4 Hi-Seal	.185	2.531	2.281	.609	1.000	2.500	.938	1.328
	701-CS-06	3/8 Hi-Seal	3/8 Hi-Seal	.242	2.500	2.312	.719	1.094	2.500	1.156	1.531
	701-CS-08	1/2 Hi-Seal	1/2 Hi-Seal	.302	2.938	2.688	.844	1.312	3.000	1.391	1.859
	703-CS-04	1/4 Fem. P. T.	1/4 Fem. P. T.	.185	2.438	2.188	.531	.875	2.500		
	703-CS-06	3/8 Fem. P. T.	3/8 Fem. P. T.	.242	2.312	2.125	.594	1.000	2.500		
	703-CS-08	1/2 Fem. P. T.	1/2 Fem. P. T.	.302	3.000	2.125	.750	1.250	3.000		
	703-CS-12	3/4 Fem. P. T.	3/4 Fem. P. T.	.500	4.594	4.281	1.500	1.500	2.750		
	703-CS-16	1" Fem. P. T.	1" Fem. P. T.	.562	4.453	4.531	1.750	1.750	2.750		

\*Zinc plating available, consult factory.

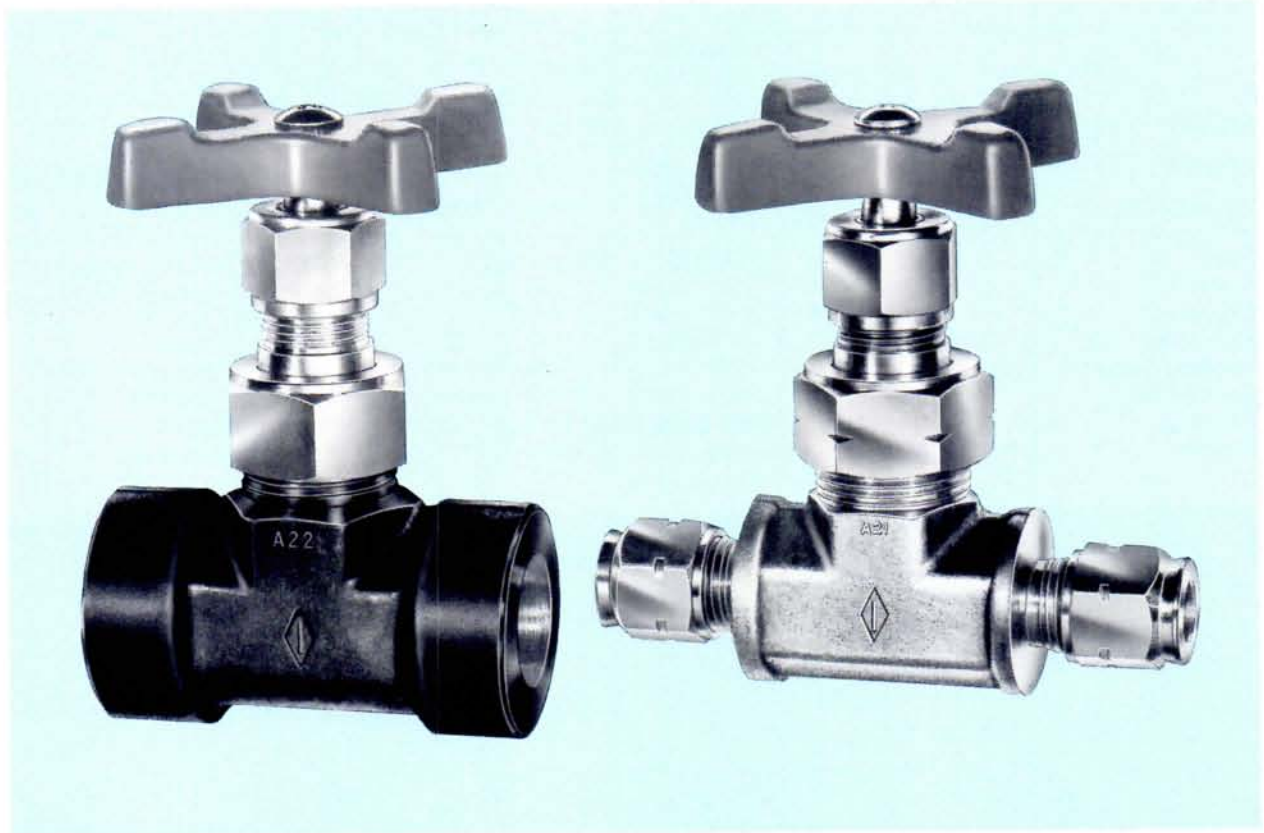


# SERIES 750

HIGH PRESSURE NEEDLE VALVES

Bulletin No. 1059

Gould Imperial-Eastman



Designed for leakproof performance under high pressure and high temperature conditions.

## MAXIMUM WORKING PRESSURE

6500 psi at 100°F. (4 to 1 safety factor)

Pressures are contingent upon end configurations and sizes.

## BODY MATERIALS:

Carbon Steel – SA-105

Stainless Steel – SA-182, GR. F316

## BODY FINISH:

Carbon Steel – Nickel Pentrate. Coated with 72-D Protective lab oil.

Stainless – As Immunized.

## PACKING:

Teflon (standard) –60° F. to 450° F.

Asbestos: –60° F. to 850° F.

Grafoil: –60° F. to 1100° F.

## ORIFICE:

.156

## CONNECTIONS:

¼" to ½" Male and Female NPTF

¼" to ½" Socket Weld Pipe

¼" to ½" Socket Weld Tube

¼" to ½" Hi-Seal Tube Fitting

## WIDE VARIETY OF END CONFIGURATIONS

The 750 series valves are available with socket weld tube, socket weld pipe, Imperial-Eastman extra-reliable Hi-Seal tube fitting ends, male and female pipe fitting ends or combinations to give you complete design freedom in selection of end configurations.

## POSITIVE CLOSURE

Ease of shut off without danger of metal galling is assured on this high performance series of valves. Valve stems are precision machined to an angle of 15° to allow for an extra smooth wedging action of the stem into the seat permitting effortless and positive shut off.

## "N" STAMP AUTHORIZED

Imperial-Eastman has the ASME Certificate of Authorization to manufacture valves that meet specifications for Class 1, 2 and 3, Section III Nuclear Service. Consult factory.



# SERIES 750

HIGH PRESSURE NEEDLE VALVES



Easy to grip handle is available in carbon or stainless steel.

Stem guide maintains close tolerance of stem at nut or an accurate, straight center line to valve seat. Eliminates binding and assures smooth handle torque.

Available with Teflon packing as standard. Asbestos and Grafoil (not shown) are also available as options for elevated temperature applications.

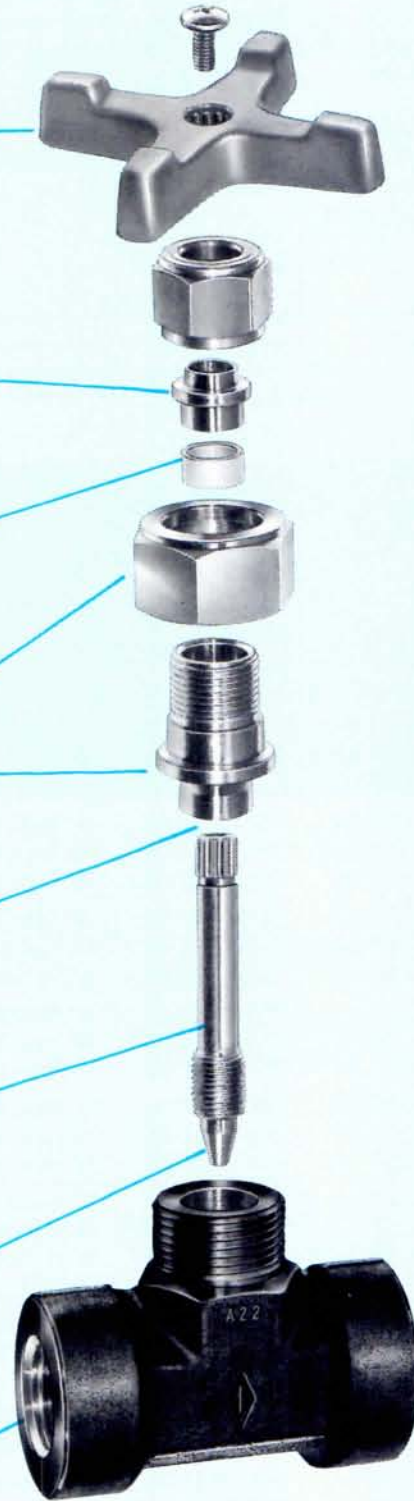
Union bonnet assembly eliminates all danger of valve stem loosening or backing out due to excessive hand torque.

5° bonnet seat angle insures positive seating of bonnet to valve body.

Stainless steel stem precision machined for strength and true center line alignment.

15° taper on stem allows for a slight wedging action into the seat for easy and positive closure.

One piece heavy duty body is forged from carbon or stainless steel with a wide choice of end configurations.



Gould Inc., Valve and Fittings Division

6300 West Howard Street, Chicago, Illinois 60648  
Telephone (312) 967-4500/Chicago 774-1700

677150 RP

Printed in U.S.A.

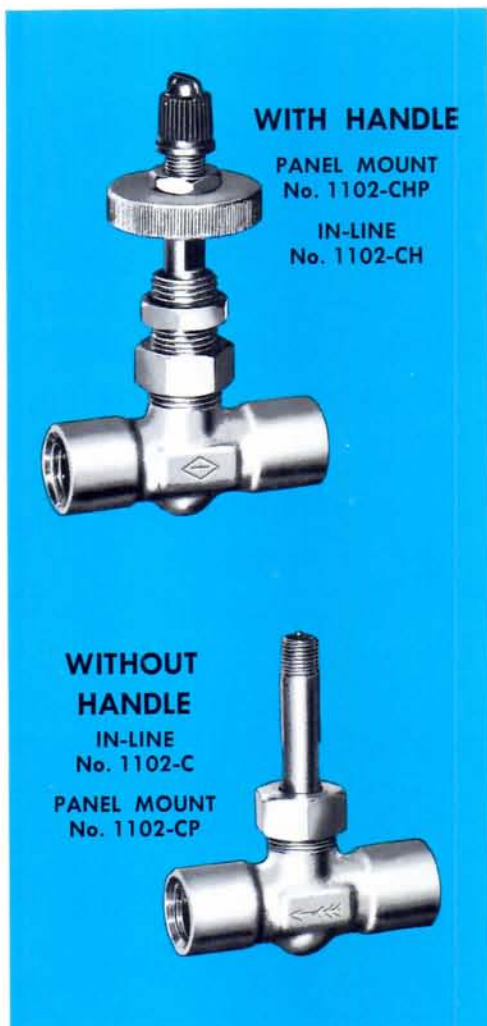
 **GOULD**

# SERIES 1100

TEST SAMPLING VALVES

Gould Imperial-Eastman

Bulletin No. 1055



- Provides Easy Access to System for Pressure Testing and Sampling
- Types—Panel Mounted or In-Line, with or without Round Brass Handles
- Stems and Bodies—Made of Brass
- Packing—Buna-N O-Ring
- Maximum Working Pressure—200 psi
- Maximum Temperature—200°F.

These valves provide a simple method for testing or sampling air or other fluids in a system.

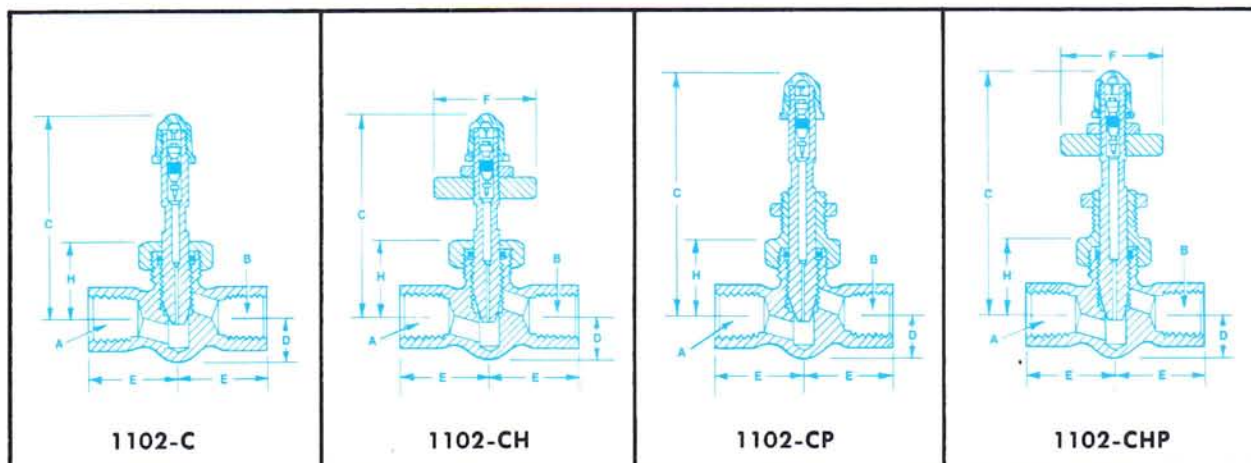
A special passage through the length of the valve stem, controlled by a depressor valve, gives access to the system fluid at all times — with the valve open or closed. Extra valving is eliminated and a more compact circuit layout can be provided.

Ideal for instrumentation, panel boards and process systems in chemical plants, refineries, paper mills, process industries, etc.

Valve stems are single point precision machined to 15° angle to give a slight wedging action into valve seat for easy positive closure.



Spring loaded, self closing stem valve is actuated by core depressor just like a tire valve. Simply attach pressure gage or sampling unit to top of stem for access to system. When not in use, plastic cap keeps stem valve free of dirt or contamination.



Valve Type	Catalog Number	A	B	Orifice	C		D	E	F	H
		Inlet	Outlet		Open	Closed				
In-Line	1102-C-04	1/4" Fem.	1/4" Fem.	.218	2 3/8	2 1/4	15/32	1	—	—
	1102-CH-04	1/4" Fem.	1/4" Fem.	.218	2 3/8	2 1/4	15/32	1	1 1/8	—
Panel Mount	1102-CP-04	1/4" Fem.	1/4" Fem.	.218	2 13/16	2 11/16	15/32	1	—	7/8
	1102-CHP-04	1/4" Fem.	1/4" Fem.	.218	2 13/16	2 11/16	15/32	1	1 1/8	7/8

Max. Bulkhead Thickness—3/8". Panel Hole Diameter—17/32"

# TEST VALVES

QUICK OPENING FOR INSTRUMENTATION TESTING

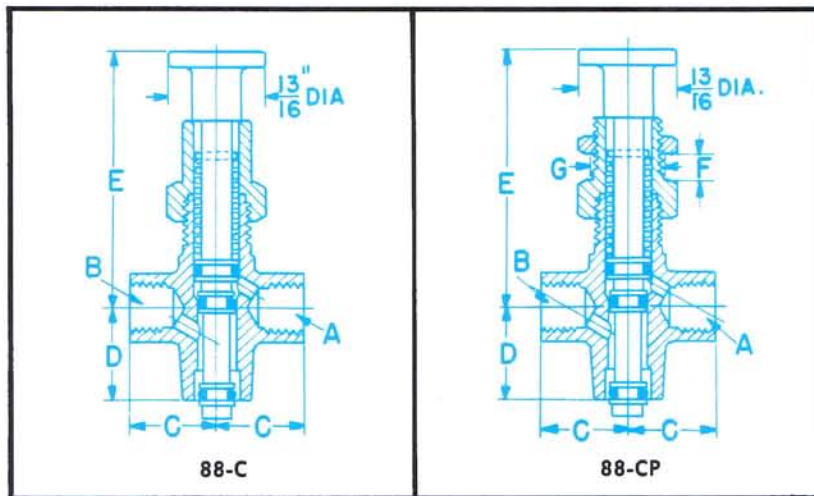


A quick operating valve for testing in instrumentation, test stands, etc.

When valve is in "open" position, flow is permitted for test. When returned to "off" position, source is closed and test side of line is automatically exhausted into atmosphere.

Pulling up on handle opens valve. Rotating handle engages pin in stem, causing valve to remain open until released.

Valve body is made from brass forging. Stem is sealed with O-rings.



Valve Type	Cat. No.	A Inlet	B Outlet	C	D	E	
						Open	Closed
Straight Pattern	88-C-02	1/8 Fem. P. T.	1/8 Fem. P. T.	1 1/16	3/4	2 15/32	2 5/32

Valve Type	Cat. No.	A Inlet	B Outlet	C	D	E		F Max. Bulk- head	G Dia. Hole
						Open	Closed		
Straight Pattern Panel Mounted	88-CP-02	1/8 Fem. P. T.	1/8 Fem. P. T.	1 1/4	3/4	2 15/32	2 5/32	3/8	1 1/32

# SERIES 1800

HIGH PRESSURE MINIATURE NEEDLE VALVES

Bulletin No. 1044  
**Gould Imperial-Eastman**



Provide accurate  
precise flow control under high  
pressure conditions

## MAXIMUM WORKING PRESSURE

6500 psi in Stainless Steel  
3500 psi in Brass

## TYPES AVAILABLE

Globe and Angle Types  
In-line and panel mount

## CONNECTIONS

1/8" thru 1/2" pipe threads  
1/4" thru 1/2" Hi-Seal tube fitting

## MATERIALS

Body—Brass or 316 Stainless Steel  
Stem—316 Stainless Steel

## PACKING

Teflon (standard) to 450°F.  
Asbestos, John Crane 187-I & Grafoil available.  
Contact factory.

## TEMPERATURE

–60 to 450°F.

## POSITIVE CLOSURE AND FINE FLOW CONTROL

The new Series 1800 Miniature High Pressure Needle Valve is the easiest, most positive operating valve now available. Blunt valve stems are single point precision machined to an angle of 15° (2½° on metering stems) to allow for a slight wedging action of the stem into the seat to assure positive closure and fine flow control.

## WIDE VARIETY OF APPLICATIONS

These valves include over 94 combinations for a vast assortment of uses in test cells, instrumentation, refineries, laboratories, processing plants and other applications where accurate control and leak-tight service is vital.

Valves are available in in-line or panel mount styles with male or female pipe threads and Hi-Seal fitting connections, or a combination of these. The Series 1800 valves are furnished with Teflon packing for use under corrosive conditions and with temperatures up to 450°F. as standard.

## COLOR CODED HANDLES

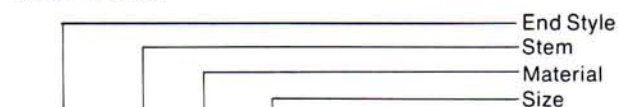
The round handles are removable and designed for color coding for fast identification of tubing line. Constructed of phenolic plastic, the handles accommodate red, orange, yellow and white coding labels.

## ORDERING INFORMATION

To order, simply specify complete catalog number indicated for end configurations and size. Standard teflon packing.

### EXAMPLE:

1/4 Female x 1/4 Female In-Line Globe Valve with  
regulating stem. Stainless Steel  
1862-RSS-04



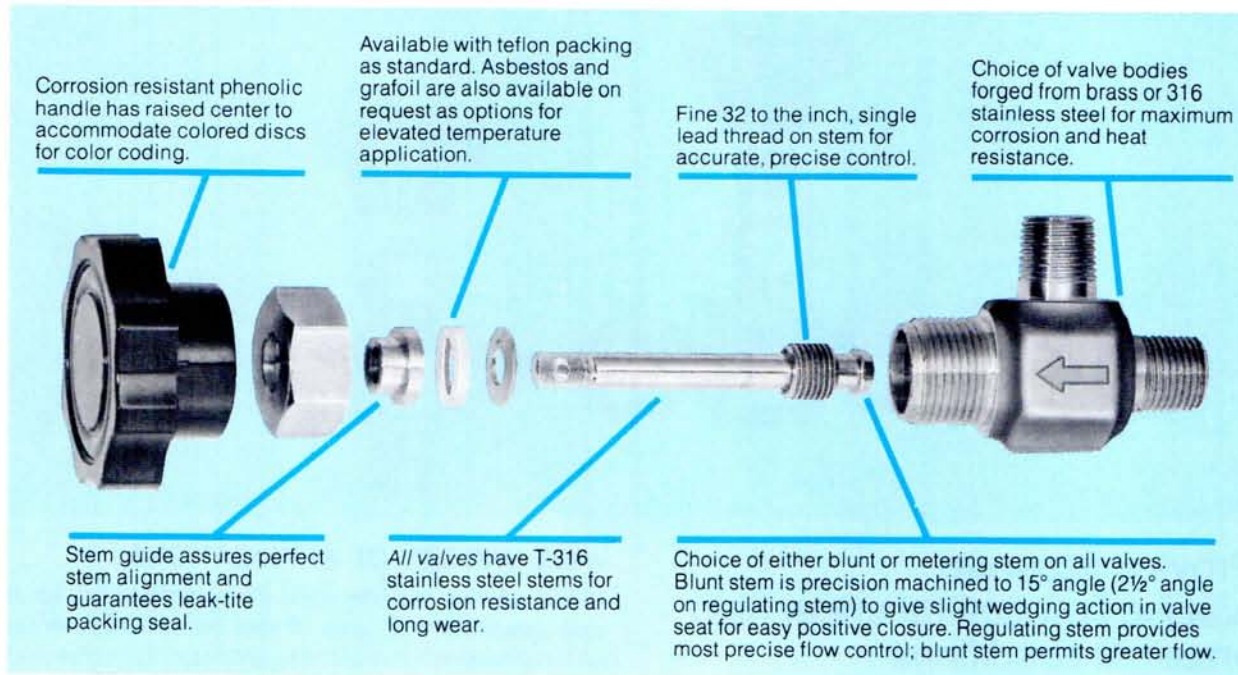
**1862-R SS-04**

### Panel Mounting:

To order panel mounting, add the letter P after the  
the material code. 1862-RSSP-04

# SERIES 1800

## HIGH PRESSURE MINIATURE NEEDLE VALVES



B – 15° Blunt Stem R – Regulating Stem

Catalog Number	End Configuration
<b>BRASS IN-LINE GLOBE VALVES</b>	
1811-BB-02	1/8 Male x 1/8 Male
1811-RB-02	1/8 Male x 1/8 Male
1811-BB-04	1/4 Male x 1/4 Male
1811-RB-04	1/4 Male x 1/4 Male
1812-BB-02	1/8 Female x 1/8 Female
1812-RB-02	1/8 Female x 1/8 Female
1812-BB-04	1/4 Female x 1/4 Female
1812-RB-04	1/4 Female x 1/4 Female
1812-BB-06	3/8 Female x 3/8 Female
1812-RB-06	3/8 Female x 3/8 Female
1812-BB-08	1/2 Female x 1/2 Female
1812-RB-08	1/2 Female x 1/2 Female
1813-BB-04	1/4 Male x 1/4 Hi-Seal
1813-RB-04	1/4 Male x 1/4 Hi-Seal
1814-BB-04	1/4 Hi-Seal x 1/4 Hi-Seal
1814-RB-04	1/4 Hi-Seal x 1/4 Hi-Seal
1814-BB-06	3/8 Hi-Seal x 3/8 Hi-Seal
1814-RB-06	3/8 Hi-Seal x 3/8 Hi-Seal
1814-BB-08	1/2 Hi-Seal x 1/2 Hi-Seal
1814-RB-08	1/2 Hi-Seal x 1/2 Hi-Seal
1819-BB-04	1/4 Male x 1/4 Female
1819-RB-04	1/4 Male x 1/4 Female

Catalog Number	End Configuration
<b>BRASS ANGLE VALVES</b>	
1815-BB-02	1/8 Male x 1/8 Male
1815-RB-02	1/8 Male x 1/8 Male
1815-BB-04	1/4 Male x 1/4 Male

Catalog Number	End Configuration
1815-RB-04	1/4 Male x 1/4 Male
1816-BB-02	1/8 Female x 1/8 Female
1816-RB-02	1/8 Female x 1/8 Female
1816-BB-04	1/4 Female x 1/4 Female
1816-RB-04	1/4 Female x 1/4 Female
1817-BB-02	1/8 Male x 1/8 Female
1817-BB-04	1/4 Male x 1/4 Female
1818-BB-04	1/4 Male x 1/4 Hi-Seal
1818-RB-04	1/4 Male x 1/4 Hi-Seal
1810-BB-04	1/4 Hi-Seal x 1/4 Hi-Seal
1810-RB-04	1/4 Hi-Seal x 1/4 Hi-Seal
1810-BB-06	3/8 Hi-Seal x 3/8 Hi-Seal
1810-RB-06	3/8 Hi-Seal x 3/8 Hi-Seal

Catalog Number	End Configuration
<b>316 STAINLESS STEEL IN-LINE GLOBE VALVES</b>	
1861-BSS-02	1/8 Male x 1/8 Male
1861-RSS-02	1/8 Male x 1/8 Male
1861-BSS-04	1/4 Male x 1/4 Male
1861-RSS-04	1/4 Male x 1/4 Male
1861-BSS-06	3/8 Male x 3/8 Male
1861-RSS-06	3/8 Male x 3/8 Male
1862-BSS-02	1/8 Female x 1/8 Female
1862-RSS-02	1/8 Female x 1/8 Female
1862-BSS-04	1/4 Female x 1/4 Female
1862-RSS-04	1/4 Female x 1/4 Female
1862-BSS-06	3/8 Female x 3/8 Female
1862-RSS-06	3/8 Female x 3/8 Female

Catalog Number	End Configuration
1862-BSS-08	1/2 Female x 1/2 Female
1862-RSS-08	1/2 Female x 1/2 Female
1863-BSS-04	1/4 Male x 1/4 Hi-Seal
1863-RSS-04	1/4 Male x 1/4 Hi-Seal
1864-BSS-04	1/4 Hi-Seal x 1/4 Hi-Seal
1864-RSS-04	1/4 Hi-Seal x 1/4 Hi-Seal
1864-BSS-06	3/8 Hi-Seal x 3/8 Hi-Seal
1864-RSS-06	3/8 Hi-Seal x 3/8 Hi-Seal
1864-BSS-08	1/2 Hi-Seal x 1/2 Hi-Seal
1864-RSS-08	1/2 Hi-Seal x 1/2 Hi-Seal
1869-BSS-04	1/4 Male x 1/4 Female
1869-RSS-04	1/4 Male x 1/4 Female

Catalog Number	End Configuration
<b>316 STAINLESS STEEL ANGLE VALVES</b>	
1865-BSS-02	1/8 Male x 1/8 Male
1865-RSS-02	1/8 Male x 1/8 Male
1865-BSS-04	1/4 Male x 1/4 Male
1865-RSS-04	1/4 Male x 1/4 Male
1866-BSS-04	1/4 Female x 1/4 Female
1866-RSS-04	1/4 Female x 1/4 Female
1867-BSS-02	1/8 Male x 1/8 Female
1867-BSS-04	1/4 Male x 1/4 Female
1868-BSS-04	1/4 Male x 1/4 Hi-Seal
1868-RSS-04	1/4 Male x 1/4 Hi-Seal
1860-BSS-04	1/4 Hi-Seal x 1/4 Hi-Seal
1860-RSS-04	1/4 Hi-Seal x 1/4 Hi-Seal
1860-BSS-06	3/8 Hi-Seal x 3/8 Hi-Seal
1860-RSS-06	3/8 Hi-Seal x 3/8 Hi-Seal

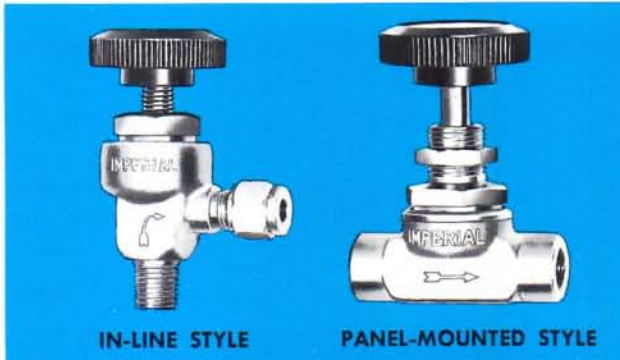


**LOW PRESSURE  
VALVES**

**LOW PRESSURE  
VALVES**

# DIAPHRAGM VALVES

## MIDGET DIAPHRAGM VALVES WITH TEFLON DIAPHRAGM



**IN-LINE STYLE**

**PANEL-MOUNTED STYLE**

**Soft Seat**  
**Quick, Easy Closure**  
**Positive Shut-Off**

**Working Pressures to 300 psi**  
**Hold High Vacuum**

Solid Teflon diaphragm forms a soft seat with the valve body. Withstands unlimited cycles of operation. Teflon is chemically stable and resists most liquids and gases. Diaphragm is protected on top with high tensile strength DuPont Mylar disc.

Excellent for high vacuum applications. Tested to a vacuum of .001 micron ( $1 \times 10^{-6}$  TORR).

These diaphragm valves provide the advantages of rapid opening and closing and a full seat area which is flushed clean when the valve is open.

Valve bodies made from brass forgings; round black phenolic plastic handles. All exposed parts of panel mount valves (except handles) are chrome plated.

Working pressures up to 300 psi.

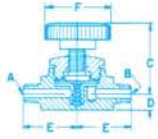
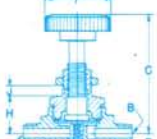
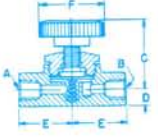
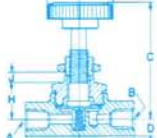
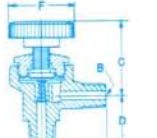
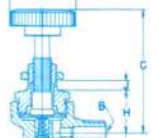
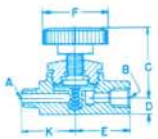
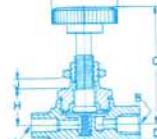
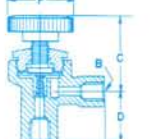
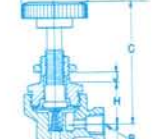
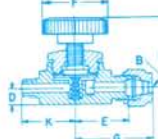
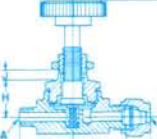
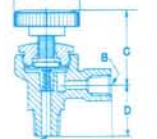
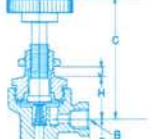
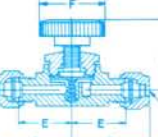
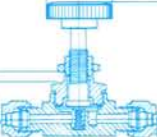
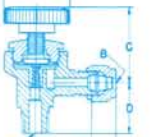
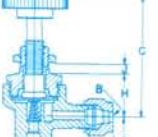
Temperature range:  $-100^{\circ}\text{F.}$  to  $400^{\circ}\text{F.}$

**Valve Handles Can Be Color Coded**

Red, orange, yellow and white color coding labels are available in accordance with ISA Recommended Practice.

Handles are recessed to receive code label.



<p><b>IN-LINE</b> Male P.T. to Male P.T.</p>  <p><b>301-D</b></p>	<p><b>PANEL-MOUNTED</b> Male P.T. to Male P.T.</p>  <p><b>301-DP</b></p>		
<p>Female P.T. to Female P.T.</p>  <p><b>302-D</b></p>	<p>Female P.T. to Female P.T.</p>  <p><b>302-DP</b></p>	<p><b>IN-LINE</b> Male P.T. to Male P.T.</p>  <p><b>305-D</b></p>	<p><b>PANEL-MOUNTED</b> Male P.T. to Male P.T.</p>  <p><b>305-DP</b></p>
<p>Male P.T. to Female P.T.</p>  <p><b>309-D</b></p>	<p>Male P.T. to Female P.T.</p>  <p><b>309-DP</b></p>	<p>Female P.T. to Female P.T.</p>  <p><b>306-D</b></p>	<p>Female P.T. to Female P.T.</p>  <p><b>306-DP</b></p>
<p>Male P.T. to Hi-Seal</p>  <p><b>303-D</b></p>	<p>Male P.T. to Hi-Seal</p>  <p><b>303-DP</b></p>	<p>Male P.T. to Female P.T.</p>  <p><b>307-D</b></p>	<p>Male P.T. to Female P.T.</p>  <p><b>307-DP</b></p>
<p>Hi-Seal to Hi-Seal</p>  <p><b>304-D</b></p>	<p>Hi-Seal to Hi-Seal</p>  <p><b>304-DP</b></p>	<p>Male P.T. to Hi-Seal</p>  <p><b>308-D</b></p>	<p>Male P.T. to Hi-Seal</p>  <p><b>308-DP</b></p>

# DIAPHRAGM VALVES

MIDGET DIAPHRAGM VALVES WITH TEFLON DIAPHRAGM



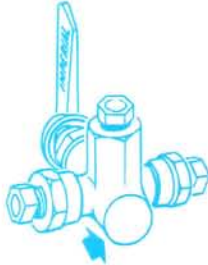
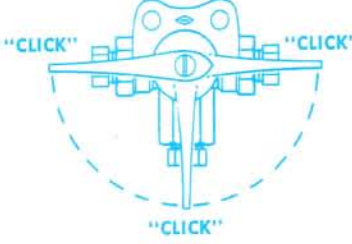


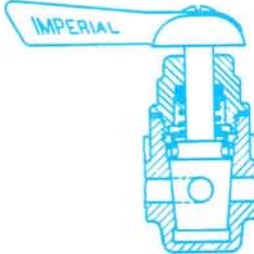
## IN-LINE VALVES

Valve Type	Catalog No.	A Inlet	B Outlet	Ori-fice	C		D	E	F	G	K	
					Open	Closed						
Straight	301-D-02	1/8 Male P. T.	1/8 Male P. T.	.187	1 1/2	1 3/8	1 1/32	1 3/32	1 3/8	—	—	
	301-D-04	1/4 Male P. T.	1/4 Male P. T.	.187	1 1/2	1 3/8	1 1/32	1 1/32	1 3/8	—	—	
	302-D-02	1/8 Fem. P. T.	1/8 Fem. P. T.	.187	1 1/2	1 3/8	1 1/32	1 5/16	1 3/8	—	—	
	302-D-04	1/4 Fem. P. T.	1/4 Fem. P. T.	.187	1 1/2	1 3/8	1 1/32	1 1/8	1 3/8	—	—	
	302-D-06	3/8 Fem. P. T.	3/8 Fem. P. T.	.281	1 11/16	1 9/16	7/16	1 3/16	1 3/8	—	—	
	Pattern	303-D-02x04	1/8 Male P. T.	1/4 Hi-Seal	.187	1 1/2	1 3/8	1 1/32	1 3/32	1 3/8	1 7/16	—
		303-D-04x04	1/4 Male P. T.	1/4 Hi-Seal	.187	1 1/2	1 3/8	1 1/32	1 1/32	1 3/8	1 7/16	1 3/32
		304-D-04	1/4 Hi-Seal	1/4 Hi-Seal	.187	1 1/2	1 3/8	1 1/32	1 3/32	1 3/8	1 7/16	—
		302-D-06	3/8 Hi-Seal	3/8 Hi-Seal	.187	1 1/2	1 3/8	1 1/32	1 1/8	1 3/8	1 9/16	—
		309-D-04	1/4 Male P. T.	1/4 Fem. P. T.	.187	1 1/2	1 3/8	1 1/32	1 1/32	1 3/8	—	1 1/8
309-D-06		3/8 Male P. T.	3/8 Fem. P. T.	.281	1 11/16	1 9/16	7/16	1 5/16	1 3/8	—	1 3/16	
Angle	305-D-02	1/8 Male P. T.	1/8 Male P. T.	.187	1 19/32	1 15/32	1 5/16	1 1/8	1 3/8	—	—	
	305-D-04	1/4 Male P. T.	1/4 Male P. T.	.187	1 19/32	1 15/32	1 1/8	1 5/16	1 3/8	—	—	
	306-D-02	1/8 Fem. P. T.	1/8 Fem. P. T.	.187	1 19/32	1 15/32	1 5/16	1 5/16	1 3/8	—	—	
	307-D-02	1/8 Male P. T.	1/8 Fem. P. T.	.187	1 19/32	1 15/32	1 5/16	1 5/16	1 3/8	—	—	
	Pattern	307-D-04	1/4 Male P. T.	1/4 Fem. P. T.	.187	1 19/32	1 15/32	1 1/8	1 3/8	1 3/8	—	—
		307-D-06	3/8 Male P. T.	3/8 Fem. P. T.	.281	1 25/32	1 21/32	1 1/8	1 3/8	1 3/8	—	—
	308-D-04x04	1/4 Male P. T.	1/4 Hi-Seal	.187	1 19/32	1 15/32	1 1/8	1 3/32	1 3/8	1 7/16	—	

## PANEL MOUNT VALVES

Valve Type	Catalog No.	A Inlet	B Outlet	Ori-fice	C		D	E	F	G	H	J	K	
					Open	Closed								
Straight	301-DP-02	1/8 Male P. T.	1/8 Male P. T.	.187	2 5/8	2 1/2	1 1/32	1 3/32	1 3/8	—	5 1/64	1 3/32	—	
	301-DP-04	1/4 Male P. T.	1/4 Male P. T.	.187	2 5/8	2 1/2	1 1/32	1 1/32	1 3/8	—	5 1/64	1 3/32	—	
	302-DP-02	1/8 Fem. P. T.	1/8 Fem. P. T.	.187	2 5/8	2 1/2	1 1/32	1 5/16	1 3/8	—	5 1/64	1 3/32	—	
	302-DP-04	1/4 Fem. P. T.	1/4 Fem. P. T.	.187	2 5/8	2 1/2	1 1/32	1 1/8	1 3/8	—	5 1/64	1 3/32	—	
	Pattern	302-DP-06	3/8 Fem. P. T.	3/8 Fem. P. T.	.281	2 13/16	2 11/16	7/16	1 3/16	1 3/8	—	3 1/32	1 3/32	—
		304-DP-04	1/4 Hi-Seal	1/4 Hi-Seal	.187	2 5/8	2 1/2	1 1/32	1 3/32	1 3/8	1 7/16	5 1/64	1 3/32	—
Angle	309-DP-06	3/8 Male P. T.	3/8 Fem. P. T.	.281	2 13/16	2 11/16	7/16	1 5/16	1 3/8	—	3 1/32	1 3/32	—	
	305-DP-02	1/8 Male P. T.	1/8 Male P. T.	.187	2 23/32	2 19/32	1 5/16	1 1/8	1 3/8	—	5 7/64	1 3/32	—	
	305-DP-04	1/4 Male P. T.	1/4 Male P. T.	.187	2 23/32	2 19/32	1 1/8	1 5/16	1 3/8	—	5 7/64	1 3/32	—	
	306-DP-02	1/8 Fem. P. T.	1/8 Fem. P. T.	.187	2 23/32	2 19/32	1 5/16	1 5/16	1 3/8	—	5 7/64	1 3/32	—	
	Pattern	307-DP-02	1/8 Male P. T.	1/8 Fem. P. T.	.187	2 23/32	2 19/32	1 5/16	1 5/16	1 3/8	—	5 7/64	1 3/32	—
		307-DP-06	3/8 Male P. T.	3/8 Fem. P. T.	.281	2 29/32	2 25/32	1 1/8	1 3/8	1 3/8	—	1 1/16	1 3/32	—
	308-DP-04x04	1/4 Male P. T.	1/4 Hi-Seal	.187	2 23/32	2 19/32	1 1/8	1 3/32	1 3/8	1 7/16	5 7/64	1 3/32	—	

Diameter of panel hole—2 1/32".

 <p>Solid bottom — to prevent leakage.</p>	 <p>Indicating "click" on 3- and 4-way types—tells when handle is in full open or closed position. Pointer handle permits use with indicator plate.</p>	
 <p>Integral mounting bracket.</p>	 <p>Floating stem with O-ring seal. Spring maintains proper tension on plug.</p>	

Pat. No. 2,488,283

A plug valve with solid bottom and O-ring stem seal which prevent leakage to, or from, the atmosphere.

Used for low pressures where quick on and off operation and generous flow are required. Port openings of Hi-Duty Valves with tubing connections are equal to the opening through the tubing. Because of the large openings, there is a momentary interconnection between the ports of most 3- and 4-way valves when switching from one port to another. No. 128-HD does not have interconnection between port openings.

Indicating "click" on 3- and 4-way valves tells when handle is in full open or closed position. 2-way valves have positive stop to assure full openings.

Bodies of most sizes made from brass forgings. Valves with tubing connections have Hi-Duty ends and are furnished with No. 81-LB Hi-Duty Nuts. Pipe threads are Long Dryseal.

Packed with a special synthetic grease which resists gasoline, solvents, water and air. Conforms to military specification MIL-G-6032. Non-drying and lasts up to 100 times longer than ordinary grease.

#### Solubility of grease:

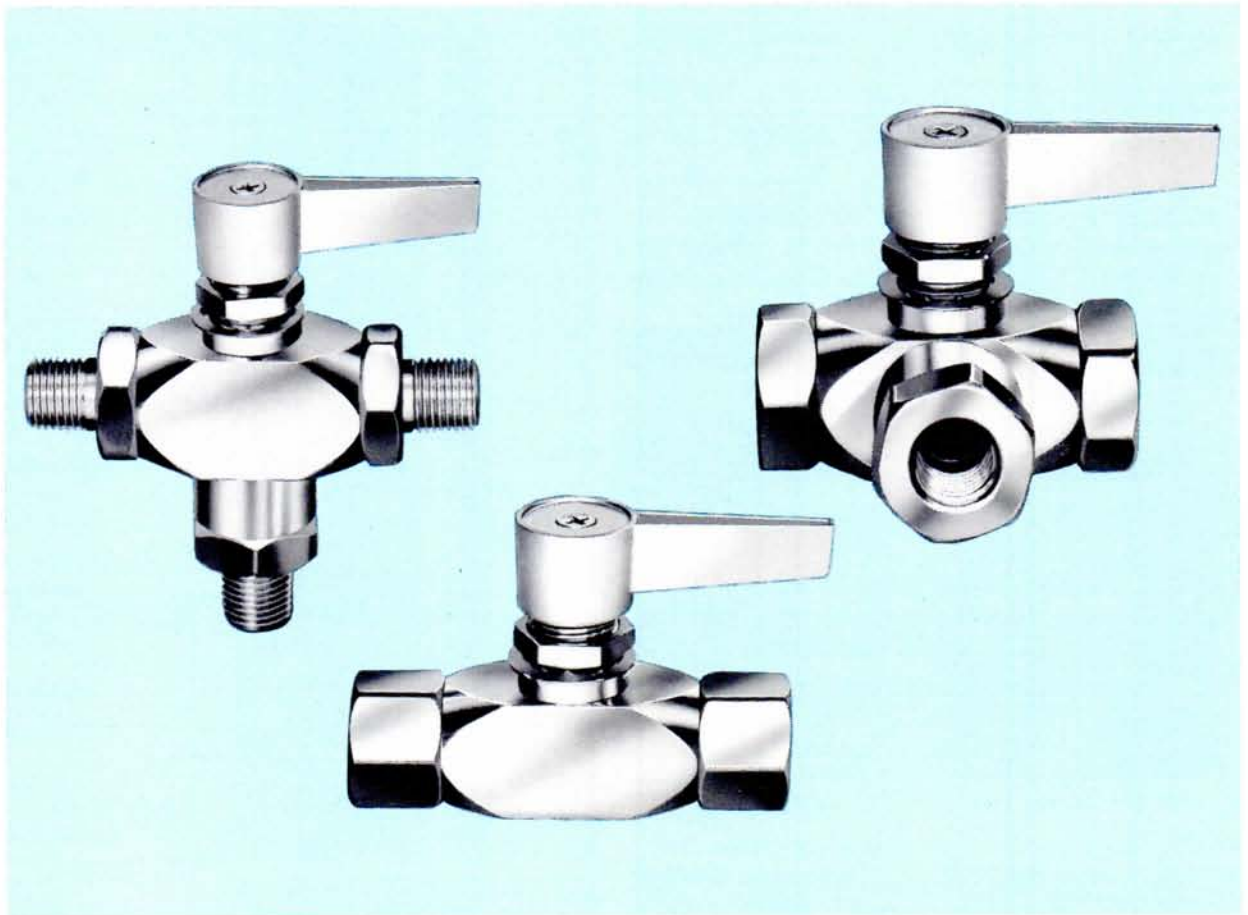
Gasoline . . . . .	Nil
Oil . . . . .	Nil
Water . . . . .	Nil
Alcohol-Water . . . . .	Nil
MIL-H-3136 . . . . .	10%
Mixed Alcohols . . . . .	31%
Mixed Ketones . . . . .	45%
Toluene . . . . .	90%
Benzene . . . . .	100%
Carbon Tetrachloride . . . . .	100%

**Gould Inc., Valve and Fittings Division**  
6300 West Howard Street, Chicago, Illinois 60648  
Telephone (312) 967-4500/Chicago 774-1700

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# Gould Imperial-Eastman Ball Valves



Extra reliability and versatility in small valves for process control or general service.

**MATERIALS:**

- Brass Bodies with Teflon Seats and Buna-N seals.
- Stainless Steel Bodies with Teflon Seats and Viton Seals.

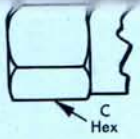
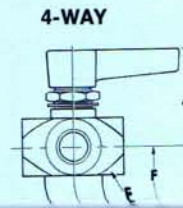
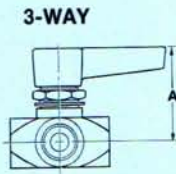
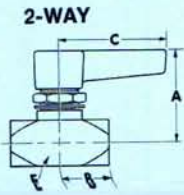
**RECOMMENDED MAXIMUM  
WORKING PRESSURE:**

500 psi 2 way  
125 psi 3 and 4 way

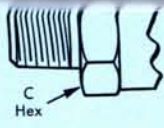
**SIZE RANGE:**

1/4" to 1/2" Tube O.D.  
1/8" to 1/2" Port NPTF

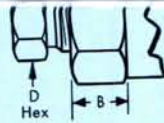
BODY



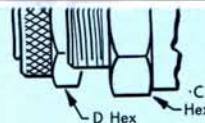
FEMALE PIPE



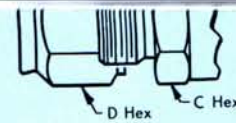
MALE PIPE



HI-DUTY



POLY-FLO

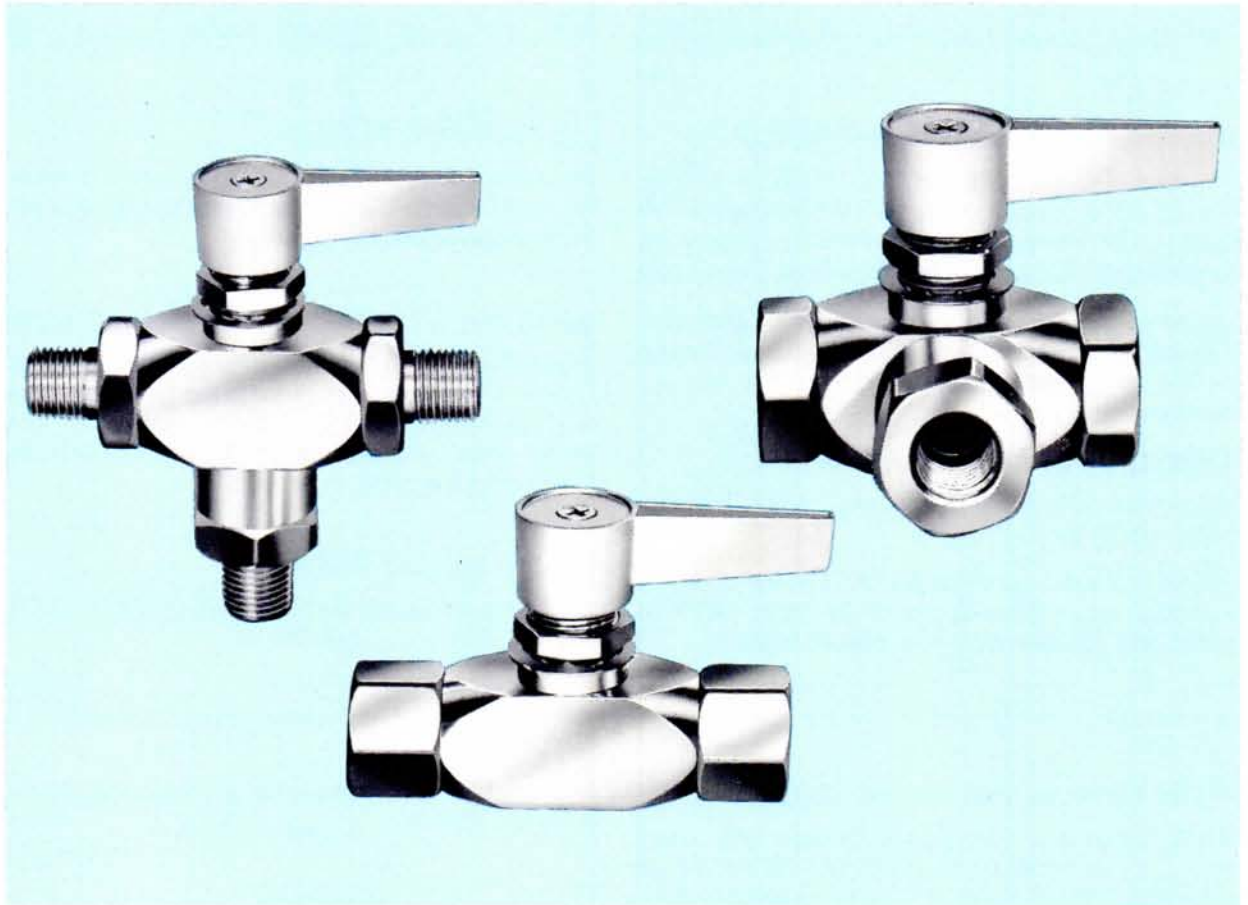


HI-SEAL

	O.D. Tube or Pipe Size	2 WAY (242)				2 WAY (263), 3 WAY (343), (353), 4 WAY (443)				3 WAY (332)			
		A	B	C	D	A	B	C	D	A	B	C	D
<b>FEMALE PIPE</b>	1/8	.250		.812		.250		.937		.250		.812	
	1/4	.625		.812		.375		.937		.625		.812	
	3/8					.625		.937					
	1/2					.843		1.062					
<b>MALE PIPE</b>	1/8	.625		.812		.625		.937		.625		.812	
	1/4	.812		.812		.875		.937		.812		.812	
	3/8					.875		.937					
	1/2					1.125		.937					
<b>HI-DUTY</b>	1/4	.781	.375	.812	.437	.937	.625	.937	.437	.781	.375	.812	.437
	3/8	1.125	.718	.812	.625	1.032	.625	.937	.625	1.125	.718	.812	.625
	1/2					1.062	.625	.937	.750				
<b>POLY-FLO</b>	1/4	.937	.718	.812	.437	.937	.718	.937	.437	.937	.718	.812	.437
	3/8	.968	.718	.812	.562	.968	.718	.937	.562	.968	.718	.812	.562
	1/2					1.093	.843	.937	.812				
<b>HI-SEAL</b>	1/4	1.016	.688	.812	.625	.984	.656	.937	.625	.984	.688	.812	.625
	3/8	1.078	.641	.812	.750	1.172	.734	.937	.750	1.046	.641	.812	.750
	1/2					1.328	.781	.937	.875				



# Gould Imperial-Eastman Ball Valves



Extra reliability and versatility in small valves for process control or general service.

**MATERIALS:**

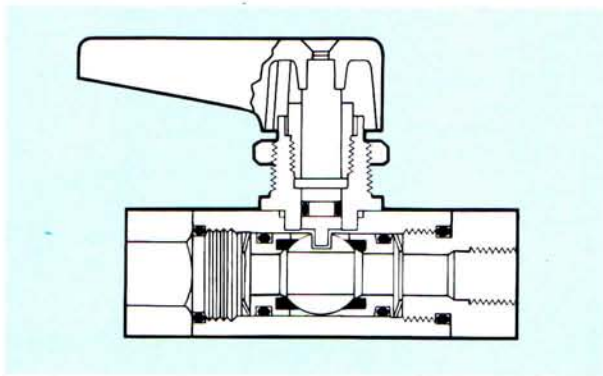
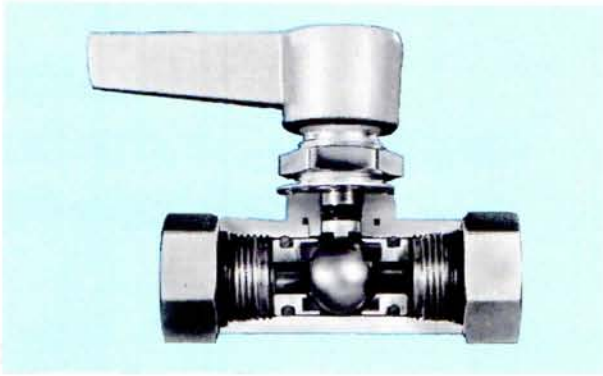
- Brass Bodies with Teflon Seats and Buna-N seals.
- Stainless Steel Bodies with Teflon Seats and Viton Seals.

**RECOMMENDED MAXIMUM  
WORKING PRESSURE:**

500 psi 2 way  
125 psi 3 and 4 way

**SIZE RANGE:**

1/4" to 1/2" Tube O.D.  
1/8" to 1/2" Port NPTF



### MULTIPLE SPRING-LOADED SEATS

The ball fits securely between multiple spring-loaded seats (one at each orifice opening) which keep constant pressure against the ball. The springs compensate for any wear or fluctuations in pressure.

The valve can be installed with any side upstream, and the flow can be reversed without any change in the valve—because all sides have spring-loaded seats.

### WIDE TEMPERATURE RANGE

Teflon seats with Buna-N seals permit temperatures from -40°F. to 200°F.

Use of 316 stainless steel bodies with Teflon seats and Viton seals allow temperatures from -40°F. to 400°F. and use with chemical service systems.

### LOW HANDLE TORQUE

This unique floating suspension of the ball between the seats makes it possible to turn the handle with under 5 pound-inches of torque.

### WIDE SELECTION OF END CONNECTIONS

This valve can be installed in just about any application, because of the wide range of end connection availability, including male and female pipe ends, Imperial-Eastman Hi-Duty<sup>®</sup> Hi-Seal<sup>®</sup> and Poly-Flo<sup>®</sup> tube ends.

### PANEL MOUNT FEATURE

All standard valves are furnished with a mounting nut for panel board installation.

### FLOW RATE vs. PRESSURE DROP

These charts show the excellent water flow characteristics of Imperial-Eastman ball valves. When substituting a ball valve for a needle valve, you can use a smaller valve size and still get an equivalent flow... or you can even use less input capacity.

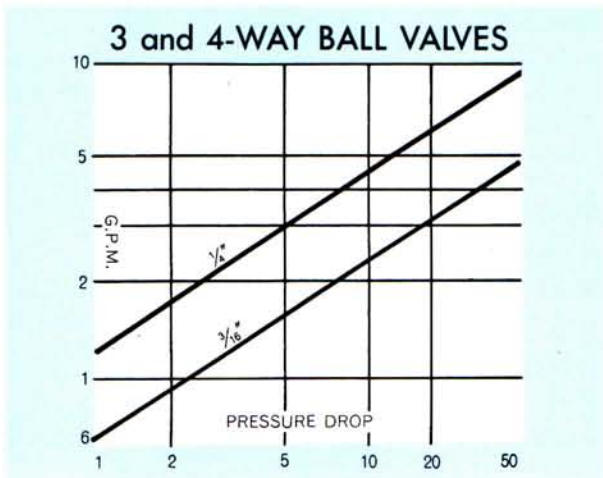
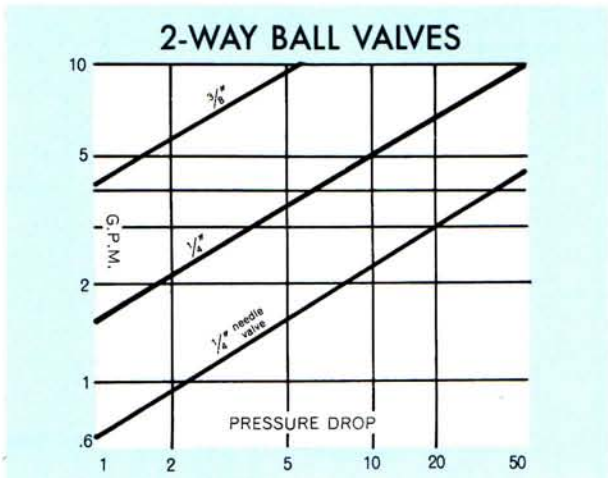
To apply the Cv factor to other applications, use the following formula:

$$C_v = \text{GPM} / \sqrt{\frac{\Delta P}{G}}$$

Water (at 60°F)  $\Delta P = P_1 - P_2$  in PSI  
 $P_1$  = Inlet Pressure PSIA  
 $P_2$  = Outlet Pressure PSIA

$G$  = Specific Gravity = 1.0  $T$  = Absolute temperature  
 Gas is based on air @ of flowing medium (°F+460)  
 14.7 PSIA and 60°F = 1.0

$$\text{SCFH} = 1360 C_v \sqrt{\frac{\Delta P}{G T}} \sqrt{\frac{P_1 + P_2}{2}}$$



# ORDERING INFORMATION

Select valve required and specify appropriate catalog numbers.

## BRASS

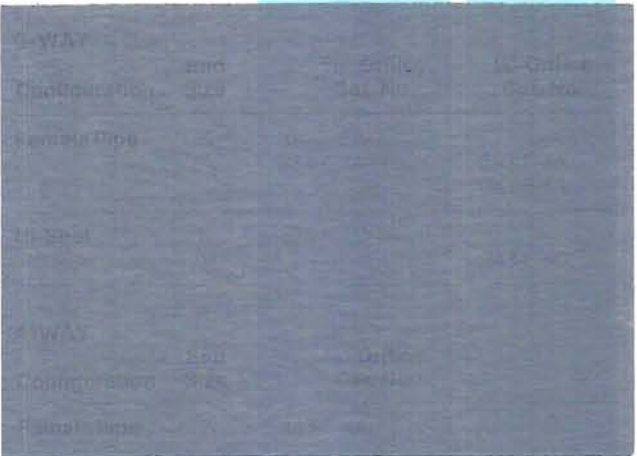
2-WAY		1/4" Orifice Cat. No.	3/8" Orifice Cat. No.
Configuration	End Size		
Female Pipe	1/8	242-B-2A 242-BL-2A*	—
	1/4	242-B-4A	263-B-4A 263-BL-4A*
	3/8	—	263-B-6A 263-BL-6A*
	1/2	—	263-B-8A
	—	—	—
Male Pipe	1/4	242-B-4B	263-B-4B
	3/8	—	263-B-6B
	1/2	—	263-B-8B
Hi-Duty	1/4	242-B-4C	—
	1/2	—	263-B-8C
Hi-Seal	1/4	242-B-4D	—
Poly-Flo	1/4	242-B-4E	—
	3/8	242-B-6E	—
Female Pipe x Male Pipe	1/8	242-B-2A x 2B	—
	1/4	242-B-4A x 4B 242-BL-4A x 4B*	263-B-4A x 4B
Male Pipe x Poly-Flo	3/8	—	263-B-6A x 6B
	1/4	242-B-4B x 4E	—
Male Pipe x Hi-Seal	3/8	—	263-B-6B x 6D
Poly-Flo x Female Pipe	3/8 x 1/8	242-B-6E x 2A	—

3-WAY		3/16" Orifice Cat. No.	1/4" Orifice Cat. No.	1/4" Orifice Bottom Entry Cat. No.
Configuration	End Size			
Female Pipe	1/8	332-B-2A	—	353-B-2A
	1/4	332-B-4A	343-B-4A	353-B-4A
	1/4 x 3/8 x 3/8	—	343-B-4A 4Ax6Ax6A	—
	3/8	—	343-B-6A	353-B-6A
	1/2	—	343-B-8A	353-B-8A
Male Pipe	1/4	—	343-B-4B	—
Hi-Duty	1/4	332-B-4C	—	—
Poly-Flo	1/4	332-B-4E	—	—

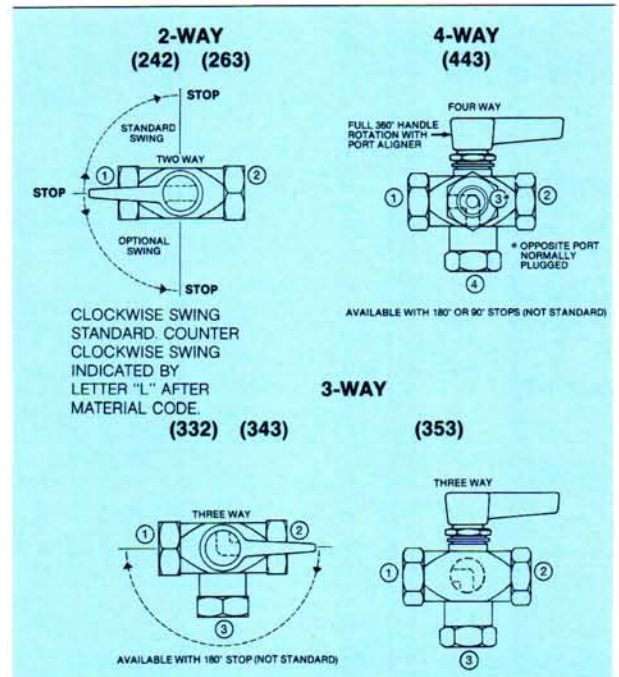
4-WAY		1/4" Orifice Cat. No.
Configuration	End Size	
Female Pipe	1/4	443-B-4A
Hi-Seal	3/8	443-B-6D

## STAINLESS STEEL

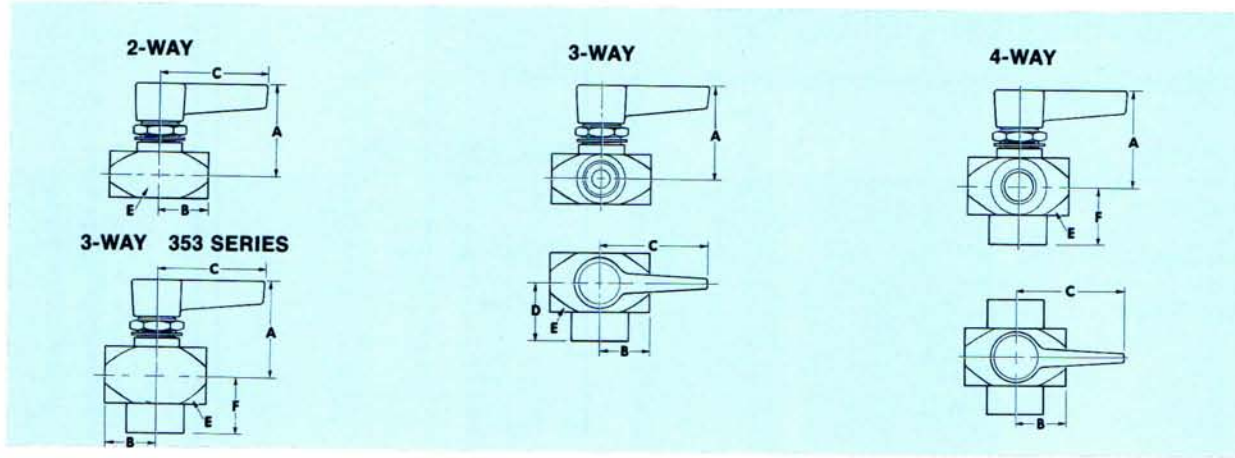
2-WAY		1/4" Orifice Cat. No.	3/8" Orifice Cat. No.
Configuration	End Size		
Female Pipe	1/8	242-F-2A	—
	1/4	242-F-4A	263-F-4A
	3/8	—	263-F-6A
	1/2	—	263-F-8A
Male Pipe	1/4	242-F-4B	—
Hi-Seal	1/4	242-F-4D	—
	3/8	—	263-F-6D
	1/2	—	263-F-8D
Female Pipe x Male Pipe	1/4	242-F-4A x 4B	—



\*Counter clockwise handle swing.



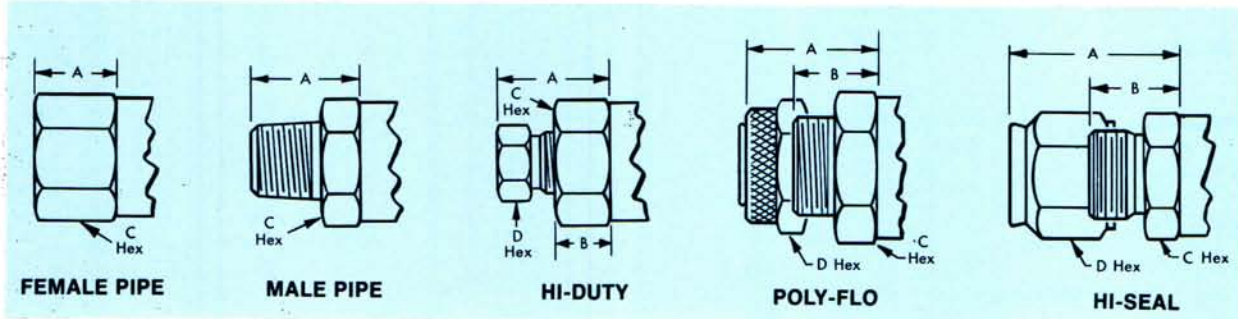
**BODY**



	A	B	C	D	E sq.	F
2 Way, 1/4" Orifice (242)	1.531	.867	1.750		.812	
2 Way, 3/8" Orifice (263)	1.640	.843	1.750		.937	
3 Way, 3/16" Orifice (332)	1.562	.800	1.750	.891	.812	
3 Way, 1/4" Orifice (343)	1.640	.843	1.750	.921	.937	
3 Way, 1/4" Orifice (353)	1.640	.843	1.750		.937	.921
4 Way, 1/4" Orifice (443)	1.640	.843	1.750	.921	.937	.921

Diameter of holes in panel boards: .625 with bonnet extender: .890.  
 Maximum bulkhead thickness: .250

**END CONNECTIONS**

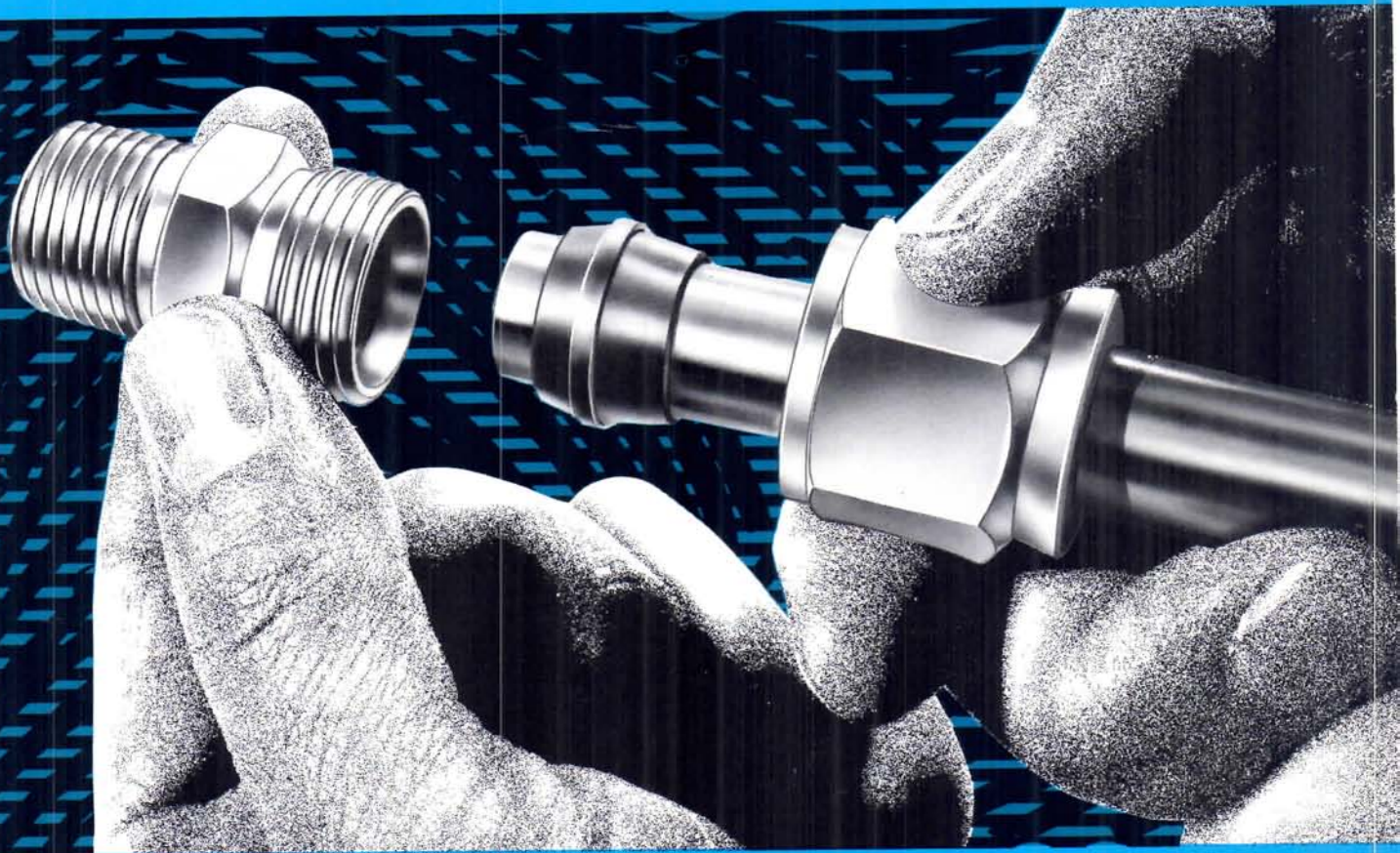


	O.D. Tube or Pipe Size	2 WAY (242)				2 WAY (263), 3 WAY (343), (353), 4 WAY (443)				3 WAY (332)			
		A	B	C	D	A	B	C	D	A	B	C	D
<b>FEMALE PIPE</b>	1/8	.250		.812		.250		.937		.250		.812	
	1/4	.625		.812		.375		.937		.625		.812	
	3/8					.625		.937					
	1/2					.843		1.062					
<b>MALE PIPE</b>	1/8	.625		.812		.625		.937		.625		.812	
	1/4	.812		.812		.875		.937		.812		.812	
	3/8					.875		.937					
	1/2					1.125		.937					
<b>HI-DUTY</b>	1/4	.781	.375	.812	.437	.937	.625	.937	.437	.781	.375	.812	.437
	3/8	1.125	.718	.812	.625	1.032	.625	.937	.625	1.125	.718	.812	.625
	1/2					1.062	.625	.937	.750				
<b>POLY-FLO</b>	1/4	.937	.718	.812	.437	.937	.718	.937	.437	.937	.718	.812	.437
	3/8	.968	.718	.812	.562	.968	.718	.937	.562	.968	.718	.812	.562
	1/2					1.093	.843	.937	.812				
<b>HI-SEAL</b>	1/4	1.016	.688	.812	.625	.984	.656	.937	.625	.984	.688	.812	.625
	3/8	1.078	.641	.812	.750	1.172	.734	.937	.750	1.046	.641	.812	.750
	1/2					1.328	.781	.937	.875				

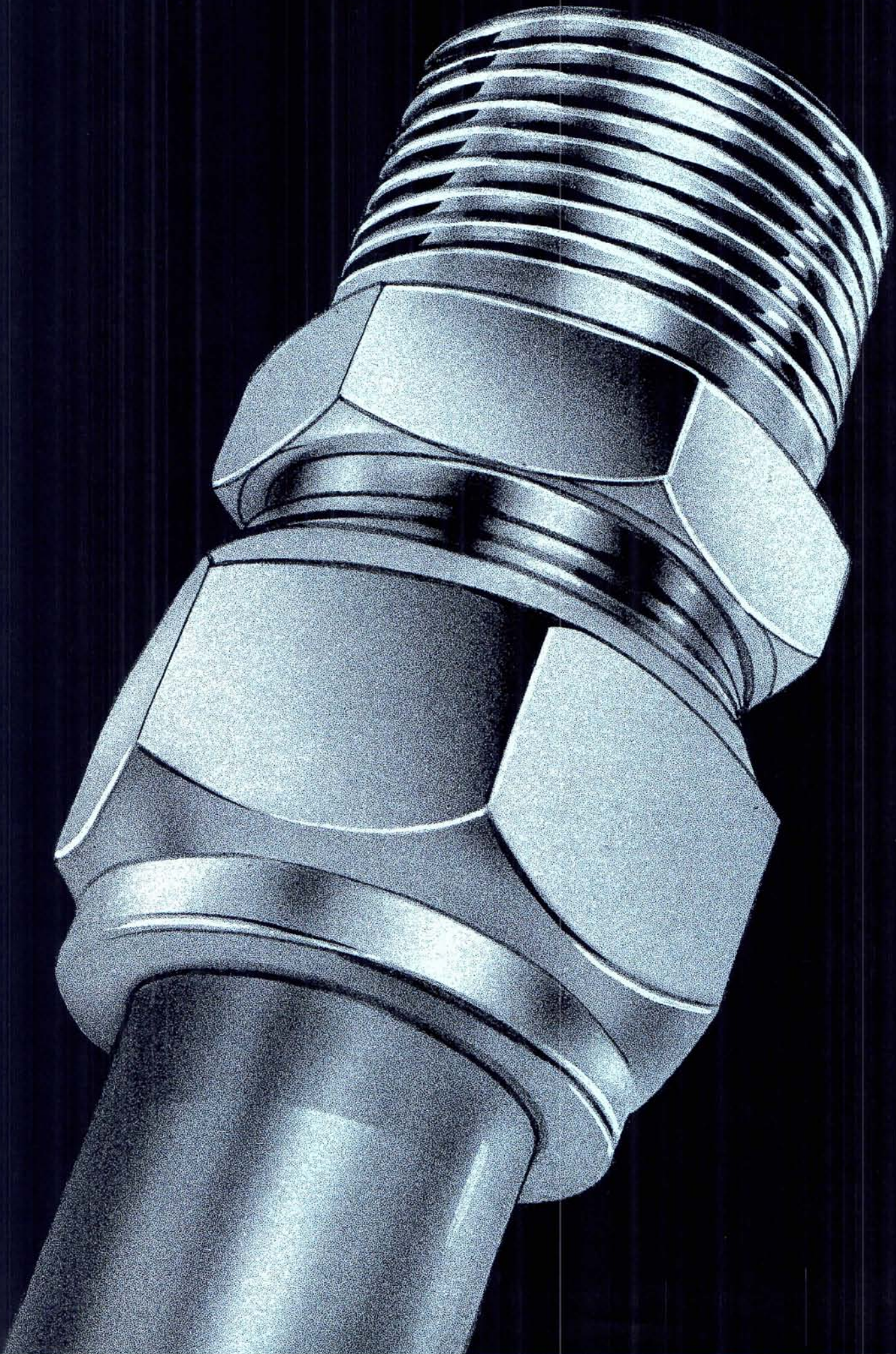
**HI-SEAL TUBE  
FITTINGS**

HI-SEAL TUBE  
FITTINGS

**Gould  
Imperial-Eastman  
Hi-Seal® Braze-Seal®**



**HIGH PERFORMANCE TUBE FITTINGS  
FOR LOW TO HIGH PRESSURE  
AND VACUUM APPLICATIONS**





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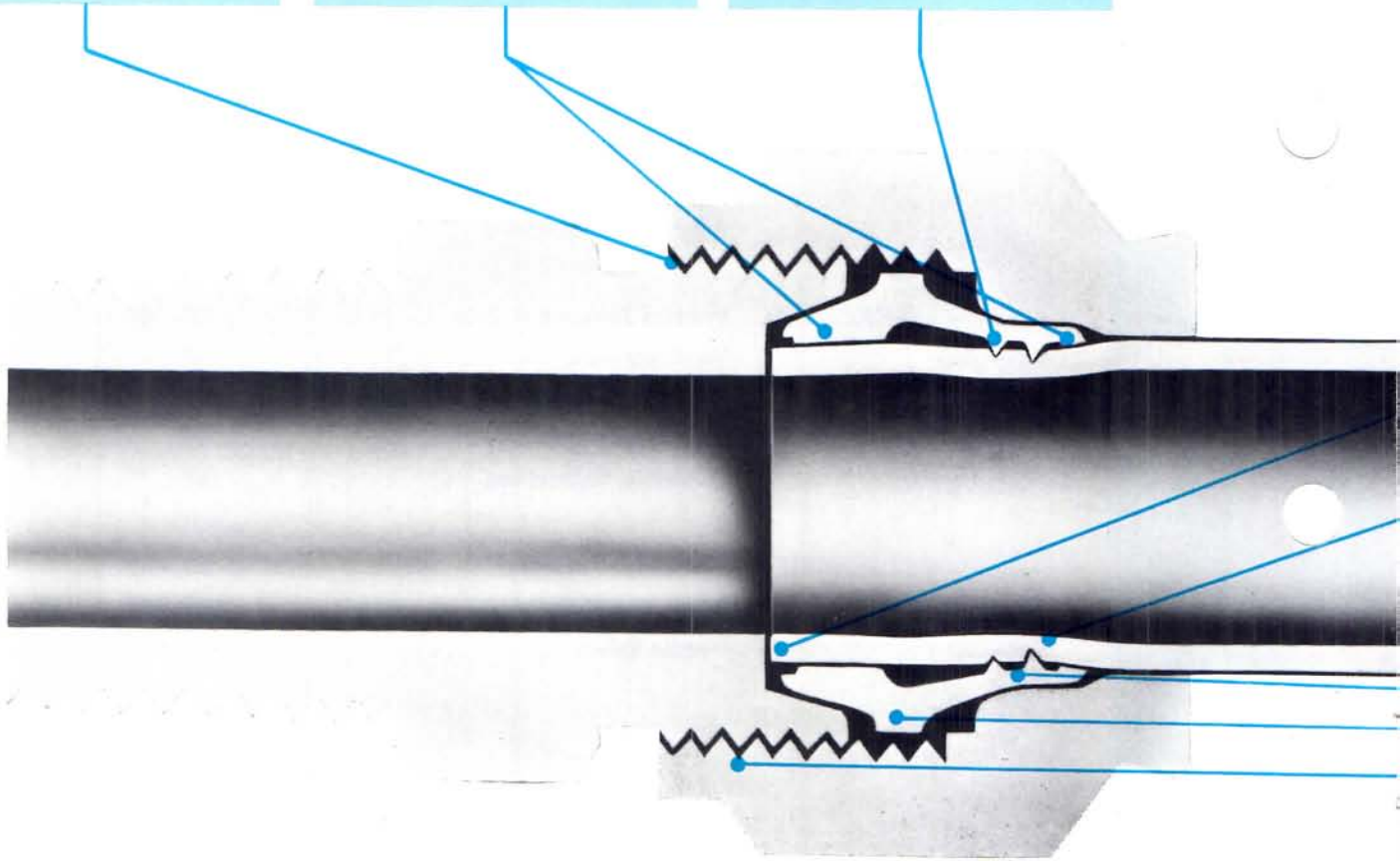
# HERE'S WHY HI-SEAL<sup>®</sup> IS THE PREFERRED TUBE FITTING

- Recommended for low or high pressure and vacuum service
- Withstands vibration, shock, pressure surges
- Withstands abuse in normal service and maintenance
- Easy to assemble—easy to remake assemblies
- Visual assembly check—without disassembly of fitting
- Compact design provides improved tubing layout
- Available from stock in brass, steel, stainless steel, aluminum, Monel—also available in other metals

Fitting is tight when threads are out of sight. No tube marking or disassembly needed to assure proper make-up.

Positive tubing support on both sides of gripping teeth absorbs shock, vibration and tube movement. Seal maintained even under abusive or vibrating service.

"Reserve gripping power" of second gripping tooth provides fresh seal on every remake. Positive seal maintained, even after repeated disassembly, without tubing constriction.

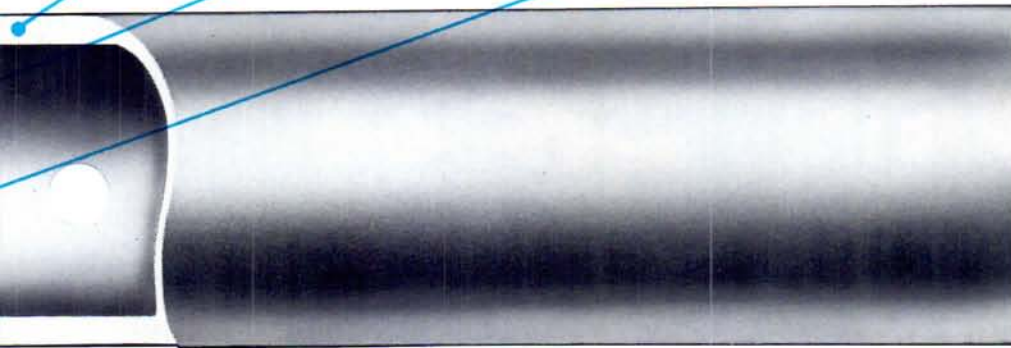


Pat. No. 3,290,069

Hi-Seal Fittings can be used on varying wall thickness tubing with unvarying results.

Safety margin insures tight joint even without exact placement of tubing in fitting. Even tubing not squarely cut off will hold tight.

Controlled "bite" does not deform tubing and constrict flow; yet Hi-Seal holds to burst pressures of tubing.



Hi-Seal design prevents "locked-in" nut because body threads are not deformed outwardly. Always easy to disassemble when necessary.

One-piece, collared sleeve prevents serious assembly error; connection is pressure-tight even if sleeve is reversed.

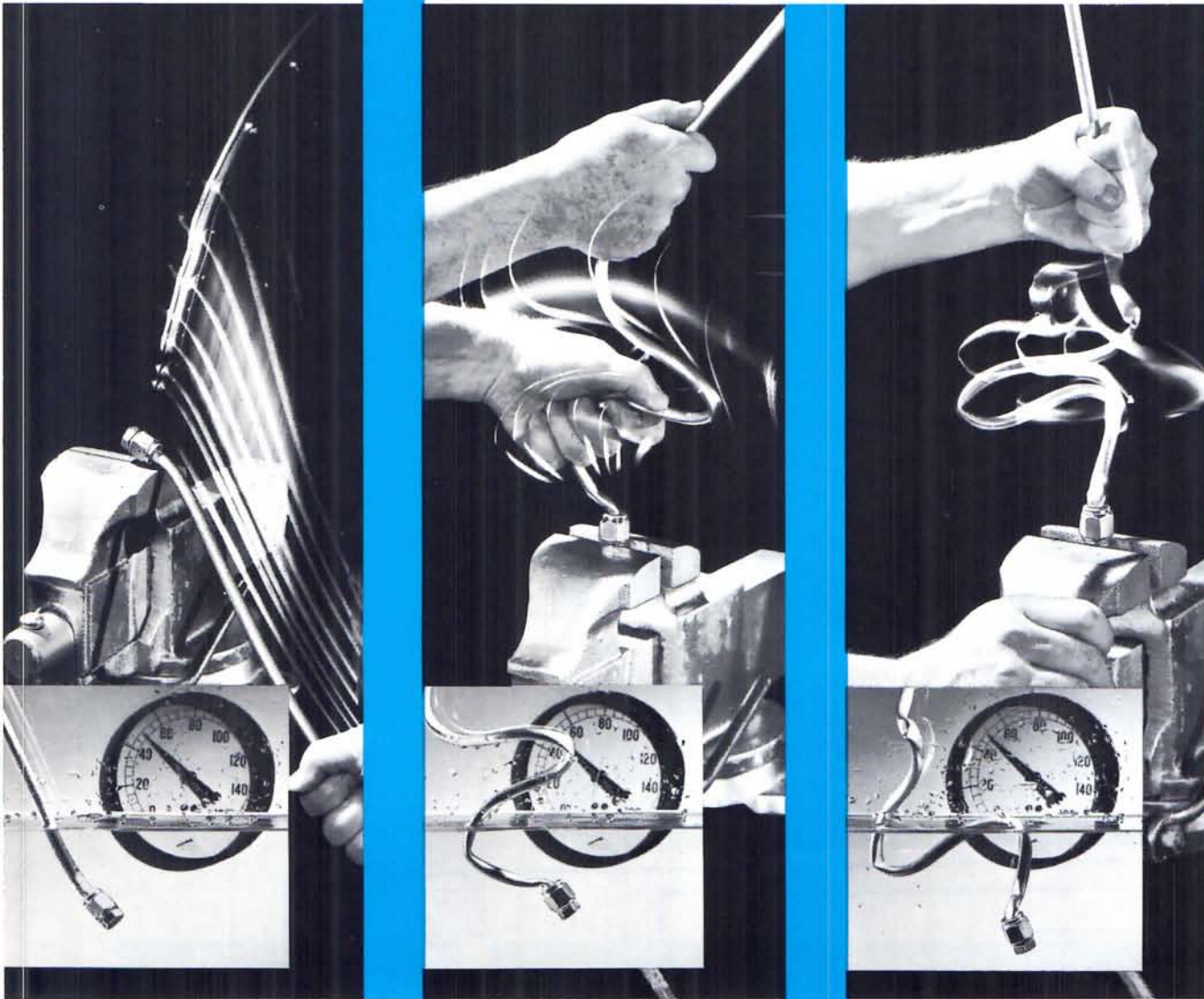
Tube supports on both sides of sealing area hold tubing and absorb shock and vibration.

# HI-SEAL<sup>®</sup>

HIGH PERFORMANCE  
**PROVED**  
IN TORTURE TESTS

For years, Hi-Seal Tube Fittings have proved their dependability and value on many applications. Now, with design refinements, proof of dependability is even more convincing.

A series of dramatic tests demonstrates this. These tests subject high performance Hi-Seal Fittings to extreme, abnormal abuse. Yet Hi-Seal Fittings prove their ability to resist leakage or pressure loss—demonstrate their stamina and reliability.



## BANG IT!

An assembled Hi-Seal Fitting may be rapped sharply against a hard surface. If after abuse leakage occurs, 1/6 turn of nut (one hex) will restore seal, and fitting will test pressure tight.

## BEND IT!

Tubing may be bent in all directions, even at the point of insertion. Again, if leakage occurs, 1/6 turn will restore seal and under water pressure test shows no leakage.

## TWIST IT!

Twisting or spinning the tubing in the fitting socket won't permanently upset the seal. If leakage does occur, 1/6 turn tightening will restore seal and pressure test under water again demonstrates Hi-Seal's positive connection.

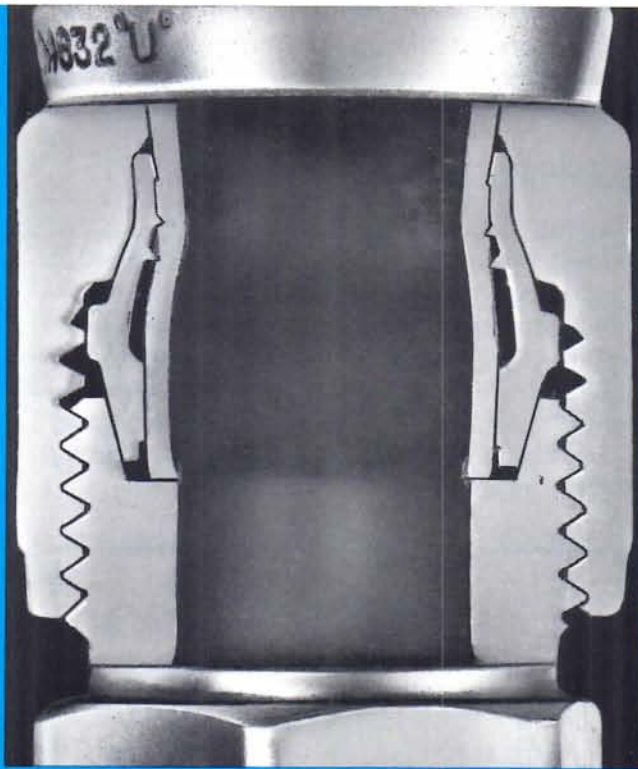
The second gripping tooth in the Hi-Seal Fitting insures "reserve gripping power" which provides a fresh seal on every remake. See illustrations.

# HI-SEAL<sup>®</sup>

## RESERVE GRIPPING

# POWER

## IS THE REASON



Photograph of Hi-Seal Fitting after initial make-up. Note the first tooth gripping tube to provide a pressure tight seal.



Photograph of Hi-Seal Fitting after repeated remakes. Note the second tooth now gripping tube.

Positive seal is maintained even after repeated disassembly and reassembly, without tubing constriction.

**COMPACT DESIGN** Hi-Seal's butt-joint type design and freedom from flaring permit bends to be made exceptionally close to the tube end. In areas where space is limited, exact placement of tubing in the fitting is not required. (Tubing must extend through the sleeve.) These factors provide savings in materials and space.

**VARIETY OF METALS, TYPES, SIZES** Hi-Seal becomes the one versatile fitting for the entire job. Available from stock in brass, steel, stainless steel, aluminum, Monel. Can be furnished in other machinable metals on special order.

**PRESETTING** Hi-Seal Fittings do not require disassembly to assure proper makeup. However, they can be preset where space restrictions make it awkward to assemble fittings, or for pre-production assembly.

Special presetting tools are available. (See listing of tools with presetting instructions in this catalog.) In an emergency, a fitting body can be used as a presetting tool.

# THE VERSATILE TUBE FITTING FOR MANY APPLICATIONS

Examine the features and characteristics of Hi-Seal Tube Fittings. You will quickly see why they become the ideal fittings for standard and critical applications—in instrumentation, chemical, petrochemical, refinery, pneumatic, hydraulic and other fluid transmission operations.

## PRESSURE

Hi-Seal Fittings are recommended for low or high pressure service—within the safe pressure ranges of the most commonly used types of commercially available tubing. Tables on the following pages indicate recommended working pressures for these fittings when used with various types of tubing.

## VACUUM

Independent laboratory tests of Hi-Seal fittings indicate *no leakage* when tested by means of a mass spectrometer leak detector, adjusted to indicate a leakage rate of  $1.0 \times 10^{-10}$  standard cubic centimeter of gaseous helium per second.

## TEMPERATURE

As a general rule, the following temperature limitations should be observed for tubing systems:

- 900°F with stainless steel
- 1000°F with monel
- 425°F with copper and brass
- 500°F with aluminum
- 600°F with steel

## VIBRATION AND SHOCK

Hi-Seal far exceeds the minimum requirement of 10,000,000 cycles of vibration required under Military Specification MIL-F-18280B, which calls for certain performance standards.

Hi-Seal permits overhang deflection because the sleeve gives positive tubing support on both sides of the seal with the tube. Pivot points are eliminated—the cause of failure in many fittings.

## REPEATED ASSEMBLY

Military Specification MIL-F-18280B also requires that a fitting connection be taken apart and remade a minimum of 8 times. (Imperial-Eastman engineering standards specify a minimum of twice the number of remakes required by military specifications.) The reserve gripping action of Hi-Seal permits the fitting to exceed this minimum, while still remaining free from leakage.

## CONFORMANCES

- J.I.C.** Pneumatic and Hydraulic Standards
- S.A.E.\*** Hydraulic Standards
- A.S.M.E.** Code for Pressure Piping
- A.N.S.I.** Code for Pressure Piping
- U.L.** Listed for use with hazardous liquids and gases in stainless and carbon steel.
- MIL\*** Conforms to MIL-F-18280-B, MIL-F-5506A, and MIL-F-18866.
- NFPA** Manufactured in accordance with NFPA recommended Standard Nos. T3.8.70.2, T3.8.70.3.
- Coast Guard** Equipment list CG190.

\* Performance standards only. Not dimensionally interchangeable.

**FITTING MATERIAL:** Steel

**TUBE FITTINGS**

**TUBING MATERIAL:** Steel, S.A.E. 1010, Dead Soft, Cold Drawn (per J.I.C. Spec.) and Brazed Steel

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALLY AVAILABLE TUBING WALL THICKNESSES RECOMMENDED MAXIMUM WORKING PRESSURES—psi													
		SEAMLESS STEEL—S.A.E. 1010— DEAD SOFT, COLD DRAWN*								BRAZED STEEL— ANNEALED (Such as Bundy or GM)					
		.028	.035	.049	.065	.083	.095	.109	.120	.028	.035	.049			
<b>MINOR SURGES</b>  Safety Factor 4—1	1/8"	6050	7560										6050		
	3/16"	4180	5050	7060									4180		7160
	1/4"	3350	3800	6210									3350	3800	6210
	5/16"	2630	3340	5190									2630	3340	4850
	3/8"	2160	2760	3960	5430	7100							2160	2760	3960
	1/2"		2020	2900	3940	5160	6000	6980	7750					2020	2900
	5/8"			2280	3100	4040	4680	5450	6070						2280
	3/4"			1880	2540	3310	3840	4460	5370						
	7/8"			1610	2150	2800	3240	3760	4190						
	1"			1390	1860	2430	2810	3260	3620						
1 1/4"				1470	1920	2200	2560	3060							
1 1/2"				1210	1580	1820	2120	2320							
<b>SURGES Up to 50%</b>  Safety Factor 6—1	1/8"	4040	5110										4040		
	3/16"	2790	3360	4700									2790		
	1/4"	2240	2530	4070									2240	2530	4070
	5/16"	1750	2230	3450									1750	2230	3240
	3/8"	1440	1840	2740	3620	4740							1440	1840	2740
	1/2"		1350	1930	2630	3440	4000	4650	5160					1350	1930
	5/8"			1520	2060	2690	3120	3630	4050						1520
	3/4"			1250	1690	2200	2560	2980	3550						
	7/8"			1070	1440	1870	2160	2500	2800						
	1"			926	1240	1620	1870	2180	2410						
1 1/4"				980	1280	1470	1710	2020							
1 1/2"				806	1050	1220	1410	1550							
<b>SURGES of 50% to 100%</b>  Safety Factor 8—1	1/8"	3030	3780										3030		
	3/16"	2090	2530	3530									2090		
	1/4"	1680	1900	3110									1680	1900	3110
	5/16"	1320	1670	2590									1320	1670	2420
	3/8"	1080	1380	1980	2660	3650							1080	1380	1980
	1/2"		1010	1450	1970	2580	3000	3490	3880					1010	1450
	5/8"			1140	1550	2020	2340	2720	3040						1140
	3/4"			940	1270	1660	1920	2230	2660						
	7/8"			805	1080	1400	1620	1880	2100						
	1"			700	930	1220	1400	1630	1810						
1 1/4"				735	960	1100	1280	1520							
1 1/2"				605	780	910	1060	1160							
<b>SURGES of 100% to 150%</b>  Safety Factor 10—1	1/8"	2420	3070										2420		
	3/16"	1670	2020	2820									1670		
	1/4"	1340	1520	2490									1340	1520	2490
	5/16"	1050	1340	2080									1050	1340	1940
	3/8"	865	1110	1580	2170	2840							865	1110	1580
	1/2"		808	1160	1580	2060	2400	2790	3100					808	1160
	5/8"			912	1240	1620	1870	2180	2430						912
	3/4"			745	1020	1330	1540	1790	2130						
	7/8"			590	860	1120	1300	1510	1680						
	1"			556	745	973	1120	1300	1450						
1 1/4"				589	768	880	1020	1220							
1 1/2"				485	632	725	850	929							

\*Above pressures are based on the use of Steel Hi-Seal Fittings with S.A.E. 1010, J.I.C. Steel Tubing. Higher pressures may be obtained with certain other high strength steel tubing. Check with factory for pressure limitations on type of tubing being used.

NOTE: Working pressures based on room temperature (72°) service. For elevated temperature service, multiply these pressures by derating factors obtained from chart on page 13.

### TUBE FITTINGS

**FITTING MATERIAL:** Stainless Steel, Type 316  
and Type 316 with Armco 17-4 PH Sleeves

**TUBING MATERIAL:** Annealed Stainless Steel, Type 304

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALLY AVAILABLE TUBING WALL THICKNESSES RECOMMENDED MAXIMUM WORKING PRESSURES—psi															
		TYPE 316 ASSEMBLIES <small>(For higher working pressures and heavier wall tubing, see values shown at right)</small>				TYPE 316 ASSEMBLIES WITH ARMCO 17-4 PH SLEEVES											
		.028	.035	.049	.065	.028	.035	.049	.065	.083	.095	.109	.120				
<b>MINOR SURGES</b>  Safety Factor 4—1	1/8"	8180	10200			8180	10200										
	3/16"	5650	6820	9710		5650	6820	9710									
	1/4"	4520	5900	8400		4520	5900	8400									
	3/8"	2920	3900	5500	7250	2920	3900	5500	7250								
	1/2"	2150	3000	4100	5500	2150	3000	4100	5500	6980	8100	9430	10500				
	5/8"	1710	2400	3300	4400	1710	2400	3300	4400	5450	6310	7360	8200				
	3/4"			2700	3600			2700	3600	4470	5170	6020	6700				
	1"			750	750			1870	2510	3270	3790	4380					
1 1/4"							1470	1980	2580	2970	3420						
1 1/2"							1220	1640	2130	2460	2840	3130					
<b>SURGES Up to 50%</b>  Safety Factor 6—1	1/8"	5450	6800			5450	6800										
	3/16"	3770	4550	6470		3770	4550	6470									
	1/4"	3020	3940	5700		3020	3940	5700									
	3/8"	1950	2700	3670	4840	1950	2700	3670	4840								
	1/2"	1430	2000	2740	3660	1430	2000	2740	3660	4650	5400	6290	7000				
	5/8"	1140	1600	2200	2940	1140	1600	2200	2940	3610	4210	4910	5470				
	3/4"			1800	2400			1800	2400	2980	3450	4010	4460				
	1"			500	500			1250	1670	2180	2530	2930					
1 1/4"							980	1320	1720	1980	2280						
1 1/2"							814	1100	1420	1640	1900	2090					
<b>SURGES of 50% to 100%</b>  Safety Factor 8—1	1/8"	4090	5100			4090	5100										
	3/16"	2830	3410	4860		2830	3410	4860									
	1/4"	2260	2950	4200		2260	2950	4200									
	3/8"	1460	1950	2750	3630	1460	1950	2750	3630								
	1/2"	1080	1500	2050	2750	1080	1500	2050	2750	3490	4050	4720	5250				
	5/8"	855	1200	1650	2200	855	1200	1650	2200	2740	3160	3680	4100				
	3/4"			1350	1800			1350	1800	2240	2580	3010	3350				
	1"			375	375			935	1260	1640	1900	2200					
1 1/4"							735	990	1290	1490	1710						
1 1/2"							610	820	1070	1230	1420	1570					
<b>SURGES of 100% to 150%</b>  Safety Factor 10—1	1/8"	3270	4080			3270	4080										
	3/16"	2260	2730	3890		2260	2730	3890									
	1/4"	1810	2360	3360		1810	2360	3360									
	3/8"	1170	1560	2200	2900	1170	1560	2200	2900								
	1/2"	860	1200	1640	2200	860	1200	1640	2200	2790	3240	3770	4200				
	5/8"	685	960	1320	1760	685	960	1320	1760	2180	2530	2950	3280				
	3/4"			1080	1440			1080	1440	1780	2070	2410	2680				
	1"			300	300			798	1000	1310	1520	1760					
1 1/4"							588	792	1030	1190	1370						
1 1/2"							488	656	852	984	1100	1250					

NOTE: Working pressures based on room temperature (72°) service. For elevated temperature service, multiply these pressures by derating factors obtained from chart on page 13.



# Recommended Maximum Working Pressures

# HI-SEAL TUBE FITTINGS

**FITTING MATERIAL:** Stainless Steel, Type 316, with Armco 17-4 PH Sleeves

**TUBING MATERIAL:** 1/8 Hard Stainless Steel, Type 304

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALY AVAILABLE TUBING WALL THICKNESSES RECOMMENDED MAXIMUM WORKING PRESSURES—psi							
		.028	.035	.049	.065	.083	.095	.109	.120
<b>MINOR SURGES</b>  Safety Factor 4—1	1/8"	13400	16800						
	3/16"	9300	11200	15700					
	1/4"	7440	9500	13800					
	3/8"	4800	6110	8820	12000				
	1/2"	3520	4500	6450	8760	11500	13400	15600	
	5/8"	2820	3540	5160	6970	8960	10400	12100	13500
	3/4"	2310	2940	4170	5660	7350	8520	9930	11000
	1"	1740	2160	3090	4140	4500			
	1 1/4"		1740	2430	3270	4250			
1 1/2"		1440	2010	2700	3510				
<b>SURGES Up to 50%</b>  Safety Factor 6—1	1/8"	8940	11200						
	3/16"	6200	7460	10500					
	1/4"	4950	6330	9200					
	3/8"	3200	4070	5880	8000				
	1/2"	2340	3000	4300	5840	7660	8930	10400	
	5/8"	1880	2360	3440	4550	5970	6940	8060	9000
	3/4"	1540	1960	2780	3780	4900	5680	6610	7340
	1"	1160	1440	2060	2760	3000			
	1 1/4"		1160	1620	2180	2840			
1 1/2"		960	1340	1800	2340				
<b>SURGES of 50% to 100%</b>  Safety Factor 8—1	1/8"	6700	8400						
	3/16"	4650	5600	7850					
	1/4"	3720	4750	6900					
	3/8"	2400	3060	4410	6000				
	1/2"	1710	2750	3230	4380	5750	6700	7800	
	5/8"	1410	1770	2580	3990	4480	5200	6050	6750
	3/4"	1170	1470	2080	2840	3680	4260	4950	5500
	1"	870	1080	1550	2070	2250			
	1 1/4"		870	1220	1640	2120			
1 1/2"		720	1010	1350	1760				
<b>SURGES of 100% to 150%</b>  Safety Factor 10—1	1/8"	5360	6720						
	3/16"	3720	4480	6280					
	1/4"	3960	3800	5720					
	3/8"	1920	2440	3520	4800				
	1/2"	1410	1800	2680	3510	4600	5360	6240	
	5/8"	1130	1420	2060	2790	3590	4160	4840	5400
	3/4"	925	1180	1640	2270	2940	3410	3970	4400
	1"	696	864	1240	1660	1800			
	1 1/4"		696	972	1310	1700			
1 1/2"		576	805	1080	1410				

For working pressures in excess of those shown, use Braze-Seal Fitting.

NOTE: Working pressures based on room temperature (72°) service. For elevated temperature service, multiply these pressures by derating factors obtained from chart on page 13.

**FITTING MATERIAL:** Brass

**TUBING MATERIAL:** Copper, Dead Soft, Seamless

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALLY AVAILABLE TUBING WALL THICKNESSES RECOMMENDED MAXIMUM WORKING PRESSURES—psi						
		.028	.032	.035	.042	.049	.065	.083
<b>MINOR SURGES</b>  Safety Factor 4—1	1/8"	3710	4480	5000				
	3/16"	2710	2990	3300	3920	4580		
	1/4"	2170	2250	2500	3400	4030		
	5/16"	1710	1800	2000	2640	3120		
	3/8"	1400	1500	1650	2170	2580	3520	
	1/2"	1030	1150	1250	1590	1890	2560	3360
	5/8"		936	1000	1250	1400	1800	2520
	3/4"			850	1030	1150	1500	2140
	7/8"				884	1030	1390	1810
	1"					902	1210	1580
<b>SURGES Up to 50%</b>  Safety Factor 6—1	1/8"	2470	2980	3330				
	3/16"	1810	1990	2200	2620	3060		
	1/4"	1450	1500	1670	2260	2680		
	5/16"	1140	1200	1330	1630	2080		
	3/8"	933	1000	1100	1450	1720	2340	
	1/2"	686	766	833	1060	1260	1710	2240
	5/8"		624	667	833	932	1200	1680
	3/4"			566	685	766	1000	1430
	7/8"				589	685	926	1210
	1"					600	805	1050

**FITTING MATERIAL:** Brass

**TUBING MATERIAL:** Copper, Half Hard, Seamless

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALLY AVAILABLE TUBING WALL THICKNESSES RECOMMENDED MAXIMUM WORKING PRESSURES—psi						
		.028	.032	.035	.042	.049	.065	.083
<b>MINOR SURGES</b>  Safety Factor 4—1	1/8"	4210	5100	5700				
	3/16"	3080	3400	3750	4450	5200		
	1/4"	2470	2560	2840	3860	4580		
	5/16"	1940	2040	2280	3000	3570		
	3/8"	1170	1710	1880	2470	2940	4000	
	1/2"		1310	1420	1810	2150	2910	3820
	5/8"		1070	1140	1420	1590	2050	2860
	3/4"			966	1170	1310	1710	2440
	7/8"				1000	1170	1580	2060
	1"					1030	1380	1800
<b>SURGES Up to 50%</b>  Safety Factor 6—1	1/8"	2800	3390	3780				
	3/16"	2060	2260	2500	2980	3480		
	1/4"	1650	1710	1900	2570	3270		
	5/16"	1300	1370	1510	1850	2360		
	3/8"	1110	1140	1250	1650	1960	2660	
	1/2"	820	915	994	1210	1430	1940	2550
	5/8"		745	796	994	1110	1360	1910
	3/4"			676	817	915	1140	1630
	7/8"				702	817	1110	1380
	1"					716	967	1190

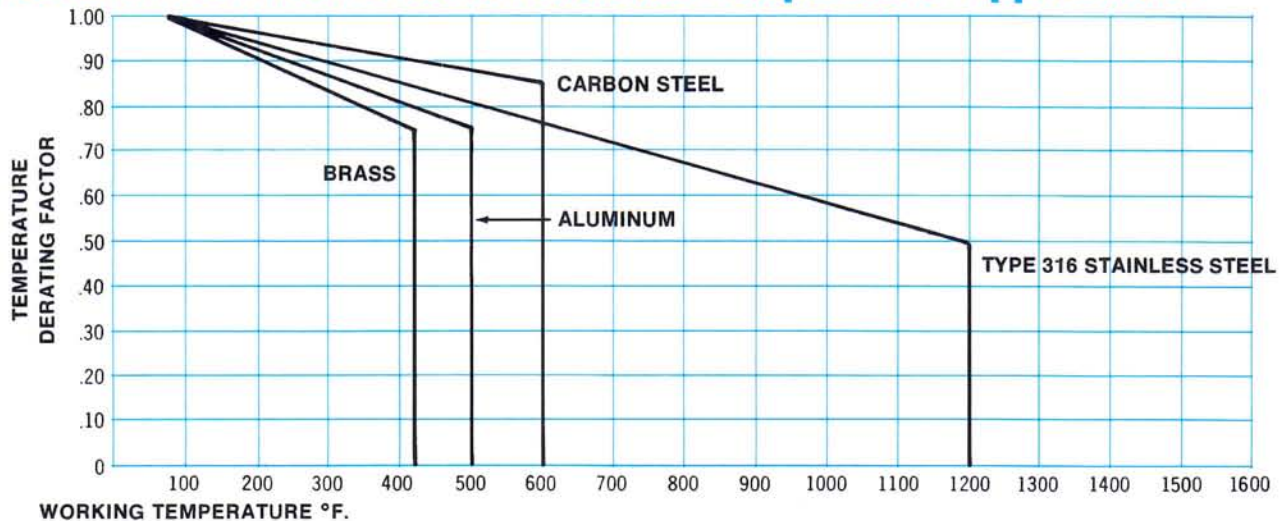
NOTE: Working pressures based on room temperature (72°) service. For elevated temperature service, multiply these pressures by derating factors obtained from chart on page 13.

**FITTING MATERIAL:** Aluminum

**TUBING MATERIAL:** Aluminum, 6061-T6

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALLY AVAILABLE TUBING WALL THICKNESSES RECOMMENDED MAXIMUM WORKING PRESSURES—psi			
		.035	.049	.065	.083
<b>MINOR SURGES</b> Safety Factor 4-1	3/16"	4900			
	1/4"	3850			
	5/16"	2950	4260		
	3/8"	2425	3750		
	1/2"	1800	2625	3650	
<b>SURGES Up to 50%</b> Safety Factor 6-1	3/16"	3270			
	1/4"	2575			
	5/16"	1965	2840		
	3/8"	1620	2500		
	1/2"	1200	1750	2450	
<b>SURGES of 50% to 100%</b> Safety Factor 8-1	3/16"	2450			
	1/4"	1925			
	5/16"	1470	2130		
	3/8"	1225	1875		
	1/2"	900	1325	1825	
<b>SURGES of 100% to 150%</b> Safety Factor 10-1	3/16"	1960			
	1/4"	1550			
	5/16"	1180	1705		
	3/8"	975	1550		
	1/2"	725	1050	1460	

## DERATING FACTORS for Elevated Temperature Applications



### LEGEND

- A — Excellent
- B — Good
- C — Fair
- D — Not Suitable
- E — Explosive
- I — Ignites
- — Information not available

	Concentration, %	Temperature, F	Carbon Steel	Copper	Brass	Muntz	Admiralty	Copper Silicon	90-10 Cupro-Nickel	70-30 Cupro-Nickel	Aluminum	17-4 PH Stainless Steel	304 Stainless Steel	316 Stainless Steel	Nickel	Monel	Inconel	Hastelloy	Titanium	Zirconium	Tantalum
Acetaldehyde	100	70	A	E	E	E	E	E	E	A	A	A	A	A	A	A	A	B	•	A	
Acetic Acid (Aerated)	100	70	D	D	D	D	D	C	C	B	A	A	D	A	B	A	A	A	A	A	A
Acetic Anhydride	100	70	D	B	C	D	C	B	B	B	A	B	B	B	B	B	A	A	A	A	B
Acetone	100	70	A	A	A	A	A	A	A	A	A	A	B	A	A	B	A	A	•	A	
Aluminum Hydroxide	10	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	•	•	B	
Ammonia (Anhydrous)	100	70	A	A	A	A	A	A	A	A	A	A	B	A	B	B	A	•	A		
Ammonium Chloride	10	70	D	D	D	D	D	D	D	C	B	B	B	B	B	B	A	A	A	A	
Ammonium Sulfate	10	70	C	C	C	C	C	C	C	D	C	C	B	A	B	B	A	A	A	A	
Aniline	100	70	A	D	D	D	D	D	D	D	A	A	B	B	B	B	A	•	A		
Aroclor	100	70	B	A	A	A	A	A	A	A	B	B	A	A	A	A	A	•	A		
Barium Chloride	30	70	B	B	B	D	C	B	B	B	B	B	B	B	B	B	A	A	A	A	
Benzaldehyde	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	•	A	
Benzene	100	70	A	A	A	A	A	A	A	B	B	B	B	B	B	B	A	•	A		
Benzoic Acid	10	70	D	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Boric Acid	10	70	D	B	B	B	B	B	B	C	A	A	B	B	B	A	A	•	A		
Butane	100	70	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	•	A		
Butanol	100	70	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	•	A		
Butyl Acetate	100	70	A	B	B	B	B	B	B	A	B	B	A	B	A	B	A	•	A		
Butyl Chloride	100	70	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	•	A		
Calcium Chloride	20	70	B	B	B	D	C	B	B	B	C	B	A	A	A	B	A	A	A	A	
Calcium Hydroxide	10	70	B	B	B	B	B	B	B	D	B	B	B	B	B	B	A	•	A		
Carbon Dioxide (Wet)	100	70	C	C	C	C	C	C	C	B	A	A	A	A	A	A	A	•	A		
Carbon Tetrachloride (Dry)	100	70	B	B	B	B	B	B	B	B	B	B	A	A	A	B	A	A	A	A	
Chlorine Gas (Dry)	100	70	B	B	B	B	B	B	B	C	B	B	B	B	A	B	I	A	A	A	
Chloroform (Dry)	100	70	B	B	B	B	B	B	B	B	B	B	A	A	B	B	A	A	A	A	
Citric Acid	20	70	D	C	C	D	C	C	C	A	C	B	B	B	A	C	A	A	A	A	
Creosote	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Dibutylphthalate	100	70	A	A	A	A	A	A	A	B	B	B	B	B	B	B	A	•	A		
Dichlorodifluoromethane (F-12)	100	70	A	A	A	A	A	A	A	A	A	B	B	B	B	A	A	•	A		
Diethanolamine	100	85	A	B	B	B	B	B	B	A	A	A	A	A	A	A	A	•	A		
Diethyl Ether	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Diethylene Glycol	100	70	A	B	B	B	B	B	B	B	A	A	B	B	B	B	A	•	A		
Diphenyl	100	160	B	B	B	B	B	B	B	A	B	B	B	B	B	B	A	•	A		
Diphenyl Oxide	100	85	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Ethanolamine	100	70	B	B	B	B	B	B	B	B	A	B	B	B	B	B	B	•	A		
Ether	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Ethyl Acetate (Dry)	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Ethyl Alcohol	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	
Ethyl Ether	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Ethylene Glycol	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A		
Fatty Acids	100	400	D	D	D	D	D	D	D	A	D	A	B	C	B	A	B	•	A		
Ferric Sulfate	10	70	D	D	D	D	D	D	D	D	B	B	D	D	D	A	A	•	A		
Formaldehyde	50	200	D	B	B	D	B	B	B	C	B	B	B	B	B	B	B	•	A		
Furfural	100	70	B	B	B	D	B	B	B	B	B	B	B	B	B	B	A	•	A		
Glycerine	100	70	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	•	A		

### LEGEND

- A — Excellent
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- D — Not Suitable
- E — Explosive
- I — Ignites
- — Information not available

	Concentration, %	Temperature, F	Carbon Steel	Copper	Brass	Muntz	Admiralty	Copper Silicon	90-10 Cupro-Nickel	70-30 Cupro-Nickel	Aluminum	17-4 PH Stainless Steel	304 Stainless Steel	316 Stainless Steel	Nickel	Monel	Inconel	Hastelloy	Titanium	Zirconium	Tantalum
Hydrochloric Acid (Aerated)	38	70	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B	D	D	A	
Hydrofluoric Acid (Aerated)	40	70	D	C	D	D	D	D	C	D	D	D	D	C	D	A	D	D	D	D	
Iodine	20	70	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B	D	•	A	
Isopropanol	100	70	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A	
Lactic Acid	50	70	D	B	B	D	C	B	B	B	D	B	A	B	C	A	A	A	A	A	
Lithium Chloride	30	200	B	B	B	D	B	B	B	B	D	B	A	A	A	A	A	•	•	A	
Lithium Hydroxide	10	200	B	B	B	D	B	B	B	B	D	B	B	B	B	B	B	•	•	A	
Magnesium Chloride	30	70	B	B	B	D	C	B	B	B	C	B	B	A	B	A	A	A	A	A	
Magnesium Hydroxide	10	70	B	B	B	B	B	B	B	B	D	B	B	B	B	B	B	A	•	B	
Magnesium Sulfate	30	200	B	B	B	B	B	B	B	B	C	A	A	B	B	B	A	A	A	A	
Methallyamine	100	70	C	B	B	B	B	B	B	B	B	B	B	B	C	B	B	B	•	A	
Methyl Alcohol	100	70	B	B	B	B	B	B	B	B	B	B	B	B	A	B	A	A	A	A	
Methylene Chloride (Dry)	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	•	A	
Monochlorobenzene (Dry)	100	70	B	B	B	B	B	B	B	B	A	B	B	A	A	A	B	B	•	A	
Monochlorodifluoro Methane (F-22)	100	70	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	•	A	
Monoethanolamine	100	200	B	B	B	B	B	B	B	B	B	B	B	B	B	B	•	•	•	A	
Naphthalene	100	70	A	B	B	B	B	B	B	B	A	A	A	A	A	A	B	B	•	A	
Nickel Sulfate	10	200	D	B	B	D	B	B	B	B	D	B	B	B	B	B	B	B	A	A	
Nitric Acid	50	200	D	D	D	D	D	D	D	D	D	B	B	D	D	D	D	A	B	A	
Nitrous Acid	10	70	D	D	D	D	D	D	D	D	D	B	B	D	D	D	•	•	•	A	
Oleic Acid	100	70	B	B	B	C	B	B	B	B	B	B	A	A	A	A	B	B	B	B	
Oxalic Acid	10	70	D	B	B	C	B	B	B	B	C	B	B	C	B	B	B	D	B	A	
Perchloroethylene	100	70	A	B	B	C	B	B	B	B	B	B	A	A	A	•	A	•	A		
Phenol	10	120	B	B	B	B	B	B	B	B	A	B	B	B	A	B	A	A	•	A	
Phosphoric Acid (Aerated)	50	200	D	D	D	D	D	D	D	D	D	B	B	D	D	B	A	C	D	B	
Potassium Carbonate	40	200	B	B	B	B	B	B	B	B	D	B	B	B	B	B	B	A	•	A	
Propylene Glycol	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	•	A	
Pyridine	100	70	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	•	A	
Sodium Acetate	10	70	D	B	B	B	B	B	B	B	C	B	B	B	B	B	B	B	•	A	
Sodium Hydroxide	50	300	D	D	D	D	D	D	D	D	D	D	D	A	B	B	B	B	B	D	
Sodium Sulfate	10	200	B	B	B	B	B	B	B	A	B	A	B	B	B	B	B	A	•	A	
Sulfur Dioxide (Dry)	100	300	B	B	B	C	B	B	B	B	B	B	B	B	B	B	B	A	•	A	
Sulfuric Acid (Aerated)	60	200	D	D	D	D	D	D	D	D	D	D	D	D	D	D	B	D	A	A	
Trichloroethylene (Dry)	100	150	B	B	B	C	B	B	B	B	B	B	A	A	B	A	A	A	A	A	
Turpentine	100	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	•	A	
Vinyl Chloride (Dry)	100	70	A	B	B	D	C	B	B	B	A	B	A	A	A	A	A	A	•	A	
Water (Fresh)	100	70	C	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	
Water (Sea)	100	70	C	B	B	C	A	B	A	A	B	A	A	B	A	B	B	A	A	A	
Xylene	100	200	B	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	
Zinc Chloride	10	70	D	D	D	D	D	D	D	C	B	B	B	A	D	B	A	A	A	A	
Zinc Sulfate	20	70	D	B	B	D	B	B	B	D	B	A	B	B	A	B	A	•	A		

# HOW TO SPECIFY AND ORDER HI-SEAL FITTINGS

The catalog number shown with each fitting listing designates the type of fitting as indicated by the illustration and listing.

Hi-Seal Fittings are available as standard in steel, stainless steel, brass, aluminum and Monel. See price sheet for stock items.

All design and dimensional data shown in this catalog are subject to change without notice. Technical information has been prepared from actual test results and other available data considered to be reliable, but no responsibility can be assumed for its accuracy under varied field conditions.

One of the following suffix letters must be added to the catalog number to indicate the metal desired:

**S** —Steel. (Low Carbon) Elbows and tees are close grain forgings.

**SS** —Stainless Steel (316)

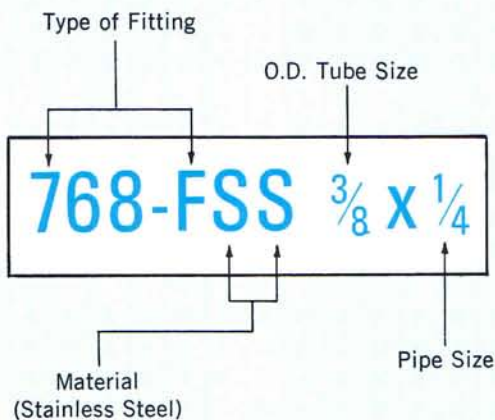
**PH** —Stainless Steel, Armco 17-4 PH. (Sleeves only are furnished in this material. Designation also used for assemblies with 316 Bodies and Nuts with 17-4 PH Sleeves.)

**B** —Brass

**A** —Aluminum

**M** —Monel

### EXAMPLE



The size designation must also be included with the catalog number.

#### Example:

When specifying No. 768-F Connector in Stainless steel, with  $\frac{3}{8}$ " O.D. tube connection and  $\frac{1}{4}$ " male pipe thread, this should be written: No. 768-FSS  $\frac{3}{8}$  x  $\frac{1}{4}$ .

When fittings with O-Ring Port Seal are desired, this specification must also be included in the catalog number. The letter "O" following the number indicates O-Ring.

#### Example:

"No. 768-FSO  $\frac{3}{8}$ " would specify a steel connector for  $\frac{3}{8}$ " O.D. tube with straight thread O-Ring Port Seal on other end.

To order Hi-Seal Fitting bodies only, add suffix "BO" to catalog number. Example: No. 768-FS-BO  $\frac{3}{8}$  x  $\frac{1}{4}$ .

## STEEL FITTINGS

**Elbows and Tees:** Close grained steel forgings—Low Carbon Steel.

**Connectors, Unions and Nuts:** Steel bar stock—Low Carbon Steel.

**Sleeves:** Steel bar stock—S.A.E. C-1144, stress relieved, black phosphate finish.

**Bodies and Nuts** are furnished with zinc plate finish as standard. (Cadmium plate finish standard on 3/8" nuts and larger.) Black phosphate finish can be obtained on special order.

## STAINLESS STEEL FITTINGS

**Elbows and Tees:** Stainless steel forgings—Type 316.

**Connectors and Unions:** Stainless Steel bar stock—Type 316.

**Nuts:** Stainless steel bar stock—Type 316. Zinc plated to provide lubricant for facilitating assembly. (Cadmium plate finish standard on 5/8" size and larger.)

**Sleeves:** Stainless steel bar stock—Type 316 or Armco 17-4 PH.

## BRASS FITTINGS

**Elbows and Tees:** Brass forgings—S.A.E. CA377.

**Connectors, Unions, Sleeves and Nuts:** Stress relieved brass bar stock—S.A.E. CA360.

## ALUMINUM FITTINGS

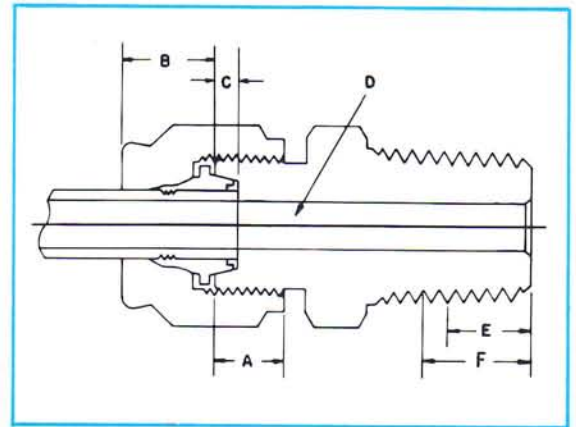
**Elbows and Tees:** Aluminum forgings—6262F Extruded.

**Connectors, Unions, Nuts and Sleeves—**Aluminum bar stock—6262-T9.

## MONEL FITTINGS

**Elbows and Tees:** Forgings—Monel Alloy 400.

**Connectors, Unions, Nuts and Sleeves:** Bar Stock—Monel Alloy R-405.



### TUBE END

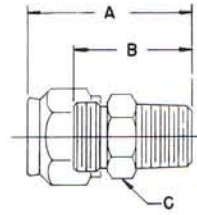
Tube O.D.	Straight Thread	Length of Thread				Min. Bore
		A	B	C	D	
1/16	1/4-28	11/64	7/32	1/16	.055	
1/8	3/8-24	7/32	19/64	5/64	7/64	
3/16	7/16-20	13/64	21/64	3/64	11/64	
1/4	1/2-20	17/64	21/64	7/64	13/64	
5/16	9/16-18	17/64	13/32	7/64	13/64	
3/8	5/8-18	5/16	7/16	7/64	9/32	
1/2	3/4-16	11/32	35/64	1/8	27/64	
5/8	15/16-16	3/8	5/8	9/64	1/2	
3/4	11/16-16	3/8	5/8	9/64	21/32	
7/8	13/16-16	3/8	5/8	5/32	23/32	
1	15/16-16	3/8	5/8	5/32	7/8	
1 1/4	1 3/8-16	13/32	13/16	11/64	13/32	
1 1/2	1 7/8-16	7/16	13/16	3/16	1 11/32	
2	2 1/2-12	17/32	55/64	3/16	1 13/16	

### PIPE THREAD END

Pipe Thread	Hand Engagement	
	E	F
1/16	5/32	1/4
1/8	11/64	1/4
1/4	15/64	3/8
3/8	15/64	3/8
1/2	21/64	1/2
3/4	11/32	33/64
1	13/32	5/8
1 1/4	27/64	41/64
1 1/2	27/64	41/64
2	7/16	21/32

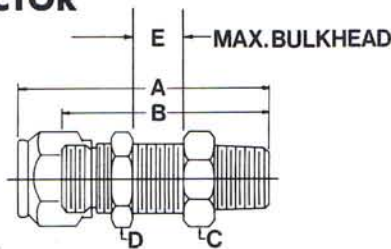


## 768-F MALE CONNECTOR Tube to Male P.T.



Tube O.D.	Pipe Thread	A	B	C Hex.
1/16	1/16	1	25/32	5/16
1/16	1/8	1	25/32	7/16
1/8	1/16	1 9/64	27/32	7/16
1/8	1/8	1 9/64	27/32	7/16
1/8	1/4	1 25/64	1 3/32	9/16
3/16	1/16	1 11/64	27/32	7/16
3/16	1/8	1 11/64	27/32	7/16
3/16	1/4	1 27/64	1 3/32	9/16
1/4	1/8	1 19/32	61/64	1 1/2
1/4	1/4	1 31/64	1 5/32	5/8
1/4	3/8	1 29/64	1 1/8	3/4
1/4	1/2	1 53/64	1 1/2	7/8
5/16	1/8	1 23/64	61/64	9/16
5/16	1/4	1 9/16	1 5/32	5/8
5/16	3/8	1 9/16	1 5/32	3/4
3/8	1/8	1 7/16	1	5/8
3/8	1/4	1 41/64	1 13/64	5/8
3/8	3/8	1 41/64	1 13/64	3/4
3/8	1/2	1 31/32	1 17/32	7/8
3/8	3/4	1 63/64	1 35/64	1 1/8
1/2	1/4	1 51/64	1 1/4	3/4
1/2	3/8	1 51/64	1 1/4	3/4
1/2	1/2	1 29/64	1 19/32	7/8
1/2	3/4	1 27/64	1 9/16	1 1/8
5/8	3/8	1 31/32	1 11/32	1 5/16
5/8	1/2	1 21/4	1 5/8	1 5/16
5/8	3/4	1 27/32	1 19/32	1 1/8
3/4	3/8	1 21/32	1 13/32	1 1/16
3/4	1/2	1 21/4	1 5/8	1 1/8
3/4	3/4	1 21/4	1 5/8	1 1/8
7/8	3/4	1 21/4	1 5/8	1 1/4
1	3/4	1 21/4	1 5/8	1 3/8
1	1	1 27/16	1 13/16	1 3/8
1 1/4	1 1/4	2 3/4	1 15/16	1 3/4
1 1/2	1 1/2	2 13/16	2	2
2	2	3 31/64	2 5/8	2 1/2

## 788-F BULKHEAD MALE CONNECTOR Tube to Male P.T.

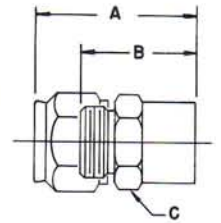


Tube O.D.	Pipe Thread	A	B	C	D	E
1/8	1/8	1 47/64	1 7/16	9/16	9/16	3/8
1/8	1/4	1 63/64	1 11/16	9/16	9/16	3/8
3/16	1/8	1 63/64	1 21/32	5/8	5/8	3/8
1/4	1/8	1 59/64	1 19/32	11/16	11/16	3/8
1/4	1/4	1 27/64	1 25/32	11/16	11/16	3/8
3/8	1/4	1 21/64	1 53/64	13/16	13/16	3/8
1/2	3/8	1 241/64	1 23/32	1 5/16	1 5/16	3/8
1/2	1/2	1 239/64	1 21/16	1 5/16	1 5/16	3/8



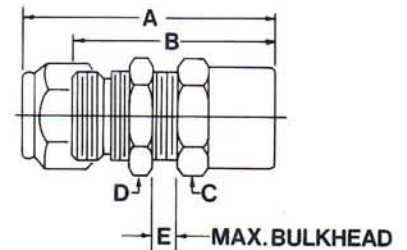


## 766-F FEMALE CONNECTOR Tube to Female P.T.



Tube O.D.	Pipe Thread	A	B	C Hex.
1/16	1/16	29/32	11/16	7/16
1/16	1/8	1	23/32	9/16
1/8	1/8	1 9/64	27/32	9/16
1/8	1/4	1 23/64	11/16	3/4
3/16	1/8	1 11/64	27/32	9/16
3/16	1/4	1 25/64	11/16	3/4
1/4	1/8	1 9/32	61/64	9/16
1/4	1/4	1 25/64	11/16	3/4
1/4	1/2	1 43/64	1 1/2	1 1/16
5/16	1/8	1 23/64	61/64	9/16
5/16	1/4	1 15/32	11/16	3/4
3/8	1/8	1 7/16	1	5/8
3/8	1/4	1 39/64	1 11/64	3/4
3/8	3/8	1 43/64	1 15/64	7/8
3/8	1/2	1 15/16	1 1/2	1 1/16
1/2	1/4	1 49/64	1 7/32	3/4
1/2	3/8	1 53/64	1 9/32	7/8
1/2	1/2	2 7/64	1 9/16	1 1/16
1/2	3/4	2 13/64	1 21/32	1 1/4
5/8	3/8	1 15/16	1 5/16	1 5/16
5/8	1/2	2 3/16	1 9/16	1 1/16
3/4	1/2	2 3/16	1 9/16	1 1/16
3/4	3/4	2 9/32	1 21/32	1 3/4
3/4	3/4	2 9/32	1 21/32	1 3/4
1	3/4	2 9/32	1 21/32	1 5/16
1	1	2 1/2	1 7/8	1 5/8
1 1/4	1 1/4	2 3/4	1 15/16	2
1 1/2	1 1/2	2 27/32	2 1/32	2 3/8

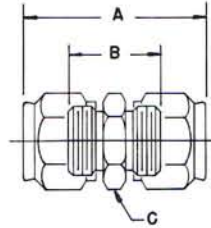
## 786-F BULKHEAD FEMALE CONNECTOR Tube to Female P.T.



Tube O.D.	Pipe Thread	A	B	C	D	E
1/8	1/8	1 53/64	1 17/32	9/16	9/16	3/8
1/4	1/8	1 57/64	1 9/16	1 1/16	1 1/16	3/8
1/4	1/4	1 65/64	1 11/16	3/4	1 1/16	3/8
3/8	1/4	2 11/64	1 47/64	3/4	1 3/16	3/8
1/2	3/8	2 29/64	1 29/32	15/16	1 5/16	3/8
1/2	1/2	2 57/64	2 11/32	1 1/16	1 5/16	3/8

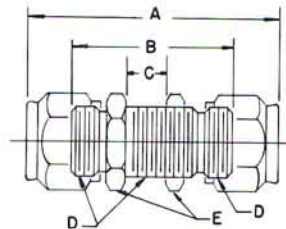


## 762-F UNION Tube to Tube



Tube O.D.	A	B	C Hex.
1/16	1 5/32	5/8	1/4
1/8	1 11/32	3/4	3/8
3/16	1 13/32	3/4	7/16
1/4	1 9/16	29/32	1/2
5/16	1 25/32	29/32	9/16
3/8	1 7/8	1	5/8
1/2	2 3/16	1 3/32	3/4
5/8	2 1/2	1 1/4	15/16
3/4	2 1/2	1 1/4	1 1/16
7/8	2 9/16	1 5/16	1 3/16
1	2 9/16	1 5/16	1 5/16
1 1/4	3 1/16	1 7/16	1 5/8
1 1/2	3 1/8	1 1/2	1 7/8
2	3 19/32	1 7/8	2 1/2

## 782-F BULKHEAD UNION Tube to Tube



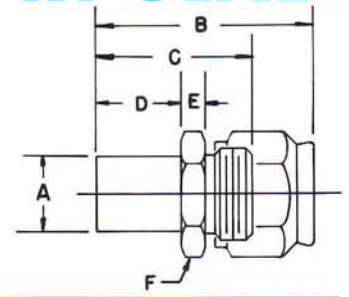
Tube O.D.	A	B	C Max. Bulkhead	D Thread	E Hex
1/16	1 21/32	1 7/32	3/8	1/4-24	7/16
1/8	1 15/16	1 11/32	3/8	3/8-24	9/16
3/16	2 3/32	1 7/16	3/8	7/16-20	5/8
1/4	2 7/32	1 9/16	3/8	1/2-20	1 1/16
5/16	2 13/32	1 19/32	3/8	9/16-18	3/4
3/8	2 17/32	1 21/32	3/8	5/8-18	13/16
1/2	2 27/32	1 3/4	3/8	3/4-16	1 5/16
5/8	3 5/16	2 1/16	5/8	15/16-16	1 1/8
3/4	3 7/16	2 3/16	5/8	1 1/16-16	1 1/4
7/8	3 7/16	2 3/16	5/8	1 3/16-16	1 3/8
1	3 7/16	2 3/16	5/8	1 5/16-16	1 1/2
1 1/4	4 1/16	2 7/16	5/8	1 5/8-16	2
1 1/2	4 1/8	2 1/2	5/8	1 7/8-16	2 1/4

# DIMENSIONAL DATA

# HI-SEAL



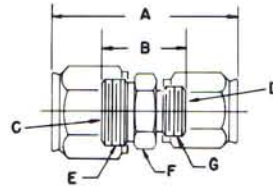
**783-F REDUCER**



A Body Size	Tube O.D.	B	C	D	E	F
1/8	1/16	1 1/8	29/32	1/2	3/16	1/4
3/16	1/8	1 23/64	1 1/16	5/8	3/16	3/8
1/4	1/8	1 25/64	1 3/32	5/8	3/16	3/8
1/4	3/16	1 27/64	1 3/32	5/8	3/16	7/16
5/16	1/8	1 29/64	1 5/32	11/16	3/16	3/8
5/16	3/16	1 37/64	1 1/4	11/16	1/4	1/2
5/16	1/4	1 37/64	1 1/4	11/16	7/32	1/2
3/8	1/8	1 39/64	1 5/16	3/4	1/4	7/16
3/8	3/16	1 39/64	1 9/32	3/4	1/4	7/16
3/8	1/4	1 43/64	1 11/32	3/4	1/4	1/2
3/8	5/16	1 23/32	1 5/16	3/4	7/16	9/16
1/2	3/16	1 43/64	1 11/32	13/16	1/4	9/16
1/2	1/4	1 47/64	1 13/32	13/16	1/4	9/16
1/2	5/16	1 27/32	1 7/16	13/16	9/32	11/16
1/2	3/8	1 57/64	1 29/64	13/16	1/4	5/8
5/8	1/4	1 57/64	1 9/16	31/32	1/4	11/16
5/8	5/16	2	1 19/32	31/32	9/32	11/16
5/8	3/8	2 3/64	1 39/64	31/32	1/4	11/16
5/8	1/2	2 13/64	1 21/32	31/32	1/4	3/4
3/4	1/4	1 59/64	1 19/32	1	1/4	13/16
3/4	5/16	2 1/32	1 5/8	1	9/32	7/8
3/4	3/8	2 3/64	1 41/64	1	1/4	13/16
3/4	1/2	2 15/64	1 11/16	1	1/4	13/16
3/4	5/8	2 11/32	1 23/32	1	1/4	15/16
7/8	3/8	2 5/64	1 41/64	1	1/4	15/16
7/8	1/2	2 15/64	1 11/16	1	1/4	15/16
7/8	5/8	2 11/32	1 23/32	1	1/4	15/16
7/8	3/4	2 11/32	1 23/32	1	1/4	1 1/16
1	3/8	2 9/64	1 45/64	1 1/16	1/4	1 1/16
1	1/2	2 19/64	1 3/4	1 1/16	1/4	1 1/16
1	5/8	2 13/32	1 25/32	1 1/16	1/4	1 1/16
1	3/4	2 13/32	1 25/32	1 1/16	1/4	1 1/16
1	7/8	2 13/32	1 25/32	1 1/16	1/4	1 3/16
1 1/4	5/8	2 19/32	1 31/32	1 1/4	1/4	1 5/16
1 1/4	3/4	2 19/32	1 31/32	1 1/4	1/4	1 5/16
1 1/4	7/8	2 19/32	1 31/32	1 1/4	1/4	1 5/16
1 1/4	1	2 19/32	1 31/32	1 1/4	1/4	1 5/16
1 1/2	3/4	2 11/16	2 1/16	1 5/16	9/32	1 9/16
1 1/2	7/8	2 11/16	2 1/16	1 5/16	9/32	1 9/16
1 1/2	1	2 11/16	2 1/16	1 5/16	9/32	1 9/16
1 1/2	1 1/4	2 15/16	2 1/8	1 5/16	9/32	1 5/8



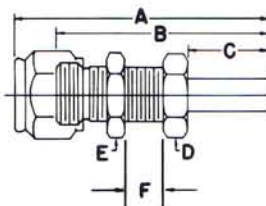
**756-F REDUCING UNION**  
Tube to Tube



Tube O.D.	A	B	C Drill	D Drill	E Thread	F Hex.	G Thread
1/8 x 1/16	1 5/32	1 1/16	7/64	.055	3/8-24	1/2	1/4-28
3/16 x 1/8	1 3/8	3/4	11/64	7/64	7/16-20	9/16	3/8-24
1/4 x 1/16	1 21/64	25/32	13/64	.055	1/2-20	5/8	1/4-28
1/4 x 3/8	1 15/32	27/32	13/64	5/32	1/2-20	5/8	3/8-24
1/4 x 3/16	1 1/2	27/32	13/64	3/16	1/2-20	5/8	7/16-20
5/16 x 1/4	1 41/64	29/32	13/64	13/64	9/16-18	11/16	1/2-20
3/8 x 1/4	1 11/16	59/64	9/32	13/64	5/8-18	3/4	1/2-20
3/8 x 3/16	1 25/32	61/64	9/32	13/64	5/8-18	3/4	9/16-18
1/2 x 1/4	1 7/8	1	27/64	13/64	3/4-16	7/8	1/2-20
1/2 x 3/8	2	1 1/64	27/64	9/32	3/4-16	7/8	5/8-18
5/8 x 1/2	2 25/64	1 7/32	1/2	27/64	15/16-16	1 1/8	3/4-16
3/4 x 1/2	2 25/64	1 7/32	21/32	27/64	1 1/16-16	1 1/4	3/4-16
3/4 x 5/8	2 1/2	1 1/4	21/32	1/2	1 1/16-16	1 1/4	13/16-16
7/8 x 3/4	2 9/16	1 5/16	23/32	21/32	1 3/16-16	1 3/8	1 1/16-16
1 x 3/4	2 9/16	1 5/16	7/8	21/32	1 5/16-16	1 1/2	1 1/16-16
1 x 7/8	2 9/16	1 5/16	7/8	23/32	1 5/16-16	1 1/2	1 3/16-16



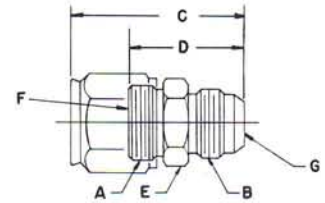
**785-F BULKHEAD ADAPTER**  
Hi-Seal to Straight Tube



Tube O.D.	A	B	C	D	E	F Max.
1/8	1 55/64	1 9/16	1/2	9/16	9/16	3/8
3/16	2 15/64	1 29/32	35/64	5/8	5/8	3/8
1/4	2 11/64	1 27/32	5/8	11/16	11/16	3/8
5/16	2 21/64	1 59/64	11/16	3/4	3/4	3/8
3/8	2 29/64	2 1/64	3/4	13/16	13/16	3/8
1/2	2 43/64	2 1/8	13/16	15/16	15/16	3/8
5/8	3 5/32	2 17/32	31/32	1 1/8	1 1/8	5/8
3/4	3 1/2	2 7/8	1	1 1/4	1 1/4	5/8
7/8	3 21/32	3 1/32	1	1 3/8	1 3/8	5/8
1	3 23/32	3 3/32	1 1/16	1 1/2	1 1/2	5/8



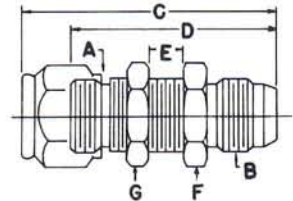
**792-F ADAPTER**  
Hi-Seal to AN Thread



Hi-Seal Tube O.D.	AN Tube O.D.	A Thread	B Thread	C	D	E Hex.	F. Drill	G Drill
1/16	1/4	1/4-28	7/16-20	1 11/64	61/64	1 1/16	.055	1 1/64
1/8	1/8	3/8-24	5/16-24	1 7/32	59/64	9/16	7/64	1/16
1/8	1/4	3/8-24	7/16-20	1 5/16	1 1/64	1 1/16	7/64	1 1/64
3/16	3/16	7/16-20	3/8-24	1 11/32	61/64	5/8	3/16	1/8
1/4	1/4	1/2-20	7/16-20	1 13/32	1 5/64	1 1/16	13/64	1 1/64
5/16	5/16	9/16-18	1/2-20	1 31/64	1 5/64	3/4	13/64	1 5/64
3/8	1/4	5/8-18	7/16-20	2 11/64	1 47/64	3/4	9/32	1 1/64
3/8	3/8	5/8-18	9/16-18	1 41/64	1 13/64	1 1/16	9/32	1 9/64
1/2	1/2	3/4-16	3/4-16	1 57/64	1 11/32	1	27/64	2 5/64
5/8	5/8	1 5/16-16	7/8-14	2 5/32	1 17/32	1 1/8	1/2	3 1/64
3/4	3/4	1 1/16-16	1 1/16-12	2 11/32	1 23/32	1 3/8	2 1/32	3 3/64
1	1	1 5/16-16	1 5/16-12	2 25/64	1 49/64	1 5/8	7/8	2 7/32



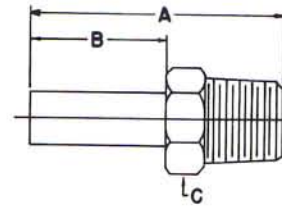
**733-F BULKHEAD ADAPTER**  
Hi-Seal to AN Thread



Hi-Seal Tube O.D.	AN Tube O.D.	A Thread	B Thread	C	D	E Max. Bulkhead	F	G
1/8	1/8	3/8-24	5/16-24	1 13/16	1 33/64	3/8	9/16	9/16
1/8	1/4	3/8-24	7/16-20	1 63/64	1 11/16	3/8	1 1/16	9/16
3/16	3/16	7/16-20	3/8-24	2 3/32	1 49/64	3/8	5/8	5/8
1/4	1/4	1/2-20	7/16-20	2 3/32	1 49/64	3/8	1 1/16	1 1/16
5/16	5/16	9/16-18	1/2-20	2 19/64	1 57/64	3/8	3/4	3/4
3/8	1/4	5/8-18	7/16-20	2 7/16	2	3/8	1 1/16	1 3/16
3/8	3/8	5/8-18	9/16-18	2 17/64	1 53/64	3/8	1 3/16	1 3/16
1/2	1/2	3/4-16	3/4-16	2 35/64	2	3/8	1	1 5/16
5/8	5/8	1 5/16-16	7/8-14	2 61/64	2 21/64	5/8	1 1/8	1 1/8
3/4	3/4	1 1/16-16	1 1/16-12	3 23/64	2 47/64	5/8	1 3/8	1 1/4
1	1	1 5/16-16	1 5/16-12	3 37/64	2 61/64	5/8	1 5/8	1 1/2



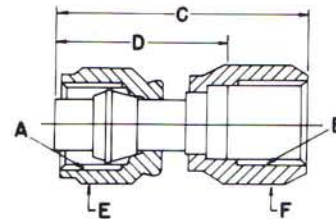
**722-F ADAPTER**  
Straight Tube to Male P.T.



Tube O.D.	Pipe Thread	A	B	C
1/16	1/16	15/16	3/8	5/16
1/16	1/8	15/16	3/8	7/16
1/8	1/8	1 1/16	1/2	7/16
1/8	1/4	15/16	1/2	9/16
9/16	1/8	1 1/8	35/64	7/16
3/16	1/4	1 23/64	35/64	9/16
1/4	1/8	13/16	5/8	7/16
1/4	1/4	17/16	5/8	9/16
1/4	3/8	17/16	5/8	11/16
1/4	1/2	1 5/8	5/8	7/8
5/16	1/8	1 1/4	11/16	7/16
5/16	1/4	1 1/2	11/16	9/16
5/16	3/8	1 15/32	11/16	11/16
5/16	1/2	1 11/16	11/16	7/8
3/8	1/8	1 5/16	3/4	7/16
3/8	1/4	1 9/16	3/4	9/16
3/8	3/8	1 9/16	3/4	11/16
3/8	1/2	1 3/4	3/4	7/8
1/2	1/4	1 5/8	13/16	9/16
1/2	3/8	1 5/8	13/16	11/16
1/2	1/2	1 13/16	13/16	7/8
5/8	3/8	1 13/16	31/32	7/8
5/8	1/2	1 31/32	31/32	7/8
5/8	3/4	2 1/16	31/32	1 1/8
3/4	1/2	2	1	7/8
3/4	3/4	2 3/32	1	1 1/8
3/4	1	2 29/32	1	1 3/8
7/8	3/4	2 3/32	1	1 1/16
1	3/4	2 29/32	1 1/16	1 1/8
1	1	2 11/32	1 1/16	1 3/8



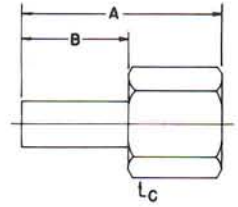
**734-F SWIVEL UNION**  
Hi-Seal Nut and Sleeve to AN Nut



Hi-Seal Tube O.D.	AN Tube O.D.	A Thread	B Thread	C	D	E Hex	F Hex
1/8	1/8	3/8-24	5/16-24	1 13/64	55/64	1/2	3/8
1/8	1/4	3/8-24	7/16-20	1 17/64	55/64	1/2	9/16
3/16	3/16	7/16-20	3/8-24	1 5/32	51/64	9/16	7/16
1/4	1/4	1/2-20	7/16-20	1 25/64	1	5/8	9/16
5/16	5/16	9/16-18	1/2-20	1 35/64	1 1/8	11/16	5/8
3/8	3/8	5/8-18	9/16-18	1 29/64	1 11/64	3/4	11/16
1/2	1/2	3/4-16	3/4-16	1 39/64	1 17/64	7/8	7/8
5/8	5/8	15/16-16	7/8-14	2 1/64	1 7/16	1 1/8	1
3/4	3/4	1 1/16-16	1 1/16-12	2 3/64	1 35/64	1 1/4	1 1/4
1	1	1 5/16-16	1 5/16-12	2 15/64	1 43/64	1 1/2	1 1/2



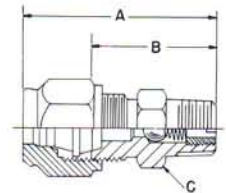
**723-F ADAPTER**  
Straight Tube to Female P.T.



Tube O.D.	Pipe Thread	A	B	C
1/8	1/8	1 1/32	1/2	9/16
1/8	1/4	1 9/32	1/2	3/4
3/16	1/8	1 5/64	35/64	9/16
3/16	1/4	1 17/64	35/64	3/4
1/4	1/8	1 1/4	5/8	9/16
1/4	1/4	1 3/8	5/8	3/4
1/4	3/8	1 13/32	5/8	7/8
1/4	1/2	1 19/32	5/8	1 1/16
5/16	1/8	1 9/32	11/16	9/16
5/16	1/4	1 13/32	11/16	3/4
5/16	3/8	1 15/32	11/16	7/8
5/16	1/2	1 21/32	11/16	1 1/16
3/8	1/8	1 11/32	3/4	9/16
3/8	1/4	1 17/32	3/4	3/4
3/8	3/8	1 19/32	3/4	7/8
3/8	1/2	1 7/8	3/4	1 1/16
1/2	1/4	1 17/32	13/16	3/4
1/2	3/8	1 19/32	13/16	7/8
1/2	1/2	1 15/16	13/16	1 1/16
5/8	3/8	1 3/4	31/32	7/8
5/8	1/2	1 15/16	31/32	1 1/16
5/8	3/4	2	31/32	1 1/4
3/4	1/2	1 31/32	1	1 1/16
3/4	3/4	2 1/32	1	1 1/4
3/4	1	2 13/32	1	1 5/8
7/8	3/4	2 1/2	1	1 1/4
1	3/4	2 3/32	1 1/16	1 1/4
1	1	2 15/32	1 1/16	1 5/8



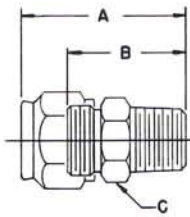
**763-F MALE CONNECTOR CHECK**  
Tube to Male P.T.



Tube O.D.	Pipe Thread	A	B	C Hex
1/8	1/8	1 9/64	27/32	7/16
1/4	1/8	1 9/32	61/64	1/2
3/8	1/4	1 41/64	1 13/64	5/8



## 780-F THERMOCOUPLE CONNECTOR



The Hi-Seal Thermocouple Connector provides the advantages of higher pressures and temperatures, plus positive make-up, obtainable with the Hi-Seal design.

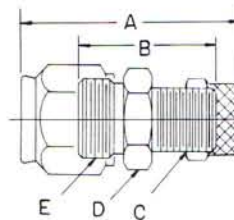
The standard connector is made of stainless steel for high corrosion resistance, and provides a temperature range of  $-325^{\circ}$  to  $+900^{\circ}$ F.

Can also be furnished in stainless steel with a Teflon sleeve. This sleeve permits the thermocouple to be readjusted to any desired depth, limited only by length of the thermocouple. Temperature range with the Teflon sleeve is  $-60^{\circ}$  to  $+425^{\circ}$ F. (200 psi with Teflon sleeve). Other materials can be furnished on special order.

Tube O.D.	Pipe Thread	A	B	C Hex.
$\frac{1}{16}$	$\frac{1}{8}$	1	$2\frac{5}{32}$	$\frac{7}{16}$
$\frac{1}{8}$	$\frac{1}{8}$	$1\frac{9}{64}$	$2\frac{7}{32}$	$\frac{7}{16}$
$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{25}{64}$	$1\frac{3}{32}$	$\frac{5}{8}$
$\frac{3}{16}$	$\frac{1}{8}$	$1\frac{11}{64}$	$2\frac{7}{32}$	$\frac{7}{16}$
$\frac{3}{16}$	$\frac{1}{4}$	$1\frac{27}{64}$	$1\frac{3}{32}$	$\frac{9}{16}$
$\frac{1}{4}$	$\frac{1}{8}$	$1\frac{9}{32}$	$6\frac{1}{64}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{1}{4}$	$1\frac{31}{64}$	$1\frac{3}{32}$	$\frac{5}{8}$
$\frac{1}{4}$	$\frac{1}{2}$	$1\frac{59}{64}$	$1\frac{1}{2}$	$\frac{7}{8}$
$\frac{3}{16}$	$\frac{1}{4}$	$1\frac{9}{16}$	$1\frac{3}{32}$	$\frac{5}{8}$
$\frac{3}{8}$	$\frac{3}{8}$	$1\frac{41}{64}$	$1\frac{13}{64}$	$\frac{3}{4}$
$\frac{1}{2}$	$\frac{1}{2}$	$2\frac{9}{64}$	$1\frac{19}{32}$	$\frac{7}{8}$



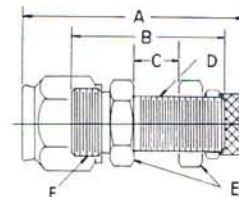
## 262-PHS UNION Hi-Seal to Poly-Flo



Tube O.D.	A	B	C Thr.	D Hex.	E Thr.
$\frac{1}{4} \times \frac{1}{4}$	$1\frac{19}{32}$	$\frac{31}{32}$	$\frac{3}{8}-24$	$\frac{1}{2}$	$\frac{1}{2}-20$
$\frac{5}{16} \times \frac{5}{16}$	$1\frac{11}{16}$	$\frac{31}{32}$	$\frac{7}{16}-24$	$\frac{9}{16}$	$\frac{9}{16}-18$
$\frac{3}{8} \times \frac{3}{8}$	$1\frac{23}{32}$	$1\frac{1}{64}$	$\frac{1}{2}-24$	$\frac{5}{8}$	$\frac{5}{8}-18$



## 282-PHS BULKHEAD UNION Hi-Seal to Poly-Flo

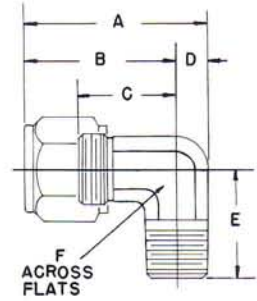


Tube O.D.	A	B	C Max. Bulkhead	D Thr.	E Hex.	F Thr.
$\frac{1}{4} \times \frac{1}{4}$	$2\frac{5}{32}$	$1\frac{17}{32}$	$\frac{3}{8}$	$\frac{3}{8}-24$	$\frac{9}{16}$	$\frac{1}{2}-20$
$\frac{3}{8} \times \frac{3}{8}$	$2\frac{11}{32}$	$1\frac{39}{64}$	$\frac{3}{8}$	$\frac{1}{2}-24$	$1\frac{1}{16}$	$\frac{5}{8}-18$





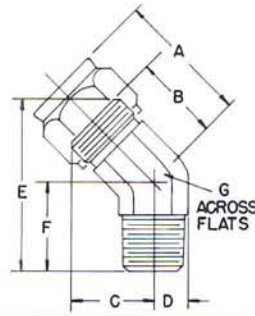
**769-F MALE ELBOW  
Tube to Male P.T.**



Tube O.D.	Pipe Thread	A		B		C				D		E		F	
		S-SS-M	B-A	S-SS-M	B-A	Body $\phi$		Swing Radius		S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
						S-SS-M	B-A	S-SS-M	B-A						
1/16	1/16	31/32	31/32	13/16	13/16	19/32	19/32	39/64	39/64	5/32	5/32	23/32	11/16	5/16	3/8
1/16	1/8	1	63/64	27/32	23/32	5/8	9/16	23/32	37/64	5/32	13/64	5/8	3/4	5/16	3/8
1/8	1/16	1 5/64	17/64	59/64	59/64	5/8	5/8	21/32	21/32	5/32	3/16	23/32	11/16	5/16	3/8
1/8	1/8	1 11/64	17/64	61/64	59/64	21/32	5/8	11/16	21/32	7/32	3/16	3/4	23/32	7/16	3/8
1/8	1/4	1 15/64	113/64	63/64	63/64	11/16	11/16	23/32	23/32	1/4	7/32	1 1/32	1 1/32	7/16	7/16
3/16	1/16	1 3/32	1 5/32	15/16	61/64	39/64	5/8	41/64	41/64	5/32	13/64	23/32	23/32	3/8	3/8
3/16	1/8	1 13/64	19/64	63/64	61/64	21/32	5/8	47/64	11/16	7/32	3/16	3/4	23/32	7/16	7/16
1/4	1/8	1 19/64	115/64	1 5/64	1 1/64	3/4	43/64	53/64	25/32	7/32	7/32	25/32	23/32	7/16	7/16
1/4	1/4	1 31/64	119/64	1 13/64	1 5/64	7/8	3/4	31/32	53/64	9/32	7/32	1 1/16	1 3/32	9/16	7/16
1/4	3/8		1 29/64		1 11/64		27/32		7/8		9/32	1			9/16
1/4	1/2		1 37/64		1 15/64		29/32		15/16		11/32	1 1/4			1 1/16
5/16	1/8	1 13/32	1 3/8	1 5/32	1 1/8	3/4	23/32	27/32	53/64	1/4	1/4	25/32	27/32	1/2	1/2
5/16	1/4	2 9/16	1 13/32	1 9/32	1 5/32	7/8	3/4	31/32	27/32	9/32	1/4	1 3/32	15/16	9/16	1/2
3/8	1/8	1 41/64	1 27/64	1 23/64	1 11/64	59/64	47/64	1 1/64	27/32	9/32	1/4	7/8	13/16	9/16	9/16
3/8	1/4	1 41/64	1 31/64	1 23/64	1 15/64	59/64	51/64	1 1/64	29/32	9/32	1/4	1 3/32	1 1/16	9/16	1/2
3/8	3/8	1 59/64	1 37/64	1 35/64	1 19/64	1 7/64	55/64	1 11/64	31/32	3/8	9/32	1 7/32	1 1/16	3/4	9/16
3/8	1/2	2	1 47/64	1 9/16	1 23/64	1 1/8	61/64	1 5/16	1	7/16	1 1/32	1 1/4	1 1/4	3/4	1 1/16
3/8	3/4	2 11/64		1 41/64		1 13/64		1 9/32		17/32		1 19/32		1 1/16	
1/2	1/4	2 3/64	1 49/64	1 43/64	1 29/64	1 1/8	29/32	1 15/64	1 1/32	3/8	5/16	1 3/32	1 1/8	3/4	5/8
1/2	3/8	2 3/64	1 49/64	1 43/64	1 29/64	1 1/8	29/32	1 15/64	1 1/32	3/8	5/16	1 3/32	1 1/8	3/4	5/8
1/2	1/2	2 3/64	1 53/64	1 43/64	1 31/64	1 1/8	15/16	1 15/64	1 1/16	3/8	1 1/32	1 3/4	1 5/16	3/4	1 1/16
1/2	3/4	2 21/64		1 51/64		1 1/4		1 23/64		17/32		1 19/32		1 1/16	
5/8	3/8	2 3/8	1 25/32	1 15/16	1 21/32	1 5/16	1 1/32	1 7/16	1 3/16	7/16	7/8	1 3/32	1 1/4	7/8	3/4
5/8	1/2	2 3/8	2 3/32	1 15/16	1 21/32	1 5/16	1 1/32	1 7/16	1 3/16	7/16	7/16	1 15/32	1 1/2	7/8	7/8
3/4	1/2	2 19/32	2 7/32	2 1/16	1 3/4	1 7/16	1 1/8	1 5/8	1 21/64	17/32	15/32	1 9/16	1 1/2	1 1/16	15/16
3/4	3/4	2 19/32	2 7/32	2 1/16	1 3/4	1 7/16	1 1/8	1 5/8	1 21/64	17/32	15/32	1 9/32	1 15/32	1 1/16	15/16
7/8	3/4	2 7/8	2 19/32	2 1/4	1 15/16	1 5/8	1 5/16	1 25/32	1 31/64	5/8	2 1/32	1 11/16	1 23/32	1 1/4	1 5/16
1	3/4	2 31/32	2 19/32	2 11/32	1 15/16	1 23/32	1 5/16	1 55/64	1 33/64	5/8	2 1/32	1 11/16	1 23/32	1 1/4	1 5/16
1	1	2 31/32	2 19/32	2 11/32	1 15/16	1 23/32	1 5/16	1 55/64	1 33/64	5/8	2 1/32	1 31/32	1 31/32	1 1/4	1 5/16
1 1/4	1 1/4	3 7/16		2 5/8		1 13/16		2 5/64		13/16		2 3/8		1 5/8	
1 1/2	1 1/2	3 11/16		2 3/4		1 15/16		2 13/64		15/16		2 9/16		1 7/8	
2	2	4 9/16		3 5/16		2 29/64		2 11/16		1 1/4		1 15/16		2 9/16	



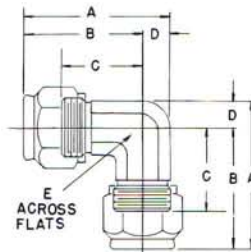
**754-F MALE 45° ELBOW**  
Tube to Male P.T.



Tube O.D.	Pipe Thread	A		B		C		D		E		F		G	
		S-SS-M	B-A	S-SS-M	B-A	Swing Radius		S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
1/8	1/8	55/64		9/16		37/64		9/32		1 13/64		5/8		9/16	
3/16	1/8	55/64	51/64	9/16	15/32	39/64	17/32	9/32	7/32	1 15/64	13/16	5/8	21/32	9/16	7/16
1/4	1/8	61/64	55/64	5/8	17/32	43/64	5/8	9/32	7/32	1 23/64	1 13/64	1 1/16	21/32	9/16	7/16
1/4	1/4		57/64		9/16		5/8		1/4		1 1/2		7/8		1/2
5/16	1/8	1 1/8	1	23/32	19/32	3/4	11/16	9/32	1/4	1 7/16	1 21/64	1 1/16	23/32	9/16	1/2
5/16	1/4	1 1/8		23/32		43/64		9/32		1 21/32		7/8		9/16	
3/8	1/4	1 15/64	1 5/64	51/64	41/64	53/64	3/4	9/32	1/4	1 45/64	1 35/64	7/8	7/8	9/16	1/2
1/2	3/8	1 21/64	1 15/64	25/32	11/16	7/8	53/64	7/16	5/16	1 19/16	1 39/64	1 5/16	7/8	7/8	5/8
5/8	1/2	1 9/16	1 5/8	15/16	1	1 3/64	1 3/32	7/16	17/32	2 15/64	2 9/32	1 3/16	1 3/16	7/8	1 1/16
3/4	1/2	1 11/16		1 1/16		1 3/16		21/32		2 1/2		1 5/16		1 5/16	
3/4	3/4	1 11/16	1 3/4	1 1/16	1 1/8	1 3/16	17/32	21/32	17/32	2 3/8	2 13/32	1 3/16	1 3/16	1 5/16	1 1/16
7/8	3/4	1 53/64	1 9/16	1 13/64	1 5/16	1 21/64	1 9/64	21/32	21/32	2 49/64	2 39/64	1 7/16	1 15/32	1 5/16	1 5/16
1	3/4	1 7/8		1 1/4		1 5/16		21/32		2 3/4		1 7/16		1 5/16	
1	1	1 7/8	1 9/16	1 1/4	1 5/16	1 25/64	1 3/16	21/32	21/32	2 53/64	2 21/32	1 7/16	1 15/32	1 5/16	1 5/16
1 1/4	1 1/4	2 3/16		1 3/8		1 19/32		13/16		3 1/4		1 21/32		1 5/8	
1 1/2	1 1/2	2		1 3/16		1 15/32		1 5/16		3 7/32		1 3/4		1 7/8	



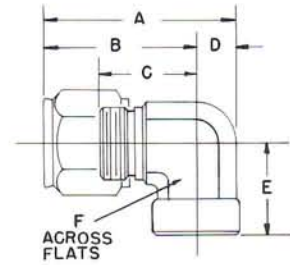
**765-F UNION ELBOW**  
Tube to Tube



Tube O.D.	A		B		C		D		E	
	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
1/16	1		27/32		5/8		5/32		5/16	
1/8	1 11/64	1 7/64	61/64	61/64	21/32	21/32	7/32	5/32	7/16	3/8
3/16	1 13/64	1 9/64	63/64	61/64	21/32	5/8	7/32	3/16	7/16	3/8
1/4	1 19/64	1 17/64	1 5/64	1 3/64	3/4	23/32	7/32	7/32	7/16	7/16
5/16	1 13/32	1 7/16	1 5/32	1 3/16	3/4	25/32	1/4	1/4	1/2	1/2
3/8	1 41/64	1 33/64	1 23/64	1 17/64	59/64	53/64	9/32	1/4	9/16	1/2
1/2	2 3/64	1 51/64	1 43/64	1 31/64	1 1/8	1 5/16	3/8	5/16	3/4	5/8
5/8	2 3/8	2 7/16	1 15/16	1 13/16	1 9/16	1 5/16	7/16	1/2	7/8	1
3/4	2 19/32	2 9/16	2 1/16	2 1/16	1 7/16	1 7/16	17/32	1/2	1 1/16	1
7/8	2 7/8	2 19/32	2 1/4	1 15/16	1 5/8	1 5/16	5/8	21/32	1 3/16	1 5/16
1	2 31/32	2 19/32	2 11/32	1 13/16	1 23/32	1 13/16	5/8	21/32	1 3/16	1 5/16
1 1/4	3 7/16		2 5/8		1 13/16		13/16		1 5/8	
1 1/2	3 11/16		2 3/4		1 15/16		1 5/16		1 7/8	
2	4 9/16		3 7/16		2 29/64		1 1/4		2 9/16	



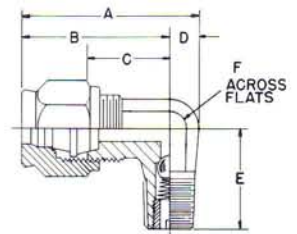
**770-F FEMALE ELBOW**  
Tube to Female P.T.



Tube O.D.	Female Pipe Thread	A		B		C				D		E		F	
		S-SS-M	B-A	S-SS-M	B-A	Body $\phi$		Swing Radius		S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
						S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
1/16	1/16														
1/16	1/8	13/32		7/8		21/32		23/32		7/32		15/16		7/16	
1/8	1/8	117/64	19/64	11/64	63/64	23/32	11/16	25/32	49/64	1/4	5/32	15/16	11/16	1/2	3/8
1/8	1/4	19/64		111/64		7/8		29/32		25/64		5/8		11/16	
8/16	1/8	119/64	115/64	13/64	13/64	23/32	23/32	51/64	51/64	1/4	3/16	5/8	3/4	1/2	3/8
1/4	1/8	123/64	117/64	17/64	13/64	23/32	23/32	55/64	51/64	1/4	7/32	11/16	11/16	1/2	7/16
1/4	1/4	143/64	125/64	121/64	19/64	1	1	13/16	15/64	29/32	3/8	1/4	7/8	3/4	1/2
5/16	1/8	147/64	113/32	131/64	15/32	3/4	3/4	13/16	27/32	27/32	1/4	1/4	11/16	13/16	1/2
5/16	1/4		115/32		17/32			13/16		29/32		1/4		7/8	1/2
3/8	1/8	23/64	135/64	143/64	119/64	17/64	55/64	15/32	31/32	3/8	1/4	13/16	11/16	11/16	1/2
3/8	1/4	159/64	135/64	135/64	119/64	17/64	55/64	113/64	31/32	3/8	1/4	7/8	7/8	3/4	1/2
3/8	3/8	21/16	123/32	137/64	113/32	19/64	131/32	115/64	15/64	7/16	5/16	15/16	15/16	7/8	5/8
3/8	1/2	21/32		11/2		11/16		15/16		17/32		13/16		11/16	
1/2	1/4	161/64	137/64	147/64	137/64	13/32	11/32	113/64	11/8	3/8	5/16	7/8	15/16	3/4	5/8
1/2	3/8	21/64	137/64	145/64	137/64	15/32	11/32	117/64	11/8	7/16	5/16	15/16	15/16	7/8	5/8
1/2	1/2	221/64	2	151/64	143/64	11/4	11/4	123/64	11/4	17/32	21/64	13/16	13/16	11/16	11/16
5/8	3/8		29/32		113/16		13/16		19/32		15/32		13/32		15/16
5/8	1/2	213/32	27/16	113/16	113/16	15/16	15/16	17/16	17/16	17/32	1/2	13/16	11/4	11/16	11/16
3/4	1/2	213/32	21/2	113/16	113/16	15/16	13/16	113/32	113/32	17/32	9/16	13/16	111/32	11/16	1
3/4	3/4	23/4	223/32	21/8	21/16	11/2	17/16	141/64	137/64	5/8	21/32	13/8	111/32	11/4	15/16
7/8	3/4	23/4	219/32	21/8	115/16	11/2	15/16	121/32	137/64	5/8	21/32	13/8	111/32	11/4	15/16
1	3/4		219/32		115/16		15/16		133/64		21/32		111/32		15/16
1	1	31/16	313/32	21/4	29/16	15/8	119/32	151/64	149/64	13/16	27/32	15/8	119/32	15/8	111/16
1 1/4	1 1/4	33/4		213/16		2		213/64		15/16		2		17/8	
1 1/2	1 1/2	47/16		33/16		23/8		219/32		1 1/4		21/8		29/16	



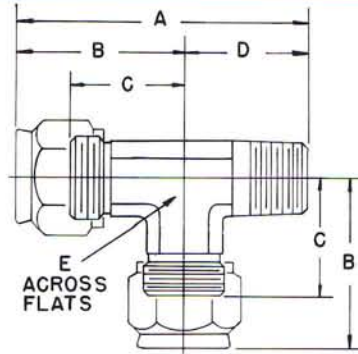
**773-F MALE ELBOW CHECK**  
Tube to Male P.T.



Tube O.D.	Pipe Thr.	A	B	C		D	E	F
				Body $\phi$	Swing Radius			
1/8	1/8	17/64	59/64	5/8	11/16	3/16	11/16	3/8
1/4	1/8	115/64	11/64	11/16	49/64	7/32	3/4	1/2
3/8	1/4	131/64	115/64	51/64	57/64	1/4	11/16	1/2



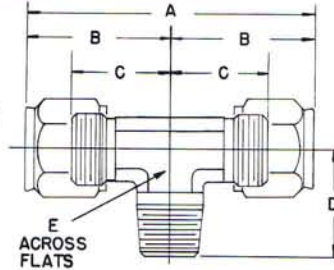
**771-F MALE RUN TEE**  
Tube to Male P.T. to Tube



Tube O.D.	Pipe Thread	A		B		C				D		E	
		Body $\varnothing$		Swing Radius		S-SS-M		B-A		S-SS-M		B-A	
		S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
1/16	1/16												
1/16	1/8	149/64		29/32		11/16		51/64		55/64		7/16	
1/8	1/8	145/64	145/64	61/64	61/64	21/32	21/32	47/64	47/64	3/4	3/4	7/16	3/8
3/16	1/8	147/64	147/64	63/64	63/64	21/32	21/32	47/64	47/64	3/4	3/4	7/16	3/8
1/4	1/8	155/64	151/64	13/64	13/64	3/4	23/32	53/64	51/64	25/32	3/4	7/16	7/16
1/4	1/4	23/64	21/64	17/64	13/64	25/32	3/4	55/64	63/64	15/16	15/16	7/16	7/16
5/16	1/8	2	2	17/32	13/16	13/16	25/32	29/32	57/64	25/32	13/16	1/2	1/2
3/8	1/4	231/64	217/64	127/64	117/64	63/64	53/64	15/64	15/16	11/16	1	5/8	1/2
1/2	3/8	255/64	235/64	143/64	131/64	11/8	15/16	115/64	11/16	13/16	11/16	3/4	5/8
1/2	1/2	33/64	313/32	149/64	145/64	17/32	15/32	13/4	17/32	19/8	11/32	7/8	13/16
5/8	1/2	33/8	33/8	115/16	115/16	13/16	13/16	17/16	17/16	17/16	17/16	7/8	11/16
3/4	3/4	35/8	31/2	21/16	21/16	17/16	17/16	19/8	19/8	19/16	17/16	11/16	1
7/8	3/4	315/16	323/32	21/4	115/16	15/8	15/16	125/32	131/64	111/16	125/32	11/4	13/16
1	3/4												
1	1	49/32	37/8	211/32	115/16	123/32	15/16	155/64	133/64	115/16	115/16	11/4	13/16
1 1/4	1 1/4	415/16		255/8		113/16		255/64		255/16		15/8	
1 1/2	1 1/2	515/16		335/8		115/16		213/64		295/16		17/8	



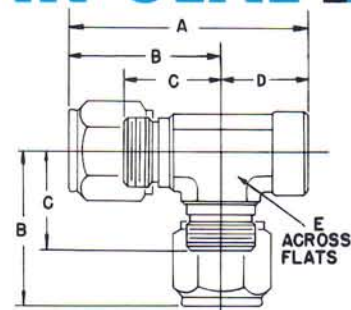
**772-F MALE BRANCH TEE**  
Tube to Tube to Male P.T.



Tube O.D.	Pipe Thread	A		B		C				D		E	
		Body $\varnothing$		Swing Radius		S-SS-M		B-A		S-SS-M		B-A	
		S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
1/16	1/16												
1/16	1/8	19/16	19/16	25/32	25/32	9/16	9/16	37/64	37/64	23/32	23/32	7/16	7/16
1/8	1/16	113/16		29/32		11/16		51/64		55/64		7/16	
1/8	1/16	129/32	129/32	61/64	61/64	21/32	21/32	43/64	43/64	23/32	23/32	7/16	3/8
1/8	1/8	2	129/32	1	61/64	45/64	21/32	25/32	47/64	55/64	3/4	7/16	3/8
3/16	1/16	21/32	2	11/64	1	11/16	21/32	45/64	23/32	23/32	23/32	7/16	3/8
3/16	1/8	131/32	131/32	63/64	63/64	21/32	21/32	47/64	47/64	3/4	3/4	7/16	3/8
1/4	1/8	25/32	23/32	15/64	13/64	3/4	23/32	53/64	13/16	25/32	3/4	7/16	7/16
1/4	1/4	23/32	23/32	17/64	13/64	25/32	3/4	55/64	53/64	15/16	15/16	7/16	7/16
5/16	1/8	27/16	23/8	17/32	13/16	13/16	25/32	29/32	57/64	25/32	13/16	1/2	1/2
3/8	1/4	227/32	217/32	127/64	117/64	63/64	53/64	15/64	15/16	11/16	1	5/8	1/2
1/2	3/8	311/32	221/32	143/64	131/64	11/8	15/16	115/64	11/16	13/16	11/16	3/4	5/8
1/2	1/2	317/32	313/32	149/64	145/64	17/32	15/32	13/4	17/32	19/8	11/32	7/8	13/16
5/8	1/2	37/8	37/8	115/16	115/16	13/16	13/16	17/16	17/16	17/16	17/16	7/8	1
3/4	3/4	41/8	41/8	21/16	21/16	17/16	17/16	19/8	19/8	19/16	17/16	11/16	11/16
7/8	3/4	41/2	37/8	21/4	115/16	15/8	15/16	125/32	131/64	111/16	125/32	11/4	13/16
1	3/4												
1	1	411/16	37/8	211/32	115/16	123/32	15/16	155/64	133/64	115/16	115/16	11/4	13/16
1 1/4	1 1/4	511/16		255/8		113/16		255/64		255/16		15/8	
1 1/2	1 1/2	63/4		335/8		115/16		213/64		295/16		17/8	



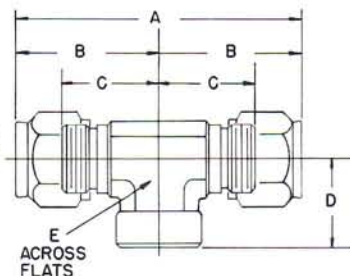
**767-F FEMALE RUN TEE**  
Tube to Female P.T. to Tube



Tube O.D.	Pipe Thread	A		B		C				D		E	
		S-SS-M	B	S-SS-M	B	Body $\phi$		Swing Radius		S-SS-M	B	S-SS-M	B
						S-SS-M	B	S-SS-M	B				
1/16	1/16												
1/8	1/8	59/64		19/64		27/32		59/64		25/32		9/16	
3/16	1/8	143/64		13/64		23/32		51/64		5/8		1/2	
1/4	1/8	151/64	123/32	17/64	13/64	25/32	3/4	55/64	27/32	11/16	41/64	1/2	5/8
1/4	1/4	27/64	21/16	17/32	111/64	57/64	27/32	61/64	15/16	57/64	57/64	11/16	3/4
5/16	1/8	129/32	27/64	17/32	19/32	13/16	3/4	29/32	55/64	11/16	61/64	1/2	5/8
3/8	1/4	225/64	213/64	133/64	15/16	15/64	7/8	111/64	63/64	7/8	57/64	3/4	3/4
1/2	3/8	243/64	233/64	147/64	135/64	13/16	1	119/64	11/8	15/16	31/32	7/8	13/16
5/8	1/2	31/8	263/64	115/16	13/4	15/16	1 1/8	17/16	19/32	13/16	115/64	1 1/16	1
3/4	3/4	31/2	313/32	21/8	21/16	1 1/2	1 7/16	141/64	137/64	1 3/8	111/32	1 1/4	1 5/16
7/8	3/4	3 1/2	313/32	21/8	21/16	1 1/2	1 7/16	121/32	143/64	1 3/8	111/32	1 1/4	1 5/16
1	1 3/4	3 7/8	3 3/4	2 1/4	2 3/16	1 5/8	1 9/16	151/64	1 3/4	1 5/8	1 9/16	1 5/8	1 5/8
1 1/4	1 1/4	4 13/16		2 13/16		2		213/64		2		1 7/8	
1 1/2	1 1/2	5 3/8		3 5/16		2 1/2		223/32		2 1/16		1 7/8	



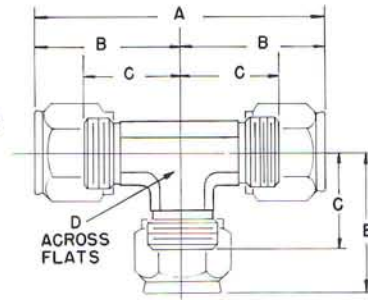
**777-F FEMALE BRANCH TEE**  
Tube to Tube to Female P.T.



Tube O.D.	Pipe Thread	A		B		C				D		E	
		S-SS-M	B	S-SS-M	B	Body $\phi$		Swing Radius		S-SS-M	B	S-SS-M	B
						S-SS-M	B	S-SS-M	B				
1/16	1/16												
1/16	1/8	17/8		15/16		23/32		25/32		25/32		9/16	
1/8	1/8	21/32	131/32	11/64	63/64	23/32	11/16	25/32	23/32	5/8	11/16	1/2	1/2
3/16	1/8	23/32		13/64		23/32		51/64		5/8		1/2	
1/4	1/8	27/32	25/32	17/64	15/64	25/32	3/4	55/64	27/32	11/16	41/64	1/2	5/8
1/4	1/4	219/32	211/32	119/64	111/64	29/32	27/32	15/16	15/16	17/32	57/64	11/16	3/4
5/16	1/8	27/16	25/16	17/32	15/32	13/16	3/4	29/32	55/64	11/16	41/64	1/2	9/16
3/8	1/4	31/32	29/32	133/64	15/16	15/64	7/8	111/64	63/64	7/8	57/64	3/4	3/4
1/2	3/8	315/32	33/32	147/64	135/64	13/16	1	119/64	11/8	15/16	31/32	7/8	13/16
5/8	1/2	3 7/8	3 1/2	115/16	13/4	15/16	1 1/8	17/16	19/32	13/16	115/64	1 1/16	1
3/4	3/4	4 1/4	4 1/8	2 1/8	2 1/16	1 1/2	1 7/16	141/64	119/32	1 3/8	111/32	1 1/4	1 5/16
7/8	3/4	4 1/4	4 1/8	2 1/8	2 1/16	1 1/2	1 7/16	121/32	141/64	1 3/8	111/32	1 1/4	1 5/16
1	3/4	4 1/4	4 1/8	2 1/8	2 1/16	1 1/2	1 7/16	121/32	141/64	1 3/8	111/32	1 1/4	1 5/16
1	1	4 1/2	4 3/8	2 1/4	2 3/16	1 5/8	1 9/16	151/64	1 3/4	1 5/8	1 9/16	1 5/8	1 5/8
1 1/4	1 1/4	5 5/8		2 13/16		2		213/64		2		1 7/8	
1 1/2	1 1/2	5 3/4		2 7/8		2 1/16		25/16		2 1/16		1 7/8	

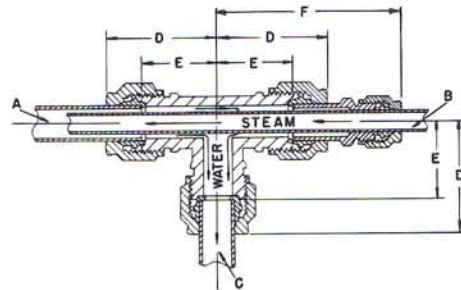


**764-F UNION TEE**  
Tube to Tube to Tube



Tube O.D.	A		B		C		D	
	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A	S-SS-M	B-A
1/16	1 13/16	1 9/16	29/32	25/32	1 1/16	9/16	7/16	5/16
1/8	1 29/32	1 25/32	61/64	57/64	2 1/32	19/32	7/16	5/16
3/16	1 31/32	1 31/32	63/64	63/64	2 1/32	2 1/32	7/16	3/8
1/4	2 5/32	2 3/32	1 5/64	1 3/64	3/4	23/32	7/16	7/16
5/16	2 7/16	2 3/8	1 7/32	1 3/16	13/16	25/32	1/2	1/2
3/8	2 27/32	2 15/32	1 27/64	1 15/64	63/64	5 1/64	5/8	1/2
1/2	3 11/32	2 31/32	1 43/64	1 31/64	1 1/8	15/16	3/4	5/8
5/8	3 7/8	3 7/8	1 15/16	1 15/16	1 5/16	1 5/16	7/8	1
3/4	4 1/8	4 1/8	2 1/16	2 1/16	1 7/16	1 7/16	1 1/16	1
7/8	4 1/2	3 7/8	2 1/4	1 15/16	1 5/8	1 5/16	1 1/4	1 5/16
1	4 11/16	3 7/8	2 11/32	1 15/16	1 23/32	1 5/16	1 1/4	1 5/16
1 1/4	5 1/4		2 5/8		1 13/16		1 5/8	
1 1/2	5 1/2		2 3/4		1 15/16		1 7/8	
2	6 5/8		3 5/16		2 29/64		2 1/2	

**784-F HEAT EXCHANGER TEE**  
Tube to Tube to Tube

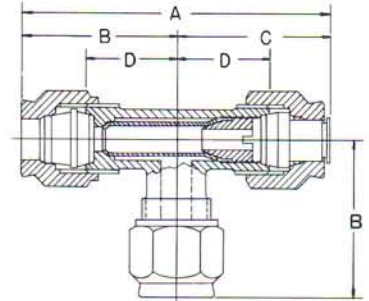


A Tube O.D.	B Tube O.D.	C Tube O.D.	D	E	F
1/2	1/4	1/2	1 43/64	1 1/8	2 27/64

DISCONTINUED



**794-F FILTER TEE**  
Tube to Tube to Tube



A blow-off type filter with a sintered wire filter element. Rated filtration of 5 microns furnished as standard. Other filtration ratings up to 50 microns, are available on special order.

For use in gas chromatography, chemical plants, refineries, hydraulic work and pneumatic systems.

Particles filtered from the fluid are trapped inside the filter element. The retained particles can be flushed away by removing the cap from blow-off end of the strainer. Filter element can also be removed for reverse flushing or cleaning with solvent.

Tube O.D.	A	B	C	D
1/4	27/32	15/64	19/64	3/4
3/8	25/8	19/32	111/32	27/32
1/2	31/32	131/64	135/64	15/16

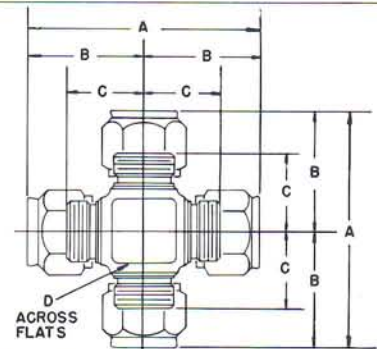
FILTER AREAS	
Tube O.D.	Area of Filtering Element
1/4"	.34 sq. in.
3/8"	.78 sq. in.
1/2"	1.32 sq. in.

RECOMMENDED MAXIMUM WORKING PRESSURES				
Tube O.D.	Safety Factors			
	4-1	6-1	8-1	10-1
1/4"	4930	3290	2460	1970
3/8"	4850	3240	2430	1940
1/2"	3670	2450	1830	1470

Tubing selected must be suitable for use with pressures shown above.



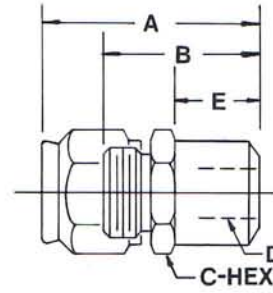
**752-F CROSS**  
Tube to Tube  
to Tube to Tube



Tube O.D.	A		B		C	
	S-SS-M	B	S-SS-M	B	S-SS-M	B
1/8	129/32	129/32	61/64	61/64	21/32	21/32
3/16	131/32		63/64		21/32	
1/4	25/32	21/32	15/64	11/64	3/4	11/16
5/16	23/8		13/16		25/32	
3/8	225/32	225/32	125/64	125/64	61/64	59/64
1/2	33/32	31/32	135/64	133/64	1	31/32
5/8	35/8		113/16		13/16	
3/4	35/8		113/16		13/16	
7/8	315/16		131/32		111/32	
1	315/16		131/32		111/32	



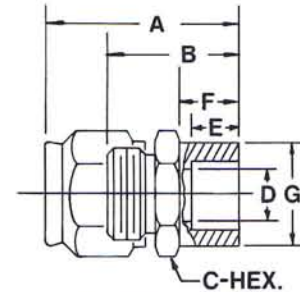
### 729-FSS MALE CONNECTOR TUBE TO BUTT WELD



Tube O.D.	Butt Weld Pipe Size	Butt Weld O.D.	A	B	C	D Minimum Opening	E
1/4	1/8	.405	1 9/32	61/64	1/2	13/64	3/8
1/4	1/4	.540	1 31/64	1 5/32	5/8	13/64	9/16
3/8	1/4	.540	1 41/64	1 13/64	5/8	9/32	9/16
3/8	3/8	.675	1 41/64	1 13/64	3/4	9/32	9/16
3/8	1/2	.840	1 31/32	1 17/32	7/8	9/32	3/4
1/2	3/8	.675	1 51/64	1 1/4	3/4	2 1/64	9/16
1/2	1/2	.840	2 9/64	1 19/32	7/8	2 1/64	3/4
5/8	1/2	.840	2 1/4	1 5/8	13/16	1/2	3/4
3/4	3/4	1.050	2 1/4	1 5/8	1 1/8	2 1/32	3/4
1"	1"	1.815	2 7/16	1 13/16	1 3/8	7/8	15/16



### 731-FSS FEMALE CONNECTOR TUBE TO SOCKET WELD



Tube O.D.	A	B	C	D Minimum Opening	E	F	G
1/4	1 19/64	31/32	1/2	3/16	5/16	13/32	7/16
3/8	1 33/64	1 5/64	5/8	9/32	3/8	1 5/32	5/8
1/2	1 53/64	1 9/32	13/16	13/32	1/2	1 5/32	3/4
5/8	1 17/16	1 3/16	1 1/16	1/2	9/16	1 5/32	7/8
3/4	1 17/16	1 3/16	1 1/16	5/8	9/16	1 5/32	1 1/16
1"	2 3/32	1 15/32	1 3/8	7/8	3/4	9/16	1 5/16

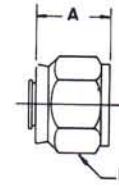
See Price Schedule for stock items.





## 708-F FITTING CAP

For capping tube end of any Hi-Seal fitting. (Includes captive sleeve.)



Tube O.D.	Thread	A		B
1/16	1/4-28	25/64		5/16
1/8	3/8-24	33/64		1/2
3/16	7/16-20	17/32		9/16
1/4	1/2-20	19/32		5/8
5/16	9/16-18	43/64		11/16
3/8	5/8-18	3/4		3/4
1/2	3/4-16	51/64		7/8
5/8	15/16-16	1		1 1/8
3/4	1 1/16-16	1		1 1/4
7/8	1 3/16-16	1		1 3/8
1	1 5/16-16	1		1 1/2
1 1/4	1 5/8-16	1 7/32		2
1 1/2	1 7/8-16	1 1/4		2 1/4



## 721-F TUBING CAP

Used with 760-F Sleeve and 761-F Nut for capping end of tube



Tube O.D.	Thread	A		B Hex.
1/16	1/4-28	13/32		5/16
1/8	3/8-24	15/32		3/8
3/16	7/16-20	15/32		7/16
1/4	1/2-20	9/16		1/2
5/16	9/16-18	9/16		9/16
3/8	5/8-18	39/64		5/8
1/2	3/4-16	21/32		3/4
5/8	15/16-16	25/32		15/16
3/4	1 1/16-16	25/32		1 1/16
7/8	1 3/16-16	27/32		1 3/16
1	1 5/16-16	27/32		1 5/16
1 1/4	1 5/8-16	29/32		1 5/8
1 1/2	1 7/8-16	15/16		1 7/8



## 711-F LOCK NUT

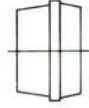
For Use with Bulkhead Fittings



Tube O.D.	Thread	A		B Hex.
		S-SS-M	B-A	
1/16	1/4-28	3/16		7/16
1/8	3/8-24	3/16	7/32	9/16
3/16	7/16-20	1/4	1/4	5/8
1/4	1/2-20	1/4	11/64	11/16
5/16	9/16-18	17/64	17/64	3/4
3/8	5/8-18	1/4	11/64	13/16
1/2	3/4-16	1/4	11/64	15/16
5/8	15/16-16	1/4		1 1/8
3/4	1 1/16-16	5/16		1 1/4
7/8	1 3/16-16	5/16		1 3/8
1	1 5/16-16	5/16		1 1/2
1 1/4	1 5/8-16	3/8		2
1 1/2	1 7/8-16	3/8		2 1/4



## 760-F SLEEVE



Tube O.D.
$\frac{1}{16}$
$\frac{1}{8}$
$\frac{3}{16}$
$\frac{1}{4}$
$\frac{5}{16}$
$\frac{3}{8}$
$\frac{1}{2}$
$\frac{5}{8}$
$\frac{3}{4}$
$\frac{7}{8}$
1
$1\frac{1}{4}$
$1\frac{1}{2}$
2

One of the following suffix letters must be added to the catalog number to indicate the metal desired:

**S** —Steel

**SS** —Stainless Steel (316)

**PH**—Stainless Steel, Armco 17-4 PH. (Sleeves only are furnished in this material. Designation also used for assemblies with 316 Bodies and Nuts with 17-4 PH Sleeves.)

**B** —Brass

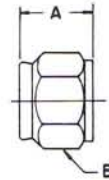
**A** —Aluminum

**M** —Monel

**T** —Teflon (For 780-F Thermocouple Fitting)



## 761-F NUT

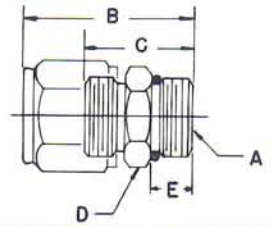


Tube O.D.	Thread	A	B
$\frac{1}{16}$	$\frac{1}{4}$ —28	$\frac{25}{64}$	$\frac{5}{16}$
$\frac{1}{8}$	$\frac{3}{8}$ —24	$\frac{33}{64}$	$\frac{1}{2}$
$\frac{3}{16}$	$\frac{7}{16}$ —20	$\frac{17}{32}$	$\frac{9}{16}$
$\frac{1}{4}$	$\frac{1}{2}$ —20	$\frac{19}{32}$	$\frac{5}{8}$
$\frac{5}{16}$	$\frac{9}{16}$ —18	$\frac{43}{64}$	$\frac{11}{16}$
$\frac{3}{8}$	$\frac{5}{8}$ —18	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{1}{2}$	$\frac{3}{4}$ —16	$\frac{57}{64}$	$\frac{7}{8}$
$\frac{5}{8}$	$\frac{15}{16}$ —16	1	$1\frac{1}{8}$
$\frac{3}{4}$	$1\frac{1}{16}$ —16	1	$1\frac{1}{4}$
$\frac{7}{8}$	$1\frac{3}{16}$ —16	1	$1\frac{3}{8}$
1	$1\frac{5}{16}$ —16	1	$1\frac{1}{2}$
$1\frac{1}{4}$	$1\frac{5}{8}$ —16	$1\frac{3}{16}$	2
$1\frac{1}{2}$	$1\frac{7}{8}$ —16	$1\frac{1}{4}$	$2\frac{1}{4}$
2	$2\frac{1}{2}$ —12	$1\frac{25}{64}$	$2\frac{7}{8}$

## STRAIGHT THREAD O-RING FITTINGS



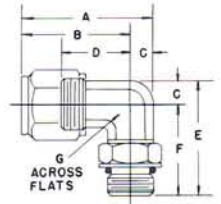
**768-FSO MALE CONNECTOR**  
**Tube to Straight Thread**  
 with O-Ring



Tube O.D.	A Thread	B	C	D Hex.	E
1/4	7/16-20	1 13/64	7/8	9/16	23/64
5/16	1/2-20	1 9/32	7/8	9/16	23/64
3/8	9/16-18	1 29/64	1 1/64	1 1/16	25/64
1/2	3/4-16	1 43/64	1 1/8	7/8	7/16
5/8	7/8-14	1 29/32	1 9/32	1	1 1/2
3/4	1 1/16-12	2 1/16	1 7/16	1 1/4	1 9/32
7/8	1 3/16-12	2 1/16	1 7/16	1 3/8	1 9/32
1	1 5/16-12	2 1/16	1 7/16	1 1/2	1 9/32
1 1/4	1 5/8-12	2 7/16	1 1/2	1 7/8	1 19/32
1 1/2	1 7/8-12	2 3/8	1 9/16	2 1/8	1 19/32
2	2 1/2-12	2 11/64	1 25/32	2 3/4	1 19/32



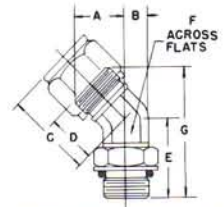
**769-FSO MALE ELBOW**  
**Tube to Straight Thread**  
 with O-Ring, Back-up Washer and Lock Nut



Tube O.D.	Thread	A	B	C	D		E	F	G
					Body $\varnothing$	Swing Radius			
1/4	7/16-20	1 19/64	1 5/64	7/32	3/4	53/64	1 17/64	1 5/64	7/16
5/16	1/2-20	1 7/16	1 5/32	9/32	3/4	27/32	1 25/64	1 7/32	1 1/2
3/8	9/16-18	1 5/8	1 11/32	9/32	29/32	63/64	1 33/64	1 1/4	9/16
1/2	3/4-16	1 59/64	1 35/64	3/8	1	1 1/8	1 13/16	1 7/16	3/4
5/8	7/8-14	2 11/32	1 29/32	7/16	1 9/32	1 13/32	2 1/8	1 11/16	7/8
3/4	1 1/16-12	2 39/64	2 5/64	17/32	1 29/64	1 5/8	2 15/32	1 15/16	1 1/16
7/8	1 3/16-12	2 7/8	2 1/4	5/8	1 5/8	1 23/32	2 21/32	2 1/32	1 1/4
1	1 5/16-12	2 31/32	2 11/32	5/8	1 23/32	1 55/64	2 21/32	2 1/32	1 1/4
1 1/4	1 5/8-12	3 7/16	2 3/2	15/16	1 11/16	1 13/16	3 1/16	2 1/4	1 5/8
1 1/2	1 7/8-12	3 11/16	2 3/4	15/16	1 15/16	2 3/32	3 21/64	2 25/64	1 5/8
2	2 1/2-12	4 9/16	3 7/16	1 1/4	2 29/64	2 11/16	4 9/64	2 57/64	2 9/16



**754-FSO 45° MALE ELBOW**  
**Tube to Straight Thread**  
 with O-Ring, Back-up Washer and Lock Nut

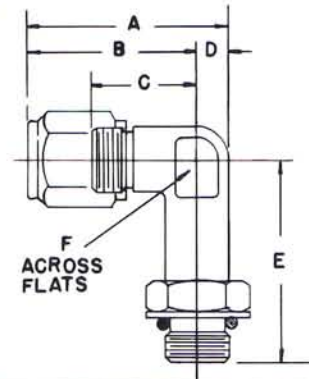


Tube O.D.	Thread	A Swing Radius	B	C	D	E	F	G
1/4	7/16-20	43/64	7/32	61/64	5/8	1 1/32	1/2	1 15/64
5/16	1/2-20	3/4	9/32	1 1/8	23/32	1 1/16	9/16	1 13/16
3/8	9/16-18	53/64	9/32	1 15/64	31/64	1 1/8	9/16	1 61/64
1/2	3/4-16	7/8	3/8	1 21/64	25/32	1 9/32	3/4	2 5/32
5/8	7/8-14	1 3/64	7/16	1 9/16	15/16	1 1/2	7/8	2 35/64
3/4	1 1/16-12	1 3/16	17/32	1 11/16	1 1/16	1 23/32	1 1/16	2 23/32
7/8	1 3/16-12	1 21/64	21/32	1 53/64	1 13/64	1 13/16	1 5/16	3 3/32
1	1 5/16-12	1 25/64	21/32	1 7/8	1 1/4	1 27/32	1 5/16	3 15/64

## STRAIGHT THREAD O-RING FITTINGS



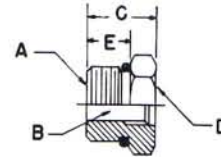
**769LL-FSO EXTRA LONG MALE ELBOW**  
**Tube to Straight Thread**  
 with O-Ring, Back-up Washer and Lock Nut



Tube O.D.	Thread	A	B	C	D	E	F
				Body $\varnothing$	Swing Radius		
1/2	3/4-16	1 59/64	1 35/64	1	1 1/32	3/8	2 3/4



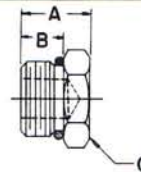
**719-FSO ADAPTER**  
 with O-Ring



A		B		C	D	E
Tube O.D.	Thread	Tube O.D.	Thread		Hex.	
1/2	3/4-16	1/4	7/16-20	3/4	7/8	7/16
1/2	3/4-16	5/16	1/2-20	3/4	7/8	7/16
5/8	7/8-14	1/4	7/16-20	13/16	1	1/2
5/8	7/8-14	5/16	1/2-20	13/16	1	1/2
3/4	1 1/16-12	1/4	9/16-18	1	1 1/4	19/32
3/4	1 1/16-12	3/8	7/16-20	1	1 1/4	19/32
7/8	1 1/16-12	1/4	7/16-20	1	1 3/8	19/32
7/8	1 3/16-12	5/16	1/2-20	1	1 3/8	19/32
7/8	1 3/16-12	3/8	9/16-18	1	1 3/8	19/32
1	1 5/16-12	1/4	7/16-20	1	1 1/2	19/32
1	1 5/16-12	5/16	1/2-20	1	1 1/2	19/32
1	1 5/16-12	3/8	9/16-18	1	1 1/2	19/32



**721-FSO PLUG**  
 with O-Ring



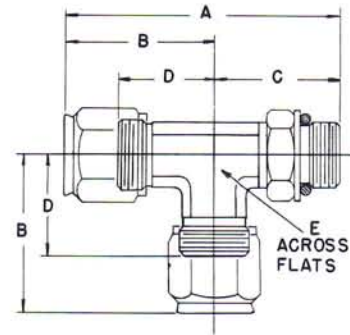
Tube O.D.	Thread	A	B	C
				Hex.
1/4	7/16-20	43/64	23/64	9/16
5/16	1/2-20	43/64	23/64	5/8
3/8	9/16-18	47/64	25/64	11/16
1/2	3/4-16	51/64	7/16	7/8
5/8	7/8-14	151/16	1/2	1
3/4	1 1/16-12	135/32	19/32	1 1/4
7/8	1 3/16-12	135/32	19/32	1 3/8
1	1 5/16-12	1 1/8	19/32	1 1/2
1 1/4	1 5/8-12	1 13/64	19/32	1 7/8
1 1/2	1 7/8-12	1 11/64	19/32	2 1/8
2	2 1/2-12	1 7/16	19/32	2 3/4

## STRAIGHT THREAD O-RING FITTINGS

### 771-FSO MALE RUN TEE

**Tube to Straight Thread to Tube**

with O-Ring, Back-up Washer and Lock Nut

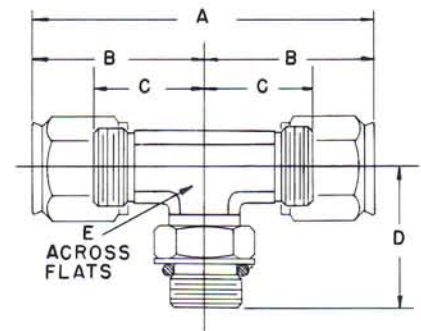


Tube O.D.	Thread	A	B	C	D		E
					Body $\phi$	Swing Radius	
$\frac{1}{4}$	$\frac{7}{16}$ -20	$2\frac{5}{32}$	$1\frac{3}{8}$	$1\frac{1}{16}$	$\frac{49}{64}$	$\frac{53}{64}$	$\frac{7}{16}$
$\frac{5}{16}$	$\frac{1}{2}$ -20	$2\frac{13}{32}$	$1\frac{9}{16}$	$1\frac{11}{64}$	$\frac{57}{64}$	$\frac{31}{32}$	$\frac{9}{16}$
$\frac{3}{8}$	$\frac{9}{16}$ -18	$2\frac{11}{16}$	$1\frac{7}{16}$	$1\frac{1}{4}$	1	$1\frac{5}{64}$	$\frac{9}{16}$
$\frac{1}{2}$	$\frac{3}{4}$ -16	$3\frac{9}{64}$	$1\frac{11}{16}$	$1\frac{29}{64}$	$1\frac{9}{64}$	$1\frac{15}{64}$	$\frac{3}{4}$
$\frac{5}{8}$	$\frac{7}{8}$ -14	$3\frac{21}{32}$	$1\frac{61}{64}$	$1\frac{45}{64}$	$1\frac{21}{64}$	$1\frac{7}{16}$	$\frac{7}{8}$
$\frac{3}{4}$	$1\frac{1}{16}$ -12	$4\frac{1}{64}$	$2\frac{5}{16}$	$1\frac{61}{64}$	$1\frac{29}{64}$	$1\frac{5}{8}$	$1\frac{1}{16}$
$\frac{7}{8}$	$1\frac{3}{16}$ -12	$4\frac{3}{8}$	$2\frac{9}{16}$	$2\frac{1}{16}$	$1\frac{11}{16}$	$1\frac{27}{32}$	$1\frac{5}{16}$
1	$1\frac{5}{16}$ -12	$4\frac{27}{64}$	$2\frac{3}{8}$	$2\frac{3}{64}$	$1\frac{3}{4}$	$1\frac{7}{8}$	$1\frac{5}{16}$

### 772-FSO MALE BRANCH TEE

**Tube to Tube to Straight Thread**

with O-Ring, Back-up Washer and Lock Nut



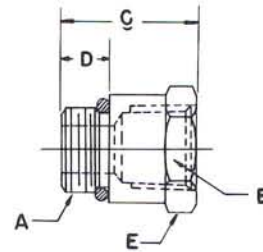
Tube O.D.	Thread	A	B	C		D	E
				Body $\phi$	Swing Radius		
$\frac{1}{4}$	$\frac{7}{16}$ -20	$2\frac{5}{32}$	$1\frac{5}{64}$	$\frac{3}{4}$	$\frac{53}{64}$	$1\frac{3}{64}$	$\frac{7}{16}$
$\frac{5}{16}$	$\frac{1}{2}$ -20	$2\frac{9}{16}$	$1\frac{9}{32}$	$\frac{7}{8}$	$\frac{31}{32}$	$1\frac{5}{32}$	$\frac{9}{16}$
$\frac{3}{8}$	$\frac{9}{16}$ -18	$2\frac{27}{32}$	$1\frac{27}{64}$	$\frac{63}{64}$	$1\frac{5}{64}$	$1\frac{15}{64}$	$\frac{9}{16}$
$\frac{1}{2}$	$\frac{3}{4}$ -16	$3\frac{9}{32}$	$1\frac{11}{64}$	$1\frac{3}{32}$	$1\frac{15}{64}$	$1\frac{15}{32}$	$\frac{3}{4}$
$\frac{5}{8}$	$\frac{7}{8}$ -14	$3\frac{7}{8}$	$1\frac{15}{16}$	$1\frac{9}{16}$	$1\frac{7}{16}$	$1\frac{11}{16}$	$\frac{7}{8}$
$\frac{3}{4}$	$1\frac{1}{16}$ -12	$4\frac{1}{8}$	$2\frac{1}{16}$	$1\frac{7}{16}$	$1\frac{5}{8}$	$1\frac{15}{16}$	$1\frac{1}{16}$
$\frac{7}{8}$	$1\frac{3}{16}$ -12	$4\frac{5}{8}$	$2\frac{5}{16}$	$1\frac{11}{16}$	$1\frac{27}{32}$	$2\frac{1}{32}$	$1\frac{5}{16}$
1	$1\frac{5}{16}$ -12	$4\frac{5}{8}$	$2\frac{5}{16}$	$1\frac{11}{16}$	$1\frac{7}{8}$	$2\frac{1}{32}$	$1\frac{5}{16}$

## STRAIGHT THREAD O-RING FITTINGS

### 720-FSO ADAPTER

Straight Thread to Female P.T.

with O-Ring

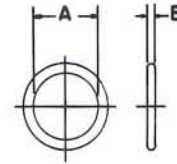


Tube O.D.	A Thread	B Pipe Thread	C	D	E
$\frac{1}{4}$	$\frac{7}{16}$ -20	$\frac{1}{4}$	$1\frac{1}{16}$	$\frac{23}{64}$	$\frac{3}{4}$
$\frac{5}{16}$	$\frac{1}{2}$ -20	$\frac{1}{4}$	$1\frac{1}{16}$	$\frac{23}{64}$	$\frac{3}{4}$
$\frac{3}{8}$	$\frac{9}{16}$ -18	$\frac{1}{4}$	$1\frac{3}{32}$	$\frac{25}{64}$	$\frac{3}{4}$
$\frac{1}{2}$	$\frac{3}{4}$ -16	$\frac{1}{2}$	$1\frac{11}{32}$	$\frac{7}{16}$	$1\frac{1}{16}$
$\frac{5}{8}$	$\frac{7}{8}$ -14	$\frac{1}{2}$	$1\frac{13}{32}$	$\frac{1}{2}$	$1\frac{1}{16}$

### 710-FSO O-RING

These O-Rings, which are furnished on Hi-Seal Fitting assemblies, meet SAE J515 specifications. This compound is suitable for use with hydraulic fluid of mineral oil base, lubricating and vegetable oils, water and for pneumatic service.

O-Ring compounds for other types of service can also be furnished. Write factory for data, stating type of fluid to be used.



Tube O.D.	A Diameter	B Thickness
$\frac{1}{4}$	.351	.072
$\frac{5}{16}$	.414	.072
$\frac{3}{8}$	.468	.078
$\frac{1}{2}$	.644	.087
$\frac{5}{8}$	.755	.097
$\frac{3}{4}$	.924	.116
$\frac{7}{8}$	1.048	.116
1	1.171	.116
$1\frac{1}{4}$	1.475	.118
$1\frac{1}{2}$	1.720	.118
2	2.337	.118

### 711-FSO LOCK NUT

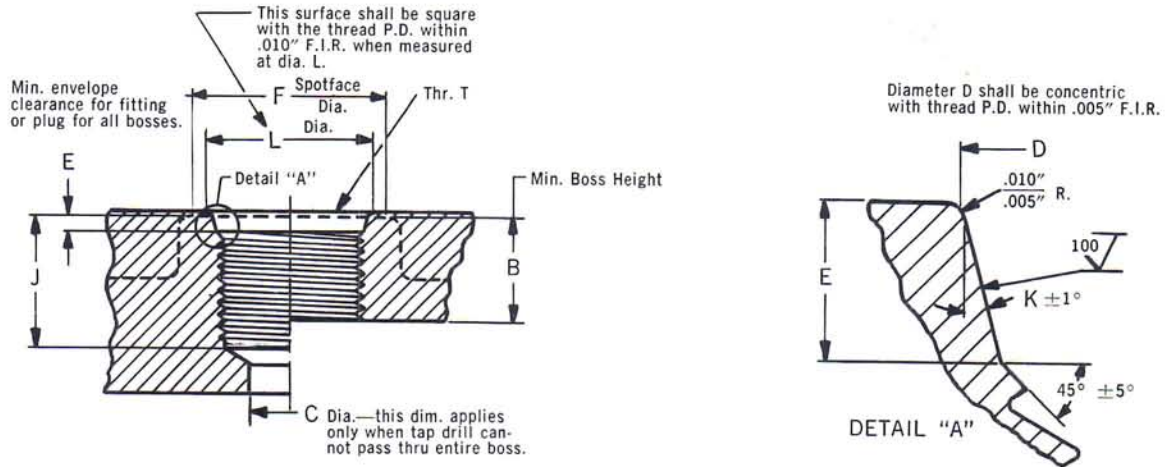
For Use with O-Ring Fittings



Tube O.D.	Thread	A	B Hex.
$\frac{1}{4}$	$\frac{7}{16}$ -20	$\frac{1}{4}$	$\frac{9}{16}$
$\frac{5}{16}$	$\frac{1}{2}$ -20	$\frac{1}{4}$	$\frac{9}{16}$
$\frac{3}{8}$	$\frac{9}{16}$ -18	$\frac{17}{64}$	$1\frac{1}{16}$
$\frac{1}{2}$	$\frac{3}{4}$ -16	$\frac{5}{16}$	$\frac{7}{8}$
$\frac{5}{8}$	$\frac{7}{8}$ -14	$\frac{23}{64}$	1
$\frac{3}{4}$	$1\frac{1}{16}$ -12	$1\frac{3}{32}$	$1\frac{1}{4}$
$\frac{7}{8}$	$1\frac{3}{16}$ -12	$1\frac{3}{32}$	$1\frac{3}{8}$
1	$1\frac{5}{16}$ -12	$1\frac{3}{32}$	$1\frac{1}{2}$

## SAE INTERNAL STRAIGHT THREAD O-RING BOSS

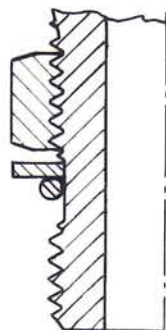
for Imperial-Eastman Straight Thread Tube Fittings with O-Ring Sealing  
Meets Standards of MS 16142 (ships)



Finish diameters "A" and "D" shall be free from longitudinal and spiral tool marks. Annular tool marks up to 100 micro-inches will be permissible.

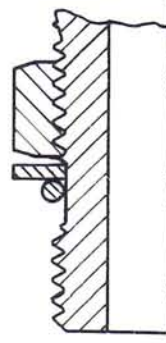
tube outside diameter	STRAIGHT THREAD "T"				B Min. Th'd. Depth	C Min. Dia.	D +.005 -.000 Dia.	E +.015 -.000	F Dia.	J Min.	K ±1°	L Min. Dia.	
	Th'd. Size UNF-2B	Pitch Dia.		Minor Dia.									
		Min.	Max.	Min.									Max.
1/8	3/16-24	.2854	.2902	.267	.277	.390	.062	.358	.074	.672	.468	12°	.438
3/16	3/8-24	.3479	.3528	.330	.340	.390	.125	.421	.074	.750	.468	12°	.500
1/4	7/16-20	.4050	.4104	.383	.395	.454	.172	.487	.093	.828	.547	12°	.563
3/16	1/2-20	.4675	.4731	.446	.457	.454	.234	.550	.093	.906	.547	12°	.625
3/8	9/16-18	.5264	.5323	.502	.515	.500	.297	.616	.097	.969	.609	12°	.688
1/2	3/4-16	.7094	.7159	.682	.696	.562	.391	.811	.100	1.188	.688	15°	.875
5/8	7/8-14	.8286	.8356	.798	.814	.656	.484	.942	.100	1.344	.781	15°	1.000
3/4	1 1/16-12	1.0084	1.0158	.972	.990	.750	.609	1.148	.130	1.625	.906	15°	1.250
7/8	1 1/8-12	1.1334	1.1409	1.097	1.115	.750	.719	1.273	.130	1.765	.906	15°	1.375
1	1 1/2-12	1.2584	1.2659	1.222	1.240	.750	.844	1.398	.130	1.910	.906	15°	1.500
1 1/4	1 3/8-12	1.5709	1.5785	1.535	1.553	.750	1.078	1.713	.132	2.270	.906	15°	1.875
1 1/2	1 7/8-12	1.8209	1.8287	1.785	1.803	.750	1.312	1.962	.132	2.560	.906	15°	2.125
2	2 1/2-12	2.4459	2.4540	2.410	2.428	.750	1.781	2.587	.132	3.480	.906	15°	2.750

### Assembly Instructions for Adjustable Fittings



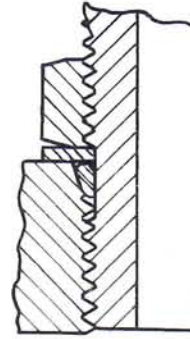
STEP 1

Turn the locknut as far back on the fitting as is possible. Lubricate O-Ring by coating with a light oil or petrolatum and position to the extreme rear of the O-Ring groove.



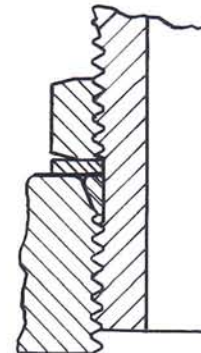
STEP 2

Turn the locknut down until it just contacts the back-up washer.



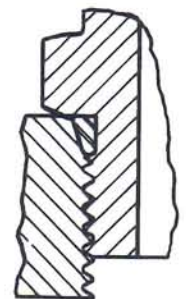
STEP 3

Holding the fitting and the locknut in position screw the fitting into the straight thread boss until the back-up washer just contacts the face of the boss.



STEP 4

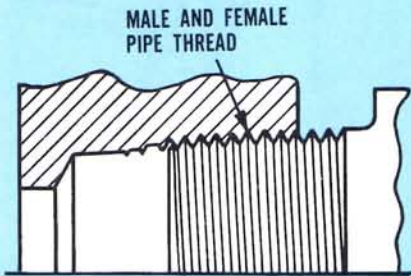
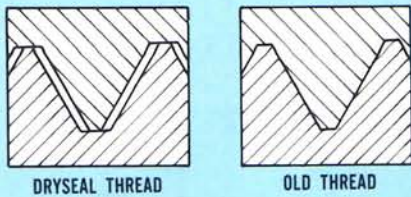
Position the fitting by turning the fitting out (counter clockwise) up to 359° and tighten the locknut against the face of the boss.



Typical installation of adapter into straight thread boss.

On Hi-Seal Connector, hex on body takes the place of locknut. Screw fully into straight thread boss and tighten hex against face of boss.

## PORT SEALING METHODS



Hi-Seal Fittings are furnished with 2 types of port seals

### LONG DRYSEAL PIPE THREADS

Standard pipe threads are the common connection between tube fittings, valves and other components. Hi-Seal is furnished with long Dryseal Pipe Threads.

Dryseal threads have a flat on the root wider than the flat on the crest. Because of this, contact between root and crest is assured before the flanks of threads engage. Also, spiral clearance—often a problem with the former American Standard—is eliminated.

The additional length of Dryseal pipe threads is highly valuable when reconnecting. It allows for further take-up; and in combination with the thread form, gives a tighter joint with less chance of leakage.

### STRAIGHT THREAD O-RING SEAL

For connecting into ports of hydraulic valves and other parts, the O-Ring seal offers these advantages: It eliminates the possibility of broken fittings, deformed housings, and cracking of ports which result from over-torquing with pipe threads. An O-Ring seal also lets you position elbows and tees so that tube ends will always be in proper alignment.

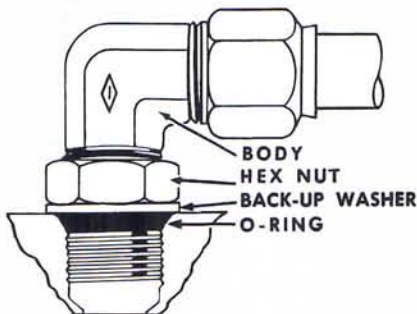
Hi-Seal elbows and tees with straight thread O-Ring seal have a back-up washer crimped into position in the O-Ring groove ahead of the lock nut. This washer prevents O-Ring from extruding into threads when the joint is under pressure.

When specifying O-Rings, they must be of a compound compatible with the fluid in the system.

## HOW TO ASSEMBLE

### FITTINGS WITH STRAIGHT THREAD O-RING SEAL

1. Turn the locknut as far back on the fitting as is possible. Lubricate O-Ring by coating with a light oil or petrolatum and position to the extreme rear of the O-Ring groove.
2. Turn the locknut down until it just contacts the back-up washer.
3. Holding the fitting and the locknut in position screw the fitting into the straight thread boss until the back-up washer just contacts the face of the boss.
4. Position the fitting by turning the fitting out (counter clockwise) up to 359° and tighten the locknut.
5. On Hi-Seal Connector, hex on body takes the place of locknut. Screw fully into straight thread boss and tighten hex against face of boss.





**FITTING MATERIAL:**

Steel

**TUBING MATERIAL:**

Steel, S.A.E. 1010  
(Tensile Strength Assumed  
 $S_U = 38 \text{ da N/mm}^2$ )

**RECOMMENDED MAX. WORKING PRESSURE  
AT 4:1 SAFETY FACTOR (bar)**

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)				
	0.75	1	1.5	2	2.5
6	237	316	474	—	—
8	178	237	356	474	—
10	142	190	284	380	475
12	—	158	237	316	396
15	—	127	190	254	317

**FITTING MATERIAL:**

Stainless Steel, Type 316  
with Armco 17-4PH  
Sleeves

**TUBING MATERIAL:**

Annealed Stainless  
Steel, Type 304  
(Tensile Strength Assumed  
 $S_U = 55 \text{ da N/mm}^2$ )

**RECOMMENDED MAX. WORKING PRESSURE  
AT 4:1 SAFETY FACTOR (bar)**

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)				
	0.75	1	1.5	2	2.5
6	343	458	686	—	—
8	258	344	516	688	—
10	206	275	412	550	687
12	171	229	342	458	572
15	—	183	275	366	458

**FITTING MATERIAL:**

Brass

**TUBING MATERIAL:**

Annealed Copper  
(Tensile Strength Assumed  
 $S_U = 20 \text{ da N/mm}^2$ )

**RECOMMENDED MAX. WORKING PRESSURE  
AT 4:1 SAFETY FACTOR (bar)**

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)				
	0.75	1	1.5	2	2.5
6	125	167	250	—	—
8	94	125	188	250	—
10	75	100	150	200	250
12	62	83	124	166	208
15	—	66	100	132	166

**FITTING MATERIAL:**

Brass

**TUBING MATERIAL:**

Copper, Half Hard  
(Tensile Strength Assumed  
 $S_U = 28 \text{ da N/mm}^2$ )

**RECOMMENDED MAX. WORKING PRESSURE  
AT 4:1 SAFETY FACTOR (bar)**

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)				
	0.75	1	1.5	2	2.5
6	174	233	348	—	—
8	131	175	262	350	—
10	105	140	210	280	350
12	87	117	174	234	291
15	—	93	140	186	233

The above recommended maximum working pressure values are based on an average tensile strength of tubing material and on assumption of 4:1 safety factor. These pressure values have been calculated from formula

$$p = \frac{2 S_U t}{Dn} \times 10^2$$

WHERE: p — max. working pressure (bar)  
 $S_U$  — tensile strength of the tube material (da N/mm<sup>2</sup>)  
 t — tube wall thickness (mm)  
 D — tube O.D. (mm)  
 n — safety factor; n = 4

To obtain max. working pressure based on a safety factor of 6:1, divide the pressure value, indicated in the table, by 1.5; for a 8:1 safety factor, divide by 2.

## HOW TO SPECIFY AND ORDER METRIC HI-SEAL TUBE FITTINGS

The catalog number shown with each fitting listing designates the type of fitting as indicated by the illustration and listing.

Metric Hi-Seal fittings are available as standard in steel, stainless steel, and brass. Pipe threads are available as standard in NPTF, BSPT Whitworth Conical and Metric Conical ends.

One of the following suffix letters must be added to the catalog number to indicate the metal desired.

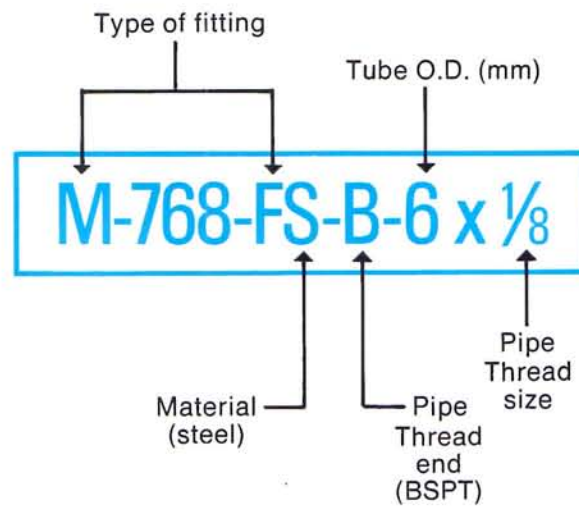
- S** —Steel
- SS**—Stainless Steel
- B** —Brass

Also, add one of the following suffix letters to indicate the pipe thread end desired.

- N** —NPTF thread
- B** —BSPT
- M** —Metric Conical thread

Finally, include the size designation.

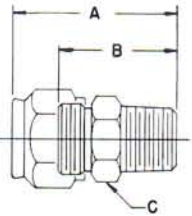
### EXAMPLE:



When specifying No. M-768-F connector in steel with a 6 mm O.D. tube connection and 1/8" BSPT Whitworth Conical male pipe thread, this should be written No. M-768-FS-B-6 x 1/8.



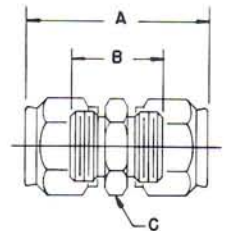
**M-768-F MALE CONNECTOR**  
Tube to Male P.T.



Tube O.D. mm	Pipe Thread	A mm	B mm	C Hex. mm
6	1/8 NPTF	32.4	24.2	12.7
6	1/8 BSPT	32.4	24.2	14
6	M10x1 con.	31.0	22.8	14
8	1/4 NPTF	39.7	29.3	16
8	1/4 BSPT	39.7	29.3	15
8	M12x1.5 con.	37.4	27.0	15
10	1/4 NPTF	41.7	30.6	16
10	1/4 BSPT	41.7	30.6	17
10	M14x1.5 con.	39.4	28.3	17
12	3/8 NPTF	45.6	31.7	19
12	3/8 BSPT	45.6	31.7	19
12	M16x1.5 con.	43.3	29.4	19
15	1/2 NPTF	57.1	41.3	24
15	1/2 BSPT	57.1	41.3	24
15	M18x1.5 con.	51.1	35.3	24



**M-762-F UNION**  
Tube to Tube



Tube O.D. mm	A mm	B mm	C Hex. mm
6	39.7	23.0	12.7
8	45.2	23.0	14.3
10	47.6	25.4	16
12	55.6	27.8	19
15	63.5	31.7	24



## M-760-F SLEEVE



Tube O.D. mm
6
8
10
12
15

One of the following suffix letters must be added to the catalog number to indicate the metal desired:

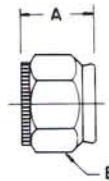
**S** —Steel

**PH**—Stainless Steel, Armco 17-4 PH. (Sleeves only are furnished in this material.)

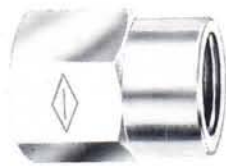
**B** —Brass



## M-761-F NUT



Tube O.D. mm	Thread	A mm	B mm
6	1/2—20	15.0	15
8	9/16—18	17.0	17
10	5/8—18	19.0	19
12	3/4—16	22.6	22
15	15/16—16	25.4	27

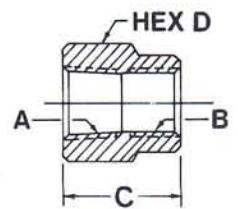


## Metric COUPLING

Female NPTF to  
Female BSP Parallel

M-103-B . . . . . BRASS

M-103-SS . . . . . STAINLESS STEEL



A NPTF THREAD	B BSP PARALLEL THREAD	C mm	HEX D mm
1/8	1/8	19.0	14
1/4	1/4	28.6	19
3/8	3/8	28.6	22
1/2	1/2	38.1	27

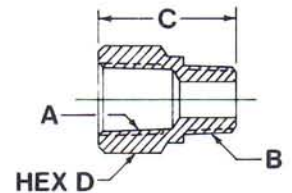


## Metric ADAPTER

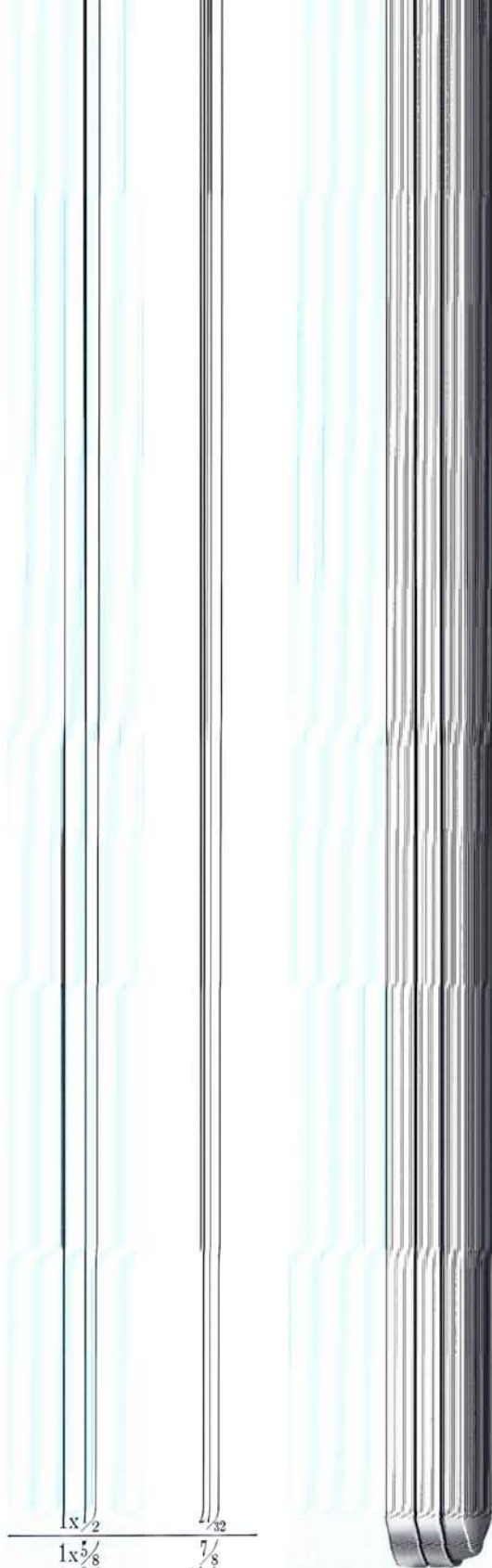
Female NPTF to  
Male BSP Taper

M-120-B . . . . . BRASS

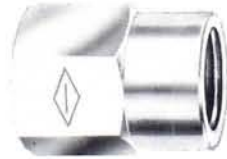
M-120-SS . . . . . STAINLESS STEEL



A NPTF THREAD	B BSP TAPER THREAD	C mm	HEX D mm
1/8	1/8	23.0	14
1/4	1/4	31.7	19
3/8	3/8	32.1	22
1/2	1/2	42.9	27



$1 \times \frac{1}{2}$	$\frac{1}{32}$
$1 \times \frac{3}{8}$	$\frac{7}{8}$
$1 \times \frac{1}{4}$	$1 \frac{1}{32}$
$1 \frac{1}{4} \times \frac{1}{4}$	$\frac{7}{8}$
$1 \frac{1}{4} \times \frac{3}{8}$	$\frac{29}{32}$
$1 \frac{1}{4} \times \frac{1}{2}$	$\frac{15}{16}$
$1 \frac{1}{4} \times 1$	$1 \frac{3}{16}$
$1 \frac{1}{2} \times \frac{1}{2}$	$1 \frac{1}{32}$
$1 \frac{1}{2} \times \frac{3}{4}$	$1 \frac{7}{32}$
$1 \frac{1}{2} \times 1$	$1 \frac{9}{32}$
$1 \frac{1}{2} \times 1 \frac{1}{4}$	$1 \frac{3}{8}$

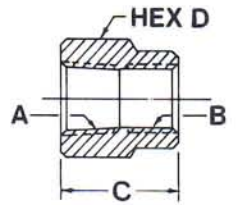


**Metric  
COUPLING**

**Female NPTF to  
Female BSP Parallel**

M-103-B . . . . . BRASS

M-103-SS . . . . . STAINLESS STEEL



A NPTF THREAD	B BSP PARALLEL THREAD	C mm	HEX D mm
1/8	1/8	19.0	14
1/4	1/4	28.6	19
3/8	3/8	28.6	22
1/2	1/2	38.1	27

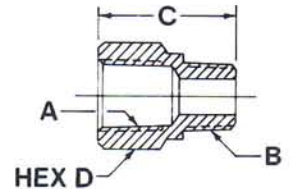


**Metric  
ADAPTER**

**Female NPTF to  
Male BSP Taper**

M-120-B . . . . . BRASS

M-120-SS . . . . . STAINLESS STEEL



A NPTF THREAD	B BSP TAPER THREAD	C mm	HEX D mm
1/8	1/8	23.0	14
1/4	1/4	31.7	19
3/8	3/8	32.1	22
1/2	1/2	42.9	27

### TUBE FITTINGS

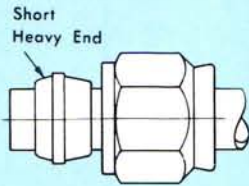


Figure 1

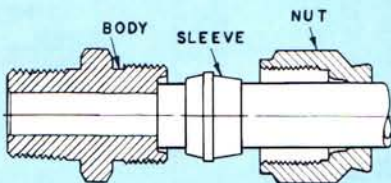


Figure 2

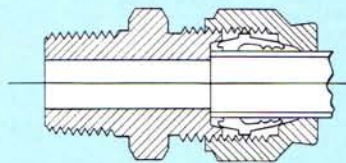


Figure 3

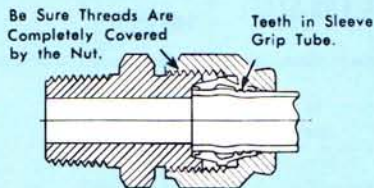


Figure 4

## 1. PREPARATION OF TUBING

- Cut tubing with a tube cutter such as Imperial No. 274-FB, or a hacksaw with a fine tooth blade and a sawing vise, such as Imperial No. 384-FA.
- Deburr inside and outside of tubing sufficiently to remove burrs and to assure that sleeve will slip freely onto the tube.

## 2. ASSEMBLY

- If permissible, lubricate the threads and the camming area of the nut with a lubricant that will be compatible with the system fluid. Hydraulic Fluid or ordinary motor oil may be used.
- Slide nut onto tubing, place sleeve over end of tube with short, heavy end facing end of tubing. (Figure 1). Butt tubing end against body tubing stop (Figure 2).
- Assemble nut, sleeve and tube to body hand tight (Figure 3).
- Tighten nut with a wrench until threads on body are completely covered by the nut as shown in Figure 4. This visual check provides positive assurance of a tight joint.

### ASSEMBLY HINTS WITH HI-SEAL FLARELESS TUBE FITTING

- Always use a fitting that is compatible with the tubing that is used (i.e. when using annealed stainless steel tubing, use 316 stainless steel fitting; when using  $\frac{1}{8}$  hard stainless steel tubing, use 316 stainless steel body and nut with Armco 17-4 PH stainless steel sleeve). Keep in mind that the sleeve should always have a hardness greater than that of the tubing used.
- Assemble both ends of tube hand tight before tightening nuts.



## PRESETTING INSTRUCTIONS FOR HI-SEAL FITTINGS

It normally is not necessary to preset Hi-Seal Fittings. Presetting is ordinarily used only where adequate torque cannot be applied at point of installation due to space restrictions, or for pre-production assembly. Special presetting tools are available. See listing below. In an emergency, a fitting body may be used as a presetting tool.

### 1. PREPARATION OF TUBING

Follow Step 1 as outlined in general assembly instructions.

### 2. PRESETTING

- Select the proper size presetting tool.
- Lubricate the threads and the camming area of the nut with a lubricant that will be compatible with the system fluid.
- Slide nut onto tubing and place sleeve over end of tube with short, heavy end facing end of tubing as shown in Figure 1. Butt tubing end against tubing stop in tool.
- Assemble nut, sleeve and tube to presetting tool hand tight as shown in Figure 2.
- Tighten nut with a wrench until threads on presetting tool are covered by the nut as shown in Figure 3.

### 3. DISASSEMBLY AND INSPECTION

- Disassemble from presetting tool and clean off excessive lubricant and foreign matter.
- Make sure that:
  - Sleeve has been coined into tubing leaving a slight concave surface on outside diameter of sleeve.
  - Sleeve does not move longitudinally. (It may rotate on tube.)

### 4. FINAL ASSEMBLY

- Install the line in position and finger tighten nut on body of fitting.
- Tighten nut until an increased resistance to turning is felt. At this point the nut should completely cover the threads on the body; if not, tighten until it does. See Figure 4.

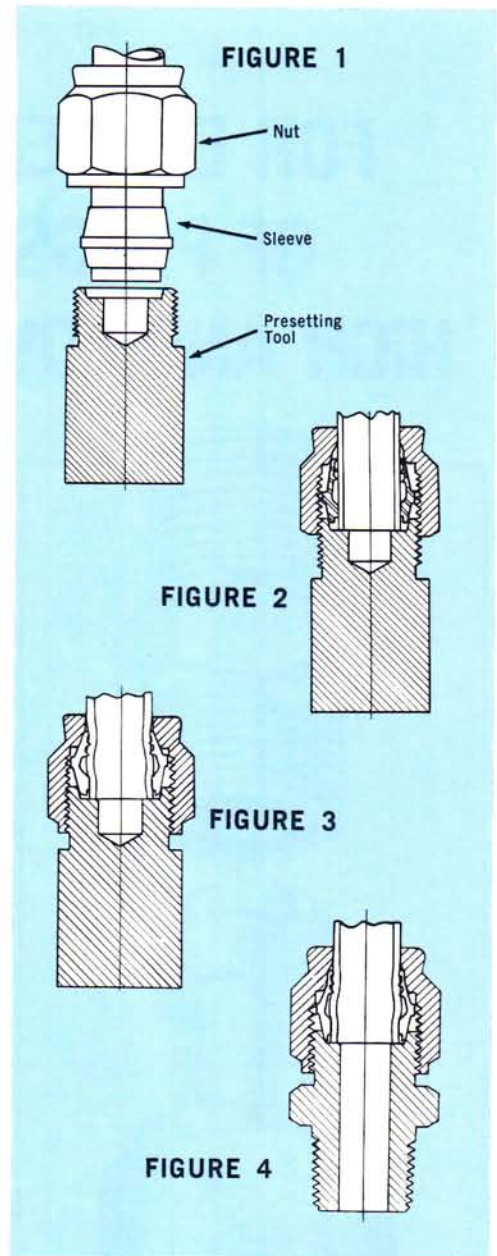
### MAINTENANCE OF PRESETTING TOOL

Handle presetting tools with care, being sure that the threads and 12° seat are not nicked or in any way damaged.

Do not attempt to rework tool if it becomes damaged—obtain a new tool.

Keep tools stored so that they will not be damaged.

“Seal-peal” dip or a similar protective coating that is used for gages and tools is recommended.



**PRESETTING TOOLS**

Made of hardened stainless steel.

No. 700-FS	
O.D. Tube Size	O.D. Tube Size
1/8"	5/8"
3/16"	3/4"
1/4"	7/8"
5/16"	1"
3/8"	1 1/4"
1/2"	1 1/2"

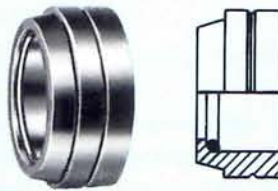
## TUBE FITTINGS

# FOR EXTREME CONDITIONS OF PRESSURE, VACUUM, HIGH AND LOW TEMPERATURES



Pat. No. 3,201,154

The Braze-Seal Fitting Solves the problem of tubing installations which demand absolute reliability under very high pressures, vacuum, higher temperatures, cryogenics and vibration—applications which formerly required welded connections.



**BRAZE-SEAL SLEEVES**  
contain a special silver alloy brazing ring.



**BRAZE-SEAL TORCH**  
simplifies installation.

# BRAZED FITTINGS with MAKE-AND-BREAK ADVANTAGES

The Braze-Seal sleeve contains a ring of silver brazing alloy inside of it. This sleeve does not have gripping serrations like the standard Hi-Seal sleeve.

The Braze-Seal sleeve is placed over end of tube and heated, causing the ring of brazing alloy to flow and form a tough, lasting bond between the tube and the sleeve. The Braze-Seal sleeve and nut are then assembled with the standard Hi-Seal Fitting body.

This fitting assembly offers all the advantages of the standard Hi-Seal Fitting, including make-and-break convenience. A Braze-Seal fitting can be repeatedly disconnected and reassembled without loss of original reliability.

## SIMPLIFIED ASSEMBLY

The Braze-Seal fitting is more compact, economical and easier to install than any other fitting made for very high pressure, high and low temperature service. Braze-Seal fittings require minimum tube preparation. No machining of tube is necessary. Tube need only be cleaned and fluxed. The easy brazing operation is far faster and cleaner than welding joints.

## REDUCING SLEEVES

An important advantage of Braze-Seal is that tubing of smaller diameter can be connected to any specified fitting body size, with the use of a reducing sleeve. (Jump sizes can be made.) This feature is extremely convenient on tees, for example, where any smaller size tube can be connected to the same tee body.

Braze-Seal reducing sleeves are used with the standard Braze-Seal nuts and Hi-Seal bodies.

## RELIABILITY FOR CRITICAL INSTALLATIONS

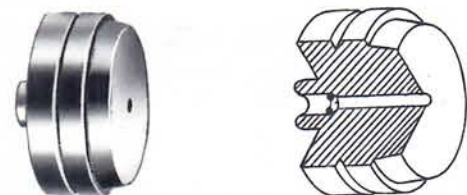
The porosity which can occur in a welded joint is eliminated in a Braze-Seal connection. The brazing ring was especially developed to give 100% coverage, providing a completely reliable connection.

Braze-Seal eliminates contamination of the system and the need for stress relieving which can be caused by welded connections. Braze-Seal can be readily inspected for cleanliness before assembly. It allows for correction of installation errors by re-heating and removing the sleeve. All of these features eliminate the hazards of a permanently brazed, non-threaded connection.

Braze-Seal will hold high and low pressure volatiles and other fluids where zero leakage is required. Excellent for cryogenic applications where nitrogen, hydrogen, helium, etc. must be conducted under zero leakage conditions. These fittings have been used with complete success on applications which caused every other practical connecting method to fail.



This application illustrates two  $\frac{3}{4}$ " O.D. tubes connected to a  $\frac{1}{8}$ " O. D. outlet with the aid of a Braze-Seal reducing sleeve.



A typical Braze-Seal reducing sleeve.

# MAXIMUM DESIGN PRESSURES

### Based on 80% Braze Coverage

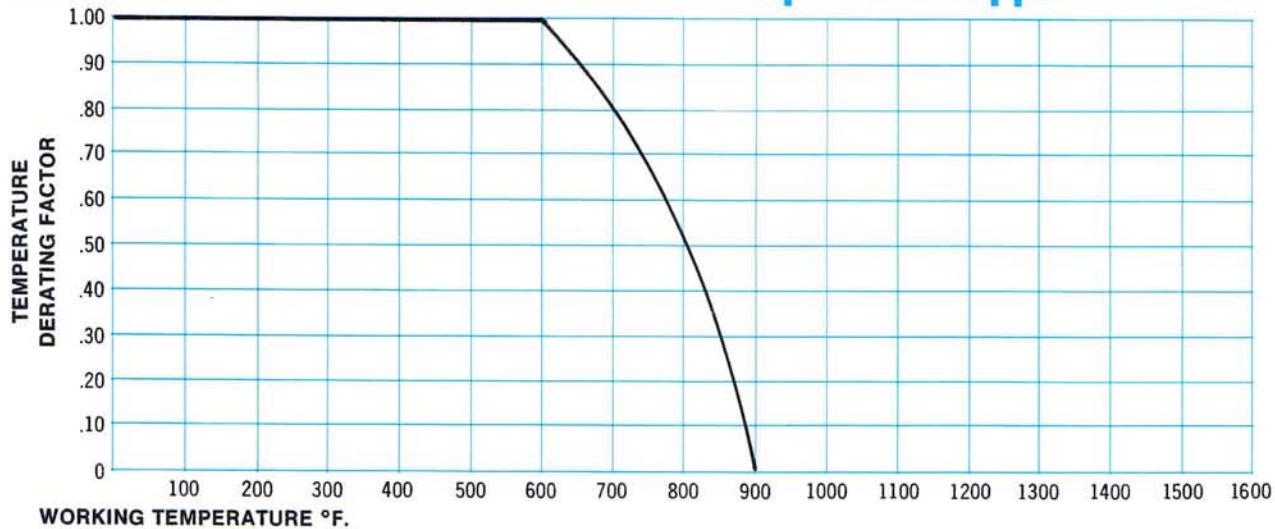
(It is recommended that tubing with an O.D. of nominal to plus tolerance be used to provide optimum clearance for the brazed joint.)

### MAXIMUM PRESSURES – psi

TUBE O.D.	316 STAINLESS	CARBON STEEL
1/4"	77,000	60,000
3/8"	64,000	48,000
1/2"	62,400	46,800
5/8"	61,600	
3/8"	61,600	46,200
3/4"	60,000	45,000
7/8"	56,000	42,000
1"	52,000	39,000
1 1/4"	48,000	36,000
1 1/2"	44,000	33,000

Application of a 4 to 1 safety factor is normally recommended.

## DERATING FACTORS for Elevated Temperature Applications



### PRESSURE RATING PROCEDURE FOR BRAZE-SEAL FITTINGS

1. Select appropriate absolute pressure capability from chart above.
2. Divide by proper safety factor. Application of a 4 to 1 safety factor is normally recommended. The value obtained is the pressure rating at room temperature (72°F).

3. For applications involving service at elevated temperatures the pressure rating must be multiplied by an appropriate temperature derating factor obtained from the temperature derating chart above.

Notes: 1. Carbon Steel fittings not normally recommended above 600°F.

2. 316 stainless steel fittings not normally recommended above 800°F.

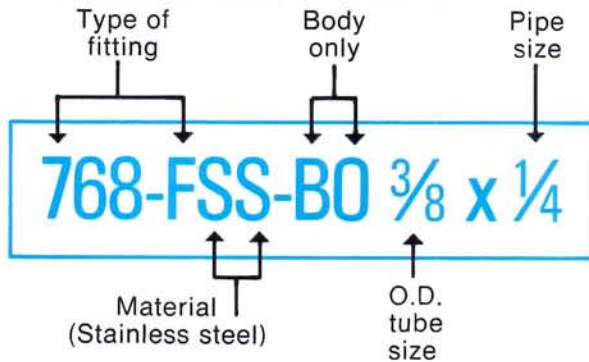
Note: These working pressures are not necessarily valid for system components other than Braze-Seal fitting ends. Prudent system design requires that all other system components be evaluated for their specific proper pressure capabilities.

## HOW TO SPECIFY & ORDER BRAZE-SEAL FITTINGS

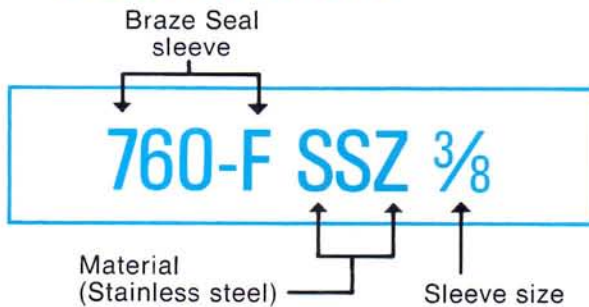
Any Hi-Seal steel or stainless steel fitting can be converted to an extra-reliable Braze-Seal fitting by replacing the Hi-Seal nut and sleeve with the Braze-Seal nut and sleeve.

To order the Braze-Seal Fitting, specify the Hi-Seal body and order the Braze-Seal nuts and sleeves separately.

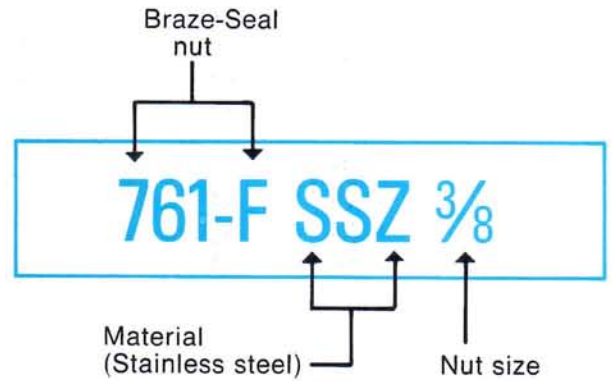
### EXAMPLE: BODY ONLY



### EXAMPLE: SLEEVE



### EXAMPLE: NUT



### Example:

The size designation must be included in the catalog number.

When specifying No. 768-F Braze-Seal connector in stainless steel with  $\frac{3}{8}$ " O.D. tube connection and  $\frac{1}{4}$ " male pipe thread, this should be written:

**768-FSS-BO  $\frac{3}{8}$  x  $\frac{1}{4}$**

**760-FSSZ  $\frac{3}{8}$**

**761-FSSZ  $\frac{3}{8}$**

## 700-T BRAZE-SEAL TORCH

This torch provides an excellent means of heating Braze-Seal Fittings for making the brazed joint. The circular tip, with 6 flame jets, provides fast, even heating.

Spring tension on the two halves of the tip permits adjustment to any Braze-Seal size with a slight hand pressure. Six flame ports are evenly spaced around the tip to distribute the flame equally on the sleeve.

Mixer delivers proper amount of acetylene and air for best results. Furnished with standard hose connection.



No. 700-T Braze-Seal Torch. Size: 4" x 14½."

Silver brazing ring is furnished in Braze-Seal Sleeve. Braze-Seal Nuts and Sleeves are made of either stainless steel or carbon steel. They are used with standard stainless steel or carbon steel Hi-Seal bodies.

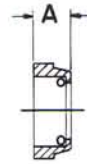
**Reducing Sleeves** for use in reducing any size Braze-Seal Fitting tube end to any specified tube size can be supplied on special order. Standard sizes for Reducing Sleeves are listed at right.

To order Braze-Seal Fittings, specify Hi-Seal body only (Example: No. 768-FSS-BO  $\frac{3}{8}$  x  $\frac{1}{4}$ ) and order Braze-Seal Nuts and Sleeves separately.



## 760-F BRAZE-SEAL® SLEEVE

STEEL - - - - 760-FSZ  
STAINLESS - - 760-FSSZ



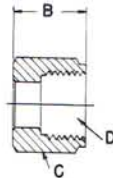
### 760-F Sleeves

Tube O.D.	A
$\frac{1}{4}$	$\frac{1}{4}$
$\frac{3}{8}$	$\frac{9}{32}$
$\frac{1}{2}$	$\frac{5}{16}$
* $\frac{9}{16}$	$\frac{13}{32}$
$\frac{5}{8}$	$\frac{11}{32}$
$\frac{3}{4}$	$\frac{1}{2}$
$\frac{7}{8}$	$\frac{1}{2}$
1	$\frac{9}{16}$
$1\frac{1}{4}$	$2\frac{1}{32}$
$1\frac{1}{2}$	$\frac{3}{4}$



## 761-F BRAZE-SEAL® NUT

STEEL - - - - 761-FSZ  
STAINLESS - - 761-FSSZ



Tube O.D.	B	C Hex.	D Thread
$\frac{1}{4}$	$2\frac{1}{32}$	$\frac{5}{8}$	$\frac{1}{2}$ -20
$\frac{3}{8}$	$\frac{49}{64}$	$\frac{3}{4}$	$\frac{5}{8}$ -18
$\frac{1}{2}$	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{3}{4}$ -16
* $\frac{9}{16}$	$\frac{59}{64}$	$1\frac{1}{8}$	$\frac{15}{16}$ -16
$\frac{5}{8}$	$\frac{55}{64}$	$1\frac{1}{8}$	$\frac{15}{16}$ -16
$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{16}$ -16
$\frac{7}{8}$	1	$1\frac{3}{8}$	$1\frac{3}{16}$ -16
1	$1\frac{1}{16}$	$1\frac{1}{2}$	$1\frac{5}{16}$ -16
$1\frac{1}{4}$	$\frac{13}{16}$	2	$1\frac{5}{8}$ -16
$1\frac{1}{2}$	$\frac{19}{32}$	$2\frac{1}{4}$	$1\frac{7}{8}$ -16

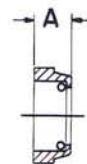
\*Used with  $\frac{3}{8}$ " bodies.

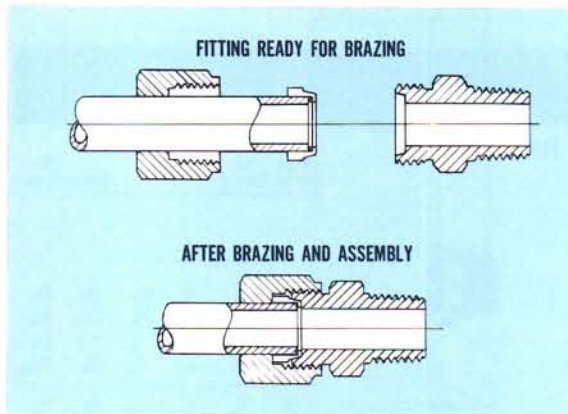
### 750-F Reducing Sleeves

Tube O.D.	A
$\frac{3}{8}$ x $\frac{1}{8}$	$\frac{31}{64}$
$\frac{3}{8}$ x $\frac{1}{4}$	$\frac{1}{2}$
$\frac{1}{2}$ x $\frac{1}{8}$	$\frac{33}{64}$
$\frac{1}{2}$ x $\frac{1}{4}$	$\frac{17}{32}$
$\frac{1}{2}$ x $\frac{3}{8}$	$\frac{9}{16}$
$\frac{5}{8}$ x $\frac{1}{4}$	$\frac{9}{16}$
$\frac{5}{8}$ x $\frac{3}{8}$	$\frac{19}{32}$
$\frac{5}{8}$ x $\frac{1}{2}$	$\frac{5}{8}$
$\frac{3}{4}$ x $\frac{1}{4}$	$\frac{23}{32}$
$\frac{3}{4}$ x $\frac{3}{8}$	$\frac{3}{4}$
$\frac{3}{4}$ x $\frac{1}{2}$	$\frac{25}{32}$
$\frac{3}{4}$ x $\frac{5}{8}$	$\frac{13}{16}$
1x $\frac{1}{4}$	$\frac{25}{32}$
1x $\frac{3}{8}$	$\frac{13}{16}$
1x $\frac{1}{2}$	$\frac{27}{32}$
1x $\frac{5}{8}$	$\frac{7}{8}$
1x $\frac{3}{4}$	$\frac{11}{32}$
$1\frac{1}{4}$ x $\frac{1}{4}$	$\frac{7}{8}$
$1\frac{1}{4}$ x $\frac{3}{8}$	$\frac{29}{32}$
$1\frac{1}{4}$ x $\frac{1}{2}$	$\frac{15}{16}$
$1\frac{1}{4}$ x1	$\frac{13}{16}$
$1\frac{1}{2}$ x $\frac{1}{2}$	$\frac{11}{32}$
$1\frac{1}{2}$ x $\frac{3}{4}$	$\frac{17}{32}$
$1\frac{1}{2}$ x1	$\frac{19}{32}$
$1\frac{1}{2}$ x $1\frac{1}{4}$	$\frac{13}{8}$

## 750-F REDUCING BRAZE-SEAL® SLEEVES

STEEL - - - - 750-FSZ  
STAINLESS - - - - 750-FSSZ





## GENERAL

To produce a satisfactory brazed joint, certain precautions must be taken. The parts to be brazed must be very thoroughly cleaned so that all scale, oxides, grease, oil, dirt or other foreign materials are removed.

A brazing flux such as Handy Flux, Lloyd's "Silver Flux," Harn's "Stay Silv," La Go's "Silver Solder Flux" should be used. These fluxes are fluid and active at the flow point of the brazing alloy. (Note that sleeve is furnished with silver brazing ring.) Flux should be applied evenly to both inside and outside of sleeve and outside of tubing with care taken to see that no bare spots remain.

A method of applying heat should be used that will heat the tube and sleeve uniformly. No. 700-T Imperial Eastman Braze-Seal Torch is excellent for this operation. The circular tip with 6 flame jets provides fast, even heating. When heating with an oxy-acetylene torch, a tip sufficiently large with a soft neutral or slightly reducing flame should be used to give the necessary heat.

As a general rule, best results are obtained when the joint is heated rapidly and kept at the brazing temperature for the minimum time required for proper flowing of the alloy. Resistance heating is acceptable; however, the current must be kept low enough to prevent severe burning at the contact points.

**STEP 1.** Cut tubing squarely with a hacksaw having a fine tooth blade and a sawing vise, such as Imperial No. 384-F. Deburr inside and outside of tubing to remove burrs and to assure that sleeve will slip freely onto the tube.

Inspect tube end for surface imperfections and ovality on the outer circumference. Make sure it conforms to tolerances and meets requirements of applicable specifications.

**STEP 2.** Clean sleeve (with silver brazing ring intact) and tube with a solvent to remove all oils and dirt. With a piece of emery cloth polish the outside surface of the tubing end over a 2 inch length to remove any metal oxides which may have formed.

**STEP 3.** Flux the I.D. of the sleeve, also covering the silver brazing ring, and place sleeve on tube. Flux the outside of the tube to a point beyond the sleeve depth.

**STEP 4.** Holding the tube upright if possible, heat tube and sleeve, concentrating the heat on the tube just below the sleeve. Slowly move the torch forward toward tip of the sleeve and back to the tube repeatedly until the braze ring begins to melt. Then move the torch to the back of the sleeve and hold until an even fillet begins to form. When fillet is formed remove the torch. Concentration of heat below the sleeve will draw the silver brazing alloy to the hot area and assure that the entire joint has been covered. If heat is concentrated at the alloy (tip of sleeve), the alloy will flow but may not fill the entire area due to cold spots.

At the flow temperature of the brazing alloy, the tube and sleeve should have a dull red color. While the alloy is still fluid, lightly press the sleeve down so that it abuts the end of the tubing.

**STEP 5.** Any excess alloy that runs down the tubing or flows on the seating surface of the sleeve should be wiped off before the alloy solidifies. Allow the brazed assembly to cool. Then scrub in hot water to remove excess flux. Filing, scratch brush, or emery cloth should not be used to clean off excess alloy from the precision seating surface of the sleeve, as scratch marks or flat spots will cause leakage.

**STEP 6.** If possible, passivate to remove most scale and flux residual, or clean with a chemical that will not attack the silver brazing alloy.

**STEP 7.** Lubricate the threads and the seat area of the body with an acceptable lubricant that will be compatible with the system fluid. Assemble fitting, using the recommended torque values below:

**STEP 8.** When fittings are disassembled, retighten to torque values shown in table below.

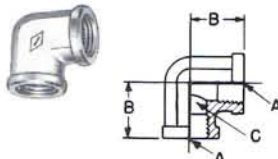
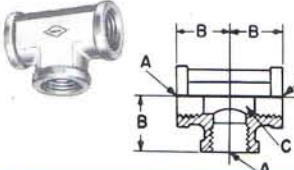
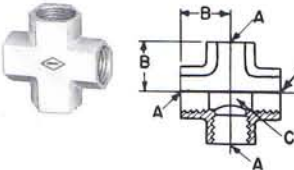
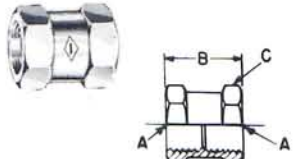
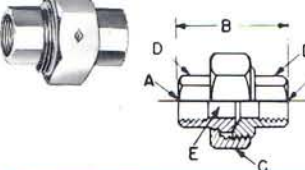
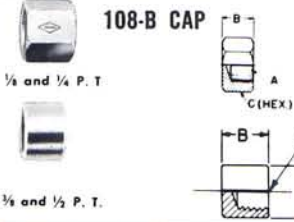
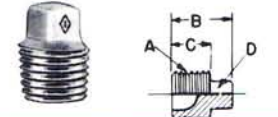
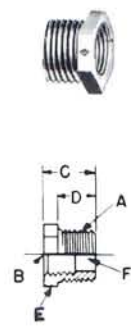
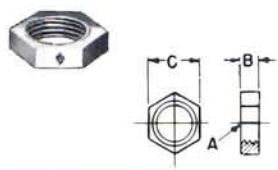
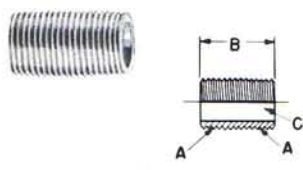
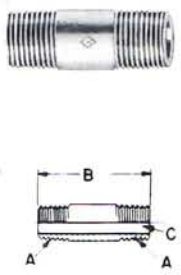
Size — Tube O.D.	Assembly Torque Limits in inch-pounds
1/4"	600-650
3/8"	750-800
1/2"	825-875
5/8"	875-925
3/4"	1100-1175
7/8"	1150-1225
1"	1250-1350
1 1/4"	1475-1575
1 1/2"	1725-1825

# BRASS PIPE FITTINGS

Imperial-Eastman Brass Pipe Fittings are far more compact and easier to install than ordinary pipe fittings. The wrench pads provided on elbows and tees facilitate assembly.

Most elbows, tees and crosses are made from brass forgings — S.A.E. CA377. They are far stronger than fittings made from castings.

Straight fittings made from stress relieved brass bar stock—S.A.E. CA360.

CATALOG NO.		A	B	C	D	E	F	CATALOG NO.		A	B	C	D	E	F		
<b>100-B ELBOW</b>		Pipe Thread	Min. Open.														
		1/8	3/8	2 1/4													
		1/4	23/32	7/16													
		3/8	13/16	9/16													
		1/2	29/32	11/16													
<b>101-B TEE</b>		Pipe Thread	Min. Open.														
		1/8	3/8	2 1/4													
		1/4	23/32	7/16													
		3/8	3/4	9/16													
		1/2	29/32	11/16													
<b>102-B CROSS</b>		Pipe Thread	Min. Open.														
		1/8	3/8	2 1/4													
		1/4	25/32	2 3/4													
		3/8	25/32	9/16													
		1/2	29/32	11/16													
<b>103-B COUPLING</b>		Pipe Thread	Hex.														
		1/8	3/4	9/16													
		1/4	7/8	1 1/16													
		3/8	1	7/8													
		1/2	1 1/8	1 1/16													
<b>104-B UNION</b>		Pipe Thread	Hex.	Oct.	Min. Open.												
		1/8	1 1/4	7/8	9/16	2 1/4											
		1/4	1 3/8	1 1/16	11/16	7/16											
		3/8	1 9/16	1 5/16	7/8	9/16											
		1/2	1 3/4	1 9/16	1 1/16	11/16											
<b>108-B CAP</b>		Pipe Thread	Dia.														
		1/8	1/2	1/2	Hex.												
		1/4	17/32	11/16	Hex.												
		3/8	21/32	15/16	Round												
		1/2	3/4	1 1/8	Round												
1/8 and 1/4 P. T.																	
3/8 and 1/2 P. T.																	
<b>109-B PLUG</b>		Pipe Thread	Square														
		1/8	5/8	3/8	3/32												
		1/4	23/32	7/16	5/16												
		3/8	13/16	1/2	3/8												
		1/2	7/8	9/16	1/2												
<b>110-B BUSHING</b>		Male Pipe Thread	Female Pipe Thread	Hex.		Min. Open.											
		1/4	1/8	5/8	7/16	9/16	5/16										
		3/8	1/8	11/16	1/2	11/16	2 1/4										
		3/8	1/4	11/16	1/2	11/16	7/16										
		1/2	1/8	3/4	17/32	7/8	2 1/4										
		1/2	1/4	3/4	17/32	7/8	7/16										
		3/4	3/8	7/8	5/8	1 1/8	9/16										
		3/4	1/2	7/8	5/8	1 1/8	11/16										
<b>111-B LOCK NUT</b>		Str. Pipe Thread	Hex.														
		1/8	3/16	5/8													
		1/4	1/4	1 1/16													
		3/8	1/4	1 5/16													
		1/2	1/4	1 1/8													
<b>112-B CLOSE NIPPLE</b>		Pipe Thread	Min. Open.														
		1/8	3/4	1 7/4													
		1/4	1 5/16	.358													
		3/8	1	1/2													
		1/2	1 1/16	5/8													
<b>113-B LONG NIPPLE</b>		Pipe Thread	Min. Open.														
		1/8	1 1/2	3/32													
		1/4	1 1/2	3/8													
		3/8	1 1/2	1/2													
		1/2	1 1/2	5/8													
		1/8	2	3/32													
		1/4	2	3/8													
		3/8	2	1/2													
		1/2	2	5/8													
		1/8	2 1/2	3/32													
		1/4	2 1/2	3/8													
		3/8	2 1/2	1/2													
		1/2	2 1/2	5/8													
		1/8	3	3/32													
		1/4	3	3/8													
		3/8	3	1/2													
		1/2	3	5/8													
		1/8	3 1/2	3/32													
		1/4	3 1/2	3/8													
		3/8	3 1/2	1/2													
		1/2	3 1/2	5/8													



# BRASS PIPE FITTINGS

CATALOG NO.		A	B	C	D	E	F	CATALOG NO.		A	B	C	D	E	F	G	
<b>116-B STREET ELBOW</b>		Pipe Thread		Min. Open.													
		1/8	3/8	13/16	7/32												
		1/4	23/32	1	9/16												
		3/8	13/16	1 1/16	7/8												
		1/2	1 1/4	1 7/16	9/8												
<b>123-B REDUCING NIPPLE</b>		Pipe Thread		Pipe Thread		Hex.		Min. Open.									
		1/4	1/8	1	9/16	7/32											
		3/8	1/4	1 1/16	1 1/16	1 1/32											
<b>117-B PLUG</b>		Pipe Thread															
		1/8	5/16														
		1/4	3/8														
		3/8	7/16														
<b>124-B 45° STREET ELBOW</b>		Pipe Thread		Min. Open.													
		1/8	3/4	1 1/16	7/32												
		1/4	23/32	1/2	9/16												
		3/8	7/8	1 1/32	13/32												
		1/2	1 1/8	1 1/8	1/2												
<b>118-B WING PLUG</b>		Pipe Thread															
		1/8	1 1/8	7/8													
		1/4	7/8	15/16													
		3/8	1 1/8	1 1/8													
		1/2	1 7/16	1 7/32													
<b>126-B ELBOW</b> Restricted to 1/8" opening		Pipe Thread		Min. Open.													
		1/8	1/32	1 1/16	1/8												
<b>119-B REDUCING BUSHING</b>		Pipe Thread		Pipe Thread		Hex.											
		1/4	1/8	7/8	1 1/16												
		3/8	1/4	1	7/8												
		1/2	3/8	1 1/8	1 1/16												
<b>127-B TEE</b>		Pipe Thread		Min. Open.													
		1/8	3/4	3/4	7/16												
		1/4	1 1/16	7/8	5/16												
<b>120-B ADAPTER</b>		Pipe Thread		Pipe Thread		Hex.		Min. Open.									
		1/8	1/8	27/32	3/8	1/2	.191										
		1/4	1/8	1	1/2	1 1/16	.209										
		1/4	1/4	1	3/16	3/4	5/16										
		3/8	1/4	1 1/16	7/16	7/8	5/16										
		1/2	3/8	1 1/4	1 1/32	1 1/16	13/32										
<b>128-B REDUCING STREET ELBOW</b>		Female Pipe Thread		Male Pipe Thread		Min. Open.											
		1/4	1/8	27/32	7/8	7/32											
<b>121-B PLUG</b>		Pipe Thread		Hex.													
		1/8	17/32	3/8	7/16												
		1/4	9/8	7/16	9/16												
		3/8	1 1/16	1/2	1 1/16												
		1/2	1 3/16	5/8	7/8												
		3/4	1 5/16	3/4	1 1/16												
<b>129-B BULKHEAD ADAPTER</b> Specify Pipe Thread (A) and Length (C)		Pipe Thread		Opening Length		Max. Bulkhd. Thkns.		Hex.									
		1/8	2 1/4	1 1/2	7/8	5/8-18	7/8	1 1/8									
		1/4	2 3/4	1 5/8	1 1/4	3/4-16	1	1 1/8									
		1/4	2 3/4	1 1/2	1 3/16	3/4-16	1	1 1/8									
		3/8	3 1/8	1 5/8	1 1/2	1-14	1 1/8	1 7/16									
		1/2	3 1/2	1 7/8	1 5/8	1 1/8-14	1 1/4	1 1/2									
<b>122-B HEX NIPPLE</b>		Pipe Thread		Hex.		Min. Open.											
		1/8	27/32	3/8	7/16	3/16											
		1/4	1 1/8	7/16	9/16	1 1/32											
		3/8	1 1/16	1/2	1 1/16	1 5/32											
		1/2	1 1/2	9/16	7/8	1 1/32											
<b>130-B CLAMPING STUD</b>		Male Pipe Thread		Female Pipe Thread		Max. Bulkhd. Hex.		Thread Hex.									
		1/2	1/4	2 5/32	1 1/16	1 1/4	3/4-16	1 1/8									
		1/2	1/4	2 17/32	1 1/16	1 1/4	3/4-16	1 1/8									

# STEEL PIPE FITTINGS

Elbows, tees and crosses made from steel forgings—S.A.E. C-1117, or equal.

Straight fittings made from steel bar stock—S.A.E. C-1117, or equal.

Furnished with long Dryseal pipe threads. Cadmium or zinc plated with clear chromate finish for added corrosion resistance.

Maximum recommended working pressure of sizes through 1" is 3500 psi; 1 1/4"—2500 psi.

FITTING	CATALOG NO.	A	B	C	D	E	F
<b>24SA NIPPLE</b> Has internal 30° seal on one end.	<b>24SA-02</b> <b>24SA-04</b> <b>24SA-06</b> <b>24SA-08</b> <b>24SA-12</b> <b>24SA-16</b> <b>24SA-20</b>	Pipe Thread NPTF					
		1/8	3 1/32	3/8	7/16	7/32	
		1/4	1 3/8	9/16	9/16	5/16	
		3/8	1 13/32	9/16	1 1/16	7/16	
		1/2	1 13/16	3/4	7/8	9/16	
		3/4	1 13/16	3/4	1 1/8	23/32	
		1	2 1/4	1 5/16	1 3/8	29/32	
		1 1/4	2 5/16	1 3/32	1 3/4	1 1/4	
<b>24SB REDUCER</b>	<b>24SB-04X02</b> <b>24SB-06X02</b> <b>24SB-06X04</b> <b>24SB-08X02</b> <b>24SB-08X04</b> <b>24SB-08X06</b> <b>24SB-12X04</b> <b>24SB-12X06</b> <b>24SB-12X08</b> <b>24SB-16X06</b> <b>24SB-16X08</b> <b>24SB-16X12</b> <b>24SB-20X12</b>	Male Pipe Thread NPTF / Female Pipe Thread NPTF					
		1/4	1/8	3/4	9/16	9/16	2 1/64
		3/8	1/8	3/4	9/16	1 1/16	2 1/64
		3/8	1/4	3/4	9/16	3/4	2 1/64
		1/2	1/8	3/4	3/4	7/8	2 1/64
		1/2	1/4	1	3/4	7/8	2 1/64
		1/2	3/8	1	3/4	7/8	9/16
		3/4	1/4	1	3/4	1 1/8	2 1/64
		3/4	3/8	1	3/4	1 1/8	9/16
		3/4	1/2	1	3/4	1 1/8	1 1/16
		1	3/8	1 5/16	1 5/16	1 7/16	9/16
		1	1/2	1 5/16	1 5/16	1 7/16	1 1/16
		1	3/4	1 5/16	1 5/16	1 7/16	5 7/64
		1 1/4	3/4	1 3/8	1 3/4	1 3/4	5 7/64
<b>24SG REDUCING CONNECTOR</b>	<b>24SG-08X02</b> <b>24SG-08X04</b> <b>24SG-08X06</b> <b>24SG-12X04</b> <b>24SG-12X08</b> <b>24SG-16X08</b> <b>24SG-16X12</b>	Female Pipe Thread NPTF / Male Pipe Thread NPTF					
		1/2	1/8	1 1/2	3/8	1 1/16	7/32
		1/2	1/4	1 1/2	9/16	1 1/16	5/16
		1/2	3/8	1 13/32	9/16	1 1/16	7/16
		3/4	1/4	1 5/8	9/16	1 3/8	5/16
		3/4	1/2	1 11/16	3/4	1 3/8	9/16
		1	1/2	1 7/8	3/4	1 5/8	9/16
		1	3/4	1 7/8	3/4	1 5/8	3/4
<b>24SJ CONNECTOR</b>	<b>24SJ-02</b> <b>24SJ-04</b> <b>24SJ-06</b> <b>24SJ-08</b> <b>24SJ-12</b> <b>24SJ-16</b> <b>24SJ-20</b>	Pipe Thread NPTF					
		1/8	3/4	9/16	2 1/64		
		1/4	1 1/8	3/4	2 1/64		
		3/8	1 1/8	7/8	9/16		
		1/2	1 1/2	1 1/16	1 1/16		
		3/4	1 5/8	1 3/8	5 7/64		
		1	1 11/16	1 5/8	1 1/8		
		1 1/4	1 13/16	2	1 13/32		
<b>24SR HEX HEAD PLUG</b>	<b>24SR-02</b> <b>24SR-04</b>	Male Pipe Thread NPTF / Hollow Hex					
		1/8	3/8	3/16			
		1/4	1 5/32	1/4			



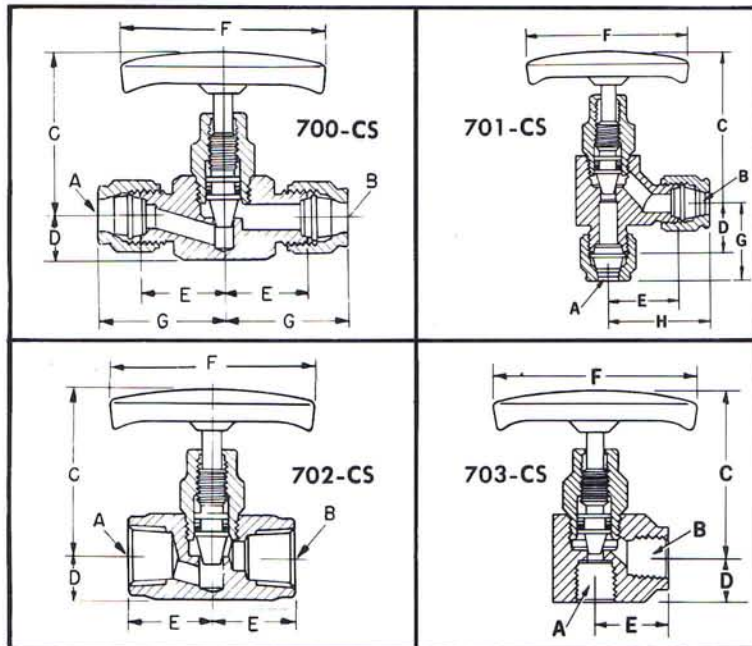
- Working pressure—5000 psi
- Temperature Range— $-40^{\circ}$  to  $200^{\circ}$ F.
- Stems—Stainless Steel
- Bodies—Steel Bar Stock
- $2\frac{1}{2}$ " Handle for Easy Grip
- $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ " Hi-Seal Tubing Connections  
 $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ " Pipe Threads
- Globe and Angle Types

Stem threads are above O-ring seal—threads never contact fluid flow. This feature prevents deposits on threads, assures long life lubrication, practically eliminates galling and wear. O-ring is backed up with Teflon washer to prevent extrusion of O-ring.

Stainless steel stem has fine pitch, single lead thread. Stem is precision machined to  $15^{\circ}$  angle to allow slight wedging action of stem into seat. Provides accurate flow control and minimum torque for operation.

Used in differential pressure transmitters, instrumentation, refineries, processing plants, laboratories, etc.

Valve bodies made from steel bar stock, cadmium plated. Stainless steel valves can be furnished on special order at special pricing.

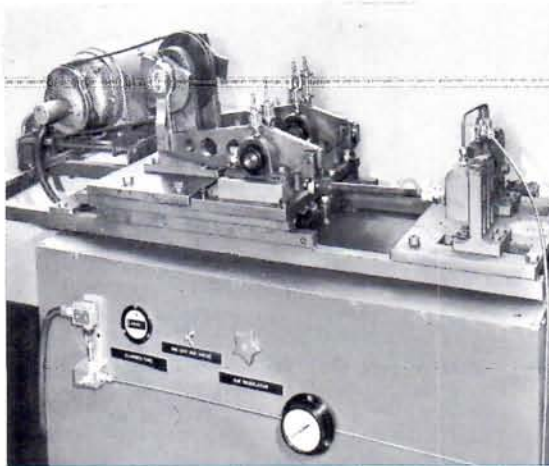


Valve Type	Catalog No.	A Inlet	B Outlet	Ori- fice	C		D	E	F	G	H
					Open	Closed					
GLOBE TYPE	700-CS-04	$\frac{1}{4}$ Hi-Seal	$\frac{1}{4}$ Hi-Seal	.185	2.344	2.094	.438	1.000	2.500	1.438	
	700-CS-06	$\frac{3}{8}$ Hi-Seal	$\frac{3}{8}$ Hi-Seal	.242	2.344	2.094	.500	1.000	2.500	1.500	
	700-CS-08	$\frac{1}{2}$ Hi-Seal	$\frac{1}{2}$ Hi-Seal	.302	2.750	2.438	.625	1.250	3.000	1.875	
	702-CS-04	$\frac{1}{4}$ Fem. P. T.	$\frac{1}{4}$ Fem. P. T.	.185	2.344	2.094	.438	.938	2.500		
	702-CS-06	$\frac{3}{8}$ Fem. P. T.	$\frac{3}{8}$ Fem. P. T.	.242	2.344	2.094	.500	1.000	2.500		
	702-CS-08	$\frac{1}{2}$ Fem. P. T.	$\frac{1}{2}$ Fem. P. T.	.302	2.750	2.438	.625	1.250	3.000		
	702-CS-12	$\frac{3}{4}$ Fem. P. T.	$\frac{3}{4}$ Fem. P. T.	.500	3.812	3.562	.750	1.500	2.750		
	702-CS-16	1" Fem. P. T.	1" Fem. P. T.	.562	4.094	3.750	.875	1.750	2.750		
ANGLE TYPE	701-CS-04	$\frac{1}{4}$ Hi-Seal	$\frac{1}{4}$ Hi-Seal	.185	2.531	2.281	.609	1.000	2.500	.938	1.328
	701-CS-06	$\frac{3}{8}$ Hi-Seal	$\frac{3}{8}$ Hi-Seal	.242	2.500	2.312	.719	1.094	2.500	1.156	1.531
	701-CS-08	$\frac{1}{2}$ Hi-Seal	$\frac{1}{2}$ Hi-Seal	.302	2.938	2.688	.844	1.312	3.000	1.391	1.859
	703-CS-04	$\frac{1}{4}$ Fem. P. T.	$\frac{1}{4}$ Fem. P. T.	.185	2.438	2.188	.531	.875	2.500		
	703-CS-06	$\frac{3}{8}$ Fem. P. T.	$\frac{3}{8}$ Fem. P. T.	.242	2.312	2.125	.594	1.000	2.500		
	703-CS-08	$\frac{1}{2}$ Fem. P. T.	$\frac{1}{2}$ Fem. P. T.	.302	3.000	2.125	.750	1.250	3.000		
	703-CS-12	$\frac{3}{4}$ Fem. P. T.	$\frac{3}{4}$ Fem. P. T.	.500	4.594	4.281	1.500	1.500	2.750		
	703-CS-16	1" Fem. P. T.	1" Fem. P. T.	.562	4.453	4.531	1.750	1.750	2.750		

# COMPLETE TESTING FACILITIES

## FOR MIL-F-18280B AND OTHER SPECIFICATIONS

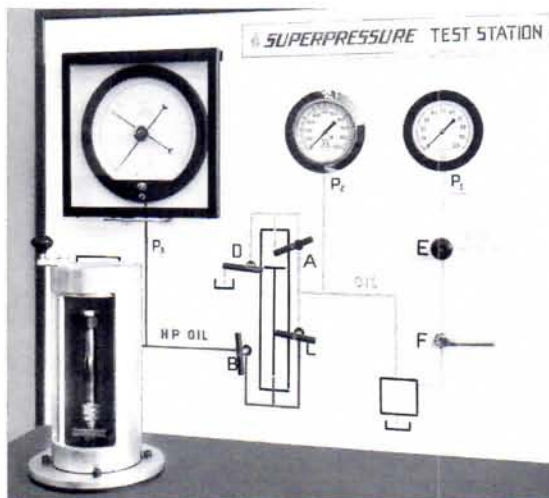
Imperial-Eastman maintains complete facilities for testing and design of Hi-Seal Fittings and other fittings, valves and flow components.



### FLEXURAL STRENGTH TESTING

This machine flexes tubing and fitting assembly to a predetermined stress level on the tubing and with internal fluid at working pressure.

MIL-F-18280B requires 10,000,000 cycles of vibration at a rate of 30 cycles per second, with stress levels and pressures as indicated above. HI-SEAL FAR EXCEEDS THIS MINIMUM REQUIREMENT.



### PRESSURE/VACUUM TESTING

A high pressure chamber, with back-up equipment, is used for testing Hi-Seal and other fittings and valves at pressures up to 100,000 psi.

A vacuum testing unit determines the ability of Imperial-Eastman components to hold a vacuum of  $10^{-6}$  torr.



### HEAT/COLD TESTING

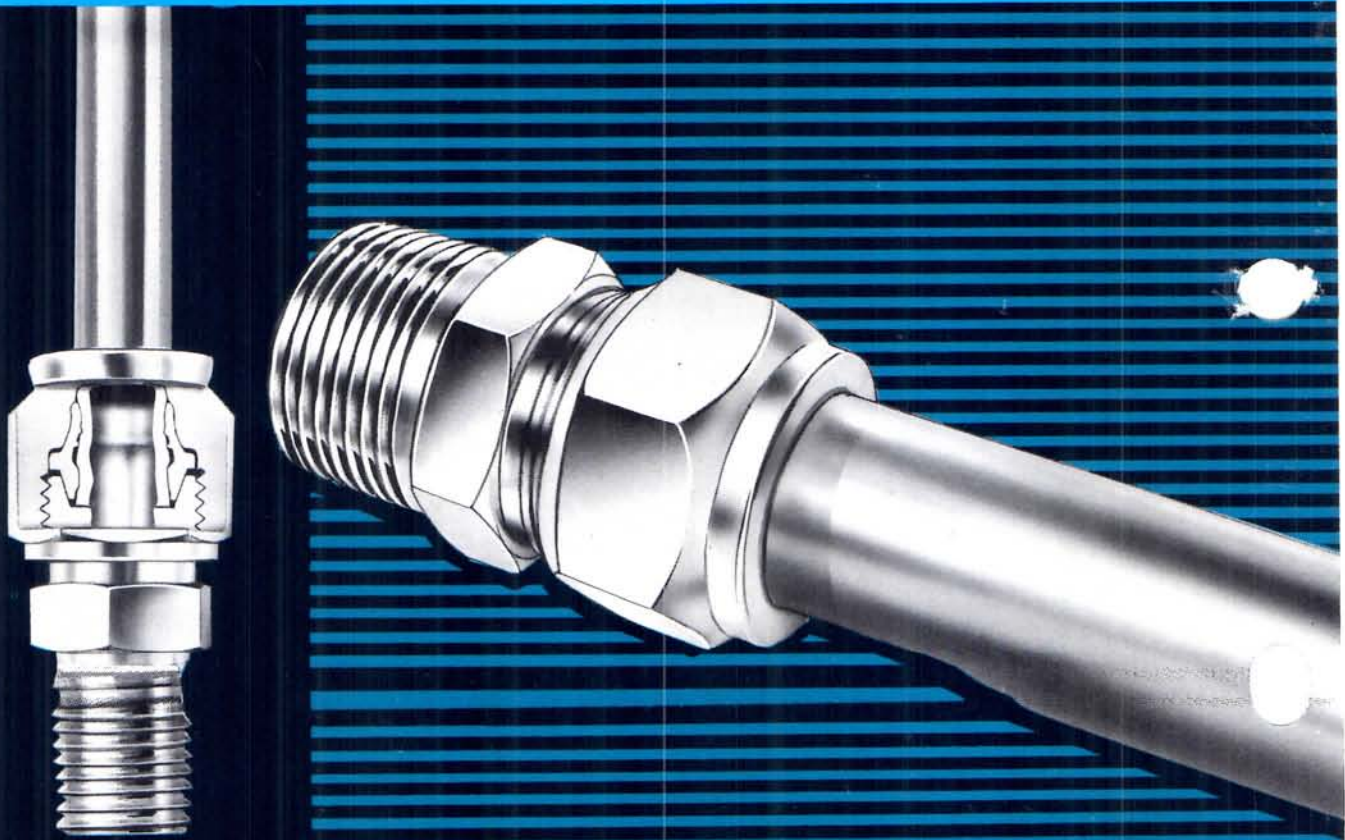
Testing the performance of materials and designs under varying temperature conditions is part of the total engineering concept. Imperial-Eastman facilities can create environmental temperatures from 100°F. below zero to a high temperature of 2000°F.

Product liability restrictions on quotations and order acknowledgements include:

Gould Inc., warrants its products to be free of defects in materials and workmanship. No warranty of merchantability or other warranty, express or implied, is made.

Liability for and the exclusive remedy for defective materials or workmanship is limited to replacement or repair of defective products returned within 60 days after receipt (except where the defect is not immediately ascertainable, in which case return shall be made within 90 days after receipt). No allowance will be made for repairs performed by the Purchaser or on his order. Gould Inc., is not liable for consequential or other damages or any expense incurred through the use of its products.

Permits compact, money-saving layouts.  
Let us help you obtain your best tubing connections with  
our complete product and engineering service.



**Gould Inc., Valve and Fittings Division**  
6300 West Howard Street, Chicago, Illinois 60648  
Telephone (312) 967-4500/Chicago 774-1700

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 **GOULD**

S.S. PIPE -  
SOCKET WELD

S.S. PIPE -  
SOCKET WELD



# PIPE FITTINGS

**Imperial-Eastman**

BULLETIN 1061

STAINLESS STEEL



## SPECIFICATIONS

### SIZE RANGE:

1/8" to 1" NPT

### MAXIMUM WORKING PRESSURE:

6200 PSIG

### MATERIALS:

- Elbows, Tees and Crosses:  
Stainless Steel forgings SA-182, Grade F316
- Straight Fittings:  
Stainless Steel Bar Stock ASME-479, Type 316

### CONFORMANCES:

Pressure calculated in accordance with Power Piping Code ASA-B31.1 (1967), Refinery Piping Code ASA-31.3 (1966)

### ORDERING INFORMATION:

To order, specify catalog number.

## DIMENSIONAL DATA

	Catalog Number	A Pipe Thread	B	C	D	E Hex.	Working Pressure (PSIG)
<b>122SS NIPPLE</b> Has internal 30° seat on one end	122SS-02	1/8	1.06	0.39	0.18	0.438	6200
	122SS-04	1/4	1.45	0.57	0.28	0.625	6200
	122SS-06	3/8	1.45	0.57	0.41	0.750	5000
	122SS-08	1/2	1.89	0.76	0.52	0.875	4600
	122SS-12	3/4	1.96	0.76	0.72	1.125	3700
	122SS-16	1	2.34	0.95	0.94	1.375	3100



	Catalog Number	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F Hex.	Working Pressure (PSIG)
<b>110SS REDUCER</b>	110SS-04×02	1/4	1/8	1.03	0.57	0.33	0.625	4100
	110SS-06×02	3/8	1/8	0.85	0.57	0.33	0.750	6200
	110SS-06×04	3/8	1/4	1.16	0.57	0.42	0.750	4500
	110SS-08×02	1/2	1/8	1.10	0.76	0.33	0.875	6200
	110SS-08×04	1/2	1/4	1.10	0.76	0.42	0.875	5400
	110SS-08×06	1/2	3/8	1.10	0.76	0.56	0.875	4400
	110SS-12×04	3/4	1/4	1.37	0.76	0.42	1.125	4400
	110SS-12×06	3/4	3/8	1.17	0.76	0.56	1.125	5500
	110SS-12×08	3/4	1/2	1.56	0.76	0.69	1.125	4300
	110SS-16×06	1	3/8	1.36	0.95	0.56	1.375	6200
	110SS-16×08	1	1/2	1.36	0.95	0.69	1.375	5900
	110SS-16×12	1	3/4	1.36	0.95	0.89	1.375	2600

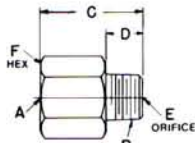


# PIPE FITTINGS

# DIMENSIONAL DATA

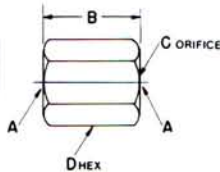
STAINLESS STEEL

## 120SS REDUCING ADAPTER



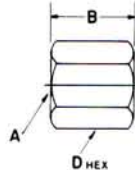
Catalog Number	A Female Pipe Thread	B Male Pipe Thread	C	D	E	F Hex.	Working Pressure (PSIG)
120SS-04×02	1/4	1/8	1.21	0.39	0.18	0.750	5000
120SS-06×02	3/8	1/8	1.26	0.39	0.18	0.875	4000
120SS-06×04	3/8	1/4	1.44	0.57	0.28	0.875	4000
120SS-08×02	1/2	1/8	1.50	0.39	0.18	1.125	4500
120SS-08×04	1/2	1/4	1.68	0.57	0.28	1.125	4500
120SS-08×06	1/2	3/8	1.68	0.57	0.40	1.125	4500
120SS-12×04	3/4	1/4	1.74	0.57	0.28	1.375	4200
120SS-12×06	3/4	3/8	1.74	0.57	0.40	1.375	4200
120SS-12×08	3/4	1/2	1.93	0.76	0.52	1.375	4200
120SS-16×06	1	3/8	1.99	0.57	0.40	1.625	3400
120SS-16×08	1	1/2	2.18	0.76	0.52	1.625	3400
120SS-16×12	1	3/4	2.18	0.76	0.72	1.625	3400

## 103SS CONNECTOR



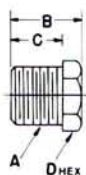
Catalog Number	A Pipe Thread	B	C	D Hex.	Working Pressure (PSIG)
103SS-02	1/8	0.75	0.33	0.625	6200
103SS-04	1/4	1.12	0.42	0.750	5000
103SS-06	3/8	1.12	0.56	0.875	4000
103SS-08	1/2	1.50	0.69	1.125	4500
103SS-12	3/4	1.53	0.89	1.375	4200
103SS-16	1	1.89	1.12	1.625	3400

## 108SS PIPE CAP



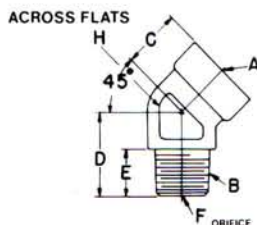
108SS-02	1/8	0.64	0.625	6200
108SS-04	1/4	0.87	0.750	5000
108SS-06	3/8	0.95	0.875	4000
108SS-08	1/2	1.16	1.125	4500
108SS-12	3/4	1.27	1.375	4200
108SS-16	1	1.50	1.625	3400

## 121SS PIPE PLUG



121SS-02	1/8	0.58	0.39	0.438	6200
121SS-04	1/4	0.77	0.57	0.562	5000
121SS-06	3/8	0.80	0.57	0.688	4000
121SS-08	1/2	0.98	0.76	0.875	4500
121SS-12	3/4	1.08	0.76	1.062	4200
121SS-16	1	1.27	0.96	1.312	3400

## 124SS 45° STREET ELBOW

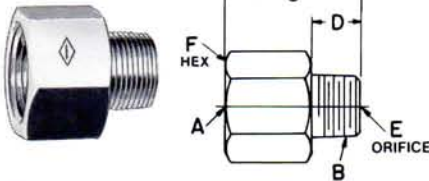
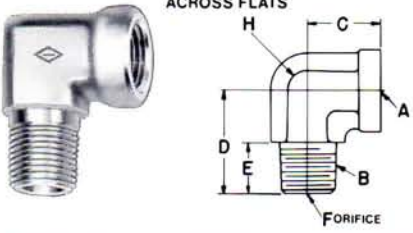
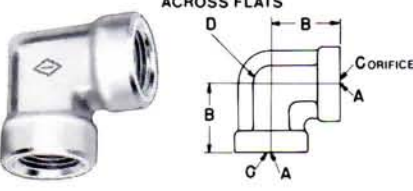
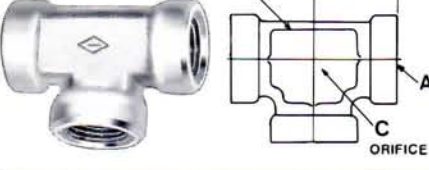
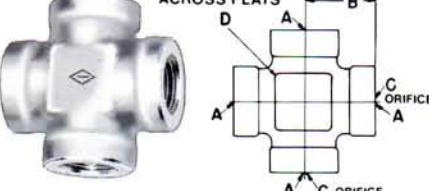


Catalog Number	A Female Pipe Thread	B Male Pipe Thread	C	D	E	F	H Across Flats	Working Pressure (PSIG)
124SS-02	1/8	1/8	0.47	0.72	0.44	0.19	0.562	5400
124SS-04	1/4	1/4	0.62	1.05	0.61	0.28	0.875	6200
124SS-06	3/8	3/8	0.72	1.06	0.62	0.41	0.875	4500
124SS-08	1/2	1/2	0.91	1.31	0.97	0.50	1.062	4200
124SS-12	3/4	3/4	0.97	1.37	0.84	0.72	1.312	3700
124SS-16	1	1	1.12	1.72	1.00	0.94	1.625	3100

# DIMENSIONAL DATA

# PIPE FITTINGS

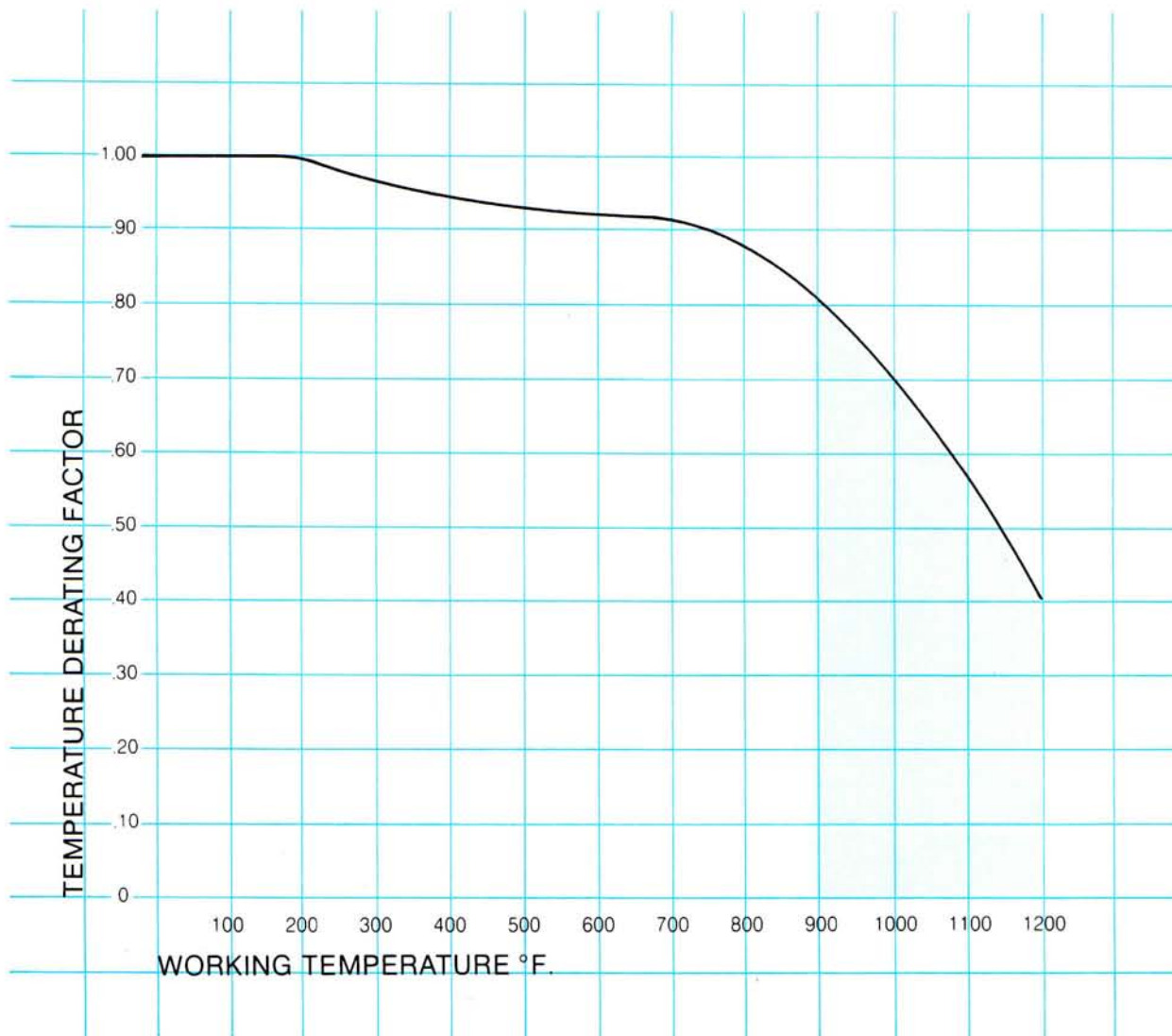
STAINLESS STEEL

	Catalog Number	A Female Pipe Thread	B Male Pipe Thread	C	D	E	F Hex.	Working Pressure (PSIG)	
<b>125SS ADAPTER</b> 	125SS-02	1/8	1/8	1.04	0.39	0.18	0.625	6200	
	125SS-04	1/4	1/4	1.39	0.57	0.28	0.750	5000	
	125SS-06	3/8	3/8	1.44	0.57	0.40	0.875	4000	
	125SS-08	1/2	1/2	1.87	0.76	0.52	1.125	4500	
	125SS-12	3/4	3/4	1.93	0.76	0.62	1.375	4200	
	125SS-16	1	1	2.37	0.95	0.94	1.625	3100	
<b>116SS STREET ELBOW</b> 	116SS-02	1/8	1/8	0.66	0.86	0.42	0.19	0.562	5400
	116SS-04	1/4	1/4	0.88	1.22	0.62	0.28	0.750	4700
	116SS-06	3/8	3/8	1.02	1.25	0.61	0.41	0.875	4500
	116SS-08	1/2	1/2	1.23	1.50	0.81	0.56	1.062	3400
	116SS-12	3/4	3/4	1.36	1.64	0.80	0.72	1.312	3600
	116SS-16	1	1	1.62	2.03	1.00	0.94	1.625	3100
<b>100SS ELBOW</b> 	100SS-02	1/8	0.81	0.33	0.562	5400			
	100SS-04	1/4	0.97	0.42	0.750	4700			
	100SS-06	3/8	1.10	0.56	0.875	4500			
	100SS-08	1/2	1.31	0.69	1.062	4200			
	100SS-12	3/4	1.50	0.89	1.312	4000			
	100SS-16	1	1.75	1.12	1.625	3900			
<b>101SS TEE</b> 	101SS-02	1/8	0.81	0.33	0.625	5500			
	101SS-04	1/4	0.97	0.42	0.750	4700			
	101SS-06	3/8	1.12	0.56	0.875	4500			
	101SS-08	1/2	1.31	0.69	1.062	4200			
	101SS-12	3/4	1.50	0.89	1.250	3300			
	101SS-16	1	1.75	1.12	1.625	3900			
<b>105SS CROSS</b> 	105SS-02	1/8	0.66	0.33	0.562	5400			
	105SS-04	1/4	0.88	0.42	0.750	4700			
	105SS-06	3/8	1.02	0.56	0.875	4500			
	105SS-08	1/2	1.23	0.69	1.062	4200			
	105SS-12	3/4	1.36	0.89	1.312	4000			
	105SS-16	1	1.62	1.12	1.625	3900			

# PIPE FITTINGS

STAINLESS STEEL

## PRESSURE/TEMPERATURE DERATING CURVE



For elevated service temperatures, multiply this given working pressure by the derating factor obtained from chart above to obtain working pressure at the desired elevated temperature.

Shaded area indicates carbide precipitation range. Prolonged exposure to these temperatures will result in reduction of corrosion resistance.

**Gould Inc., Valve & Fittings Division**  
6300 W. Howard St., Chicago, IL 60648  
Telephone (312) 967-4500



# SOCKET-WELD

PERMANENT TUBE FITTINGS

**Imperial-Eastman**  
BULLETIN 1062



Designed for Critical Applications Where Permanent Connections are Required.

## SPECIFICATIONS

### SIZE RANGE:

Tube: 1/4" to 1" O.D.

Port: 1/8" to 1" NPT

### MATERIALS:

- Elbows, Tees and Crosses:  
Stainless Steel Forgings SA-182, Grade F316
- Straight Fittings:  
Stainless Steel Bar Stock ASME-479, Type 316

### MAXIMUM WORKING PRESSURE\*

13,000 psi

### CONFORMANCES:

Pressures calculated in accordance with Section III of ASME Code for Nuclear Power Plant Components, 1974 edition and mandatory addenda Class 1, 2, 3 components for room temperature service.

- ANSI B31.1.0 "Power Piping"
- ANSI B31.3 "Petroleum Refinery Piping"
- ANSI B16.9 "Factory Made Butt-Welded Fittings"
- ANSI B16.11 "Forged Steel Fittings, Socket-Welding and Threaded"

\*See following data for specific size/pressure information.

Today's higher pressures and temperatures, especially where ultra reliability is required as in nuclear power plants, have created the need for a permanent weld-type tube fitting.

The Imperial-Eastman socket weld fitting offers a guaranteed connection in critical applications where pipe threads are not acceptable to satisfy these high pressure/temperature demands. It exceeds the schedule 80, 3000 pound fitting pressure class and is compatible with O.D. tube wall thickness meeting the related (3000 psi pipe class) pressure requirements.

### VIBRATION RESISTANT

Socket weld fittings are the ideal solution where severe vibration or shock conditions are present or a potential danger to the system.

### HEAT CODE TRACEABILITY



All fittings are stamped with a heat code traceability number to allow for back tracing to the physical and chemical analysis of the original raw material. In forgings, on all elbows, tees and crosses, a physical analysis of each forging run is performed to guarantee complete conformance to the material specifications.

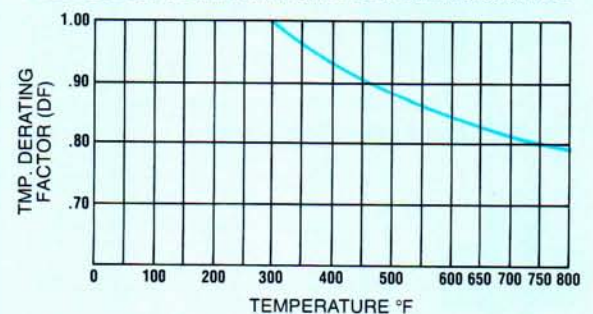
### FULL DOCUMENTATION AVAILABILITY

When required, complete documentation of heat traceability will be provided to assure full compliance with your system design.

### PRESSURE/TEMPERATURE DERATING FACTOR

For elevated service temperature, multiply the maximum working pressure by the derating factor obtained from chart below to obtain the working pressure at the desired elevated temperature.

### PRESSURE/TEMPERATURE DERATING CURVE



# SOCKET-WELD

PERMANENT TUBE FITTINGS

# DIMENSIONAL DATA

	Catalog Number	Tube O.D.	Butt Weld Pipe Size	Butt Weld O.D.	A	B	C	D Min. Opening	E	Working Pressure (PSI)
	729-FSS-04x02	1/4	1/8	.405	1.688	1.000	.500	.183	.375	12,000
	729-FSS-04x04	1/4	1/4	.540	1.807	1.119	.562	.198	.562	13,000
	729-FSS-06x04	3/8	1/4	.540	1.646	1.208	.625	.276	.562	9,500
	729-FSS-06x06	3/8	3/8	.675	1.718	1.280	.750	.183	.562	12,000
	729-FSS-06x08	3/8	1/2	.840	1.937	1.500	.875	.276	.750	12,000
	729-FSS-08x06	1/2	3/8	.675	1.857	1.310	.812	.401	.562	7,500
	729-FSS-08x08	1/2	1/2	.840	2.047	1.500	.875	.401	.750	11,000
	729-FSS-10x08	5/8	1/2	.840	2.215	1.590	.937	.495	.750	8,500
	729-FSS-12x12	3/4	3/4	1.050	2.215	1.590	1.062	.620	.750	8,500
	729-FSS-16x16	1"	1"	1.315	2.531	1.905	1.315	.870	.940	4,500

	Catalog Number	Tube O.D.	Butt Weld Pipe Size	Butt Weld O.D.	A	B	C	D Min. Opening	E	Working Pressure (PSI)
	730-FSS-04x02	1/4	1/8	.405	1.516	.828	.796	.183	.437	12,000
	730-FSS-04x04	1/4	1/4	.540	1.578	.890	1.156	.198	.500	13,000
	730-FSS-06x04	3/8	1/4	.540	1.375	.937	1.156	.276	.500	9,500
	730-FSS-08x06	1/2	3/8	.675	1.514	.968	1.203	.401	.687	7,500
	730-FSS-08x08	1/2	1/2	.840	1.514	.968	1.328	.401	.687	11,000

	Catalog Number	Tube O.D.	A	B	C	D Min. Opening	E	F	G	Working Pressure (PSI)
	731-FSS-04	1/4	1.718	1.030	.562	.198	.281	.406	.531	6,500
	731-FSS-06	3/8	1.628	1.190	.687	.277	.312	.468	.656	5,500
	731-FSS-08	1/2	1.767	1.220	.812	.417	.375	.468	.812	5,000
	731-FSS-10	5/8	1.938	1.313	.937	.495	.406	.468	.938	4,000
	731-FSS-12	3/4	1.935	1.310	1.125	.651	.437	.468	1.125	4,500
	731-FSS-16	1"	2.062	1.437	1.375	.870	.625	.562	1.375	3,500

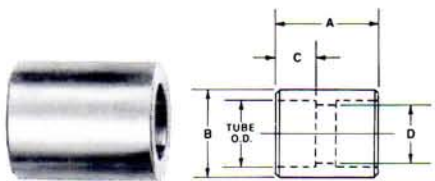
	Catalog Number	Tube O.D.	A	B	C	D Min. Opening	E	F	G	Working Pressure (PSI)
	732-FSS-04	1/4	1.438	.750	.859	.183	.281	.437		6,500
	732-FSS-06	3/8	1.406	.968	1.000	.277	.312	.687		5,500
	732-FSS-08	1/2	1.515	.968	1.140	.416	.375	.687		5,000

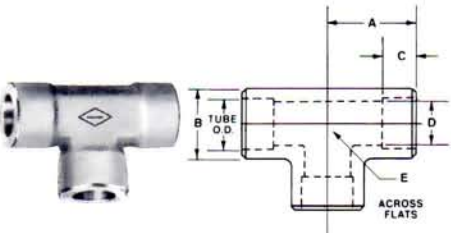
	Catalog Number	Tube O.D.	A	B	C	D Min. Opening	E	F	G	Working Pressure (PSI)
	1152-SW-04	1/4	1.380	.690	.281	.183	.500			6,500
	1152-SW-06	3/8	1.820	.910	.312	.308	.625			5,500
	1152-SW-08	1/2	2.060	1.030	.375	.433	.750			5,000

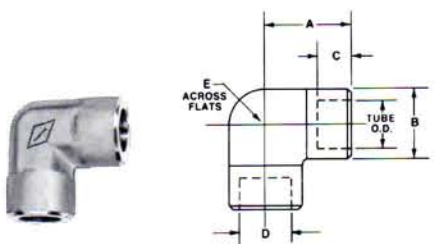
# DIMENSIONAL DATA

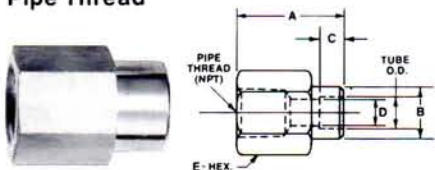
# SOCKET-WELD

PERMANENT TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D Min. Opening	E	Working Pressure (PSI)
<b>1162-SW- Tube Socket Weld – Union</b> 	1162-SW-04	1/4	.750	.562	.281	.183		6,500
	1162-SW-06	3/8	.970	.687	.312	.308		5,500
	1162-SW-08	1/2	1.060	.812	.375	.433		5,000
	1162-SW-10	5/8	1.250	.937	.406	.495		4,000
	1162-SW-12	3/4	1.310	1.125	.437	.620		4,500
	1162-SW-16	1"	1.560	1.375	.625	.870		3,500

	Catalog Number	Tube O.D.	A	B	C	D	E	Working Pressure (PSI)
<b>1164-SW Tube Socket Weld – Tee</b> 	1164-SW-04	1/4	.690	.562	.281	.183	.500	6,500
	1164-SW-06	3/8	.910	.688	.312	.308	.625	5,500
	1164-SW-08	1/2	1.030	.812	.375	.433	.750	5,000
	1164-SW-10	5/8	1.160	1.031	.406	.495	.875	4,000
	1164-SW-12	3/4	1.310	1.125	.437	.652	1.062	4,500
	1164-SW-16	1"	1.470	1.375	.625	.901	1.312	3,500

	Catalog Number	Tube O.D.	A	B	C	D	E	Working Pressure (PSI)
<b>1165-SW Tube Socket Weld – Elbow (90°)</b> 	1165-SW-04	1/4	.690	.562	.281	.183	.500	6,500
	1165-SW-06	3/8	.910	.688	.312	.308	.625	5,500
	1165-SW-08	1/2	1.030	.812	.375	.433	.750	5,000
	1165-SW-10	5/8	1.160	.937	.406	.495	.875	4,000
	1165-SW-12	3/4	1.310	1.125	.437	.652	1.062	4,500
	1165-SW-16	1"	1.470	1.375	.625	.901	1.312	3,500


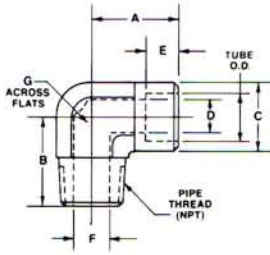
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D Min. Opening	E	Working Pressure (PSI)
<b>1166-SW Tube Socket Weld X Female Pipe Thread</b> 	1166-SW-04x02	1/4	1/8	.970	.531	.281	.183	.562	6,500
	1166-SW-04x04	1/4	1/4	1.130	.531	.281	.183	.750	6,500
	1166-SW-06x04	3/8	1/4	1.120	.656	.312	.308	.750	5,500
	1166-SW-06x06	3/8	3/8	1.310	.656	.312	.308	.937	5,500
	1166-SW-08x06	1/2	3/8	1.410	.812	.375	.433	.937	5,000
	1166-SW-08x08	1/2	1/2	1.630	.812	.375	.433	1.125	5,000
	1166-SW-10x08	5/8	1/2	1.630	.937	.406	.495	1.125	4,000
	1166-SW-12x12	3/4	3/4	1.780	1.125	.437	.651	1.375	4,500


	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D Min. Opening	E	Working Pressure (PSI)
<b>1168-SW Tube Socket Weld X Male Pipe Thread</b> 	1168-SW-04x04	1/4	1/4	1.120	.531	.281	.183	.625	6,500
	1168-SW-06x04	3/8	1/4	1.250	.656	.281	.276	.750	5,500
	1168-SW-06x06	3/8	3/8	1.310	.656	.312	.276	.750	5,500
	1168-SW-06x08	3/8	1/2	1.500	.656	.312	.276	.875	5,500
	1168-SW-08x06	1/2	3/8	1.440	.812	.375	.401	.812	5,000
	1168-SW-08x08	1/2	1/2	1.660	.812	.375	.401	.875	5,000
	1168-SW-10x08	5/8	1/2	1.660	.937	.406	.495	.937	4,000
	1168-SW-12x12	3/4	3/4	1.690	1.125	.437	.651	1.125	4,500
1168-SW-16x16	1"	1"	2.000	1.375	.625	.901	1.375	3,500	


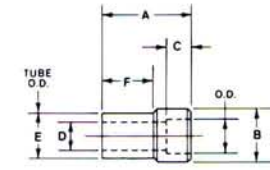
# SOCKET-WELD


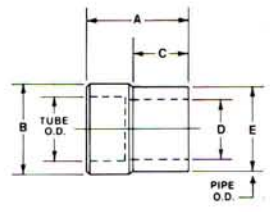
PERMANENT TUBE FITTINGS

# DIMENSIONAL DATA

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D Min. Opening	E	F	G	Working Pressure (PSI)
<b>1169-SW MALE ELBOW (90°)</b> Tube Socket Weld X Male Pipe Thread  	1169-SW-04x04	1/4	1/4	.953	1.140	.687	.203	.281	.203	.500	6,500
	1169-SW-06x04	3/8	1/4	.953	1.140	.687	.281	.312	.281	.500	5,500
	1169-SW-06x06	3/8	3/8	1.000	1.187	.812	.281	.312	.406	.687	5,500
	1169-SW-06x08	3/8	1/2	1.000	1.312	.812	.281	.312	.406	.687	5,500
	1169-SW-08x06	1/2	3/8	1.031	1.187	.812	.406	.375	.406	.687	5,000
	1169-SW-08x08	1/2	1/2	1.031	1.312	.812	.421	.375	.421	.687	5,000
	1169-SW-10x08	5/8	1/2	1.093	1.406	1.062	.500	.406	.500	.875	4,000
	1169-SW-12x12	3/4	3/4	1.437	1.500	1.187	.656	.437	.656	1.000	4,500
	1169-SW-16x16	1"	1"	1.968	1.875	1.437	.906	.625	.906	1.312	3,500

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D Min. Opening	E	F	G	Working Pressure (PSI)
<b>1170-SW FEMALE ELBOW (90°)</b> Tube Socket Weld X Female Pipe Thread  	1170-SW-04x02	1/4	1/8	.781	.843	.625	.183	.281	.687		6,500
	1170-SW-04x04	1/4	1/4	.937	1.187	.812	.183	.281	.687		6,500
	1170-SW-06x04	3/8	1/4	1.000	1.187	.812	.276	.312	.687		5,500
	1170-SW-06x06	3/8	3/8	1.000	1.187	.812	.276	.312	.687		5,500
	1170-SW-06x08	3/8	1/2	1.125	1.500	1.187	.276	.312	1.000		5,500
	1170-SW-08x06	1/2	3/8	1.156	1.312	1.187	.416	.375	1.000		5,000
	1170-SW-08x08	1/2	1/2	1.156	1.500	1.187	.416	.375	1.000		5,000
	1170-SW-10x08	5/8	1/2	1.250	1.500	1.187	.495	.406	1.000		4,000
	1170-SW-12x12	3/4	3/4	1.625	1.687	1.437	.651	.437	1.312		4,500
	1170-SW-16x16	1"	1"	2.000	2.000	1.781	.901	.625	1.625		3,500

	Catalog Number	E Tube O.D.	Tube O.D.	A	B	C	D Min. Opening	E	F	G	Working Pressure (PSI)
<b>1183-SW ADAPTER Tube Stub X Tube Socket Weld</b>  	1183-SW-04x02	1/4	1/8	.680	.437	.218	.089	.250	.343		6,500
	1183-SW-06x04	3/8	1/4	.830	.562	.281	.183	.375	.468		5,500
	1183-SW-08x04	1/2	1/4	.880	.562	.281	.183	.500	.516		5,000
	1183-SW-08x06	1/2	3/8	1.000	.687	.312	.308	.500	.562		5,000
	1183-SW-10x08	5/8	1/2	1.170	.812	.375	.401	.625	.625		4,000
	1183-SW-12x08	3/4	1/2	1.190	.812	.375	.433	.750	.687		4,500
	1183-SW-16x08	1"	1/2	1.410	.812	.375	.435	1.000	.562		3,500
	1183-SW-16x12	1"	3/4	1.390	1.125	.437	.652	1.000	.750		3,500

	Catalog Number	Tube O.D.	Nom. Pipe Size	A	B	C	D Min. Opening	E	F	G	Working Pressure (PSI)
<b>1193-SW ADAPTER Tube Socket Weld X Pipe Stub</b>  	1193-SW-04x02	1/4	1/8	.880	.562	.530	.183	.405			6,500
	1193-SW-06x04	3/8	1/4	.906	.687	.485	.276	.540			5,500
	1193-SW-08x06	1/2	3/8	1.130	.812	.593	.401	.675			5,000
	1193-SW-10x08	5/8	1/2	1.130	.938	.720	.495	.840			4,000
	1193-SW-12x12	3/4	3/4	1.410	1.125	.780	.651	1.050			4,500
	1193-SW-16x16	1"	1"	1.560	1.375	.880	.901	1.315			3,500



**TECHNICAL  
DATA**

**TECHNICAL  
DATA**



**EXAMPLES OF  
COST REDUCTION POSSIBILITIES  
USING  
IMPERIAL-EASTMAN  
BYPASS MANIFOLD VALVES**

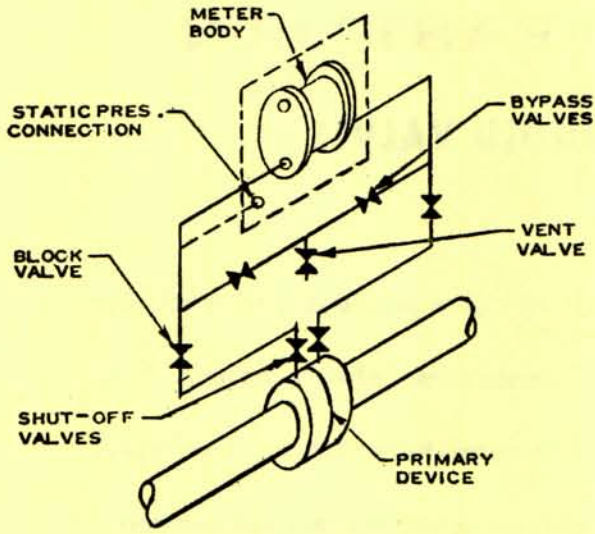
The Imperial-Eastman Bypass Manifold Valve provides a compact, inexpensive method of control for connections between primary flow measuring devices and differential pressure transmitters. The Bypass Manifold replaces a minimum of eleven separate pieces as compared to control connections made with standard valves, fittings and tubing. Installation time is cut by more than half and envelope dimensions are much smaller in size.

The following drawings show how the Imperial-Eastman Bypass Manifold can save time, material and simplify installation in 14 typical flow measurement conditions. In each case the "OLD" schematic represents the layout required for conventional hook ups with valves, fittings and tubing and the "NEW" schematic illustrating the simplification when using the Imperial-Eastman Bypass Manifold.

**EXAMPLES OF COST REDUCTION POSSIBILITIES USING  
IMPERIAL-EASTMAN BYPASS MANIFOLD VALVES**

**Flow Measurement Typical Meter Piping Diagrams**

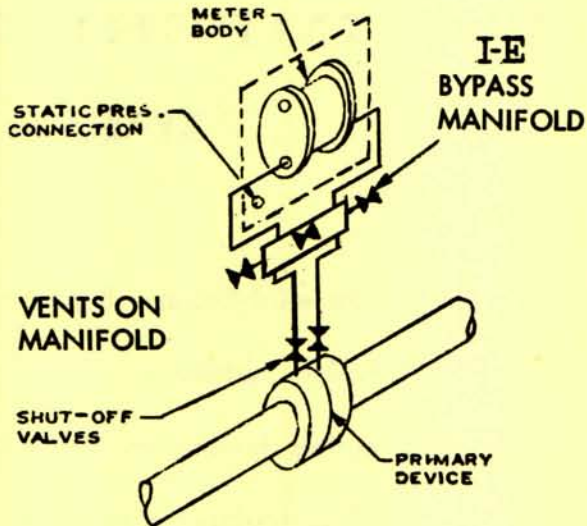
**OLD**



**GAS FLOW  
METER ABOVE RUN**

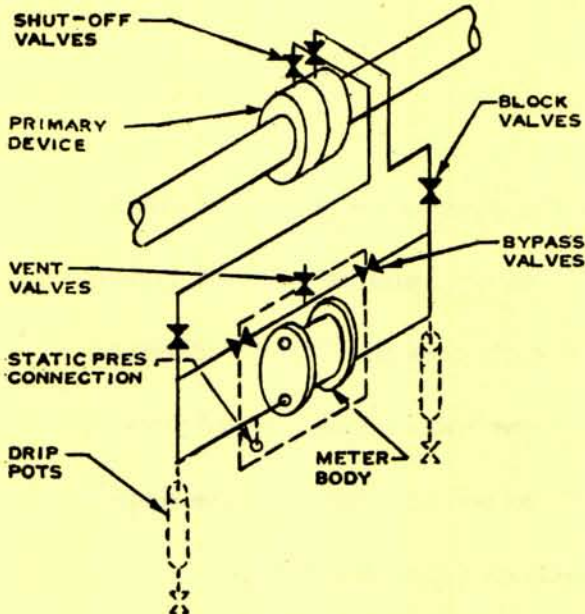
**FIG. 1**

**NEW**



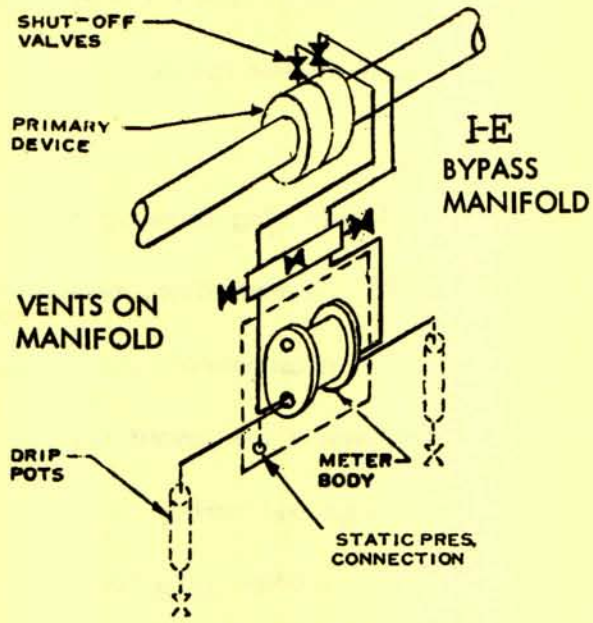
**GAS FLOW  
METER ABOVE RUN**

**FIG. 1**



**GAS FLOW  
METER BELOW RUN**

**FIG. 2**



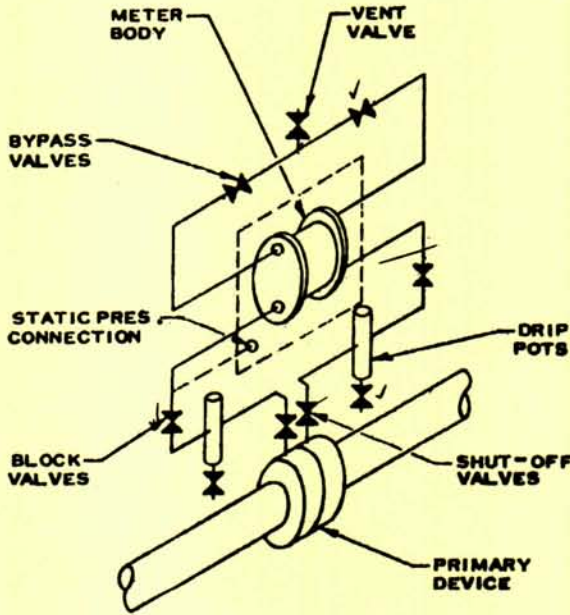
**GAS FLOW  
METER BELOW RUN**

**FIG. 2**

EXAMPLES OF COST REDUCTION POSSIBILITIES USING IMPERIAL-EASTMAN BYPASS MANIFOLD VALVES

Flow Measurement Special Meter Piping Diagrams

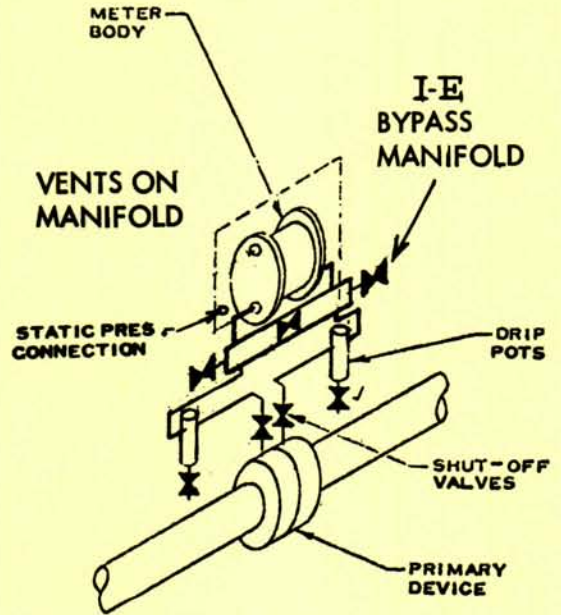
OLD



GAS FLOW  
HYDRATES PRESENT

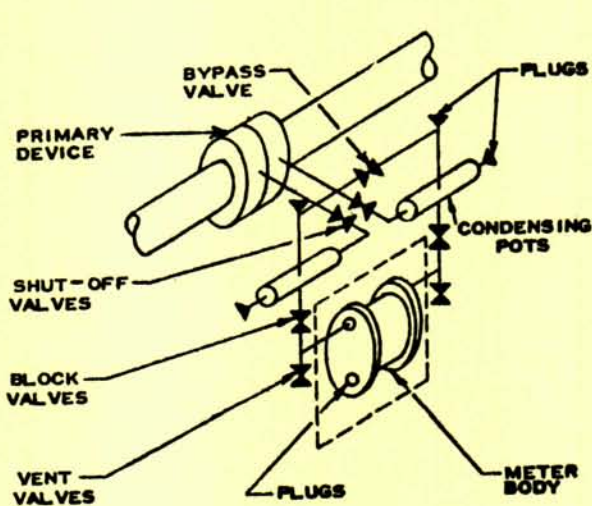
FIG. 3

NEW



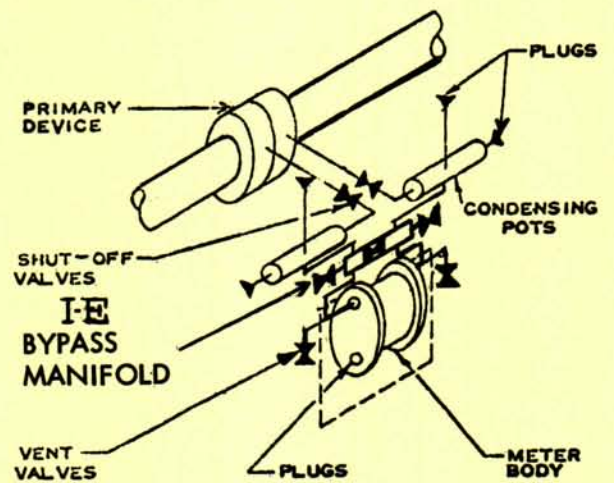
GAS FLOW  
HYDRATES PRESENT

FIG. 3



STEAM FLOW

FIG. 4



VENTS ON  
MANIFOLD

STEAM FLOW

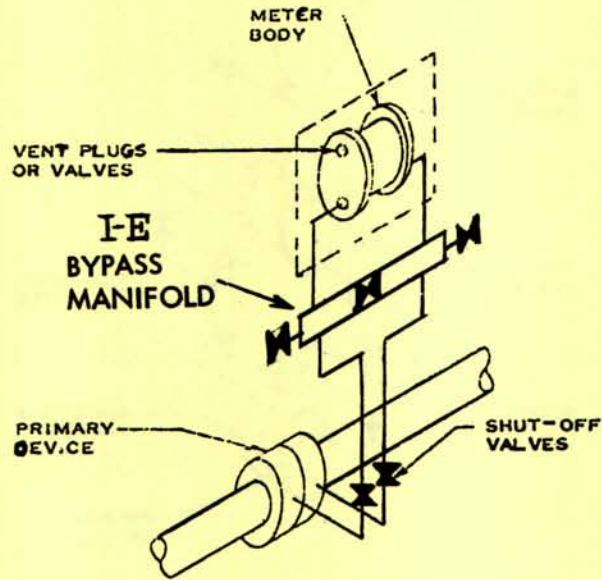
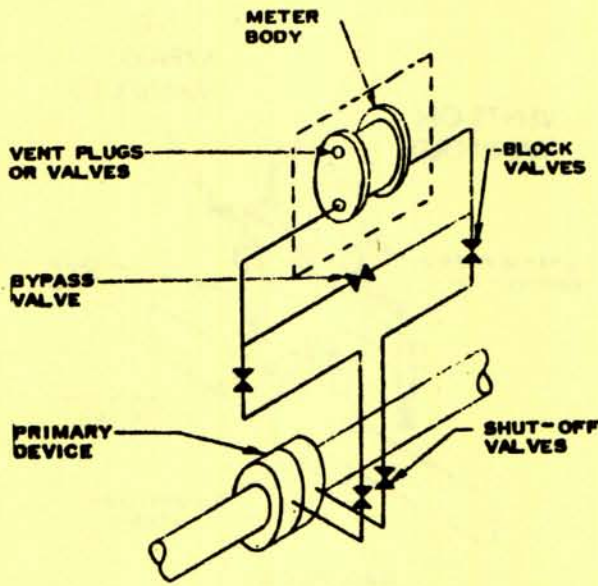
FIG. 4

EXAMPLES OF COST REDUCTION POSSIBILITIES USING  
IMPERIAL-EASTMAN BYPASS MANIFOLD VALVES

Flow Measurement Typical Meter Piping Diagrams

**OLD**

**NEW**

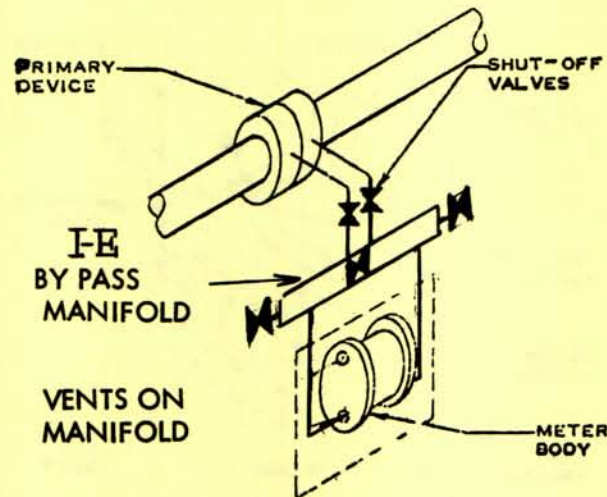
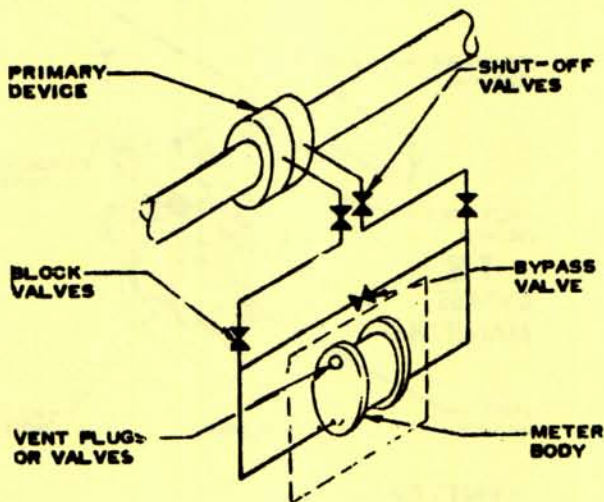


**LIQUID FLOW  
METER ABOVE RUN**

**LIQUID FLOW  
METER ABOVE RUN**

**FIG. 5**

**FIG. 5**



**LIQUID FLOW  
METER BELOW RUN**

**LIQUID FLOW  
METER BELOW RUN**

**FIG. 6**

**FIG. 6**

**EXAMPLES OF COST REDUCTION POSSIBILITIES USING  
IMPERIAL-EASTMAN BYPASS MANIFOLD VALVES**

Liquid Flow Measurement Special Meter Piping Diagrams

**OLD**

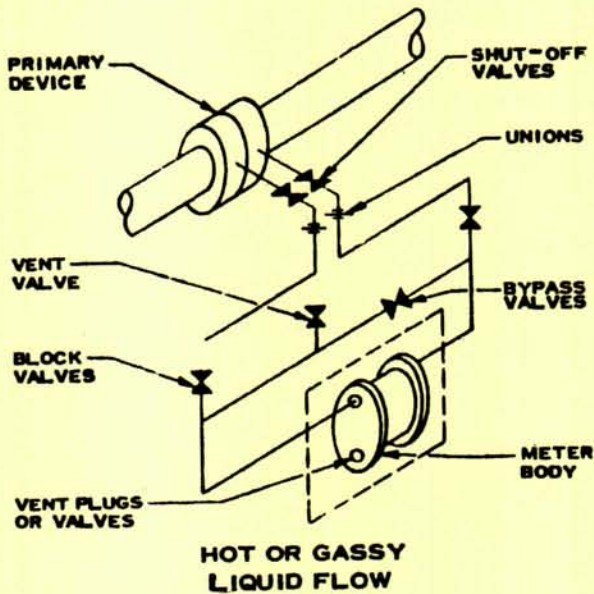


FIG. 7

**NEW**

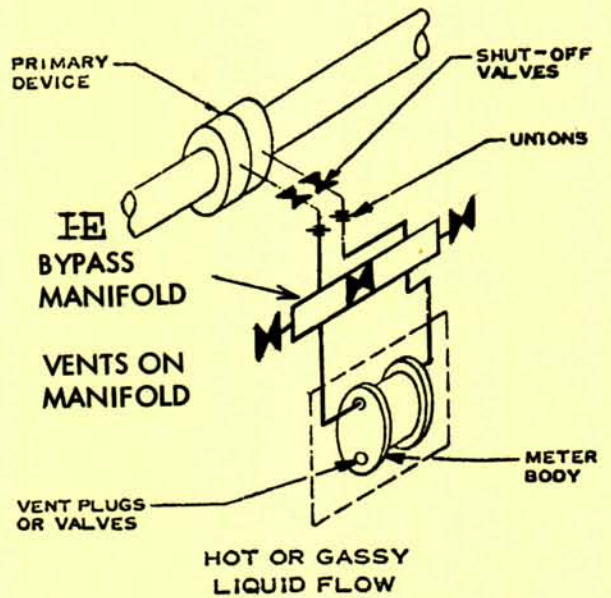


FIG. 7

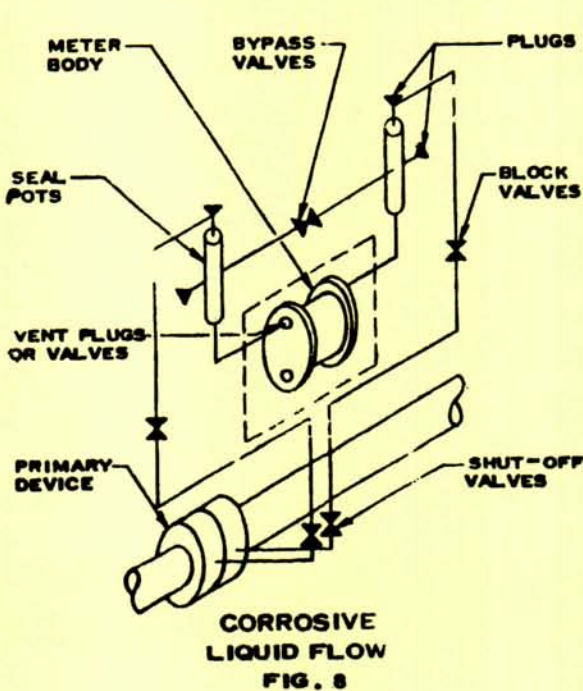


FIG. 8

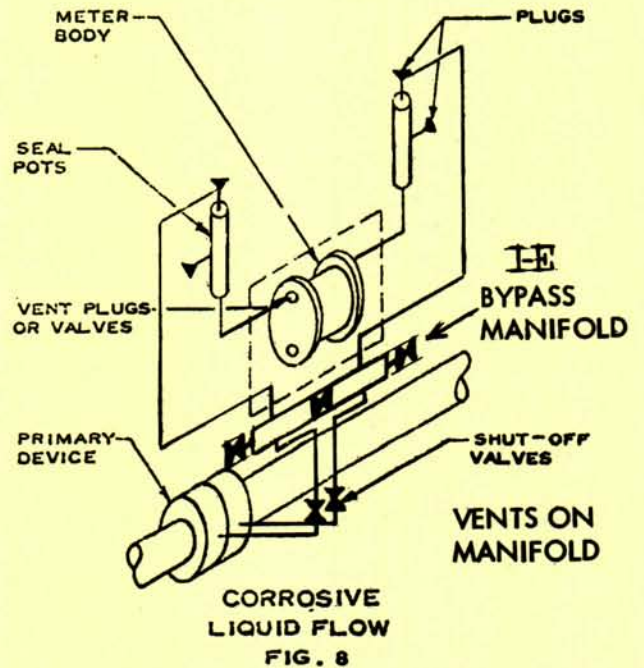


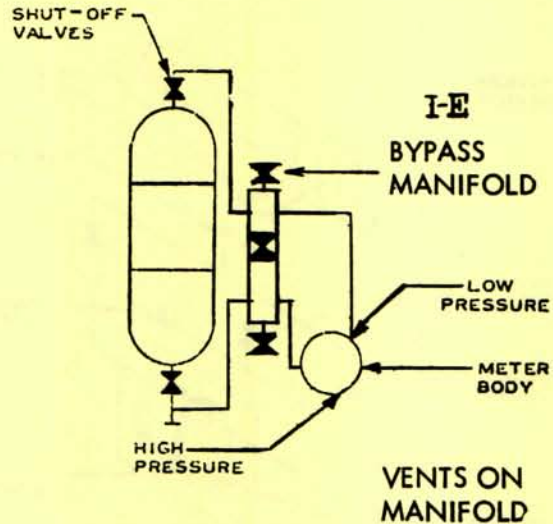
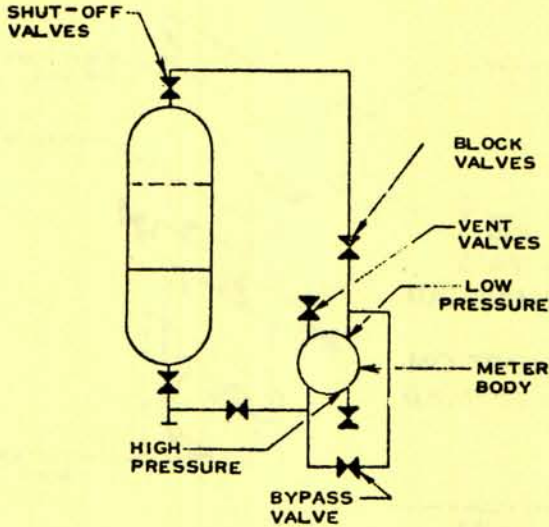
FIG. 8

EXAMPLES OF COST REDUCTION POSSIBILITIES USING  
IMPERIAL-EASTMAN BYPASS MANIFOLD VALVES

Liquid Level Applications Typical Meter Piping Diagrams

**OLD**

**NEW**

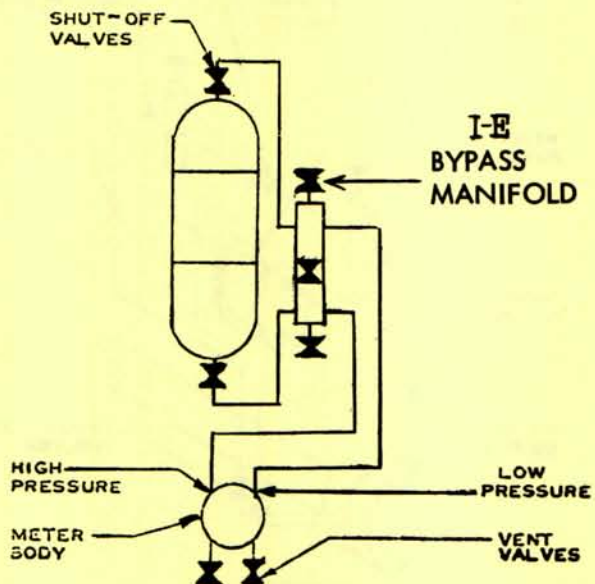
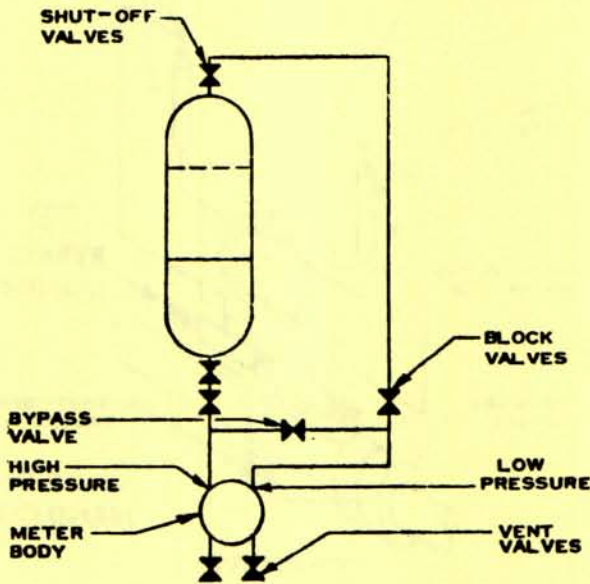


METER LEVEL WITH  
BOTTOM OF TANK

METER LEVEL WITH  
BOTTOM OF TANK

FIG. 9

FIG. 9



METER BELOW TANK  
POSITIVE SUPPRESSED RANGE

METER BELOW TANK  
POSITIVE SUPPRESSED RANGE

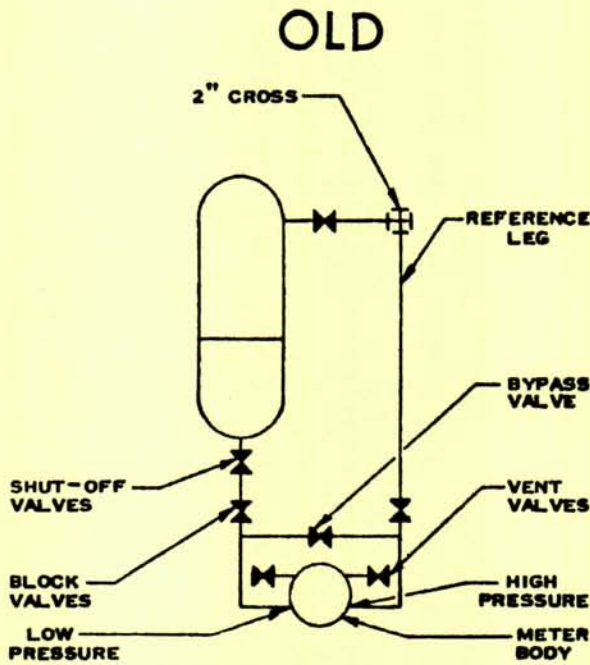
FIG. 10

FIG. 10



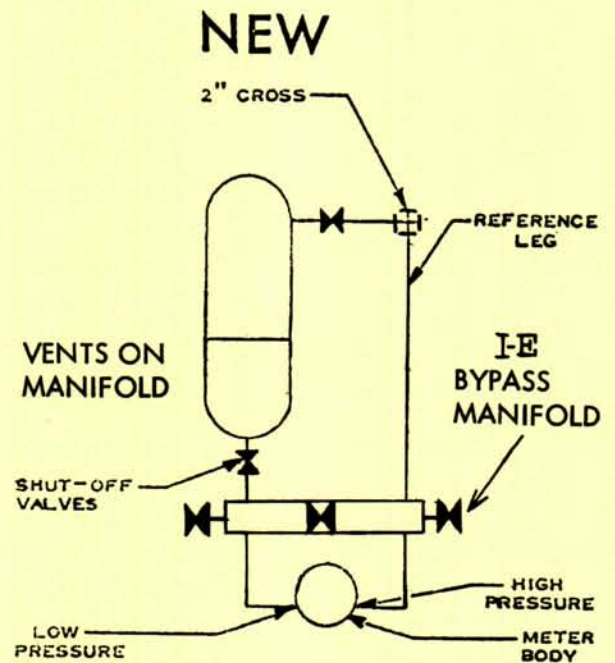
EXAMPLES OF COST REDUCTION POSSIBILITIES USING  
IMPERIAL-EASTMAN BYPASS MANIFOLD VALVES

Liquid Level Applications Typical Meter Piping Diagrams



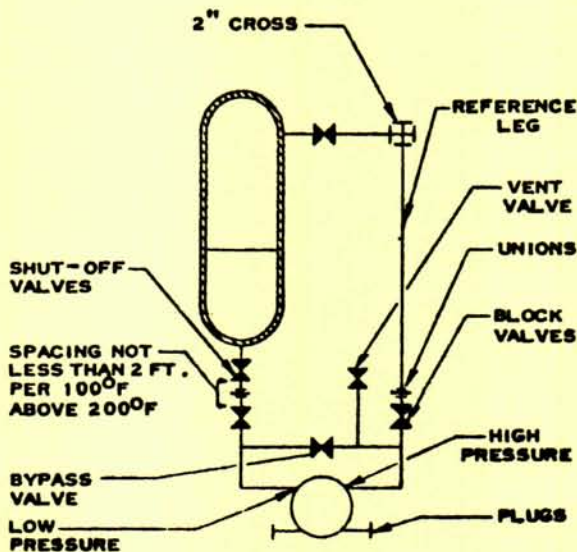
METER BELOW TANK  
WITH REFERENCE LEG

FIG. 11



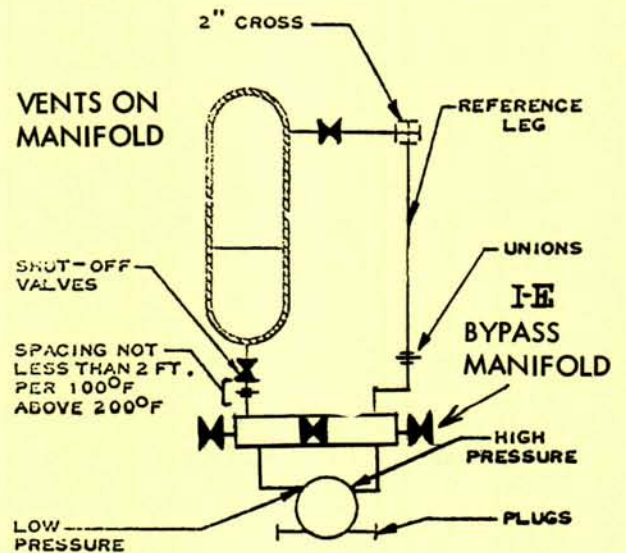
METER BELOW TANK  
WITH REFERENCE LEG

FIG. 11



METER BELOW TANK  
WITH REFERENCE LEG  
HOT LIQUIDS (VOLATILE)

FIG. 12



METER BELOW TANK  
WITH REFERENCE LEG  
HOT LIQUIDS (VOLATILE)

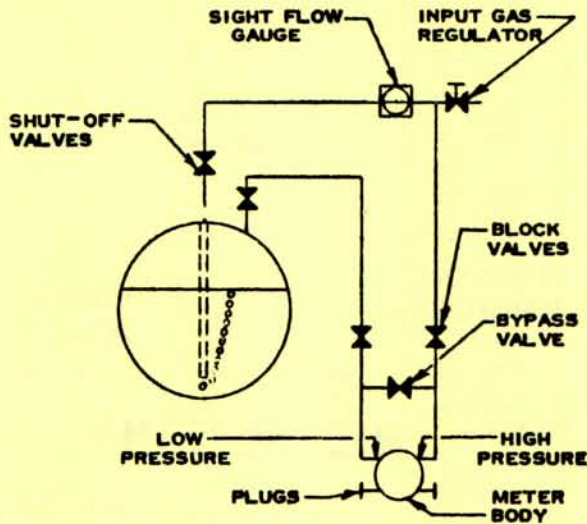
FIG. 12



EXAMPLES OF COST REDUCTION POSSIBILITIES USING IMPERIAL-EASTMAN BYPASS MANIFOLD VALVES

Liquid Specific Gravity Special Meter Body Piping

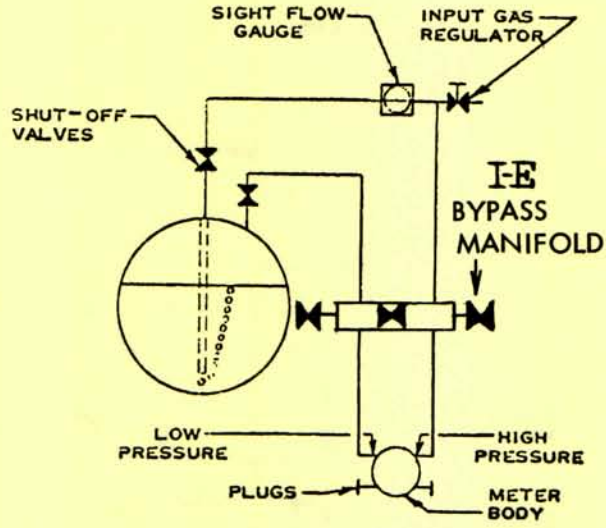
**OLD**



**BUBBLER SYSTEM**

**FIG. 13**

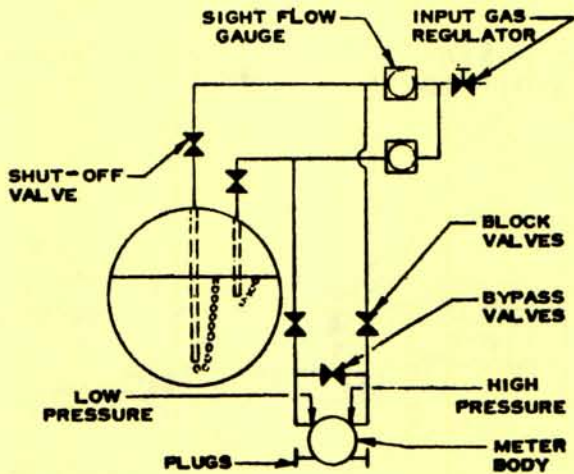
**NEW**



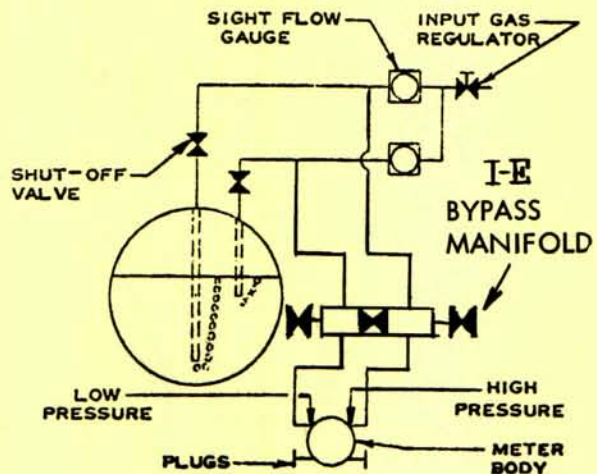
**BUBBLER SYSTEM**

**FIG. 13**

LIQUID LEVEL APPLICATIONS  
SPECIAL METER PIPING DIAGRAM



**FIG. 14**



**FIG. 14**





**MANIFOLD  
VALVES**

**Imperial-Eastman**

BULLETIN NO. 1060

# MANIFOLD VALVES

**BYPASS VALVES  
FOR PROCESS  
INSTRUMENTATION**



Provides simplicity,  
versatility and  
extra reliability of flow  
instrumentation piping.

# MANIFOLD VALVES

BYPASS

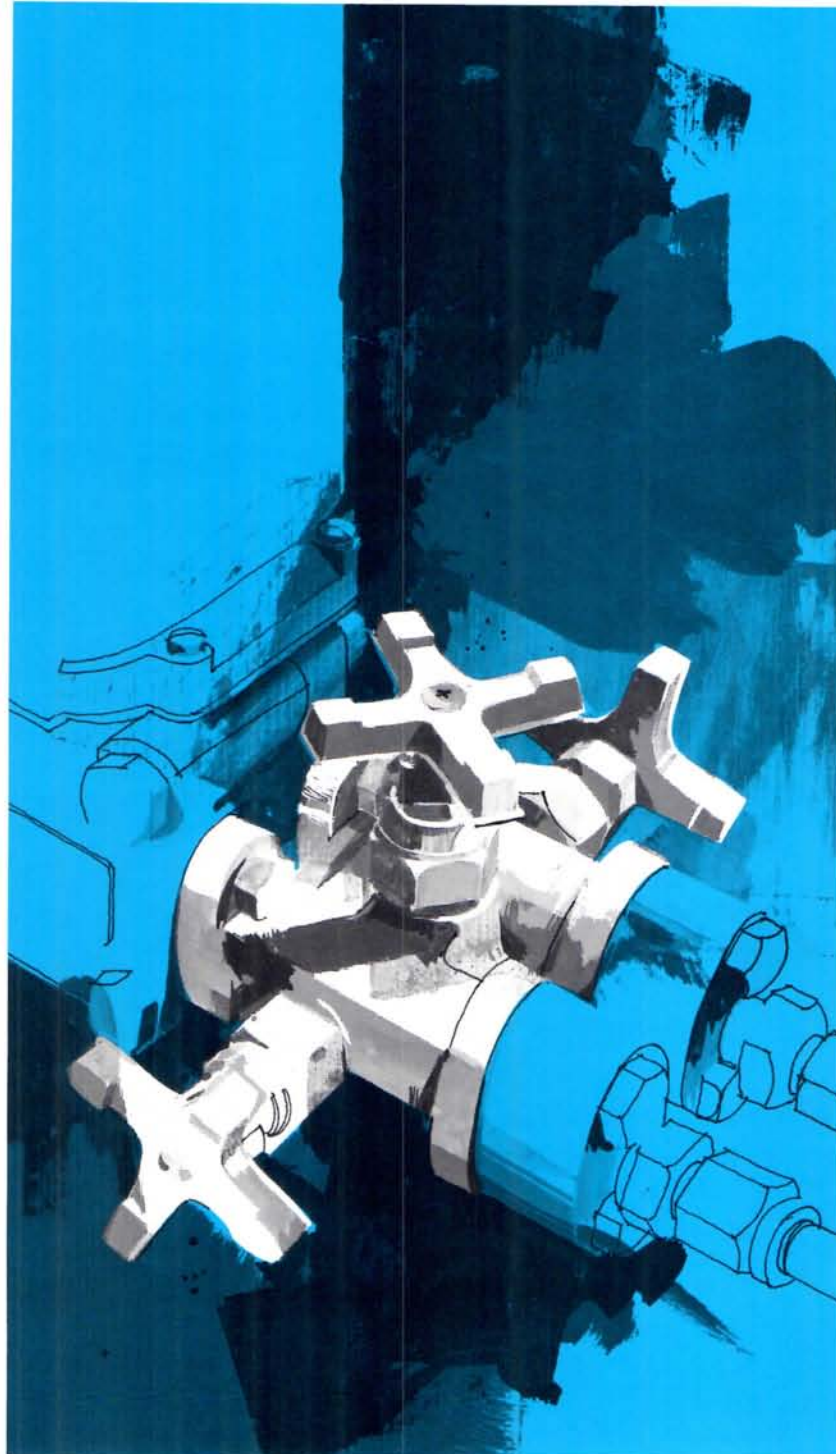
*Imperial-Eastman*

**MAXIMUM WORKING PRESSURE:**  
6500 psi at 100°F. (4 to 1 safety factor). Pressures are contingent upon materials.

**BODY MATERIALS:**  
Brass (Forged)  
Carbon Steel (Forged)  
Stainless Steel T-316 (Forged)  
Hastelloy "C" (Investment Cast)  
Monel (Investment Cast)  
Alloy 20 (Investment Cast)  
Inconel (Investment Cast)

**PACKING:**  
Teflon -60°F. to 450°F.  
Asbestos -60°F. to 850°F.  
Grafoil -60°F. to 1250°F.

**CONNECTIONS:**  
Flange x Flange  
Female NPT x Female NPT  
Flange x Female NPT  
Flange x Socket Weld Pipe  
Flange x Socket Weld Tube  
Socket Weld Pipe x Socket Weld Pipe



The concept of an Imperial-Eastman bypass manifold is to obtain simpler, easier and more reliable flow instrument piping. It provides a compact, integral valve unit in place of a maze of separate valves, pipe fittings, unions, nipples necessary to achieve bypass manifold

through on-the-job piping. Consequently, it reduces the time, effort and cost of making a bypass installation while providing more reliable performance.

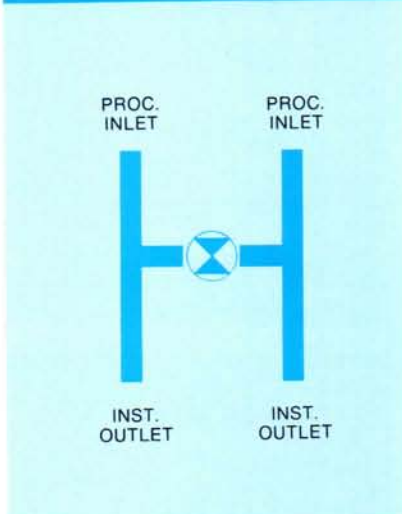
## Designed to suit any application requirement

Construction features of these valves afford wide flexibility in function, mounting and operating conditions. The manifold is offered in several configurations and designs.

1. One valve
2. Three valve
3. Three valve soft seat
4. Three valve in special metals

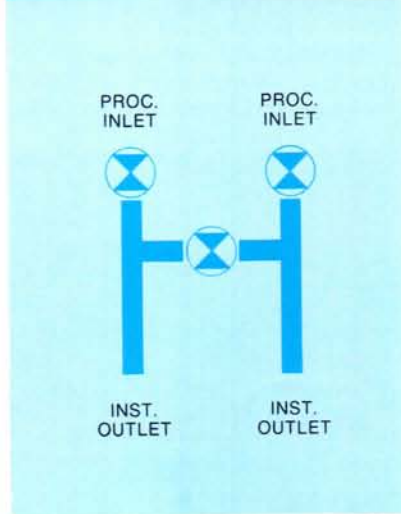
5. Three valve miniature
6. Five valve

Also available in a variety of end connections; metal-to-metal or soft seat shut-off; and with a wide choice of metals and packing options to meet severe operating conditions.



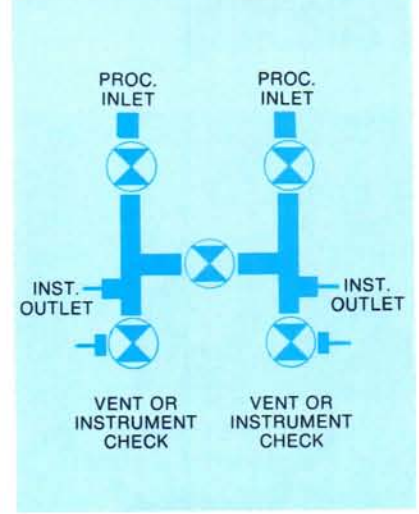
### ONE VALVE DESIGN

The mono valve design provides the center equalizing valve in the manifold body. Block valves are installed separately closer to the measuring device.



### THREE VALVE DESIGN

The three-valve design combines block valves for the flow transmitter inlets and a center valve for pressure equalizing. Normally, the block valves are open and the equalizing valve is closed. To calibrate the flow instrument, or perform service in the control loop, the block valves are closed and the center valve is opened.



### FIVE VALVE DESIGN

The compact five-valve design has two additional valves for calibration, purging, or sampling. Porting is provided to allow for permanent or temporary installation of calibration gauges for checking of the flow instrument, when required. The two additional valves control the shut-off function to the gauges.

# MONO VALVE MANIFOLD

**Imperial-Eastman**

## SPECIFICATIONS



### ORDERING INFORMATION:

To order, specify catalog number indicated for end configuration, size and material. Teflon packing standard.

#### EXAMPLE:

Flange x Flange, Stainless Steel.  
Standard Teflon packing  
754-BYT

### OPTIONS

#### Packing:

Asbestos (John Crane 187-1)  
-60 to 850°F.  
*Substitute A in packing code*  
Grafoil (Union Carbide GTA)  
-60 to 1250°F.  
*Substitute G in packing code*

#### Stem:

17-4PH (Carbon Steel Valve Only)  
*Add P*  
310SS (C.S. and 316SS Valves)  
*Add Z*  
2" Extended Stems (303SS)  
*Add 2*  
2" Extended Stems (17-4PH)  
*Add 2P*

#### Flange Bolts:

316SS  
*Add F3*

#### Flange Seals:

Viton "A"  
*Add VA*  
Rulan "A"  
*Add RA*

#### Handle:

Forged 316SS  
*Add Y*

#### EXAMPLE:

1/2" Flange x 1/2" Flange, Stainless Steel. Asbestos Packing. 310SS Stem. 316SS Flange Bolts. Viton "A" Flange Seals. Forged 316SS Handle.  
754-BYA-Z-F3-VA-Y

#### STUBS:

Tube and Pipe Stubs available on request. Specify: Size, Wall or Schedule, Alloy, Length.

#### ANSI (B31.1)

Consult factory.

#### NUCLEAR CLASS

1, 2, 3, Sec. III—Consult factory.

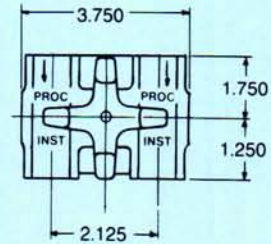
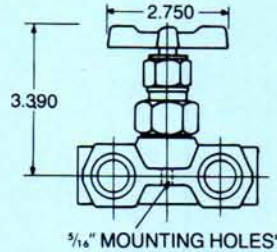
	BY-Valves Carbon Steel	BY-Valves Stainless Steel
Rating	6000 psi at 200°F.	6500 psi at 200°F.
Body	Carbon Steel (Forged)	SA-182 GR. F316 (Forged)
Stem	303SS	17-4PH
Bonnet	416SS	SA-479, 316SS
Bonnet Nut	416SS	SA-479, 316SS
Packing Nut	416SS	SA-479, 316SS
Packing Gland	316SS	SA-479, 316SS
Packing	Teflon (-60°F. to +450°F.)	Teflon (-60°F. to +450°F.)
Flange Seals	Teflon	Teflon
Flange Bolts	17-4PH	17-4PH
Handles	Forged Carbon Steel (Yellow)	Forged Carbon Steel (Red)

Body Finish: SS—As Immunized  
CS—Nickle Pentrate (Black)

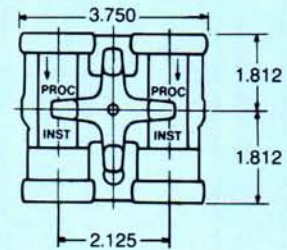
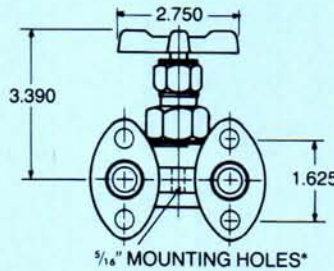


## DIMENSIONAL DATA

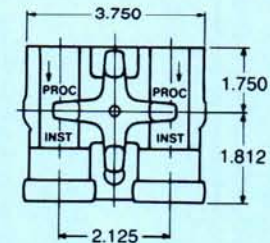
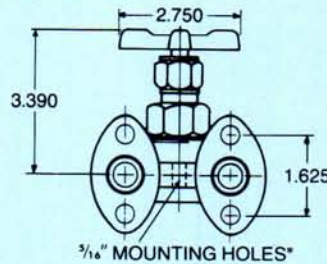
1/2" Fem. (Inst.) x 1/2" Fem. (Proc.)— 741-BYT, 751-BYT



Flange (Inst.) x Flange (Proc.)— 744-BYT, 754-BYT



Flange (Inst.) x 1/2" Fem. (Proc.)— 745-BYT, 755-BYT  
Flange (Inst.) x 1/2" Socket Weld Pipe (Proc.) 746-BYT, 756-BYT



\*ONE EACH SIDE

CONNECTIONS	CATALOG NUMBER	BODY	BONNET	STEM	PACKING	RATING*	
						TEMP.	PSI
1/2 Fem. x 1/2 Fem.	741-BYT	C.S.	416SS	303SS	Teflon	200°	6,000
1/2 Fem. x 1/2 Fem.	751-BYT	316SS	316SS	17-4PH	Teflon	200°	6,500
Flange x Flange	744-BYT	C.S.	416SS	303SS	Teflon	200°	6,000
Flange x Flange	754-BYT	316SS	316SS	17-4PH	Teflon	200°	6,500
Flange x 1/2 Fem.	745-BYT	C.S.	416SS	303SS	Teflon	200°	6,000
Flange x 1/2 Fem.	755-BYT	316SS	316SS	17-4PH	Teflon	200°	6,500
Flange x 1/2 SWP <sup>1</sup>	746-BYT	C.S.	416SS	303SS	Teflon	200°	6,000
Flange x 1/2 SWP <sup>1</sup>	756-BYT	316SS	316SS	17-4PH	Teflon	200°	6,500

<sup>1</sup>Socket Weld Pipe

\*See Pressure/Temperature Curve (page 15) for ratings with other packing options.

# 3 VALVE MANIFOLD

**Imperial-Eastman**

## SPECIFICATIONS



### ORDERING INFORMATION:

To order, specify complete catalog number indicated for end configuration, and material. Teflon packing standard.

### EXAMPLE:

Flange x Flange. Stainless Steel.  
724-BYT

### OPTIONS

#### Packing:

Asbestos (John Crane 187-1)  
-60 to 850°F.

*Substitute A in packing code*

Grafoil (Union Carbide GTA)  
-60 to 1250°F.

*Substitute G in packing code*

#### Stem:

17-4PH (Carbon Steel Valve Only)

*Add P*

310SS (C.S. and 316SS Valves)

*Add Z*

2" Extended Stems (303SS)

*Add 2*

2" Extended Stems (17-4PH)

*Add 2P*

#### Flange Bolts:

316SS

*Add F3*

#### Flange Seals:

Viton "A"

*Add VA*

Rulan "A"

*Add RA*

#### Handle:

Forged 316SS

*Add Y*

### EXAMPLE:

Flange x Flange. Stainless Steel.  
Asbestos packing. 310SS Stem.  
316SS Flange Bolts. Viton "A"  
Flange Seals. Forged 316SS Handle.  
724-BYA-Z-F3-VA-Y

### STUBS:

Tube and Pipe Stubs available on request. Specify: Size, Wall or Schedule, Alloy, Length.

### ANSI (B31.1)

Consult factory.

### NUCLEAR CLASS

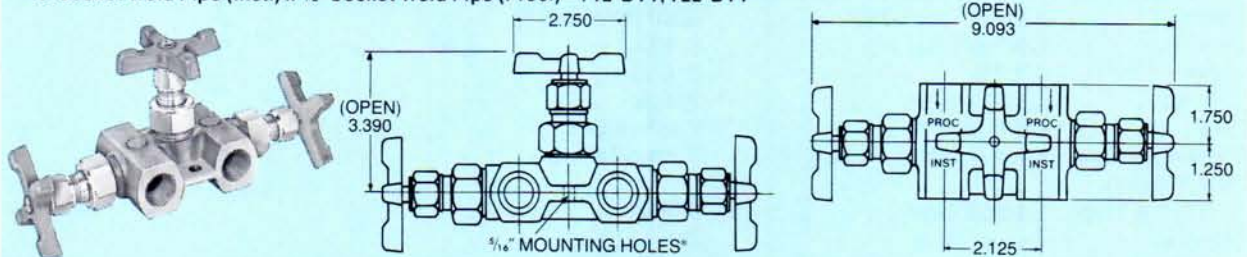
1, 2, 3. Sec. III - Consult factory.

	BY-Valves Carbon Steel	BY-Valves Stainless Steel
Rating	6000 psi at 200°F.	6500 psi at 200°F.
Body	Carbon Steel (Forged)	SA-182 GR. F316 (Forged)
Stem	303SS	17-4PH
Bonnet	416SS	SA-479, 316SS
Bonnet Nut	416SS	SA-479, 316SS
Packing Nut	416SS	SA-479, 316SS
Packing Gland	316SS	SA-479, 316SS
Packing	Teflon (-60 F. to +450°F.)	Teflon (-60°F. to +450°F.)
Flange Seals	Teflon	Teflon
Flange Bolts	17-4PH	17-4PH
Handles	Forged Carbon Steel (Yellow)	Forged Carbon Steel (Red)

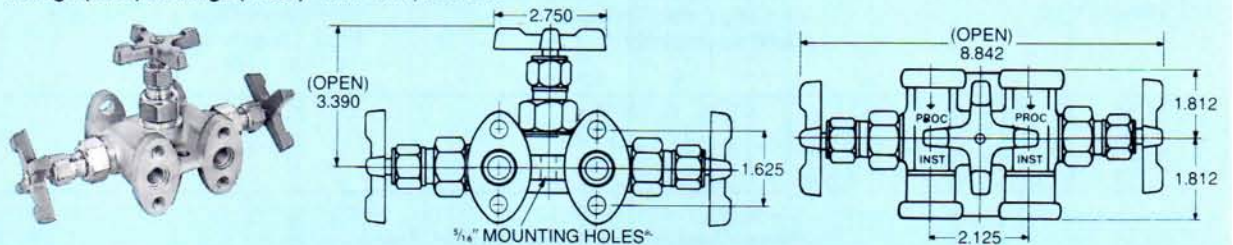
Body Finish: SS - As Immunized  
CS - Nickle Pentrate (Black)

## DIMENSIONAL DATA

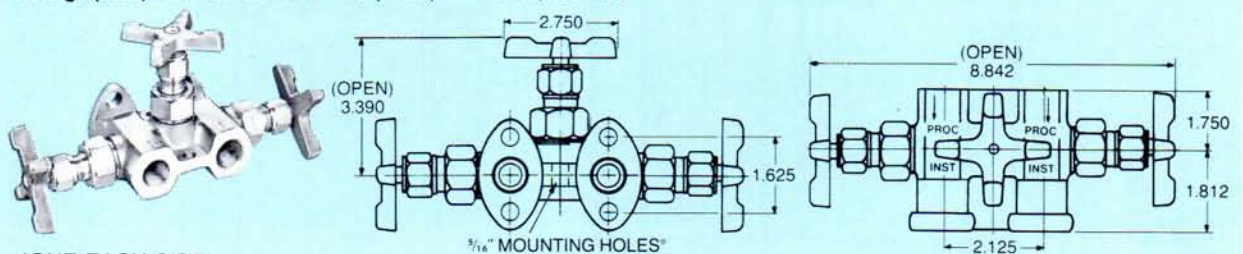
1/2" Female Pipe (Inst.) x 1/2" Female Pipe (Proc.) – 711-BYT, 721-BYT, 713-BYT, 723-BYT  
 1/2" Socket Weld Pipe (Inst.) x 1/2" Socket Weld Pipe (Proc.) – 712-BYT, 722-BYT



Flange (Inst.) x Flange (Proc.) – 714-BYT, 724-BYT



Flange (Inst.) x 1/2" Female Pipe (Proc.) – 715-BYT, 725-BYT  
 Flange (Inst.) x 1/2" Socket Weld Pipe (Proc.) – 716-BYT, 726-BYT  
 Flange (Inst.) x 1/2" Socket Weld Tube (Proc.) – 717-BYT, 727-BYT



\*ONE EACH SIDE

CONNECTIONS	CATALOG NUMBER	BODY	BONNET	STEM	PACKING	RATING*	
						TEMP.	PSI
1/2" Female Pipe x 1/2" Female Pipe	711-BYT	C.S.	416SS	303SS	Teflon	200°	5,000
	721-BYT	316SS	316SS	17-4PH	Teflon	200°	6,000
	713-BYT*	C.S.	416SS	303SS	Teflon	200°	5,000
	723-BYT*	316SS	316SS	17-4PH	Teflon	200°	6,000
*Includes auxiliary vent/purge/bleed valves.							
1/2" Socket Weld Pipe x 1/2" Socket Weld Pipe	712-BYT	C.S.	416SS	303SS	Teflon	200°	5,000
	722-BYT	316SS	316SS	17-4PH	Teflon	200°	6,000
Flange x Flange	714-BYT	C.S.	416SS	303SS	Teflon	200°	5,000
	724-BYT	316SS	316SS	17-4PH	Teflon	200°	6,000
Flange x 1/2" Female Pipe	715-BYT	C.S.	416SS	303SS	Teflon	200°	5,000
	725-BYT	316SS	316SS	17-4PH	Teflon	200°	6,000
Flange x 1/2" Socket Weld Pipe	716-BYT	C.S.	416SS	303SS	Teflon	200°	5,000
	726-BYT	316SS	316SS	17-4PH	Teflon	200°	6,000
Flange x 1/2" Socket Weld Tube	717-BYT	C.S.	416SS	303SS	Teflon	200°	5,000
	727-BYT	316SS	316SS	17-4PH	Teflon	200°	6,000

\*See Pressure/Temperature Curve (page 15) for ratings with other packing options.

# 3 VALVE MANIFOLD

**Imperial-Eastman**

SOFT SEAT

## SPECIFICATIONS

	BY-Valve Carbon Steel	BY-Valve Stainless Steel
Rating	3000 psi at 200°F.	3000 psi at 200°F.
Body	Carbon Steel	316SS
Stem	316SS	316SS
Bonnet	Carbon Steel	316SS
Seat	Kel-F (200°F)	Kel-F (200°F)
Packing (Stem)	Viton & Teflon	Viton & Teflon
Bleed Valves (1713 & 1723)	Carbon Steel	316SS
Handles	Zamac (Blue)	Zamac (Blue)

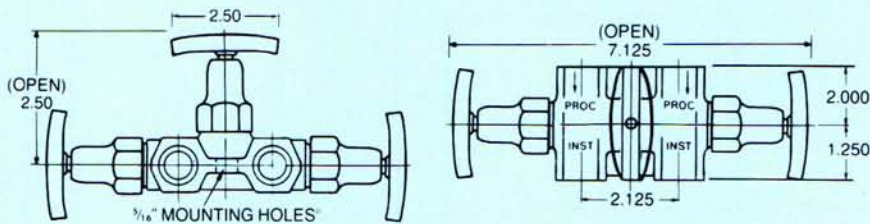
### ORDERING INFORMATION:

To order, specify catalog number for body material desired. Kel-F seat standard.

**EXAMPLE:**  
1/2" Female Pipe x 1/2" Female Pipe, Carbon Steel.  
1711-BY

## DIMENSIONAL DATA

1/2" Female Pipe (Inst.) x 1/2" Female Pipe (Proc.)



CONNECTION	CATALOG NUMBER	BODY	BONNET	STEM	SEAT	PACKING	MAX. RATING	
							TEMP.	PSI
1/2" Female Pipe x 1/2" Female Pipe	1711-BY	C.S.	C.S.	316SS	Kel-F	Viton & Teflon	200°F	3,000
	1721-BY	316SS	316SS	316SS	Kel-F	Viton & Teflon	200°F	3,000
1/2" Female Pipe	1713-BY*	C.S.	C.S.	316SS	Kel-F	Viton & Teflon	200°F	3,000
	1723-BY*	316SS	316SS	316SS	Kel-F	Viton & Teflon	200°F	3,000

Body Finish: SS—As Immunized  
CS—Nickle Pentrate (Black)

\*Includes auxiliary vent/purge/bleed valves.

## SPECIFICATIONS

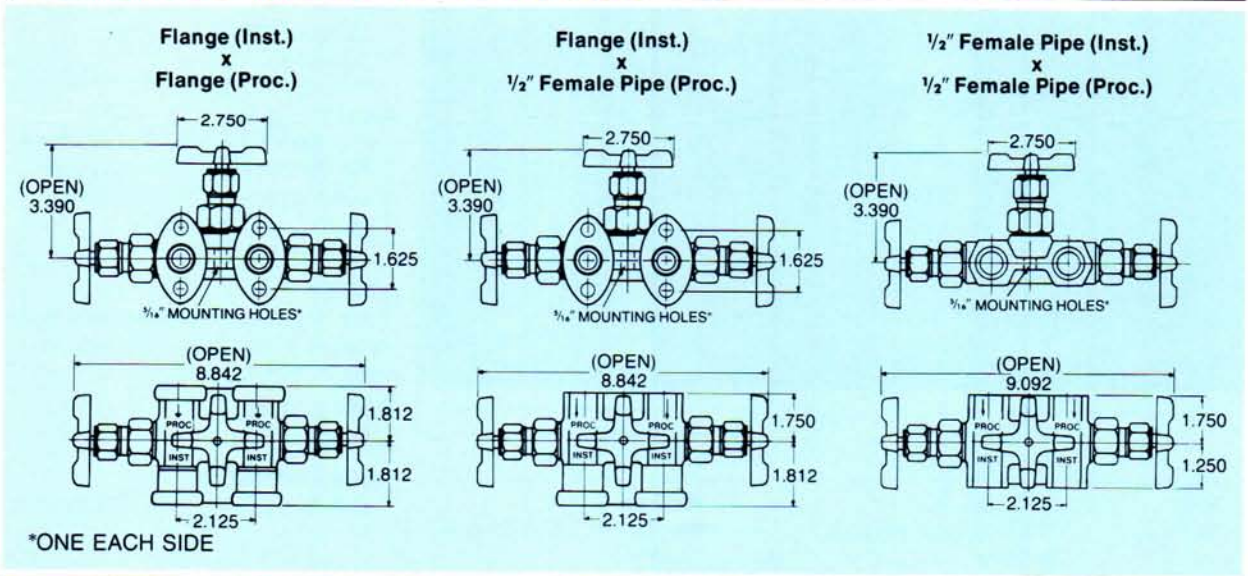
	Hastelloy "C" (Investment Cast)	Monel (Investment Cast)	Alloy 20 (Investment Cast)	Inconel (Investment Cast)
Rating	3000 psi at 100°F	3000 psi at 100°F	3000 psi at 100°F	3000 psi at 100°F
Body (Wetted Part)	Hastelloy "C"	Monel	Alloy 20	Inconel 600
Stem (Wetted Part)	Hastelloy "C"	Monel	Alloy 20	Inconel 625
Bonnet (Wetted Part)	Hastelloy "C"	Monel	Alloy 20	Inconel 625
Bonnet Nut	SA-479, 316SS	SA-479, 316SS	SA-479, 316SS	SA-479, 316SS
Packing Nut	SA-479, 316SS	SA-479, 316SS	SA-479, 316SS	SA-479, 316SS
Packing Gland	SA-479, 316SS	SA-479, 316SS	SA-479, 316SS	SA-479, 316SS
Packing	Teflon (-60 to 450°F.)	Teflon (-60 to 450°F.)	Teflon (-60 to 450°F.)	Teflon (-60 to 450°F.)
Flange Seals	Teflon	Teflon	Teflon	Teflon
Flange Bolts	316SS	316SS	316SS	316SS
Handles	Forged 316SS	Forged 316SS	Forged 316SS	Forged 316SS

**ORDERING INFORMATION:**

To order, specify complete catalog number for material and end connection desired. Teflon packing standard.

**EXAMPLE:**  
Flange x Flange.  
Hastelloy "C".  
724-BYC

## DIMENSIONAL DATA



CONNECTIONS	CATALOG NUMBER	BODY	BONNET	STEM	PACKING	RATING	
						TEMP	PSI
Flange x Flange	724-BYC	Hastelloy "C"	Hastelloy "C"	Hastelloy "C"	Teflon	100°F	3,000
	724-BYM	Monel	Monel	Monel	Teflon	100°F	3,000
	724-BY-20	Alloy 20	Alloy 20	Alloy 20	Teflon	100°F	3,000
	724-BY-IN	Inconel 600	Inconel 625	Inconel 625	Teflon	100°F	3,000
Flange x 1/2" Female Pipe	725-BYC	Hastelloy "C"	Hastelloy "C"	Hastelloy "C"	Teflon	100°F	3,000
	725-BYM	Monel	Monel	Monel	Teflon	100°F	3,000
	725-BY-20	Alloy 20	Alloy 20	Alloy 20	Teflon	100°F	3,000
	725-BY-IN	Inconel 600	Inconel 625	Inconel 625	Teflon	100°F	3,000
1/2" Female Pipe x 1/2" Female Pipe	721-BYC	Hastelloy "C"	Hastelloy "C"	Hastelloy "C"	Teflon	100°F	3,000
	721-BYM	Monel	Monel	Monel	Teflon	100°F	3,000
	721-BY-20	Alloy 20	Alloy 20	Alloy 20	Teflon	100°F	3,000
	721-BY-IN	Inconel 600	Inconel 625	Inconel 625	Teflon	100°F	3,000

# 5 VALVE MANIFOLD

**Imperial-Eastman**

## SPECIFICATIONS



### ORDERING INFORMATION:

To order, specify catalog number for end configuration, size, and material. Grafoil packing standard.

#### EXAMPLE:

1/2" Female Pipe × 1/4" Female Pipe  
× 1/4" Female Pipe. Stainless Steel.  
794-BYSLSSG

### OPTIONS

#### Packing:

Teflon (-60 to 450°F.)

Substitute "T" in packing code

Asbestos (John Crane 187-1)

-60 to 850°F.

Substitute "A" in packing code

#### Stem:

17-4PH (Carbon Steel Valve only)

Add P

310SS (C.S. and 316SS Valves)

Add Z

2" Extended Stems (303SS)

Add 2

2" Extended Stems

Add 2P

#### Handle:

Forged 316SS

Add Y

#### EXAMPLE:

1/2" Female Pipe × 1/4" Female Pipe  
× 1/4" Female Pipe. Stainless Steel.  
Asbestos packing. 310SS Stem.  
Forged 316SS Handle.  
794-BYSLSSA-Z-Y

#### STUBS:

Tube and Pipe Stubs available on request. Specify: Size, Wall or Schedule, Alloy, Length.

#### ANSI (B31.1)

Consult factory.

#### NUCLEAR CLASS

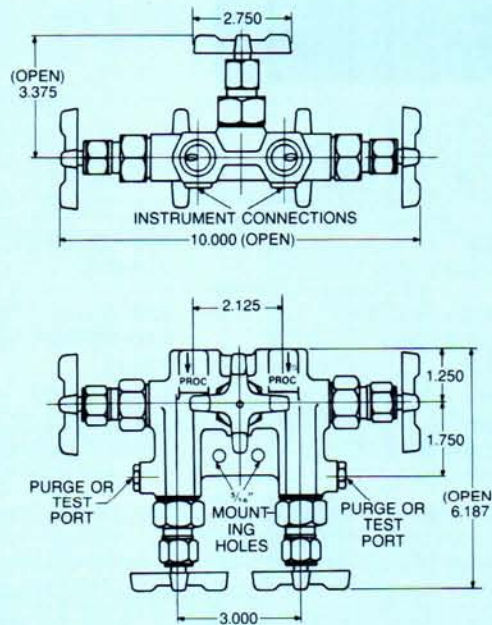
1, 2, 3. Sec. III - Consult factory.

	BY-Valves Carbon Steel	BY-Valves Stainless Steel
Rating	6000 psi at 200°F.	6500 psi at 200°F.
Body	Carbon Steel (forged)	SA-182 GR. F316 (forged)
Stem	303SS	17-4PH
Bonnet	416SS	SA-479, 316SS
Bonnet Nut	416SS	SA-479, 316SS
Packing Nut	416SS	SA-479, 316SS
Packing Gland	316SS	SA-479, 316SS
Packing	Grafoil (Union Carbide GTA) -60 to 1250°F	Grafoil (Union Carbide GTA) -60 to 1250°F
Handles	Forged Carbon Steel (Yellow)	Forged Carbon Steel (Red)

Body Finish: SS - As Immunized  
CS - Nickle Pentrate (Black)

## DIMENSIONAL DATA

**1/2" Female Pipe (Proc.) x 1/4" Female Pipe (Inst.) x 1/4" Female Pipe (Test) – 794-BY**  
**1/2" Socket Weld Pipe (Proc.) x 1/4" Female Pipe (Inst.) x 1/4" Female Pipe (Test) – 795-BY**  
**1/2" Socket Weld Tube (Proc.) x 1/4" Female Pipe (Inst.) x 1/4" Female Pipe (Test) – 796-BY**



CONNECTIONS	CATALOG NUMBER	BODY	BONNET	STEM	PACKING	MAX. RATING* TEMP.	PSI
1/2" Female Pipe (Proc.) x 1/4" Female Pipe (Inst.) x 1/4" Female Pipe (Test)	794-BYSLSG	C.S.	416SS	303SS	Grafoil	200°F	6,000
	794-BYSLSSG	316SS	316SS	17-4PH	Grafoil	200°F	6,500
1/2" Socket Weld Pipe (Proc.) x 1/4" Female Pipe (Inst.) x 1/4" Female Pipe (Test)	795-BYSLSG	C.S.	416SS	303SS	Grafoil	200°F	6,000
	795-BYSLSSG	316SS	316SS	17-4PH	Grafoil	200°F	6,500
1/2" Socket Weld Tube (Proc.) x 1/4" Female Pipe (Inst.) x 1/4" Female Pipe (Test)	796-BYSLSG	C.S.	416SS	303SS	Grafoil	200°F	6,000
	796-BYSLSSG	316SS	316SS	17-4PH	Grafoil	200°F	6,000

\*See Pressure/Temperature Curve (page 15) for ratings with other packing options.

# 3 VALVE MANIFOLD

MINIATURE

*Imperial-Eastman*



Instrument quality three-valve design for use in control panel, laboratory, manometer or similar applications where the size of our standard manifolds is not desired. Valve stems are single point precision machined to a 15° taper for better opening and seating characteristics. Available in brass, carbon steel and T-316 stainless steel, this valve meets all strength requirements of schedule 80 pipe. Heat resistant phenolic or optional metal round handles are recessed to accept color coding discs. Connections are 1/4" pipe thread on standard 2 1/8" centers.

## SPECIFICATIONS

	Brass 761-BYB	Carbon Steel 761-BYS	Stainless Steel 761-BYSS
Rating	3500 psi at 100°F.	6000 psi at 100°F.	6500 psi at 100°F.
Body	Brass (forged)	Carbon Steel (forged)	316SS (forged)
Stem	303SS	303SS	316SS
Bonnet Nut	Brass	Carbon Steel	316SS
Packing Retainer	Brass	303SS	316SS
Packing	Teflon (-60 to 450°F.)	Teflon (-60 to 450°F.)	Teflon (-60 to 450°F.)
Handle	Phenolic (Black)	Phenolic (Black)	Phenolic (Black)

OPTIONS: Packing: Above 450°F. Grafoil Handle: Chrome Plated Brass (Round)

See Pressure/Temperature Curve (page 15) for ratings with other packing options.

## DIMENSIONAL DATA

### ORDERING INFORMATION:

To order, specify catalog number for material desired.

### EXAMPLE:

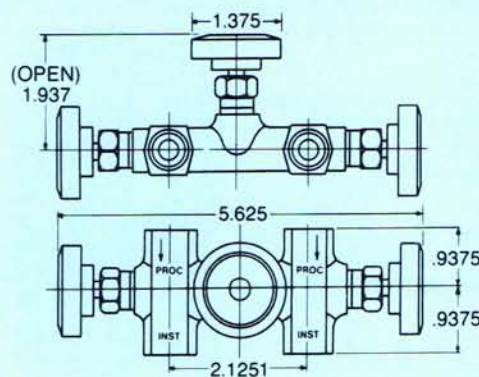
1/4" Female Pipe x 1/4" Female Pipe. Brass.  
761-BYB

Packing: Grafoil – Add "G"

Handle: Chrome Plated Brass – Add "C"

Example: 1/4" Female Pipe x 1/4" Female Pipe.  
Stainless Steel. Grafoil packing.  
Chrome Plated Brass Handle.  
761-BYSS-G-C

1/4" Female Pipe (Inst.) x 1/4" Female Pipe (Proc.)



CONNECTION	CATALOG NUMBER	BODY	BONNET	STEM	PACKING	RATING	
						TEMP.	PSI
1/4" Female Pipe x 1/4" Female Pipe	761-BYB	Brass	Brass	303SS	Teflon	100°F	3,500
	761-BYS	C.S.	C.S.	303SS	Teflon	100°F	6,000
	761-BYSS	SS	316SS	316SS	Teflon	100°F	6,500

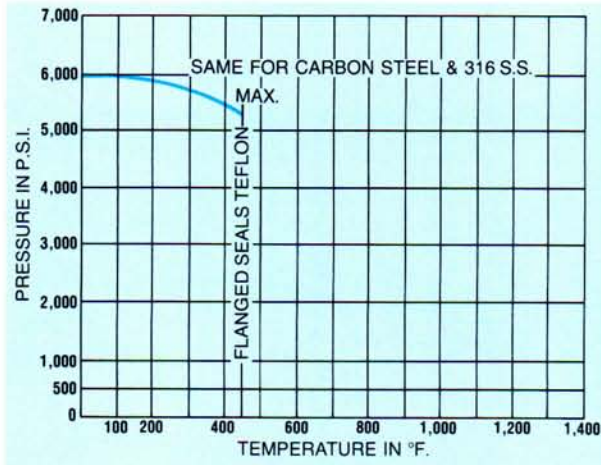
Body Finish: SS – As Immunized, C.S. – Nickel Pentrate (Black)  
Brass – Polished



# PRESSURE/TEMPERATURE DATA

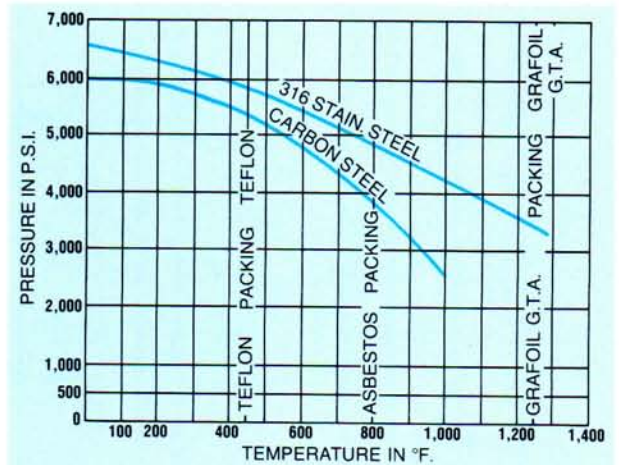
OPERATING

## FLANGED—MONO AND 3-VALVE MANIFOLDS

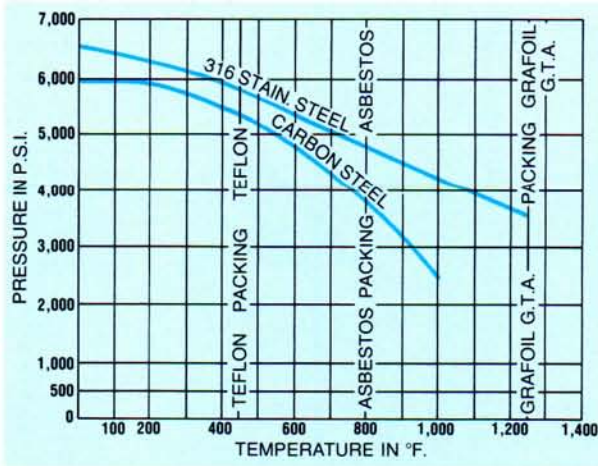


Above limited by Teflon flange seals

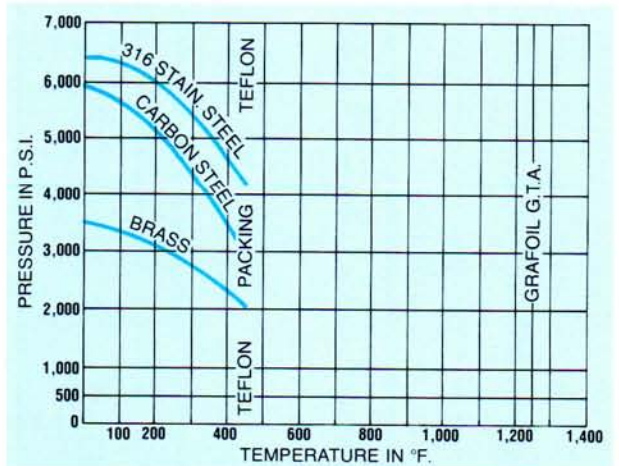
## THREADED PIPE X THREADED PIPE—MONO, 3-VALVE AND 5-VALVE MANIFOLDS



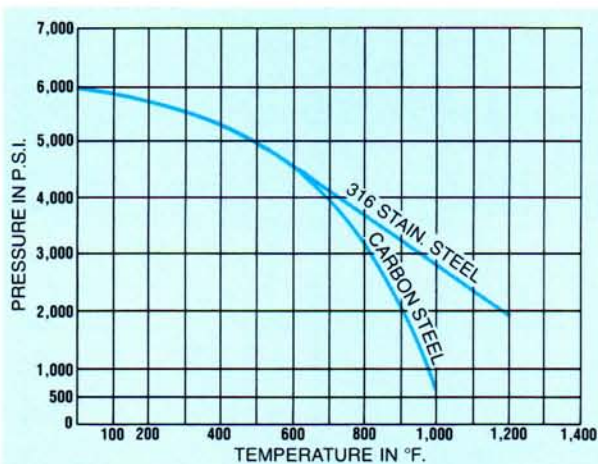
## SOCKET WELD PIPE X SOCKET WELD PIPE—MONO, 3-VALVE, 5-VALVE MANIFOLDS AND 3-VALVE IN SOCKET WELD TUBE



## 761 BY SERIES—3-VALVE MINIATURE MANIFOLDS



## PER ANSI B 16-11, 1966 6,000# CLASS FORGED—SOCKET WELD OR THREADED PIPE



Max. Oper. Temp.  
W/GTA Packing: Brass—1000 PSI @ 500°F.  
C.S.—1000 PSI @ 800°F.  
S.S.—1000 PSI @ 900°F.



**Imperial-Eastman Corporation**

6300 W. Howard St./Chicago 60648

Subsidiary of **ITE Imperial**  
CORPORATION

MIDDE PAGE

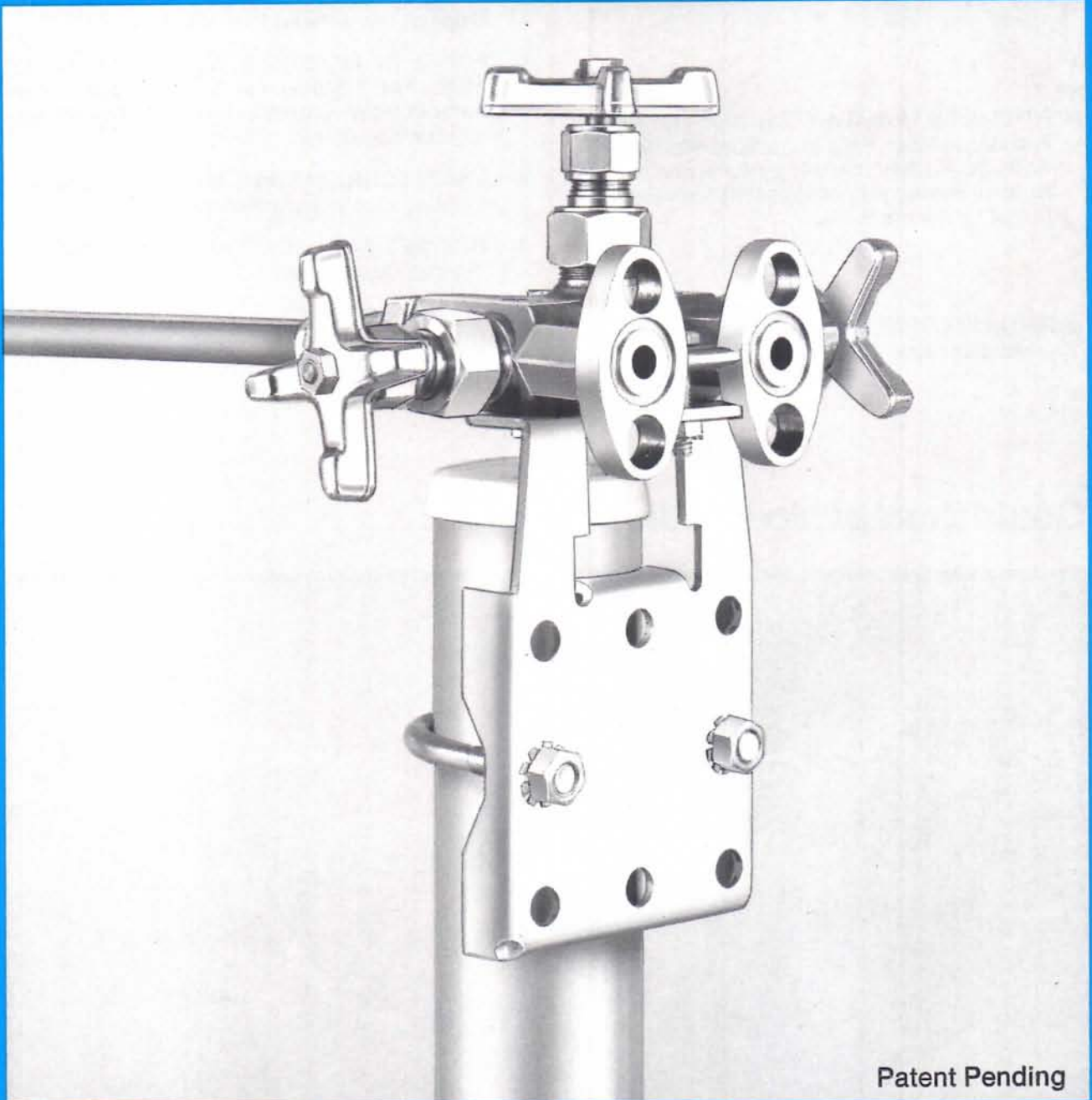
HERE!

HESSE!

MIDE BYGE

# Gould Imperial-Eastman Manifold Mounting System

**A new, superior quality mounting bracket for use in conjunction  
with Gould Manifold Bypass Valves for Process Instrumentation**



Patent Pending

**The finest manifold mounting system—FROM ANY ANGLE!**

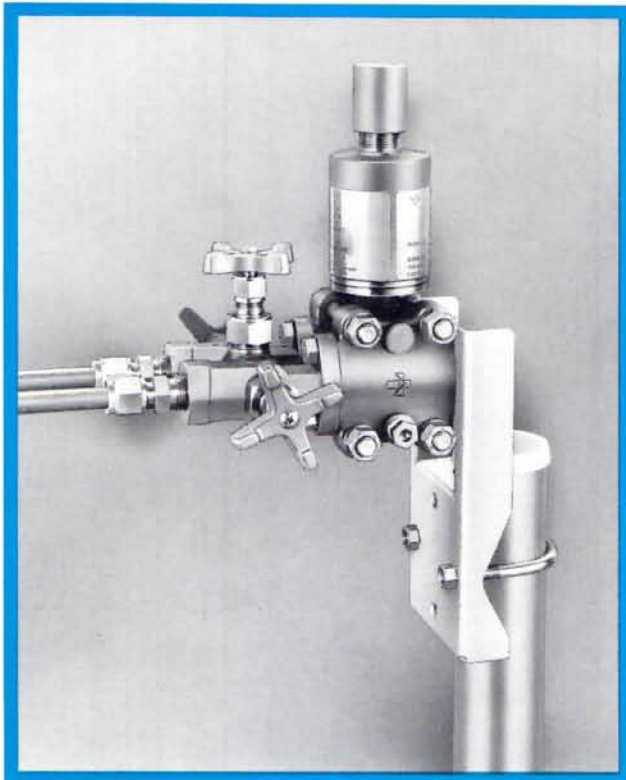
## Feature for feature— the Gould mounting system gives you more:

- **ELIMINATES TRANSMITTER CONSTRUCTION DAMAGE.** You mount only the manifold—you now can warehouse the transmitter until loop checkout is required.
- **REDUCES TRANSMITTER DELIVERY PROBLEMS.** Transmitter not required for piping installation.
- **SIMPLIFIES TRANSMITTER MAINTENANCE.** Just remove four bolts and disconnect signal leads. You're now ready to perform needed maintenance leaving process sensing lines supported by the manifold.
- **REDUCES PIPESTAND CORROSION.** Plastic protective cap to cover the pipestand is included.

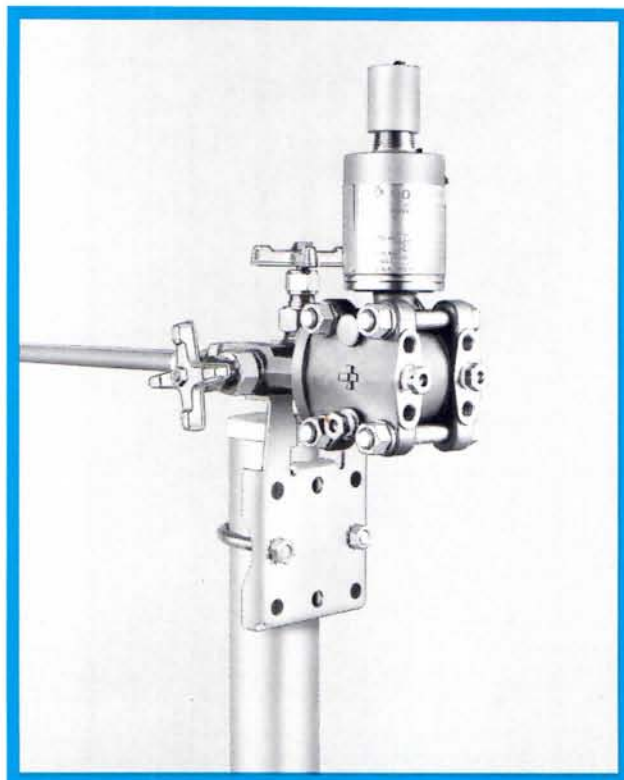
## Also, benefit from these **EXCLUSIVE FEATURES** of the Gould mounting system:

- **ELIMINATES DELIVERY DELAYS.** Your mounting bracket and/or valve is available from local stocking distributors.
- **ONE UNIVERSAL BRACKET KIT** fits both flange X pipe thread and flange X flange manifolds. Eliminates need for extra stocking or inventory.
- **VERSATILITY.** Valve can be mounted in your choice of ten different positions.
- **CHOICE OF CARBON STEEL OR STAINLESS STEEL.** The 316 Stainless Steel bracket is ideal for use in highly corrosive areas such as offshore and chemical plants.
- **MORE SECURE MOUNT.** Bracket has unique mounting cleats that bite into pipe.
- **PROVIDES EASY ADAPTABILITY TO HEAT BOX INSTALLATION.**
- **VIBRATION TESTED** to duplicate on-site conditions with a 40 lb. weight (1G Load) for 1 million cycles.

## Gould Bracket Mounts the Manifold...

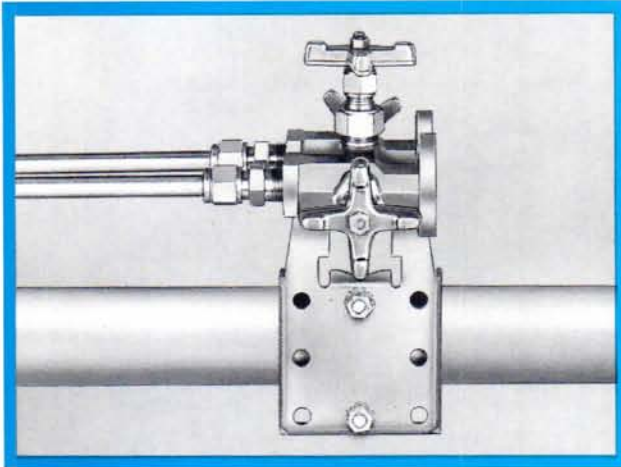


Current Mounting Method

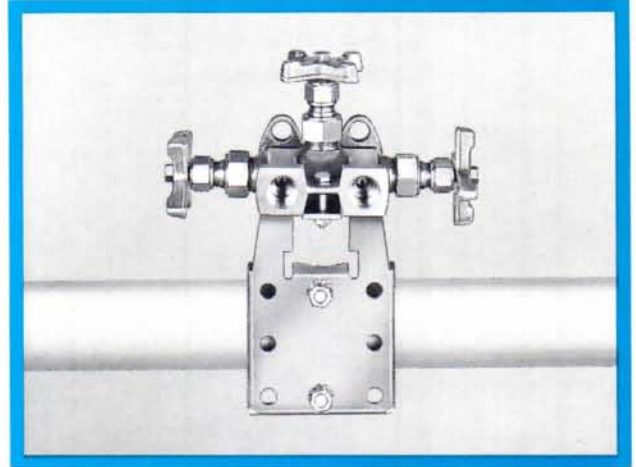


Improved Gould Mounting Bracket Method

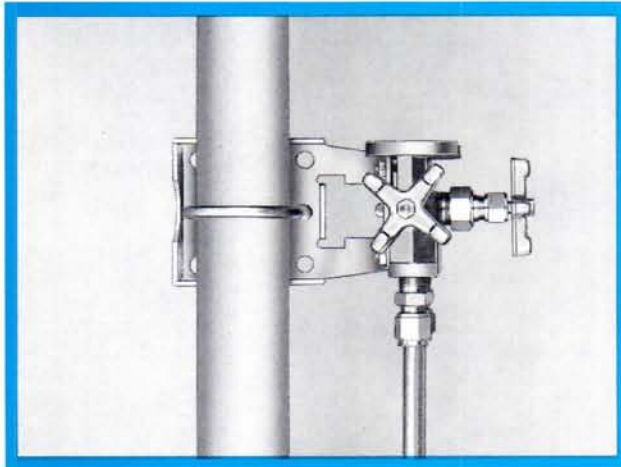
# Mounting versatility both vertical and horizontal mounting positions.



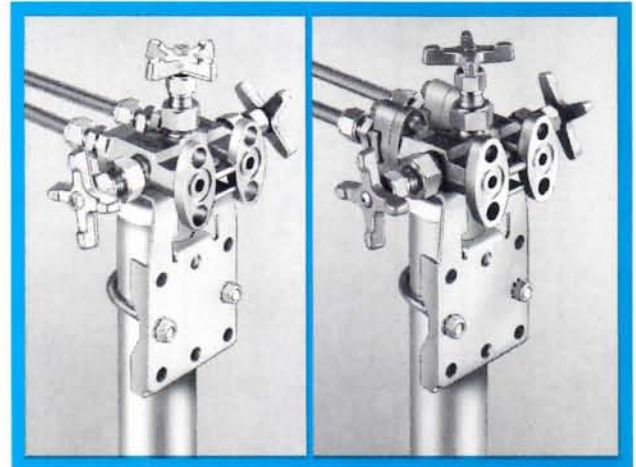
Horizontal with run



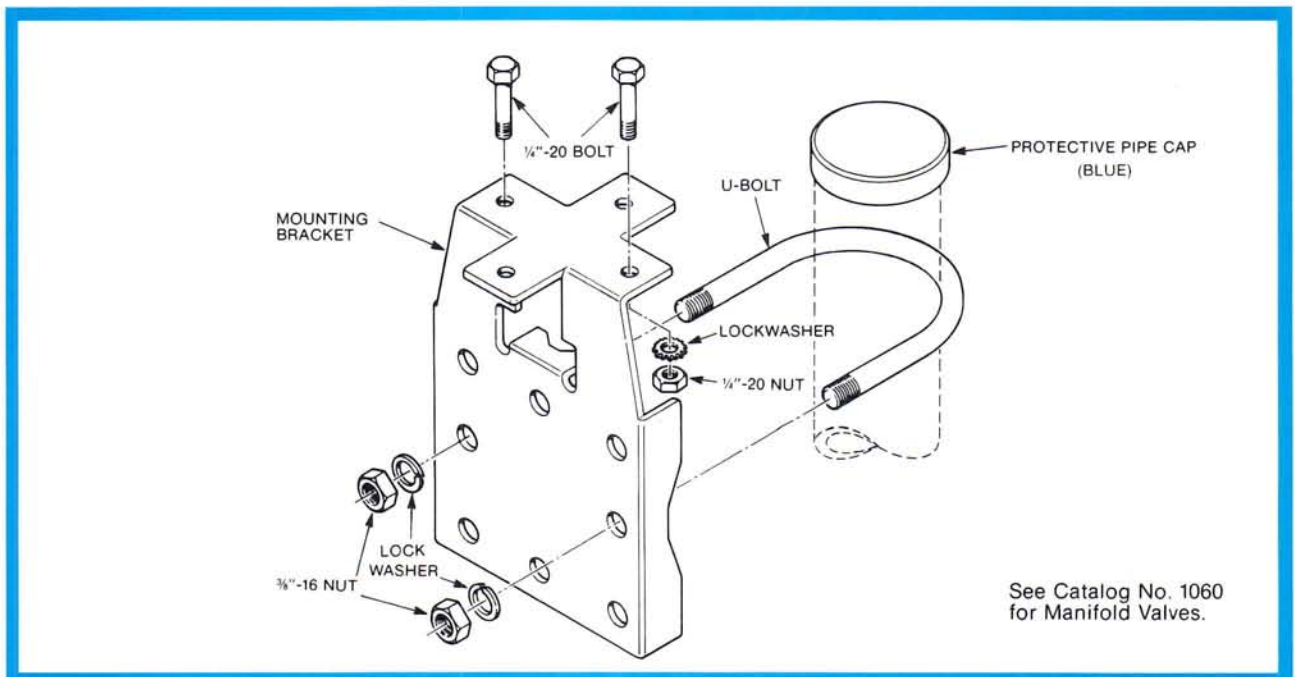
Horizontal adjacent to run



Vertical run

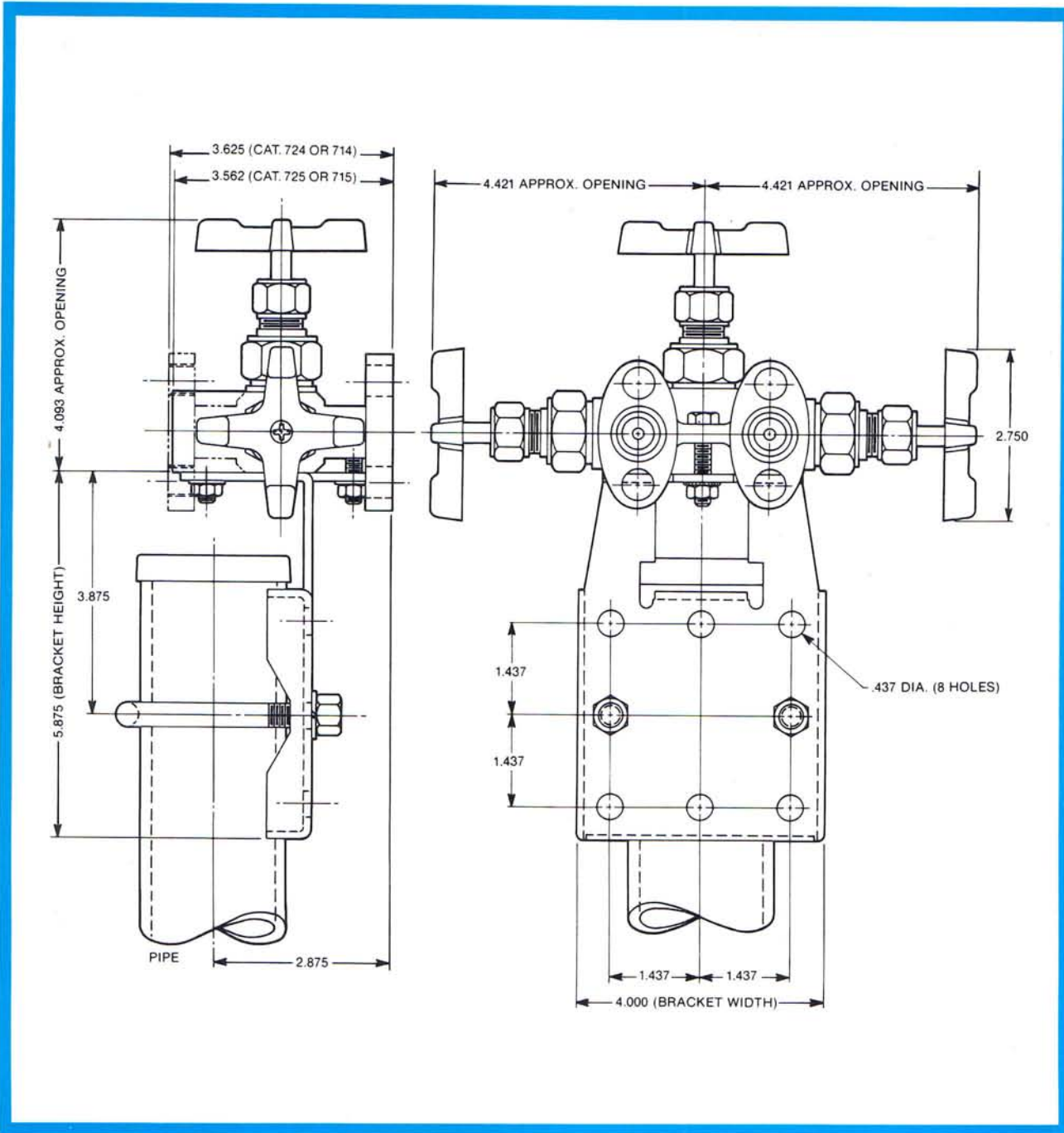


Bracket designed for both pipe and flange type manifolds



See Catalog No. 1060 for Manifold Valves.

# Dimensional data



## Ordering Information

\*700BYK Bracket—Carbon Steel  
 (Zinc Plated/Chromate Finish)  
 U Bolt  $\frac{3}{8}$ "—Alloy Steel  
 Mounting Bolts—Alloy Steel  
 Nuts & Washer—Alloy Steel  
 Pipestand Protective Cap—Blue

\*700BYKSS Bracket—316 SS  
 U Bolt  $\frac{3}{8}$ "—316 SS  
 Mounting Bolts—316 SS  
 Nuts & Washer—316 SS  
 Pipestand Protective Cap—Blue

\* See Catalog No. 1060 for Manifold Valves.

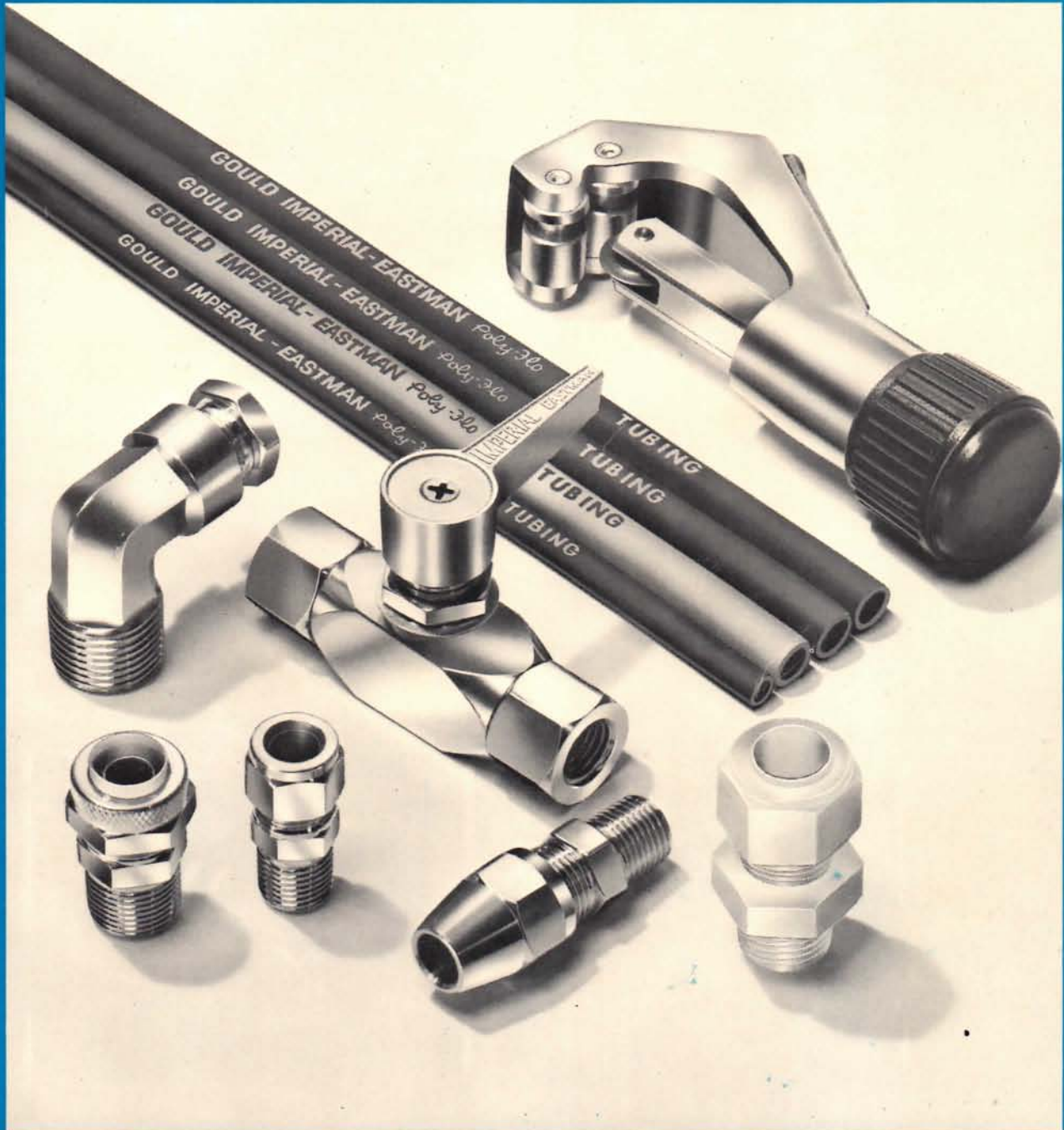
Gould Inc., Valve and Fittings Division  
 6300 West Howard Street, Chicago, Illinois 60648  
 Telephone (312) 946-4500/Chicago 774-1700








279010 RP Printed in U.S.A.













# Gould Imperial-Eastman Fluid Transmission Components



	Description	Size Range	Maximum Working Pressure*	Tubing Used With	Advantages	Page No.
<b>HI-DUTY®</b> 	1-Piece nut and sleeve. Sleeve shears off when nut is tightened and becomes permanently attached to tube. Brass, aluminum.	1/8 to 1" O.D. 1/8 to 1" P.T.	5,000 psi	Copper, aluminum, steel, brass, everdur.	Saves 36 to 77% installation time. Just push tube into fitting and tighten. Withstands severe vibration.	<b>5-14</b>
<b>POLY-FLO®</b> 	Body, nut with snap-in sleeve. Furnished assembled. Insert tube and tighten nut. No need to disassemble. Has tube support for sizes larger than 3/16". Nut has knurling and hex. Brass body and nut. Plastic or brass sleeve.	1/16 to 1/2" O.D. 1/16 to 3/8" P.T.	See plastic tubing pressures	Polyethylene, polypropylene, nylon, PVC, EVA, polyallomer and soft metal.	Save up to 93% in time and labor when used with plastic tubing. Fittings are finger tightened.	<b>15-23</b>
<b>KWIK-CONNECT</b> 	A two-piece coupler with Poly-Flo tube ends. Available in single and double end shut-off. Chrome plated brass or type 316 S.S. acetal copolymer sleeves.	1/4 and 3/8" O.D. 1/8 and 1/4" P.T.	See plastic tubing pressures	Polyethylene, polypropylene, nylon, polyvinyl chloride, polyallomer, soft copper.	Double or single end shut-off offers positive closure for frequently disconnected instrument panels.	<b>24-28</b>
<b>NYLO-SEAL®</b> 	Body, nut, snap-in sleeve. Furnished assembled, ready for installation. Just insert tube, tighten nut. Molded nylon. Sleeves of special thermoplastic.	1/4 to 1/2" O.D. 1/8 to 1/2" P.T.	See plastic tubing pressures	Nylon, polyethylene, polypropylene, other tubing.	Corrosion resistant. Quick, easy assembly. Does not torque tubing. Molded for strength.	<b>29-32</b>
<b>FLEX®</b> 	3-Piece type — body, nut and special synthetic elastic sleeve. Requires no tube preparation except where higher pressures are required. Tubing should be belled for these applications. Brass.	1/8 to 7/8" O.D. 1/8 to 3/4" P.T.	2,000 psi	All kinds of metal tubing — seamless or seamed.	Vibration and shock-absorbing sleeve. Withstands major tube movement.	<b>48-54</b>
<b>MINI-FLEX™</b> 	Body, nut, special synthetic elastic sleeve. Furnished assembled. Insert tube and tighten nut. No need to disassemble. Brass.	1/8 to 1/2" O.D. 1/8 to 3/4" P.T.	1650 psi	All kinds of metal tubing — seamless or seamed. Glass tubing.	Offers high reliability, vibration resistance and economy. Saves 36 to 77% installation time. Just push tube into fitting and tighten nut.	<b>55-59</b>
<b>COMPRESSION</b> 	Body, nut, sleeve. Brass sleeve compresses around tube when nut is tightened. Brass.	1/8 to 3/4" O.D. 1/8 to 3/4" P.T.	400 psi	Copper, aluminum, brass, seamless steel, tinned thin-wall brazed steel.	Simple, efficient, low cost. Easy to assemble. Forged elbows and tees.	<b>60-66</b>

\*Maximum recommended static working pressures are 72°F. with safety factor of 4 to 1. These values will vary with tubing material, wall thickness and size. See data with each type of fitting or tubing for details on working pressures.

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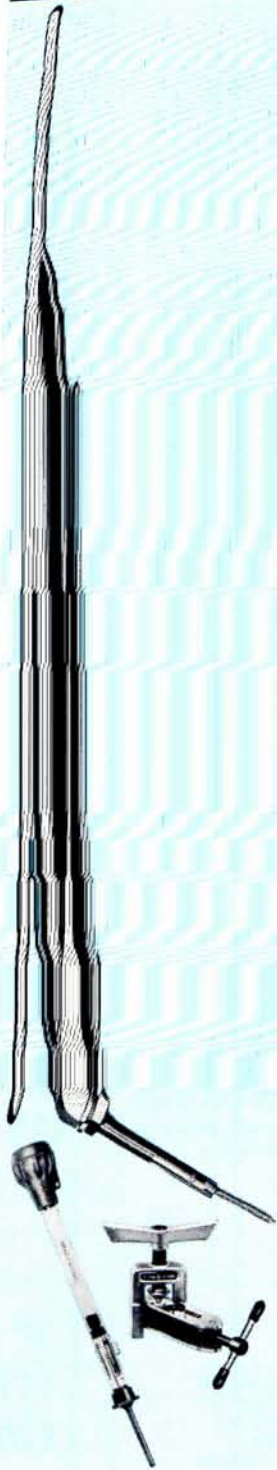
	Description	Size Range	Maximum Working Pressure*	Tubing Used With	Advantages	Page No.
<b>THREADED SLEEVE</b> 	2-Piece type. Tapered end of nut compresses on tube. Not well adapted to reassembly. Brass.	1/8 to 1/2" O.D. 1/8 to 1/4" P.T.	400 psi	Copper, aluminum, brass, thin-wall steel.	2-Piece construction simplifies assembly.	<b>67-68</b>
<b>AIR BRAKE</b> 	3-Piece compression fitting manufactured to S.A.E. standards. Brass.	1/4 to 1" O.D. 1/8 to 1" P.T.	400 psi	Copper, aluminum, brass, seamless steel, brazed steel.	Long nut compression type fitting designed for dependable automotive air brake line connections.	<b>69-81</b>
<b>SERIES 1900</b> 	Body, nut, hardened steel sleeve. Cutting edge of sleeve bites into tubing. Steel.	1/4 to 1" O.D. 1/8 to 1" P.T.	7,000 psi	Steel, brass, monel, aluminum, copper—hard or soft temper.	Withstands high pressures and vibration. Makes tight joint even when surface of tube is rough.	<b>82-89</b>
<b>45° FLARE</b> 	2-Piece construction. Long or short nuts available. Flare on tube is clamped between nut and body. Brass.	1/8 to 7/8" O.D. 1/8 to 3/4" P.T.	7,000 psi	Copper, aluminum, brass, thin-wall soft steel.	Withstands severe tensile pull. Well adapted for frequent disassembly.	<b>90-97</b>
<b>45° INVERTED FLARE</b> 	Similar to regular 45° flare fittings, except flare seat is inside body. Brass bodies, brass or steel nuts.	1/8 to 3/4" O.D. 1/8 to 3/4" P.T.	2,500 psi	Copper, aluminum, brass, thin-wall soft steel.	Seat and threads protected inside body. Smaller bodies.	<b>98-100</b>
<b>45° HEAVY-DUTY FLARE</b> 	2-Piece construction. Forged nuts, sturdy bodies. Brass.	3/16 to 3/4" O.D. 1/8 to 3/4" P.T.	4,600 psi	Copper, aluminum, brass, thin-wall soft steel.	Conform to S.A.E. standards for refrigeration service. Long Dryseal pipe threads.	<b>101-110</b>
<b>PIPE FITTINGS</b> 	Description	Size Range	Maximum Working Pressure*	Advantages		Page No.
	Standard pipe threads. Used as fitting adapters or with brass or iron pipe. Brass, Steel.	1/8 to 3/4" P.T. 1/8 to 1 1/4" P.T.	Brass—3,000 psi Steel—3,500 psi	More compact and easier to install than ordinary fittings. Elbows, tees, crosses made from forgings. Have wrench pads.		<b>111-120</b>

VALVES



Description	Size Range	Tubing Used With	Advantages	Page No.
Plug, ball, and needle type valves; drain cocks and priming cups. Pipe thread, Hi-Duty, Poly-Flo, compression or flare tubing connections. Brass, stainless.	3/16 to 1/2" O.D. 1/8 to 3/8" P.T.	Copper, brass, aluminum, steel, thermo-plastic.	Forged bodies on many types. Long Dryseal pipe threads. Plug valves packed with special grease. Ball valves with multiple spring-loaded seats.	141 157

ACCESSORIES

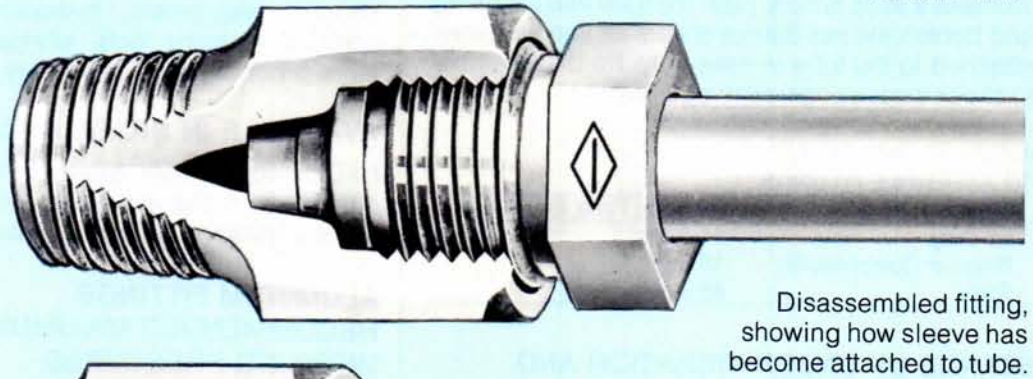
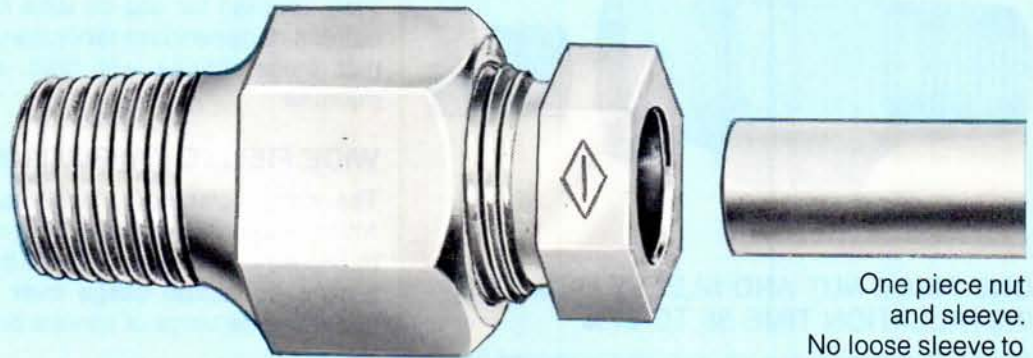


<p><b>PUSH-PULL CONTROLS</b> Stainless steel wire, will never rust. Extra heavy galvanized wire casing. Many types available.</p>	158 160
<p><b>FUEL STRAINERS</b> Shallow bowl type with shut-off needle valve and without. Large bowl type with valve.</p>	161
<p><b>BATTERY HYDROMETERS, ANTI-FREEZE TESTERS</b> Top quality hydrometers for accurate testing. Easy-to-read scales.</p>	162 164
<p><b>TUBE FITTINGS STOCKS</b></p>	165
<p><b>TUBING TOOLS AND SERVICE AIDS</b> Tools for cutting, flaring, reaming, bending, swaging. Ratchet wrenches, air nozzles, machinery cleaners, drum faucets.</p>	167 206

NUMERICAL INDEX

All products shown in this catalog listed by catalog number with page reference.

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## Reduce installation time up to 77%

**SIZE RANGE:** Tube — 1/8 to 1" O.D.  
Port — 1/8 to 1" NPTF

**MAXIMUM WORKING PRESSURE:** 5,000 psi

**MATERIALS:** Brass, Aluminum

**COMPATIBLE TUBING:** Copper, Aluminum Steel (including brazed or welded steel tubing such as Bundyweld or GM), Brass, Everdur, Thermoplastic

### CONFORMANCES:

A.N.S.I., ASME: Codes for pressure piping.

J.I.C.: Hydraulic and pneumatic standards.

S.A.E.: Hydraulic tube fittings performance standards.

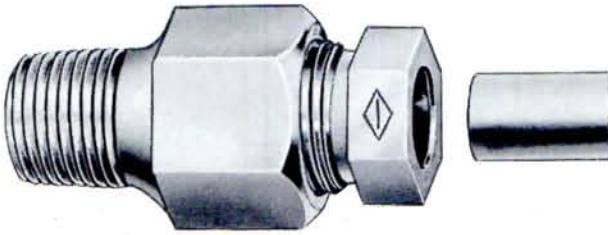
NFPA: Manufactured in accordance with NFPA recommended Standard Nos. T3.8.70.2, T3.8.70.3

See following data for specific information.

# HI-DUTY

FLARELESS TUBE FITTINGS

# SPECIFICATIONS



## ONE PIECE NUT AND SLEEVE REDUCES INSTALLATION TIME 36 TO 77%

The Hi-Duty fitting can be installed in record time. To make a joint, simply push the tube into the fitting and tighten the nut. Sleeve shears off and becomes attached to the tube in assembly. No disassembly to check sleeve alignment required.

### AVERAGE TIME REQUIRED TO ASSEMBLE FITTINGS

Type of Fitting	Average Time, Each Joint
Hi-Duty	11.7 sec.
Regular Compression	18.5 sec.
Flare	48.2 sec.

## STANDS UP UNDER VIBRATION AND SEVERE SERVICE

Unique design provides a vibration dampener which enables joints to stand up even under severe vibration. Hi-Duty fittings will withstand over 5 times as much vibration as ordinary compression or flare fittings.

### COMPARATIVE VIBRATION TESTS

Type of Fitting	Number of Test Cycles Withstood
Flare	72,450
Compression	79,350
Hi-Duty	401,925

(Conditions of test. One end of 5/16" O.D., .035" wall annealed copper tubing, 11" long was held stationary; other end was flexed 5/16" at 1725 cycles per minute. Liquid pressure in tube was 25 psi and tensile pull was 10 lbs.)

## HOLDS BURST PRESSURE OF MOST COMMONLY USED TYPES OF COPPER AND ALUMINUM TUBING

Makes tight, foolproof joints that withstand pressures beyond the burst strength of the most commonly used types of tubing. This fitting provides a double grip for safety—the gripping action of the sleeve on the tube and the broad surface contact between the sleeve and the tube. (See recommended working pressure and tubing wall thickness on pressure chart.)

## HOLDS ULTRA HIGH VACUUM

Well adapted for use on ultra high vacuum applications. Independent laboratory tests have shown that these fittings will hold a vacuum of .001 microns.

## WIDE FIELD OF APPLICATIONS

The many outstanding advantages of the Hi-Duty fitting make it one of the very widely used fittings in industry. The superiority of this fitting has been proven by actual usage over a period of years under a wide range of service conditions.

Ideal for instrumentation, mobile farm and construction equipment, hydraulic and pneumatic controls, machine tools, lubrication pressure systems, process plants, laboratory equipment.

## AVAILABLE IN BRASS AND ALUMINUM

Hi-Duty fittings are available in both brass and aluminum in popular sizes and configurations to cover a broad range of application needs.

## ALUMINUM FITTINGS RECOMMENDED MAXIMUM WORKING PRESSURES

FITTING MATERIAL: ALUMINUM

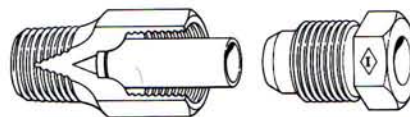
TUBING MATERIAL: ALUMINUM. SAE 3003-H14, 5052-0, 6061-T6, 2024-T3.

(Working pressures are in pounds per square inch, based on tubing burst pressures.)

Tube O.D.	Working Pressure	Burst Pressure
1/4	1375	5500
3/8	1100	4400
1/2	975	3900
5/8	825	3300
3/4	650	2600

## MEETS DOT SAFETY STANDARD

Hi-Duty fittings are also available with an integral tube support to meet DOT Motor Vehicle Standard 106 when used with C6 Hytron® Air Brake Tubing — SAE J844. See page 8 for exact ordering information.



# SPECIFICATIONS

# HI-DUTY

## FLARELESS TUBE FITTINGS

### RECOMMENDED MAXIMUM WORKING PRESSURES – psi

FITTING MATERIAL: BRASS

TUBING MATERIAL: Copper – Dead Soft (Seamless) and Copper – Half Hard (Seamless)

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALY AVAILABLE TUBING WALL THICKNESSES									
		COPPER – DEAD SOFT (SEAMLESS)					COPPER – HALF HARD (SEAMLESS)				
		.030"	.032"	.035"	.049"	.065"	.032"	.035"	.042"	.049"	.065"
MINOR SURGES  Safety Factor 4-1	1/8"	4300		5000			5000				
	3/16"	2850		3300			3400				
	1/4"	2100	2250	2500			2500				
	5/16"		1800	2000			2000				
	3/8"		1500	1650			1700	1850			
	1/2"		1150	1250		2300	1250	1400			2600
	5/8"			1000	1400	1800	1000			1500	2000
	3/4"			850	1150	1500			1100		1700
	7/8"								1100	1500	
	1"								975	1300	
SURGES UP to 50%  Safety Factor 6-1	1/8"	2850		3300			3400				
	3/16"	1900		2200			2250				
	1/4"	1400	1500	1650			1700				
	5/16"		1200	1300			1300				
	3/8"		1000	1100			1100	1200			
	1/2"		700	725			850	925			1700
	5/8"			650	925	1200	675			1000	1350
	3/4"			550	775	1000			725		1150
	7/8"								725	1000	
	1"								650	850	

FITTING MATERIAL: BRASS

TUBING MATERIAL: Steel, S.A.E. 1010, Dead Soft, Cold Drawn (Seamless) and Brazed Steel – Annealed

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALY AVAILABLE TUBING WALL THICKNESSES									
		SEAMLESS STEEL – S.A.E. 1010 DEAD SOFT – COLD DRAWN						BRAZED STEEL – ANNEALED SUCH AS BUNDY OR GM			
		.032"	.035"	.049"	.065"	.083"	.095"	.028"	.032"	.035"	.049"
MINOR SURGES  Safety Factor 4-1	1/8"	4600						4100			
	3/16"	3000						2700			
	1/4"		2500					2000	2360		
	5/16"		2000	2800				1750	1900		
	3/8"		1700	2400				1350	1550		
	1/2"		1300	1800	2300						1250 1800
	5/8"			1450	1900	2400					1000 1420
	3/4"			1200	1550		2800				
	7/8"				1350	1650					
	1"			900	1200		1700				
SURGES UP to 50%  Safety Factor 6-1	1/8"	3500						3100			
	3/16"	2300						2000			
	1/4"		1900					1550	1750		
	5/16"		1500	2100				1300	1450		
	3/8"		1250	1800				1000	1150		
	1/2"		950	1350	1750						950 1350
	5/8"			1000	1450	1800					775 1050
	3/4"			900	1150		2000				
	7/8"				1000	1250					
	1"			675	875		1300				

## FLARELESS TUBE FITTINGS

A two piece fitting, furnished assembled with one-piece nut and sleeve. No loose sleeve.

### MATERIALS

#### BRASS:

- Elbows and Tees: Brass forgings—S.A.E. CA377
- Connectors, Unions, Nuts: Stress relieved brass bar stock—S.A.E. CA360 or equal.

#### ALUMINUM:

- Elbows and Tees: Aluminum forgings—S.A.E. 6262-F extruded.
- Connectors, Unions, Nuts: Aluminum bar stock—S.A.E. 6262-T9.  
(All fittings chromate and wax finished. Meet S.A.E. requirements for salt spray test, ASTM B117.)

### PIPE THREADS

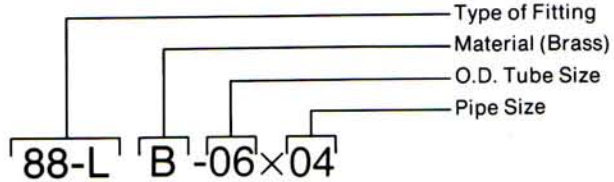
Long length Dryseal American (National) Standard Taper pipe threads.

## ORDERING INFORMATION

Fittings available in brass or aluminum. Add proper suffix to catalog number shown to obtain type of material desired. B—Brass; A—Aluminum.

#### EXAMPLE:

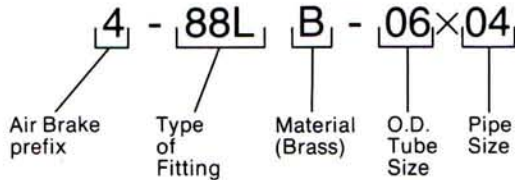
3/8" Brass Male Connector with 1/4" pipe thread  
88-LB-06 x 04.



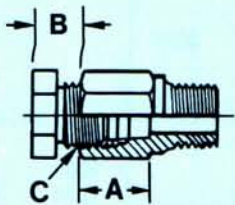
To order Hi-Duty air brake fittings that meet DOT Motor Vehicle Standard 106, add the prefix "4" before the catalog number.

#### EXAMPLE:

3/8" Brass Male Connector with 1/4" pipe thread  
4-88-LB-06 x 04.



### TUBE END DIMENSIONS



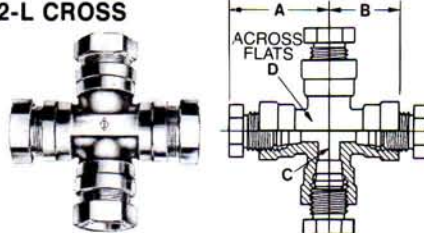
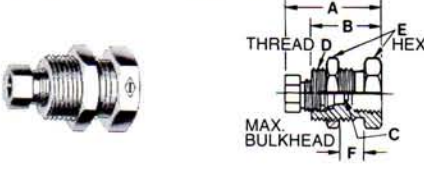
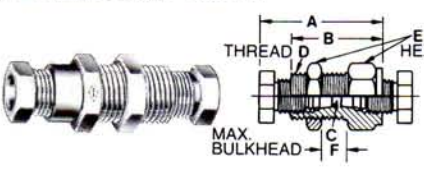
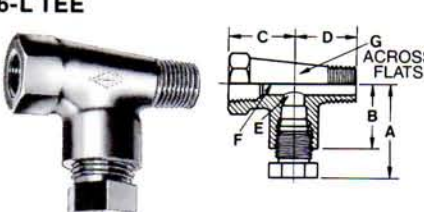


Tube O.D.	A	B (Finger Tight)	C Thread
1/8	.500	.312	5/16-24
3/16	.469	.375	3/8-24
1/4	.500	.406	7/16-24
5/16	.531	.406	1/2-20
3/8	.625	.407	9/16-20
1/2	.719	.437	1 1/16-16
5/8	.813	.563	7/8-18
3/4	.875	.594	1-18
7/8	.906	.656	1 1/8-18
1	.906	.656	1 1/4-18




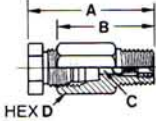

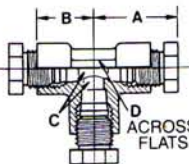

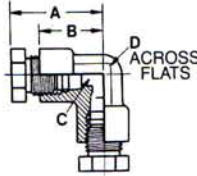

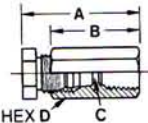

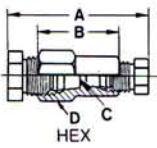
# DIMENSIONAL DATA

# HI-DUTY

## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F	G
<b>52-L CROSS</b> 	52-L-04	1/4		B	1.156	.750	.187	.562			
	52-L-05	5/16		B	1.187	.781	.250	.688			
	52-L-06	3/8		B	1.437	1.031	.312	.750			
<b>66-L BULKHEAD FEMALE CONNECTOR</b> 	66-L-04x04	1/4	1/4	B	1.437	1.031	.187	3/4-18	.875	.593	
<b>72-L BULKHEAD UNION</b> 	72-L-02	1/8		B	1.781	1.156	.093	7/16-24	.562	.625	
	72-L-04	1/4		B	1.968	1.156	.187	7/16-24	.687	.625	
	72-L-06	3/8		B	2.125	1.312	.312	1/16-24	.812	.625	
	72-L-08	1/2		B	2.375	1.500	.437	7/8-18	1.000	.625	
<b>76-L TEE</b> 	76-L-03x02	3/16	1/8	B	1.156	.781	.593	.718	.125	.187	.562
	76-L-04x02	1/4	1/8	B	1.218	.812	.593	.718	.187	.218	.562
<b>81-L NUT</b> 	81-L-02	1/8		B-A	.656	.375					
	81-L-03	3/16		B-A	.687	.375					
	81-L-04	1/4		B-A	.734	.437					
	81-L-05	5/16		B-A	.765	.500					
	81-L-06	3/8		B-A	.843	.625					
	81-L-08	1/2		B-A	.921	.750					
	81-L-10	5/8		B-A	1.078	1.000					
	81-L-12	3/4		B-A	1.140	1.125					
	81-L-14	7/8		B	1.218	1.250					
	81-L-16	1		B	1.218	1.375					
	<b>82-L UNION</b> 	82-L-02	1/8		B	1.687	1.062	.093	.375		
82-L-03		3/16		B	1.781	1.031	.125	.437			
82-L-04		1/4		B	1.906	1.093	.187	.562			
82-L-05		5/16		B	2.000	1.187	.250	.562			
82-L-06		3/8		B	2.187	1.375	.312	.625			
82-L-08		1/2		B	2.437	1.562	.437	.812			
82-L-10		5/8		B	2.937	1.812	.500	1.062			
82-L-12		3/4		B	3.031	1.937	.625	1.250			


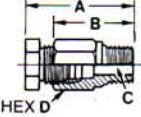
Overall dimensions, including nut, are finger tight and are approximate.


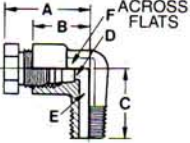
	Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F
 	83-L-02x02	1/8	1/8	B	1.406	1.093	.093	.437		
	83-L-03x02	3/16	1/8	B	1.437	1.062	.125	.437		
	83-L-04x02	1/4	1/8	B	1.500	1.093	.136	.562		
	83-L-05x02	5/16	1/8	B	1.531	1.125	.136	.562		
	83-L-06x04	3/8	1/4	B	1.843	1.437	.187	.625		
	83-L-08x06	1/2	3/8	B	1.968	1.531	.250	.812		
 	84-L-02	1/8		B	1.031	.718	.093	.312		
	84-L-03	3/16		B	1.093	.718	.125	.312		
	84-L-04	1/4		B	1.093	.687	.187	.437		
	84-L-05	5/16		B	1.156	.750	.250	.437		
	84-L-06	3/8		B	1.343	.937	.312	.562		
	84-L-08	1/2		B	1.468	1.031	.437	.687		
	84-L-10	5/8		B	1.843	1.281	.500	1.000		
	84-L-12	3/4		B	1.937	1.343	.625	1.375		
 	85-L-02	1/8		B	1.031	.718	.093	.375		
	85-L-03	3/16		B	1.093	.718	.125	.375		
	85-L-04	1/4		B	1.093	.687	.187	.437		
	85-L-05	5/16		B	1.156	.750	.250	.500		
	85-L-06	3/8		B	1.343	.937	.312	.562		
	85-L-08	1/2		B	1.562	1.125	.437	.687		
	85-L-10	5/8		B	1.968	1.406	.500	1.000		
	85-L-12	3/4		B	1.937	1.343	.625	1.312		
 	86-L-02x02	1/8	1/8	B	1.312	1.000	.093	.500		
	86-L-03x02	3/16	1/8	B	1.375	1.000	.125	.500		
	86-L-04x02	1/4	1/8	B	1.406	1.000	.187	.562		
	86-L-04x04	1/4	1/4	B	1.593	1.187	.187	.687		
	86-L-05x02	5/16	1/8	B	1.437	1.031	.250	.562		
	86-L-05x04	5/16	1/4	B	1.562	1.156	.250	.625		
	86-L-06x02	3/8	1/8	B	1.531	1.125	.312	.625		
	86-L-06x04	3/8	1/4	B	1.718	1.312	.312	.625		
	86-L-06x06	3/8	3/8	B	1.750	1.343	.312	.812		
	86-L-06x08	3/8	1/2	B	1.968	1.562	.312	1.000		
	86-L-08x04	1/2	1/4	B	1.843	1.406	.421	.812		
	86-L-08x06	1/2	3/8	B	2.250	1.812	.437	.812		
	86-L-08x08	1/2	1/2	B	2.062	1.625	.437	1.000		
	86-L-10x08	5/8	1/2	B	2.312	1.750	.500	1.062		
86-L-12x08	3/4	1/2	B	2.312	1.718	.625	1.250			
86-L-12x12	3/4	3/4	B	2.437	1.843	.625	1.250			
 	87-L-04x03	1/4x3/16		B	1.812	1.031	.125	.562		
	87-L-05x04	5/16x1/4		B	1.906	1.093	.187	.562		
	87-L-06x04	3/8x1/4		B	2.000	1.187	.187	.625		
	87-L-08x04	1/2x1/4		B	2.125	1.281	.187	.812		
	87-L-08x06	1/2x3/8		B	2.656	1.406	.312	.812		

# DIMENSIONAL DATA

# HI-DUTY

## FLARELESS TUBE FITTINGS


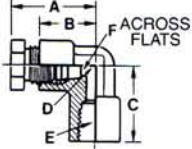
88-L MALE CONNECTOR		Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F
		88-L-02x02	1/8	1/8	B	1.062	.750	.093	.406		
		88-L-03x01	3/16	1/16	B	1.328	.953	.125	.437		
		88-L-03x02	3/16	1/8	B	1.140	.765	.125	.437		
		88-L-04x02	1/4	1/8	B	1.343	.937	.187	.562		
		88-L-04x04	1/4	1/4	B	1.468	1.062	.187	.562		
		88-L-04x06	1/4	3/8	B	1.343	.937	.187	.687		
		88-L-04x08	1/4	1/2	B	1.531	1.125	.187	.875		
		88-L-05x02	5/16	1/8	B	1.406	1.000	.218	.562		
		88-L-05x04	5/16	1/4	B	1.500	1.093	.218	.562		
		88-L-05x06	5/16	3/8	B	1.343	.937	.250	.687		
		88-L-06x02	3/8	1/8	B	1.531	1.125	.218	.625		
		88-L-06x04	3/8	1/4	B-A	1.656	1.250	.312	.625		
		88-L-06x06	3/8	3/8	B	1.531	1.125	.312	.687		
		88-L-06x08	3/8	1/2	B	1.531	1.125	.312	.875		
		88-L-08x04	1/2	1/4	B	1.813	1.375	.312	.812		
		88-L-08x06	1/2	3/8	B	1.750	1.312	.406	.812		
		88-L-08x08	1/2	1/2	B-A	1.812	1.375	.437	.875		
		88-L-08x12	1/2	3/4	B	1.625	1.187	.437	1.062		
		88-L-10x04	5/8	1/4	B	2.125	1.562	.312	1.062		
		88-L-10x06	5/8	3/8	B	2.031	1.468	.406	1.062		
		88-L-10x08	5/8	1/2	B	2.156	1.593	.500	1.062		
		88-L-10x12	5/8	3/4	B	1.812	1.250	.500	1.062		
		88-L-12x08	3/4	1/2	B	2.343	1.750	.562	1.250		
		88-L-12x12	3/4	3/4	B-A	2.218	1.625	.625	1.250		
		88-L-14x12	7/8	3/4	B	2.625	1.968	.750	1.375		
		88-L-16x12	1	3/4	B	2.062	1.406	.718	1.500		
		88-L-16x16	1	1	B	2.843	2.187	.875	1.500		

89-L MALE ELBOW		Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F
		89-L-02x02	1/8	1/8	B	.968	.656	.687	.093	.218	.375
		89-L-03x01	3/16	1/16	B	1.062	.687	.750	.125	.125	.437
		89-L-03x02	3/16	1/8	B	1.062	.687	.750	.125	.218	.437
		89-L-04x02	1/4	1/8	B	1.093	.687	.750	.187	.218	.437
		89-L-04x04	1/4	1/4	B-A	1.156	.750	.937	.187	.312	.500
		89-L-04x06	1/4	3/8	B	1.187	.781	1.000	.187	.343	.562
		89-L-05x02	5/16	1/8	B	1.093	.687	.781	.250	.218	.500
		89-L-05x04	5/16	1/4	B	1.218	.812	1.062	.250	.312	.500
		89-L-06x02	3/8	1/8	B	1.250	.843	.875	.312	.218	.562
		89-L-06x04	3/8	1/4	B	1.250	.843	1.000	.312	.312	.562
		89-L-06x06	3/8	3/8	B	1.343	.937	1.000	.312	.406	.562
		89-L-06x08	3/8	1/2	B	1.375	.968	1.250	.312	.500	.687
		89-L-08x04	1/2	1/4	B	1.437	1.000	1.062	.437	.312	.687
		89-L-08x06	1/2	3/8	B	1.437	1.000	1.062	.437	.406	.687
		89-L-08x08	1/2	1/2	B	1.468	1.031	1.312	.437	.437	.687
		89-L-08x12	1/2	3/4	B	1.718	1.281	1.281	.437	.500	.750
		89-L-10x06	5/8	3/8	B	1.750	1.187	1.343	.500	.406	.875
		89-L-10x08	5/8	1/2	B-A	1.750	1.187	1.375	.500	.500	.875
		89-L-10x12	5/8	3/4	B	1.875	1.312	1.500	.500	.625	.937
		89-L-12x08	3/4	1/2	B	1.937	1.343	1.468	.625	.500	1.000
		89-L-12x12	3/4	3/4	B	1.937	1.343	1.468	.625	.625	1.000
		89-L-14x12	7/8	3/4	B	1.968	1.312	1.531	.750	.750	1.250
		89-L-16x12	1	3/4	B	2.156	1.500	1.593	.875	.687	1.250
		89-L-16x16	1	1	B	2.156	1.500	1.812	.875	.875	1.250

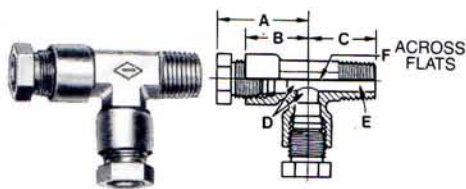
# HI-DUTY

# DIMENSIONAL DATA

## FLARELESS TUBE FITTINGS

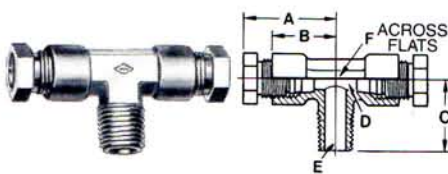
	Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F
<b>90-L FEMALE ELBOW</b>  	90-L-02x02	1/8	1/8	B	1.031	.718	.718	.093	.187	.375
	90-L-03x02	3/16	1/8	B	1.093	.718	.718	.125	.187	.375
	90-L-04x02	1/4	1/8	B	1.093	.687	.687	.187	.187	.437
	90-L-04x04	1/4	1/4	B	1.250	.843	.875	.187	.281	.500
	90-L-05x02	5/16	1/8	B	1.156	.750	.750	.250	.250	.500
	90-L-05x04	5/16	1/4	B	1.312	.906	.875	.250	.250	.500
	90-L-06x02	3/8	1/8	B	1.250	.843	.937	.312	.312	.562
	90-L-06x04	3/8	1/4	B	1.343	.937	1.093	.312	.312	.562
	90-L-06x06	3/8	3/8	B	1.468	1.062	.937	.312	.406	.625
	90-L-06x08	3/8	1/2	B	1.562	1.156	1.187	.312	.406	.687
	90-L-08x04	1/2	1/4	B	1.500	1.062	1.156	.437	.421	.687
	90-L-08x06	1/2	3/8	B	1.500	1.062	1.281	.437	.437	.687
	90-L-08x08	1/2	1/2	B	1.625	1.181	1.218	.500	.437	.875
	90-L-10x08	5/8	1/2	B	2.000	1.437	1.500	.500	.500	.937
90-L-12x12	3/4	3/4	B	1.968	1.375	1.593	.625	.625	1.312	
90-L-16x16	1	1	B	2.250	1.593	1.593	.875	.875	1.687	

### 91-L MALE RUN TEE



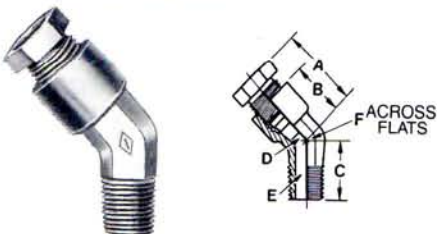
91-L-03x02	3/16	1/8	B	1.093	.718	.718	.125	.187	.312
91-L-04x02	1/4	1/8	B	1.156	.750	.750	.187	.187	.375
91-L-04x04	1/4	1/4	B	1.218	.812	.937	.187	.281	.437
91-L-05x02	5/16	1/8	B	1.156	.750	.781	.250	.218	.500
91-L-05x04	5/16	1/4	B	1.281	.875	.937	.250	.250	.500
91-L-06x02	3/8	1/8	B	1.343	.937	.812	.312	.218	.562
91-L-06x04	3/8	1/4	B	1.343	.937	1.000	.312	.312	.562
91-L-06x06	3/8	3/8	B	1.406	1.000	1.125	.312	.406	.625
91-L-08x06	1/2	3/8	B	1.468	1.031	1.031	.406	.406	.687
91-L-08x08	1/2	1/2	B	1.562	1.125	1.343	.437	.500	.812

### 92-L MALE BRANCH TEE



92-L-02x02	1/8	1/8	B	1.031	.718	.718	.093	.187	.312
92-L-03x02	3/16	1/8	B	1.093	.718	.718	.125	.187	.312
92-L-04x02	1/4	1/8	B-A	1.093	.687	.750	.187	.218	.437
92-L-04x04	1/4	1/4	B	1.281	.875	.937	.187	.281	.437
92-L-05x02	5/16	1/8	B	1.156	.750	.781	.250	.218	.500
92-L-05x04	5/16	1/4	B	1.281	.875	.937	.250	.281	.500
92-L-06x02	3/8	1/8	B	1.343	.937	.843	.312	.218	.562
92-L-06x04	3/8	1/4	B	1.343	.937	1.000	.312	.312	.562
92-L-06x06	3/8	3/8	B	1.406	1.000	1.125	.312	.375	.625
92-L-08x06	1/2	3/8	B	1.468	1.031	1.031	.437	.406	.687
92-L-08x08	1/2	1/2	B	1.562	1.125	1.343	.437	.500	.812

### 94-L 45° MALE ELBOW

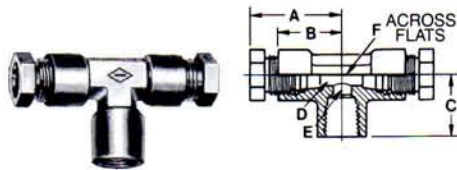


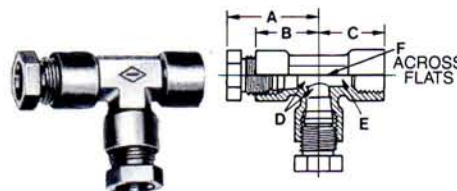
94-L-02x02	1/8	1/8	B	1.000	.687	.687	.093	.218	.437
94-L-03x02	3/16	1/8	B	1.062	.687	.687	.125	.187	.437
94-L-04x02	1/4	1/8	B	1.093	.687	.687	.187	.187	.437
94-L-04x04	1/4	1/4	B	1.093	.687	.843	.187	.281	.562
94-L-05x02	5/16	1/8	B	1.156	.750	.687	.250	.218	.437
94-L-05x04	5/16	1/4	B	1.125	.718	.843	.250	.281	.562
94-L-06x02	3/8	1/8	B	1.031	.625	.718	.312	.218	.562
94-L-06x04	3/8	1/4	B	1.187	.781	.843	.312	.312	.562
94-L-06x06	3/8	3/8	B	1.281	.875	.875	.312	.406	.500
94-L-08x06	1/2	3/8	B	1.375	.937	1.062	.437	.406	.812
94-L-08x08	1/2	1/2	B	1.312	.875	1.187	.437	.437	.812
94-L-10x08	5/8	1/2	B	1.687	1.125	1.218	.500	.500	1.062

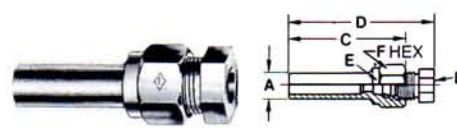
# DIMENSIONAL DATA


# HI-DUTY

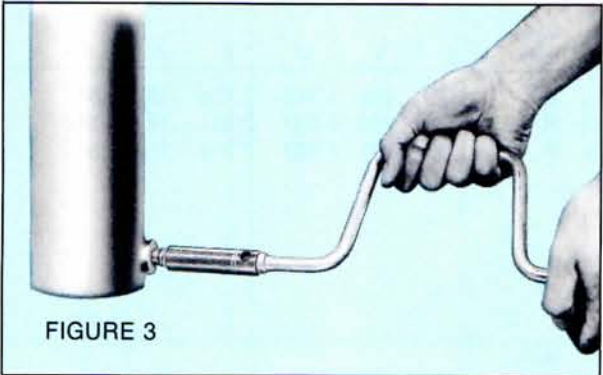
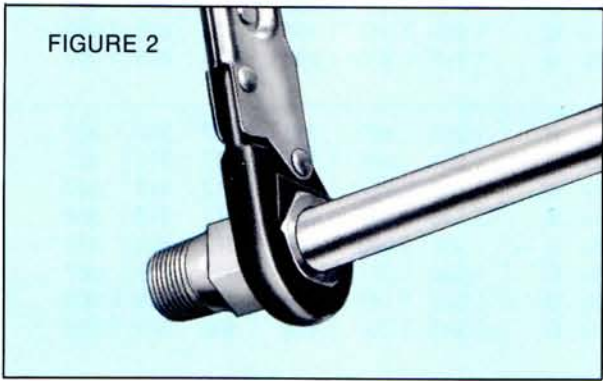
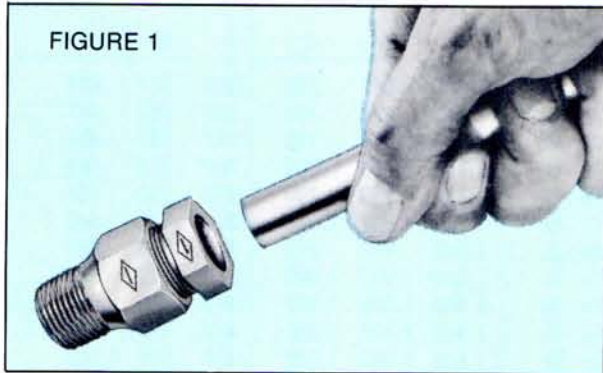
## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F
<b>95-L FEMALE BRANCH TEE</b> 	95-L-02x02	1/8	1/8	B	1.000	.687	.750	.093	.187	.437
	95-L-03x02	3/16	1/8	B	1.062	.687	.750	.125	.187	.437
	95-L-04x02	1/4	1/8	B	1.093	.687	.750	.187	.187	.437
	95-L-04x04	1/4	1/4	B	1.156	.750	1.093	.187	.312	.562
	95-L-05x02	5/16	1/8	B	1.156	.750	.750	.250	.250	.437
	95-L-05x04	5/16	1/4	B	1.343	.937	1.093	.250	.312	.562
	95-L-06x02	3/8	1/8	B	1.343	.937	.812	.312	.312	.562
	95-L-06x04	3/8	1/4	B	1.343	.937	1.093	.312	.312	.562
	95-L-06x06	3/8	3/8	B	1.406	1.000	1.187	.312	.406	.625
	95-L-08x06	1/2	3/8	B	1.468	1.031	1.031	.437	.437	.687
	95-L-08x08	1/2	1/2	B	1.625	1.187	1.500	.437	.500	1.000
	95-L-10x08	5/8	1/2	B	1.843	1.281	1.250	.500	.687	1.000
	95-L-12x08	3/4	1/2	B	1.906	1.312	1.437	.625	.625	1.093
	95-L-12x12	3/4	3/4	B	1.968	1.375	1.593	.625	.625	1.093

	Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F
<b>96-L FEMALE RUN TEE</b> 	96-L-04x02	1/4	1/8	B	1.093	.687	.750	.187	.187	.437
	96-L-04x04	1/4	1/4	B	1.281	.875	1.125	.187	.312	.625
	96-L-06x02	3/8	1/8	B	1.343	.937	.812	.312	.312	.562
	96-L-06x04	3/8	1/4	B	1.343	.937	.968	.312	.312	.562
	96-L-06x06	3/8	3/8	B	1.406	1.000	1.187	.312	.406	.625
	96-L-08x06	1/2	3/8	B	1.468	1.031	1.031	.437	.437	.687
	96-L-08x08	1/2	1/2	B	1.625	1.187	1.468	.437	.625	1.000
	96-L-10x08	5/8	1/2	B	1.843	1.281	1.468	.500	.500	1.000

	Catalog Number	Body Size A	Tube O.D. B	Materials	A	B	C	D	E	F
<b>97-L TUBE END REDUCER</b> 	97-L-06x04	3/8	1/4	B	.375	.250	1.750	2.156	.187	.562
	97-L-08x04	1/2	1/4	B	.500	.250	1.843	2.281	.187	.562
	97-L-08x06	1/2	3/8	B	.500	.375	1.937	2.375	.312	.625

	Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	F
<b>99-L PLUG</b> 	99-L-02	1/8		B	.656	.375				
	99-L-03	3/16		B	.687	.375				
	99-L-04	1/4		B	.734	.437				
	99-L-05	5/16		B	.765	.500				
	99-L-06	3/8		B	.843	.625				
	99-L-08	1/2		B	.921	.750				
	99-L-10	5/8		B	1.078	1.000				
	99-L-12	3/4		B	1.140	1.125				



### HOW TO ASSEMBLE:

1. Cut tube squarely and cleanly removing all burrs.
2. Insert tube in fitting (do not remove nut) through nut until it seats firmly against tube shoulder in body. Figure 1.
3. Grip tube firmly to prevent turning and tighten nut (An Imperial-Eastman No. 199-F ratchet wrench is recommended) until a slight give is felt. This "give" indicates the sleeve has been sheared from the nut. Figure 2.
4. Continue tightening for about one and one-half additional turns for a positive, leak-proof seal. It is not necessary to tighten the nut all the way down.

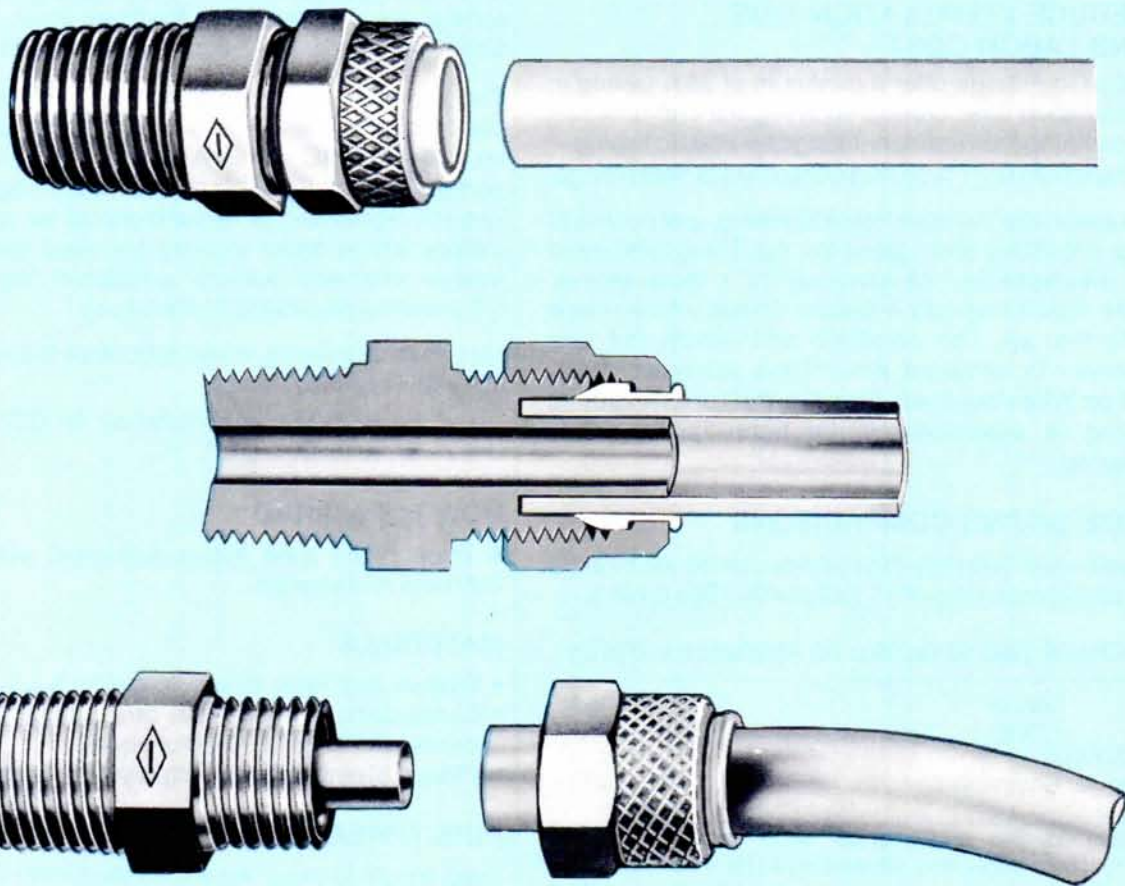
### HOW TO RECONNECT:

The Hi-Duty fitting can be disconnected and reconnected repeatedly and will always reconnect tightly.

1. Reinsert tubing.
2. Tighten nut about  $\frac{1}{8}$  of a turn more than previous make-up.

### TOOLS TO ASSEMBLE:

It is recommended that the Imperial-Eastman 199-F ratchet wrench be used to prevent distortion of hex and shearing of corners. Or a socket wrench of the proper size may also be used. For quick assembly, a speeder is suggested (Figure 3). When tubing is to be bent, bending should be done before tubing is assembled to fitting.



Pat. No. 3,834,743

**Captive sleeve reduces installation time  
and provides extra reliable grip for thermoplastic tubing**

**SIZE RANGE:** Tube  $\frac{1}{16}$ " to  $\frac{1}{2}$ " O.D.  
Port  $\frac{1}{16}$ " to  $\frac{3}{8}$ " N.P.T.F.

**MAXIMUM WORKING**

**PRESSURE:** See Plastic Tubing Pressures.

**MATERIALS:** Brass bodies and nuts. Acetal copolymer (Celcon®) or brass sleeves.

**COMPATIBLE TUBING:** Polyethylene, Polypropylene, Nylon, Polyvinyl Chloride, Polyallomer, Soft metal.

See following data for specific information.

## FLARELESS TUBE FITTINGS



### REDUCE INSTALLATION TIME AND LABOR COST

Poly-Flo Fittings offer a minimum of 36% saving in installation time, compared to regular compression type fittings, or ordinary fittings for plastic tubing — a minimum of 77% saving compared to flare fittings.

To assemble the New Poly-Flo Fitting, just push tubing into fitting and tighten the nut. There is no need to disassemble — no fumbling for a loose sleeve. This new fitting has a plastic sleeve which snaps into the nut. The complete unit — body, nut and sleeve — is furnished assembled, ready for installation. When used with Poly-Flo, PVC or EVA Tubing, fitting is assembled finger tight — no wrenches needed.

### TIME SAVING COMPARISONS

Tests show that Poly-Flo Fittings can be assembled in an average time of 11.7 seconds. (See table.)

#### AVERAGE TIME REQUIRED TO ASSEMBLE FITTINGS

Type of Fitting	Average Time Each Joint
POLY-FLO	11.7 sec.
Regular Compression	18.5 sec.
Flare	48.2 sec.

These studies made under shop conditions. While actual time might vary depending on field conditions, the relationship between time values should remain constant.

### NO TOOLS NEEDED FOR INSTALLATION

No wrenches, flaring tools, benders or other tools are used for installation.

Tubing is cut to length with a knife, tubing cutter or shears. *It is flexible, bends readily by hand.* Plastic tube racks and bend holders are available for holding tubing in position.

### EXCELLENT HOLDING POWER — NO TUBING TWIST

The Poly-Flo Fitting when assembled finger tight on Imperial-Eastman Poly-Flo or PVC Tubing will hold the burst pressure of the tubing itself.

The nut revolves around the sleeve as it is tightened, preventing twisting and weakening of the plastic tubing.

### A UNIVERSAL FITTING

Poly-Flo fittings are used with plastic or soft metal tubing for pneumatic instrumentation circuits and applications with other gases and liquids.

Acetyl copolymer sleeves, for use with Poly-Flo, PVC or EVA tubing, are furnished with Poly-Flo fitting sizes of 1/4" through 1/2" O.D. Universal brass sleeve and nut assemblies, for use with Impolene and Nylo-Seal (SN and NF) tubing and soft metal tubing, are also available for these sizes, and are furnished as standard with 1/16", 1/8" and 3/16" sizes.

The versatile brass nut (half-knurl, half-hex) with plastic sleeve is easily and quickly finger tightened on Poly-Flo, PVC and EVA tubing. The hex portion permits wrench tightening (1 turn after fingertight). Wrench tightening is recommended for all applications where brass sleeves are used, and is desirable whenever service conditions require the full pressure capability of the tubing.

Maximum allowable metal tube wall thickness for use with Poly-Flo Fittings:

1/16", 1/8", 3/16" O.D. — no limitation; 1/4" O.D. — .035";  
5/16", 3/8", 1/2" O.D. — .049".

### HOW FURNISHED

A three piece tube fitting, furnished assembled with nuts and sleeves.

### MATERIALS:

- Elbows and Tees: Brass Forgings: S.A.E. CA377.
- Connectors, Unions, Nuts: Stress relieved brass bar stock — S.A.E. CA360 or equal.
- Plastic Sleeves: Acetal copolymer (Celcon®).

### PIPE THREADS:

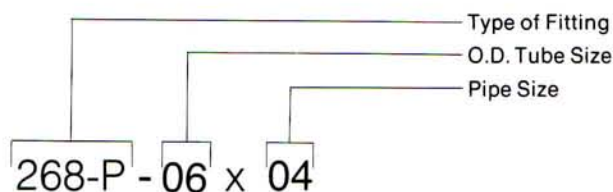
Long length Dryseal American (National) Standard Taper pipe threads.

### ORDERING INFORMATION:

To order, simply specify catalog number for configuration and size desired.

#### EXAMPLE:

3/8" O.D. tube x 1/4" pipe thread male connector:  
268-P-06 x 04.


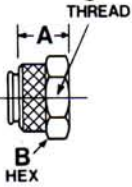

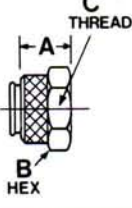

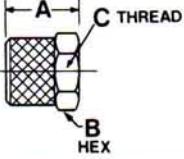

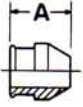

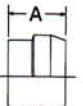

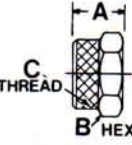




# DIMENSIONAL DATA

# POLY-FLO


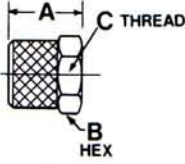

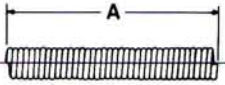



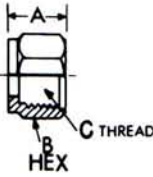

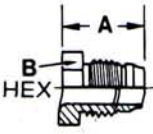

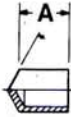
FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E
<b>261-P NUT AND PLASTIC SLEEVE ASSEMBLY</b>  	261-P-04	1/4	.343	.437	3/8-24		
	261-P-05	5/16	.343	.500	7/16-24		
	261-P-06	3/8	.375	.562	1/2-24		
	261-P-08	1/2	.421	.812	1 1/16-20		
<b>261-UB UNIVERSAL NUT AND BRASS SLEEVE ASSEMBLY</b>  	261-UB-01	1/16	.375	.312	1/4-28		
	261-UB-02	1/8	.375	.375	5/16-24		
	261-UB-03	3/16	.406	.437	3/8-24		
	261-UB-04	1/4	.343	.437	3/8-24		
	261-UB-05	5/16	.343	.500	7/16-24		
	261-UB-06	3/8	.375	.562	1/2-24		
	261-UB-08	1/2	.421	.812	1 1/16-20		
<b>261-PG NUT AND PLASTIC SLEEVE ASSEMBLY</b> For use with Spring Guard  	261-PG-04	1/4	.625	.437	3/8-24		
	261-PG-05	5/16	.625	.500	7/16-24		
	261-PG-06	3/8	.656	.562	1/2-24		
	261-PG-08	1/2	.718	.812	1 1/16-20		
<b>260-P PLASTIC SLEEVE</b>  	260-P-04	1/4	.325				
	260-P-05	5/16	.347				
	260-P-06	3/8	.356				
	260-P-08	1/2	.409				
<b>260-UB BRASS SLEEVE</b>  	260-UB-01	1/16	.359				
	260-UB-02	1/8	.359				
	260-UB-03	3/16	.328				
	260-UB-04	1/4	.266				
	260-UB-05	5/16	.266				
	260-UB-06	3/8	.296				
	260-UB-08	1/2	.359				
<b>261-U NUT ONLY</b>  	261-U-01	1/16	.375	.312	1/4-28		
	261-U-02	1/8	.375	.375	5/16-24		
	261-U-03	3/16	.406	.437	3/8-24		
	261-U-04	1/4	.343	.437	3/8-24		
	261-U-05	5/16	.343	.500	7/16-24		
	261-U-06	3/8	.375	.562	1/2-24		
	261-U-08	1/2	.421	.812	1 1/16-20		

# POLY-FLO

# DIMENSIONAL DATA

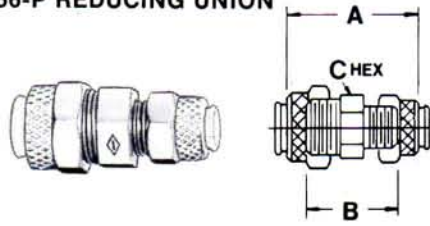
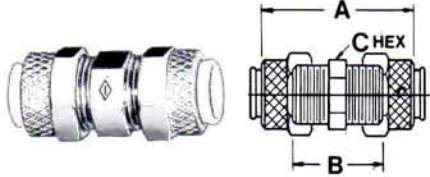

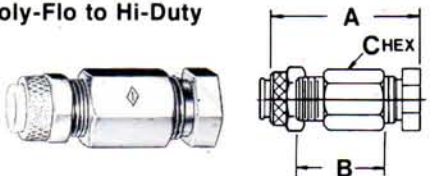
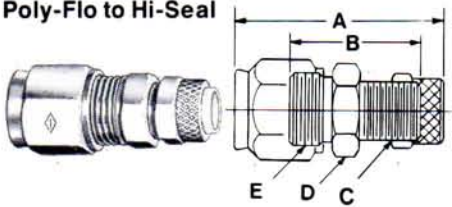
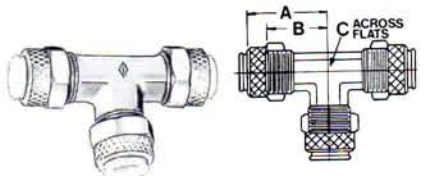
## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E
<b>261-UG NUT ONLY</b> For use with Spring Guard and 260-UB Sleeve	261-UG-04	1/4	.625	.437	3/8-24		
	261-UG-05	5/16	.625	.500	7/16-24		
	261-UG-06	3/8	.656	.562	1/2-24		
	261-UG-08	1/2	.718	.812	1 1/16-20		
	 						
<b>31-PG SPRING GUARD</b> For use with 261-PG and 261-UG Nuts	31-PG-04	1/4	3.000				
	31-PG-05	5/16	3.000				
	31-PG-06	3/8	3.000				
	31-PG-08	1/2	3.000				
	 						
<b>60-F BRASS SLEEVE</b> Standard Compression	60-F-04	1/4	.250				
	60-F-05	5/16	.250				
	60-F-06	3/8	.250				
	 						
<b>61-F NUT</b> Standard Compression	61-F-04	1/4	.438	.500			
	61-F-05	5/16	.438	.562			
	61-F-06	3/8	.469	.625			
	 						
<b>81-LB NUT</b> Hi-Duty	81-LB-04	1/4	.734	.437			
	81-LB-05	5/16	.765	.500			
	81-LB-06	3/8	.843	.625			
	 						
<b>259-P CAP</b>	259-P-04	1/4	.500				
	259-P-05	5/16	.531				
	259-P-06	3/8	.562				
	259-P-08	1/2	.593				
	 						

# DIMENSIONAL DATA

# POLY-FLO

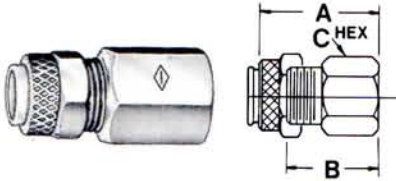
## FLARELESS TUBE FITTINGS

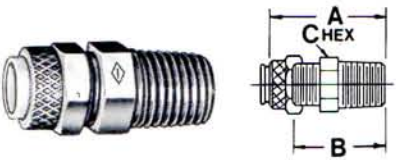
	Catalog Number	Tube O.D.	A	B	C	D	E
<b>256-P REDUCING UNION</b> 	256-P-06x04	$\frac{3}{8} \times \frac{1}{4}$	1.187	.718	.500		
<b>262-P UNION</b> 	262-P-02 262-P-03 262-P-04 262-P-05 262-P-06 262-P-08	$\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{1}{2}$	1.156 1.250 1.125 1.156 1.218 1.343	.656 .750 .687 .687 .718 .843	.312 .375 .375 .437 .500 .687		
<b>262-PC UNION</b> Poly-Flo to Standard Compression 	262-PC-04 262-PC-05 262-PC-06	$\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$	1.250 1.281 1.406	.750 .781 .843	.437 .500 .562		
<b>262-PH UNION</b> Poly-Flo to Hi-Duty 	262-PH-04 262-PH-05 262-PH-06	$\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$	1.468 1.515 1.625	.875 .875 .968	.562 .625 .625		
<b>262-PHS UNION</b> Poly-Flo to Hi-Seal 	262-PHS-04x04 262-PHS-05x05 262-PHS-06x06	$\frac{1}{4} \times \frac{1}{4}$ $\frac{5}{16} \times \frac{5}{16}$ $\frac{3}{8} \times \frac{3}{8}$	1.594 1.688 1.781	.812 .812 .859	$\frac{3}{8}-24$ $\frac{7}{16}-24$ $\frac{1}{2}-24$	.500 .562 .625	$\frac{1}{2}-20$ $\frac{9}{16}-18$ $\frac{5}{8}-18$
<b>264-P UNION TEE</b> 	264-P-01 264-P-02 264-P-03 264-P-04 264-P-05 264-P-06 264-P-08	$\frac{1}{16}$ $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{1}{2}$	.797 .875 .875 .843 .859 .906 1.062	.562 .625 .625 .625 .625 .656 .812	.312 .312 .312 .375 .375 .437 .625		

# POLY-FLO

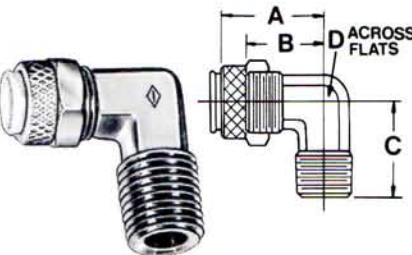
FLARELESS TUBE FITTINGS

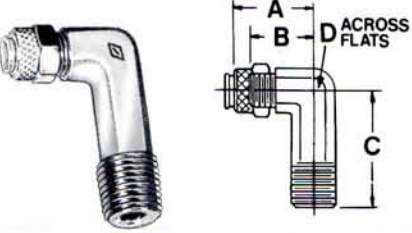
# DIMENSIONAL DATA

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
	266-P-02x02	1/8	1/8	1.031	.750	.562		
	266-P-03x02	3/16	1/8	1.031	.781	.562		
	266-P-03x04	3/16	1/4	1.218	.968	.687		
	266-P-04x02	1/4	1/8	.968	.750	.500		
	266-P-04x04	1/4	1/4	1.156	.937	.625		
	266-P-05x02	5/16	1/8	1.000	.750	.500		
	266-P-06x04	3/8	1/4	1.187	.937	.625		
	266-P-08x06	1/2	3/8	1.250	1.000	.812		

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
	268-P-01x01	1/16	1/16	1.015	.781	.375		
	268-P-02x01	1/8	1/16	1.031	.781	.375		
	268-P-02x02	1/8	1/8	1.078	.796	.437		
	268-P-03x01	3/16	1/16	1.093	.843	.437		
	268-P-03x02	3/16	1/8	1.109	.859	.437		
	268-P-04x01	1/4	1/16	1.031	.812	.375		
	268-P-04x02	1/4	1/8	1.031	.812	.437		
	268-P-04x04	1/4	1/4	1.188	1.000	.562		
	268-P-04x06	1/4	3/8	1.250	1.031	.687		
	268-P-05x02	5/16	1/8	1.046	.812	.437		
	268-P-05x04	5/16	1/4	1.234	1.000	.562		
	268-P-06x02	3/8	1/8	1.093	.843	.500		
	268-P-06x04	3/8	1/4	1.281	1.031	.562		
	268-P-06x06	3/8	3/8	1.281	1.031	.687		
	268-P-08x06	1/2	3/8	1.343	1.093	.687		
	268-P-02x10-32	1/8	10-32*	.843	.593	.375		
268-P-04x10-32	1/4	10-32*	.968	.750	.375			

\*Furnished with gaskets.

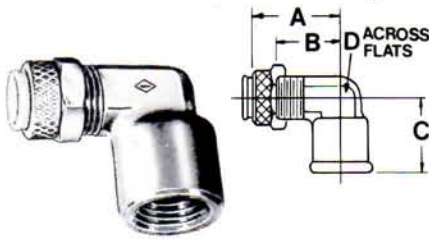
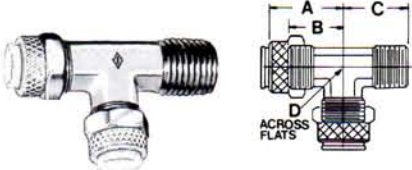
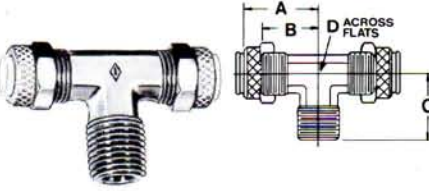
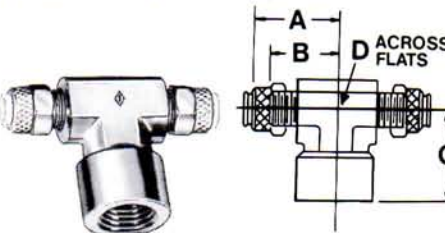
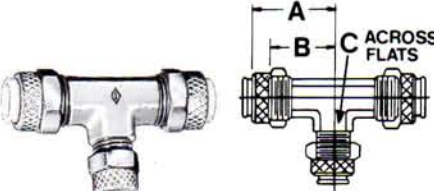
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
	269-P-01x01	1/16	1/16	.859	.625	.688	.312	
	269-P-02x01	1/8	1/16	.875	.625	.688	.312	
	269-P-02x02	1/8	1/8	.875	.625	.688	.312	
	269-P-03x01	3/16	1/16	.875	.625	.688	.375	
	269-P-03x02	3/16	1/8	.875	.625	.688	.375	
	269-P-04x01	1/4	1/16	1.000	.781	.750	.375	
	269-P-04x02	1/4	1/8	.843	.625	.750	.375	
	269-P-04x04	1/4	1/4	.875	.656	.937	.375	
	269-P-04x06	1/4	3/8	.968	.750	1.031	.500	
	269-P-05x02	5/16	1/8	.859	.625	.750	.406	
	269-P-06x02	3/8	1/8	.875	.625	.750	.437	
	269-P-06x04	3/8	1/4	.968	.718	.937	.437	
	269-P-06x06	3/8	3/8	1.031	.781	1.031	.500	
	269-P-08x06	1/2	3/8	1.031	.781	1.156	.625	

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
	269LL-P-04x04	1/4	1/4	.906	.687	1.500	.437	

# DIMENSIONAL DATA

# POLY-FLO

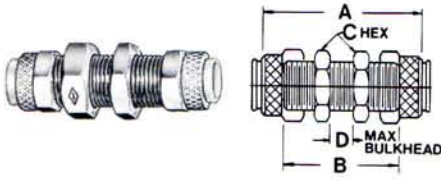
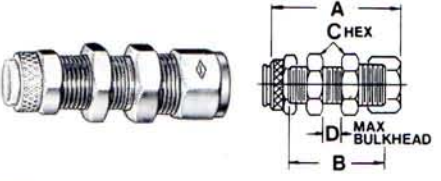
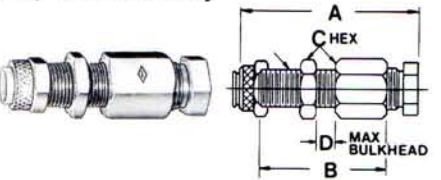
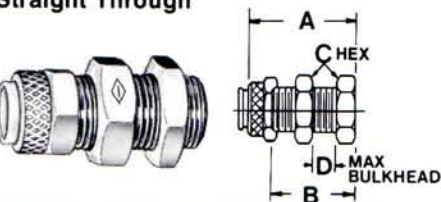
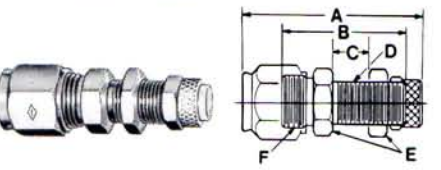
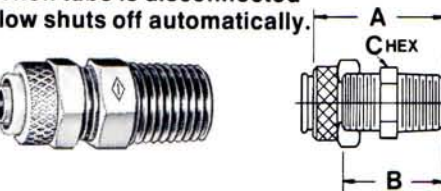
## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>270-P FEMALE ELBOW</b> 	270-P-02x02	1/8	1/8	.968	.687	.546	.562	
	270-P-03x02	3/16	1/8	.968	.718	.546	.562	
	270-P-04x02	1/4	1/8	.906	.625	.750	.375	
	270-P-04x04	1/4	1/4	.937	.718	.875	.500	
	270-P-06x04	3/8	1/4	.968	.718	.875	.500	
	270-P-08x06	1/2	3/8	1.156	.906	.937	.625	
<b>271-P MALE RUN TEE</b> 	271-P-02x02	1/8	1/8	.906	.625	.687	.312	
	271-P-03x02	3/16	1/8	.875	.625	.687	.312	
	271-P-04x02	1/4	1/8	.843	.625	.750	.375	
	271-P-04x04	1/4	1/4	.875	.656	.937	.375	
	271-P-05x02	5/16	1/8	.859	.625	.750	.375	
	271-P-06x04	3/8	1/4	.906	.656	.937	.437	
	271-P-08x06	1/2	3/8	1.062	.812	1.062	.625	
<b>272-P MALE BRANCH TEE</b> 	272-P-01x01	1/16	1/16	.796	.562	.687	.312	
	272-P-02x01	1/8	1/16	.906	.625	.687	.312	
	272-P-02x02	1/8	1/8	.906	.625	.687	.312	
	272-P-03x01	3/16	1/16	.875	.625	.687	.312	
	272-P-03x02	3/16	1/8	.875	.625	.687	.312	
	272-P-04x02	1/4	1/8	.843	.625	.750	.375	
	272-P-04x04	1/4	1/4	.875	.656	.937	.375	
	272-P-05x02	5/16	1/8	.859	.625	.750	.375	
	272-P-06x02	3/8	1/8	.875	.625	.750	.438	
	272-P-06x04	3/8	1/4	.906	.656	.937	.438	
272-P-08x06	1/2	3/8	1.062	.813	1.062	.625		
<b>277-P FEMALE BRANCH TEE</b> 	277-P-04x02	1/4	1/8	.875	.656	.937	.375	
	277-P-04x04	1/4	1/4	1.078	.844	1.156	.562	
	277-P-04x06	1/4	3/8	1.078	.848	1.250	.562	
<b>279-P UNION REDUCING TEE</b> Reducing on branch	279-P-06x04	3/8	1/4	.968	.718	.438		
								

# POLY-FLO

FLARELESS TUBE FITTINGS


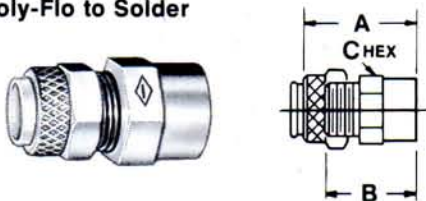
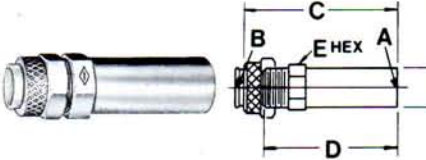
# DIMENSIONAL DATA

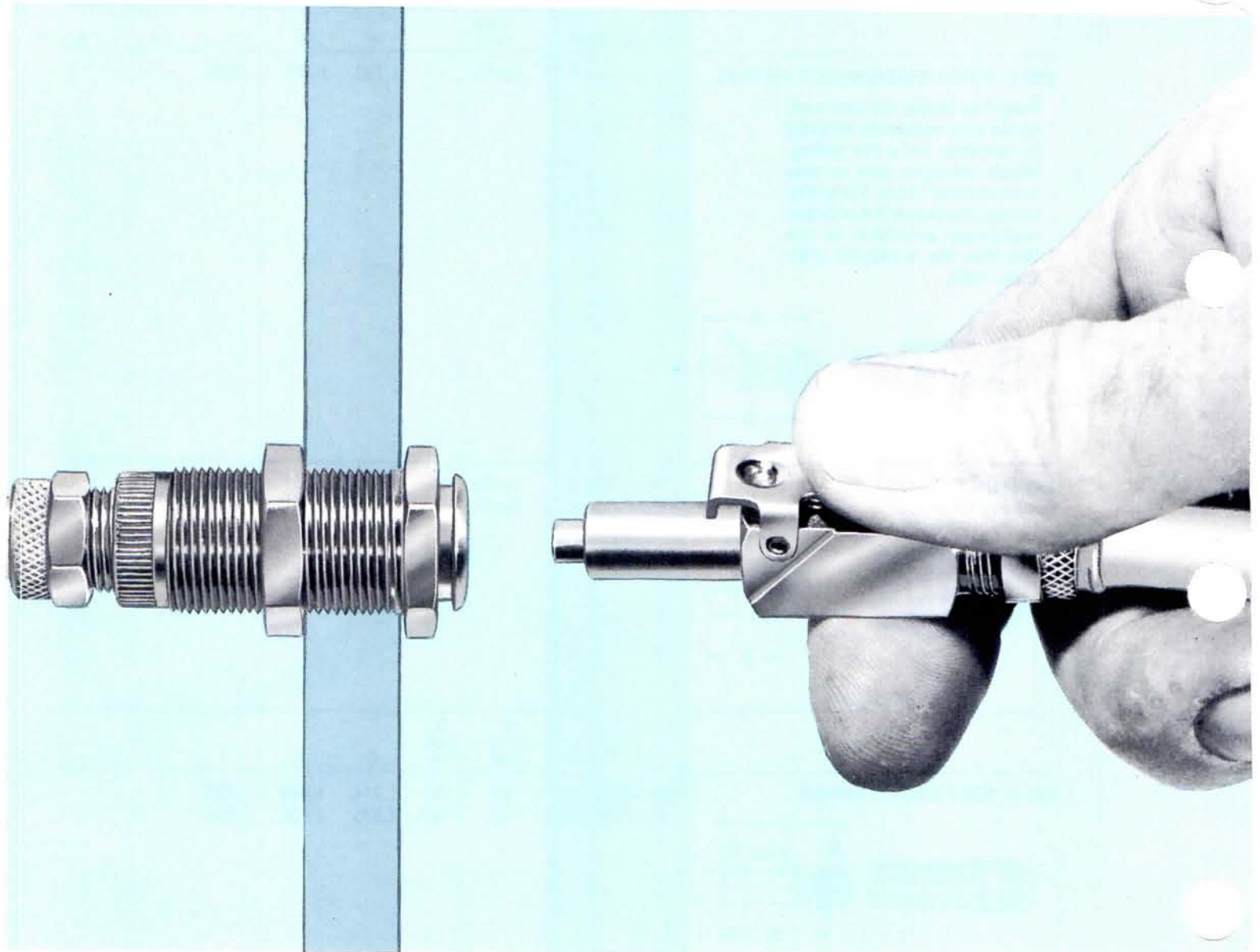
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>282-P BULKHEAD UNION</b> 	282-P-04	1/4		1.687	1.250	.562	.312		
	282-P-05	5/16		1.718	1.250	.625	.312		
	282-P-06	3/8		1.812	1.312	.687	.375		
	282-P-08	1/2		2.062	1.562	.875	.375		
<b>282-PC BULKHEAD UNION</b> Poly-Flo to Standard Compression 	282-PC-04	1/4		1.796	1.312	.562	.375		
	282-PC-05	5/16		1.843	1.343	.625	.375		
	282-PC-06	3/8		2.000	1.437	.687	.375		
<b>282-PH BULKHEAD UNION</b> Poly-Flo to Hi-Duty 	282-PH-04	1/4		2.046	1.437	.562	.375		
	282-PH-05	5/16		2.078	1.453	.625	.375		
	282-PH-06	3/8		2.218	1.562	.687	.375		
<b>282-PT BULKHEAD UNION</b> Straight Through 	282-PT-04	1/4		1.218	1.000	.562	.312		
	282-PT-05	5/16		1.234	1.000	.625	.312		
	282-PT-06	3/8		1.312	1.062	.687	.375		
<b>282-PHS BULKHEAD UNION</b> Poly-Flo to Hi-Seal 	282-PHS-04x04	1/4x1/4		2.156	1.375	.375	3/8-24	.562	1/2-20
	282-PHS-06x06	3/8x3/8		2.344	1.453	.375	1/2-24	.688	3/8-18
<b>292-P QUICK DISCONNECT FITTING</b> When tube is disconnected flow shuts off automatically. 	292-P-04x02	1/4	1/8	1.093	.875	.437			
	292-P-04x04	1/4	1/4	1.281	1.062	.562			
	292-P-05x02	5/16	1/8	1.109	.875	.437			
	292-P-06x04	3/8	1/4	1.343	1.093	.562			

# DIMENSIONAL DATA

# POLY-FLO

FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E
<b>293-P QUICK DISCONNECT FITTING</b> Poly-Flo fitting on one end, other end connects directly to another Poly-Flo fitting. When straight end is disconnected from Poly-Flo fitting, the Quick Disconnect maintains pressure in the line Pat. No. 2,842,381. Pat. Can. 1960.	293-P-04x04	1/4x1/4	1.750	1.312	.500		
							
<b>296-P UNION</b> Poly-Flo to Solder	296-P-04x06	1/4x3/8	1.000	.781	.500		
	296-P-06x08	3/8x1/2	1.031	.781	.625		
							
	Catalog Number	A Body Size	B Tube O.D.	C	D	E	
<b>297-P TUBE END REDUCER</b>	297-P-06x04	3/8	1/4	1.718	1.468	.437	
	297-P-08x06	1/2	3/8	1.875	1.625	.656	
							



Double or single end shut-off offers positive closure for frequently disconnected instrument panels

**SIZE RANGE:** Tube  $\frac{1}{4}$ " &  $\frac{3}{8}$ " O.D.  
Port  $\frac{1}{8}$ " &  $\frac{1}{4}$ " NPTF

**MAXIMUM WORKING PRESSURE:** 100 psi with Poly-Flo tubing  
300 psi with Impolene tubing  
500 psi with soft copper tubing (with 260-UB metal sleeve)

**MATERIALS:** Chrome plated brass or type 316 stainless steel bodies and nuts  
Acetal copolymer sleeves (Celcon®)

**COMPATIBLE TUBING:** Polyethylene, Polypropylene, Nylon, Polyvinyl Chloride, Polyallomer,  
Soft Copper.

See following data for specific information.



# SPECIFICATIONS

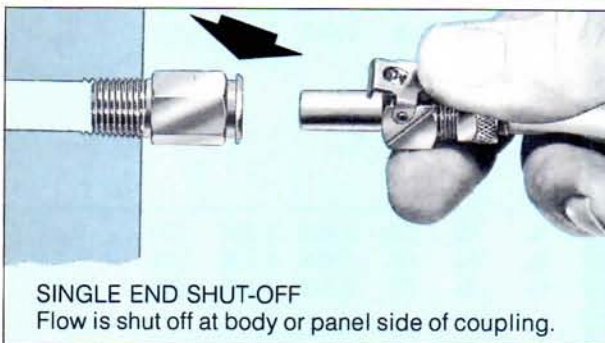
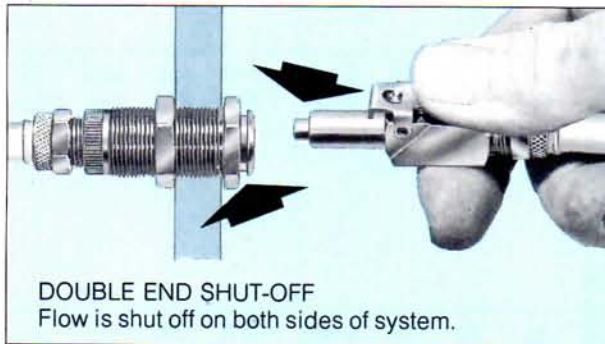
# KWIK-CONNECT

COUPLINGS

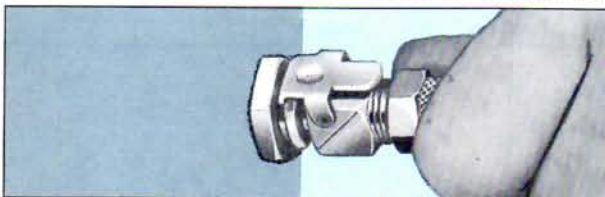
## MAINTAIN A SEALED SYSTEM AND ELIMINATE EXTRA VALVING

Kwik-Connect couplings with Poly-Flo ends provide positive flow shut-off when coupling is disconnected...without extra valving. Available in both single and double end shut-off.

**PULL—IT'S DISCONNECTED.  
JUST PRESS CLIP AND THE COUPLING  
SPRINGS OPEN.**



**PUSH—IT'S CONNECTED.  
COUPLING SNAPS TOGETHER,  
PERMITTING FLOW IN EITHER DIRECTION.**



## PROVIDES SINGLE POSITIVE OPERATION

Unique cam action automatically moves the locking clip and locks the coupling in an open flow position when the two sections are pushed together. Flow is in either direction. To uncouple, press the locking clip and pull apart. This action disconnects the coupling and instantly seals off the flow.

## AVAILABLE IN A WIDE VARIETY OF STYLES

Kwik-Connect couplings are readily available in tube to tube and tube to pipe thread styles with either double or single end shut-off.

## HOW FURNISHED

A two-piece coupler with Poly-Flo tube ends. Available in single and double end shut-off.

## MATERIALS:

- Bodies and Nuts: Chrome plated brass or type 316 stainless steel
- Sleeves: Acetal copolymer (Celcon®)
- Springs: Stainless steel on all couplings
- O-Rings: Buna-N on brass couplings  
Viton on stainless steel couplings

## PIPE THREADS:

Long length Dryseal American (National) Standard Taper pipe threads.

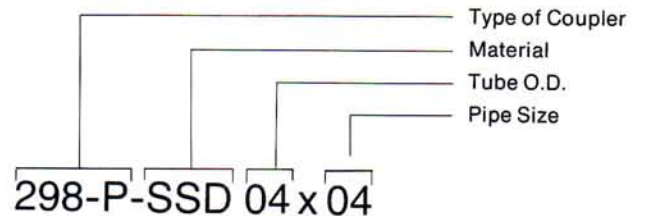
## ORDERING INFORMATION:

Determine type of shut-off required (single or double end). Select end connection. Specify catalog number for configuration and size desired.

## EXAMPLE:

To order a double end shut-off, Poly-Flo to male P.T., stainless steel 1/4" tube O.D. x 1/4" pipe thread, specify:

298-PSSD-04 x 04.



# KWIK-CONNECT

# DIMENSIONAL DATA

## COUPLERS

### DOUBLE END SHUT-OFF TYPE

Brass or Stainless Steel

#### 294-PD COUPLERS Poly-Flo to Poly-Flo

Catalog Number

Tube O.D. Pipe Thread Materials

A

B

C

D

E

Min. Bulkhead Hole

294-PD-04  
294-PD-06

1/4  
3/8

B  
B

3.672  
3.823

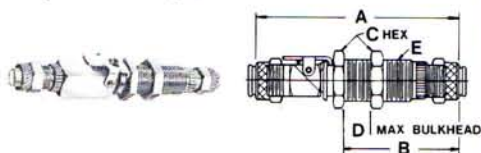
1.790  
1.965

.625  
.812

.880  
.944

1/2-24  
1 1/16-24

.516  
.703



#### 294-PSSD COUPLERS Poly-Flo to Poly-Flo

294-PSSD-04  
294-PSSD-06

1/4  
3/8

SS  
SS

3.672  
3.823

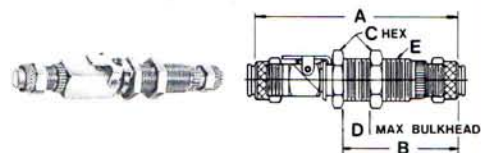
1.790  
1.965

.625  
.812

.880  
.944

1/2-24  
1 1/16-24

.516  
.703



#### 298-PD COUPLERS Poly-Flo to Male P.T.

298-PD-04x02  
298-PD-04x04  
298-PD-06x04

1/4  
1/4  
3/8

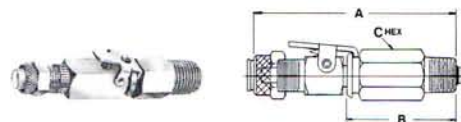
1/8  
1/4  
1/4

B  
B  
B

2.888  
2.910  
3.015

1.281  
1.270  
1.400

.500  
.562  
.625



#### 298-PSSD COUPLERS Poly-Flo to Male P.T.

298-PSSD-04x02  
298-PSSD-04x04  
298-PSSD-06x04

1/4  
1/4  
3/8

1/8  
1/4  
1/4

SS  
SS  
SS

2.888  
2.910  
3.015

1.281  
1.270  
1.400

.500  
.562  
.625



### DOUBLE END SHUT-OFF TYPE

BODY ONLY – Brass or Stainless Steel

Catalog Number

Pipe Thread

Tube O.D.

Material

With Poly-Flo Connection

294-PB-04  
294-PB-06  
294-PBSS-04  
294-PBSS-06

1/4  
3/8  
1/4  
3/8

B  
B  
SS  
SS



With Male P.T. Connection

298-PT-02x04  
298-PT-04x04  
298-PT-04x06  
298-PTSS-02x04  
298-PTSS-04x04  
298-PTSS-04x06

1/8  
1/4  
1/4  
1/8  
1/4  
1/4

1/4  
1/4  
3/8  
1/4  
1/4  
3/8

B  
B  
B  
SS  
SS  
SS



### DOUBLE END SHUT-OFF TYPE INSERT ONLY – Brass or Stainless Steel

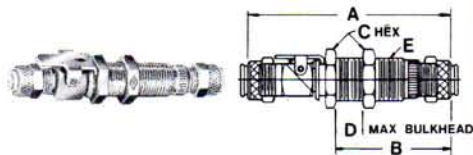
With Poly-Flo Connection



Catalog Number	Tube O.D.	Material	Used With
294-PMD-04	1/4	B	294-PB-04 298-PT-02 298-PT-04 x 04
294-PMD-06	3/8	B	294-PB-06 298-PT-04 x 06
294-PMSSD-04	1/4	SS	294-PBSS-04 298-PTSS-02 298-PTSS-04 x 04
294-PMSSD-06	3/8	SS	294-PBSS-06 298-PTSS-04 x 06

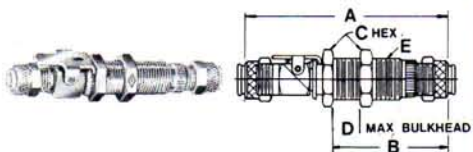
### SINGLE END SHUT-OFF TYPE Brass or Stainless Steel

294-P COUPLERS  
Poly-Flo to Poly-Flo



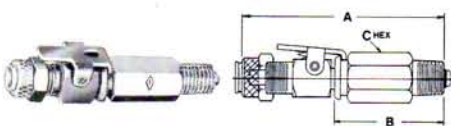
Catalog Number	Tube O.D.	Pipe Thread	Materials	A	B	C	D	E	Min. Bulk-head Hole
294-P-04	1/4		B	3.000	1.718	.625	.812	1/2-24	.516
294-P-06	3/8		B	3.562	1.921	.812	.937	1 1/16-24	.703

294-PSS COUPLERS  
Poly-Flo to Poly-Flo



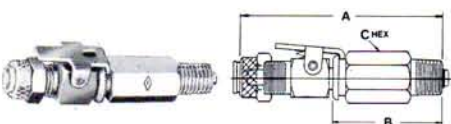
294-PSS-04	1/4		SS	3.000	1.718	.625	.812	1/2-24	.516
294-PSS-06	3/8		SS	3.562	1.921	.812	.937	1 1/16-24	.703

298-P COUPLERS  
Poly-Flo to Male P.T.



298-P-04X02	1/4	1/8	B	2.312	1.281	.500			
298-P-04X04	1/4	1/4	B	2.312	1.281	.562			
298-P-06X04	3/8	1/4	B	2.625	1.421	.625			




298-PSS COUPLERS  
Poly-Flo to Male P.T.



298-PSS-04X02	1/4	1/8	SS	2.312	1.281	.500			
298-PSS-04X04	1/4	1/4	SS	2.312	1.281	.562			
298-PSS-06X04	3/8	1/4	SS	2.625	1.421	.625			

# KWIK-CONNECT DIMENSIONAL DATA

## COUPLERS

<b>SINGLE END SHUT-OFF TYPE BODY ONLY – Brass or Stainless Steel</b>	Catalog Number	Pipe Thread	Tube O.D.	Material	Used With
With Poly-Flo Connection 	294-PB-04		1/4	B	
	294-PB-06		3/8	B	
	294-PBSS-04		1/4	SS	
	294-PBSS-06		3/8	SS	
With Male P.T. Connection 	298-PT-02x04	1/8	1/4	B	
	298-PT-04x04	1/4	1/4	B	
	298-PT-04x06	1/4	3/8	B	
	298-PTSS-02x04	1/8	1/4	SS	
	298-PTSS-04x04	1/4	1/4	SS	
	298-PTSS-04x06	1/4	3/8	SS	
<b>SINGLE END SHUT-OFF TYPE INSERT ONLY – Brass or Stainless Steel</b>					
With Poly-Flo Connection 	294-PM-04		1/4	B	294-PB-04 298-PT-02 298-PT-04x04
	294-PM-06		3/8	B	294-PB-06 298-PT-04x06
	294-PMSS-04		1/4	SS	294-PBSS-04 298-PTSS-02 298-PTSS-04x04
	294-PMSS-06		3/8	SS	294-PBSS-06 298-PTSS-04x06

## POLY-TUBE RACK



Up to 10 tubes can be held in a compact, orderly manner with these tubing racks. Furnished in black polyethylene. Nos. 14-P, 15-P, 16-P and 17-P have grooves for Unistrut P-6000 and P-7000, or similar channel mounting. No. 26-P has grooves for Unistrut A-1000 and A-4000, or similar channel mounting.

No. 14-P Poly-Tube Rack for 1/4" O.D. tubing. Has lips for fastening rack to a base with screws. Also longitudinal grooves for channel mounting.

No. 15-P Poly-Tube Rack for 1/4" O.D. tubing. Grooves, but no lips.

No. 16-P Poly-Tube Rack for 3/8" O.D. tubing. Lips and grooves.

No. 17-P Poly-Tube Rack for 3/8" O.D. tubing. Grooves, but no lips.

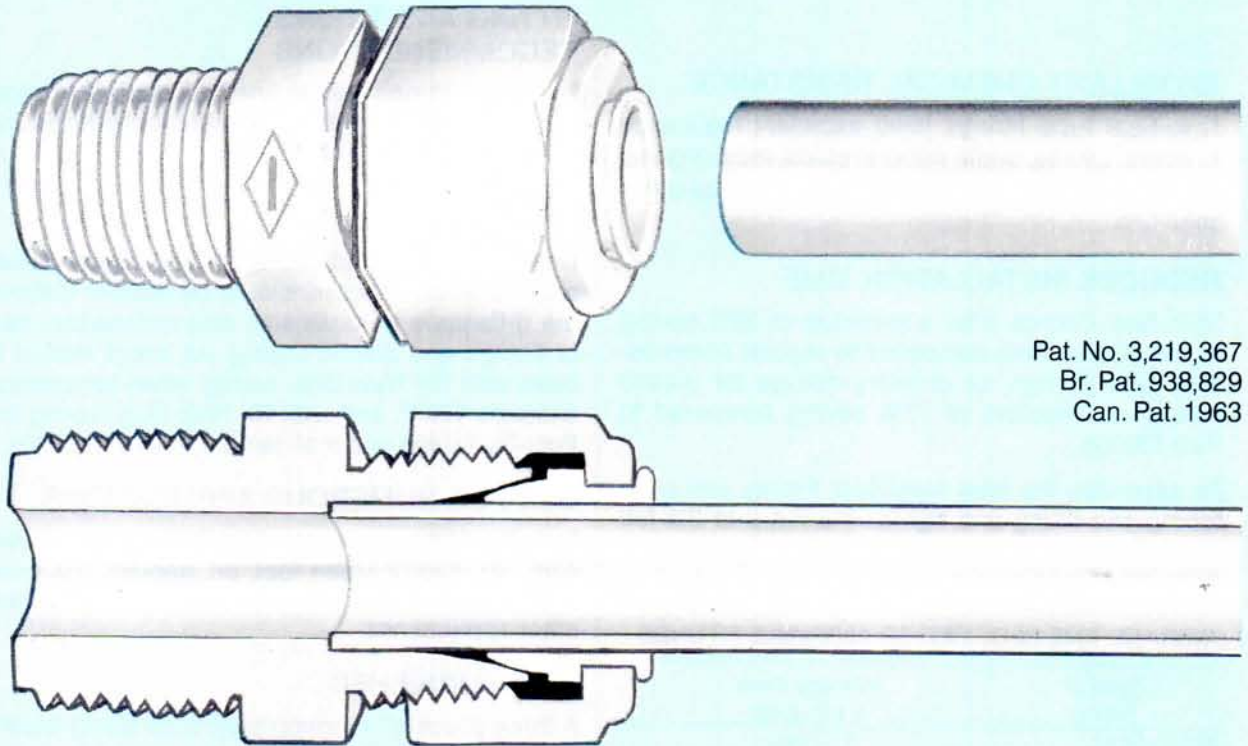
No. 26-P Poly-Tube Rack for 1/2" O.D. tubing. Holds 6 tubes. Lips and grooves.

## "1-TO-10" TUBE RACK AND BEND HOLDER



Rack can be cut quickly to size to accommodate from 1 to 10 tubes. Mounting screw holes are molded into each end of rack and also under each clip. For less than 10 tubes, rack is cut off with a knife two positions beyond last clip desired, and mounting screw hole is exposed in a convenient position. Furnished in black polyethylene.

No. 24-P Rack for 1/4" O.D. tubing.



All thermoplastic fittings provide maximum chemical resistance and reliability.

**SIZE RANGE:** Tube:  $\frac{1}{4}$ " to  $\frac{1}{2}$ " O.D.  
Port:  $\frac{1}{8}$ " to  $\frac{1}{2}$ " NPTF.

**MAXIMUM WORKING PRESSURE:** 250 psi.  
See Plastic Tubing Pressure Rating Data for Further Limitations.

**MATERIALS:** Molded Nylon Bodies and Nuts. Acetal Copolymer Sleeves (Celcon<sup>®</sup>)

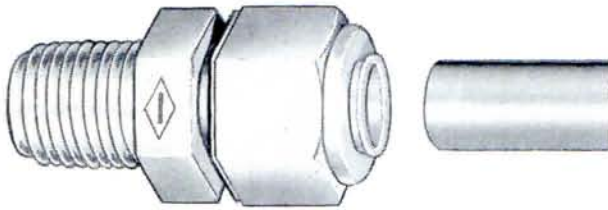
**COMPATIBLE TUBING:** Nylon – Nylo-Seal; Polyallomer – Impolene;  
Polyethylene – Poly-Flo.

See following data for specific information.

# NYLO-SEAL

# SPECIFICATIONS

FLARELESS TUBE FITTINGS



## EXCELLENT CHEMICAL RESISTANCE

Nylo-Seal tube fittings have excellent resistance to acids, alkalis, dilute mineral acids, most organic acids, petroleum oils and greases, photographic solutions.

## REDUCES INSTALLATION TIME

Nylo-Seal Fittings offer a minimum of 36% saving in installation time compared to regular compression type fittings, or ordinary fittings for plastic tubing—a minimum of 77% saving compared to flare fittings.

To assemble the New Nylo-Seal Fitting, just push tubing into fitting and tighten the nut 2 to 2½ full turns. There is no need to disassemble—no fumbling for a loose sleeve.

## AVERAGE TIME REQUIRED TO ASSEMBLE FITTINGS

Type of Fitting	Average Time Each Joint
NYLO-SEAL	11.7 sec.
Regular Compression	18.5 sec.
Flare	48.2 sec.

These studies made under shop conditions. While actual time might vary depending on field conditions, the relationship between time values should remain constant.

## NO TUBING STRESS

The New Nylo-Seal fitting eliminates the problem of plastic tube twist and stress during assembly. The nut revolves around the sleeve as it is tightened, preventing torque from being transmitted to the tubing. Design of the sleeve, nut and body assures excellent sealing and complete reliability.

## MOLDED FOR STRENGTH

Nylo-Seal tube fittings are exceptionally strong and resistant to abuse. Made of molded Nylon, they are far stronger than machined fittings of similar composition. (Sleeves are made of acetal copolymer to provide maximum performance.)

## TEMPERATURES

The maximum recommended operating temperature for Nylo-Seal fittings is 200°F. for continuous service, or 250°F. intermittent operation. Maximum service temperature is limited to the factor recommended for the tubing when this is less than the temperature specified for the fitting.

## FITTING AND TUBING RECOMMENDATIONS

Nylo-Seal fittings can be used to couple the following types of Imperial-Eastman thermoplastic tubing:

- SN, NSR, NF Nylo-Seal tubing
- Impolene tubing
- Poly-Flo tubing

Under certain conditions of temperature and pressure variation an insert should be used to stabilize the difference in expansion and contraction rates of fittings and plastic tubing. An insert should be used with SN Nylo-Seal tubing when temperature exceeds 180°F. and with NF Nylo-Seal tubing and Poly-Flo tubing under all temperature conditions.

## USE FOR NUMEROUS APPLICATIONS

Nylo-Seal fittings are excellent for instrument, lubricant, air, hydrocarbon fuel, oil, coolant, low pressure hydraulic lines, laboratory, chemical and many other applications.

## HOW FURNISHED

A three piece all thermoplastic tube fitting assembled with nuts and sleeves.

## MATERIALS

- Bodies and Nuts: Molded Nylon
- Sleeves: Acetal Copolymer

## PIPE THREAD

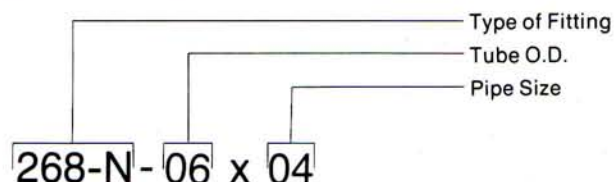
Long length Dryseal American (National) Standard Taper pipe threads.

## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

## EXAMPLE:



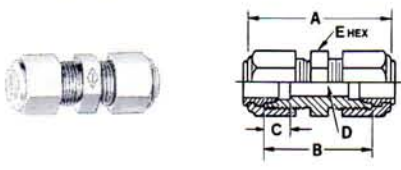
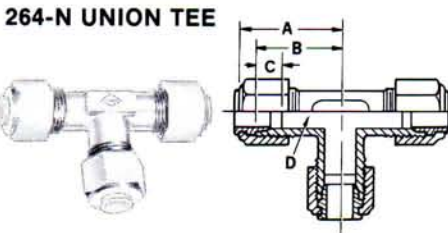

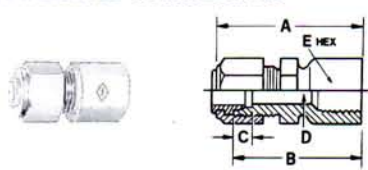
3/8" O.D. tube x 1/4" pipe thread male connector.  
268-N-06 x 04


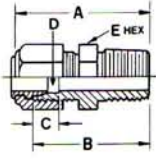



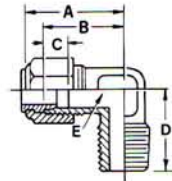
# DIMENSIONAL DATA


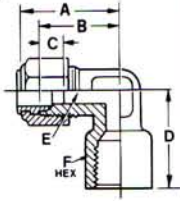
# NYLO-SEAL<sup>®</sup>


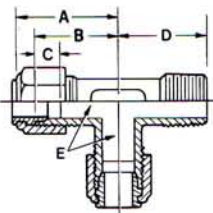
FLARELESS TUBE FITTINGS


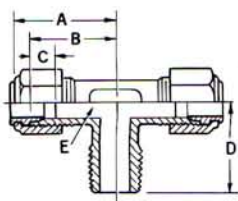
	Catalog Number	Tube O.D.	A	B	C	D	E	
<b>259-N INSERT (Nylon)</b> 	259-N-04	1/4	.375	.125				
	259-N-05	5/16	.406	.141				
	259-N-06	3/8	.437	.203				
	259-N-08	1/2	.562	.297				
<b>261-N NUT AND SLEEVE ASSEMBLY</b> 	261-N-04	1/4	.468	.562	7/16-20			
	261-N-05	5/16	.515	.625	1/2-20			
	261-N-06	3/8	.578	.750	5/8-20			
	261-N-08	1/2	.609	.875	3/4-20			
<b>262-N UNION</b> 	262-N-04	1/4	1.812	1.000	.468	.218	.625	
	262-N-05	5/16	1.812	1.000	.468	.281	.687	
	262-N-06	3/8	2.000	1.187	.531	.343	.812	
	262-N-08	1/2	2.125	1.312	.593	.406	.937	
<b>264-N UNION TEE</b> 	264-N-04	1/4	1.156	.750	.468	.218		
	264-N-05	5/16	1.218	.812	.468	.281		
	264-N-06	3/8	1.406	.937	.531	.343		
	264-N-08	1/2	1.515	1.062	.593	.406		
<b>265-N UNION ELBOW</b> 	265-N-04	1/4	1.156	.750	.468	.218		
	265-N-05	5/16	1.218	.812	.468	.281		
	265-N-06	3/8	1.406	.937	.531	.343		
	265-N-08	1/2	1.515	1.062	.593	.406		
<b>266-N FEMALE CONNECTOR</b> 	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
	266-N-04x02	1/4	1/8	1.343	.937	.468	.218	.562
	266-N-04x04	1/4	1/4	1.531	1.125	.468	.218	.687
	266-N-05x04	5/16	1/4	1.531	1.125	.468	.281	.687
	266-N-06x04	3/8	1/4	1.656	1.187	.531	.343	.687
	266-N-06x06	3/8	3/8	1.656	1.187	.531	.343	.812
	266-N-08x06	1/2	3/8	1.703	1.250	.593	.406	.812


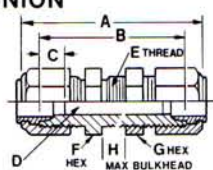
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	268-N-04x02	1/4	1/8	1.406	1.000	.468	.218	.625	
	268-N-04x04	1/4	1/4	1.593	1.187	.468	.218	.625	
	268-N-05x04	5/16	1/4	1.593	1.187	.468	.281	.687	
	268-N-06x04	3/8	1/4	1.781	1.312	.531	.343	.812	
	268-N-06x06	3/8	3/8	1.781	1.312	.531	.343	.812	
	268-N-08x06	1/2	3/8	1.828	1.375	.593	.406	.937	
	268-N-08x08	1/2	1/2	2.015	1.562	.593	.406	.937	

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	269-N-04x02	1/4	1/8	1.156	.750	.468	.750	.218	
	269-N-04x04	1/4	1/4	1.156	.750	.468	.937	.218	
	269-N-05x04	5/16	1/4	1.218	.812	.468	1.000	.281	
	269-N-06x04	3/8	1/4	1.406	.937	.531	1.062	.343	
	269-N-06x06	3/8	3/8	1.406	.937	.531	1.062	.343	
	269-N-08x06	1/2	3/8	1.515	1.062	.593	1.125	.406	
	269-N-08x08	1/2	1/2	1.515	1.062	.593	1.312	.406	

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	270-N-04x02	1/4	1/8	1.156	.750	.468	.875	.218	.562
	270-N-04x04	1/4	1/4	1.156	.750	.468	1.062	.218	.687
	270-N-05x04	5/16	1/4	1.218	.812	.468	1.125	.281	.687
	270-N-06x04	3/8	1/4	1.406	.937	.531	1.187	.343	.687
	270-N-06x06	3/8	3/8	1.406	.937	.531	1.187	.343	.812
	270-N-08x06	1/2	3/8	1.515	1.062	.593	1.250	.406	.812

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	271-N-04x02	1/4	1/8	1.156	.750	.468	.750	.218	
	271-N-04x04	1/4	1/4	1.156	.750	.468	.937	.218	
	271-N-05x04	5/16	1/4	1.218	.812	.468	1.000	.281	
	271-N-06x04	3/8	1/4	1.406	.937	.531	1.062	.343	
	271-N-06x06	3/8	3/8	1.406	.937	.531	1.062	.343	
	271-N-08x06	1/2	3/8	1.515	1.062	.593	1.125	.406	
	271-N-08x08	1/2	1/2	1.515	1.062	.593	1.312	.406	

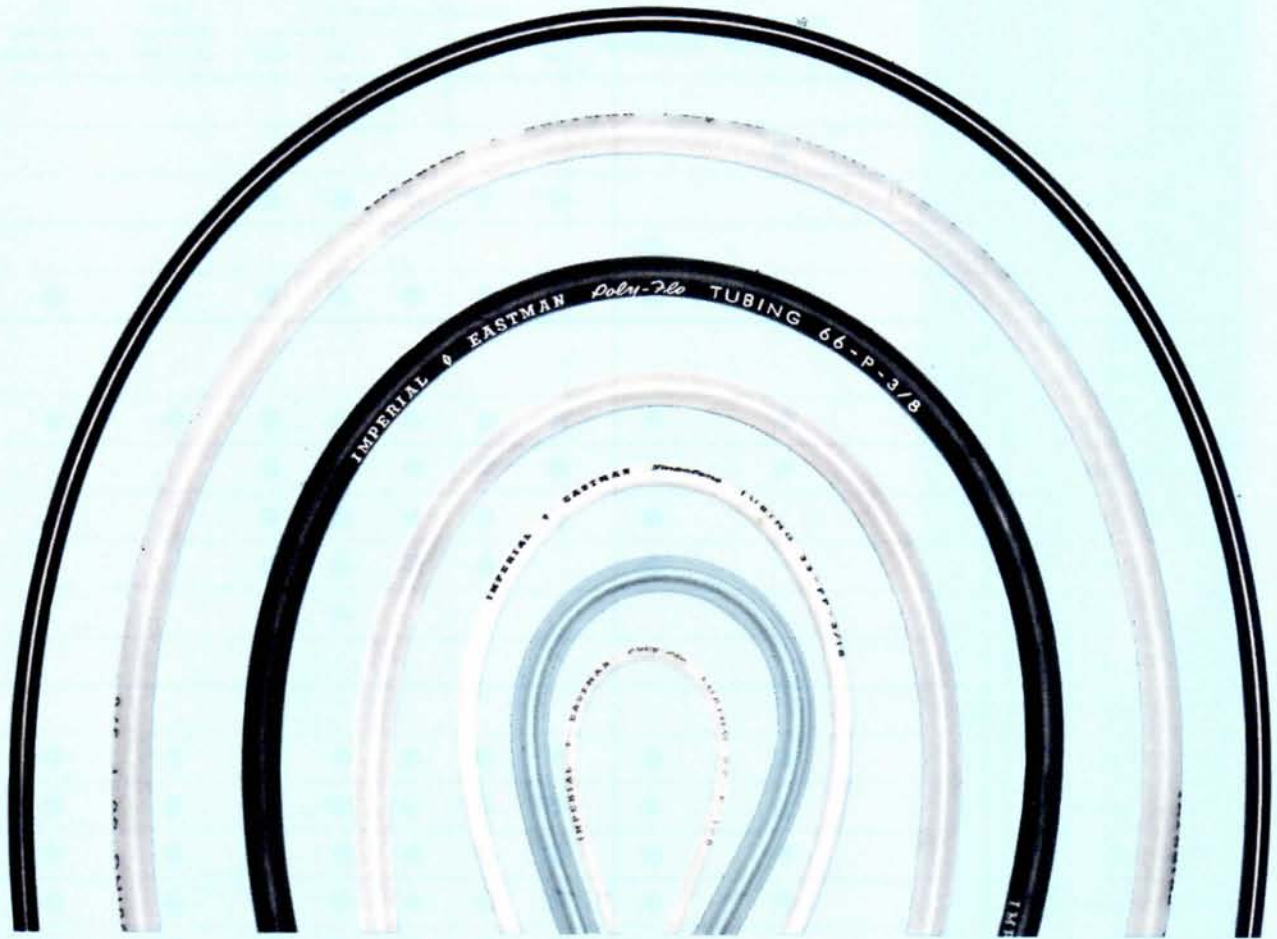
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	272-N-04x02	1/4	1/8	1.156	.750	.468	.750	.218	
	272-N-04x04	1/4	1/4	1.156	.750	.468	.937	.218	
	272-N-05x04	5/16	1/4	1.218	.812	.468	1.000	.281	
	272-N-06x04	3/8	1/4	1.406	.937	.531	1.062	.343	
	272-N-06x06	3/8	3/8	1.406	.937	.531	1.062	.343	
	272-N-08x06	1/2	3/8	1.515	1.062	.593	1.125	.406	
	272-N-08x08	1/2	1/2	1.515	1.062	.593	1.312	.406	

	Catalog Number	Tube O.D.	A	B	C	D	E	F	G	H
 	282-N-04	1/4	2.312	1.500	.468	.218	7/16-20	.625	.625	.312
	282-N-05	5/16	2.437	1.625	.468	.281	1/2-20	.687	.687	.375
	282-N-06	3/8	2.748	1.812	.531	.343	5/8-20	.812	.875	.375
	282-N-08	1/2	2.781	1.875	.593	.406	3/4-20	.937	1.000	.312





# THERMOPLASTIC TUBING



Ideal for a wide variety of low pressure and chemical applications.

**SIZE RANGES:** 1/8" to 1/2" O.D.

**MATERIALS:** Polyethylene, Polyallomer, Nylon, Polyvinyl Chloride, Ethylene Vinyl Acetate

**CONFORMANCES:** See individual tubing types.

See following data for specific information

# THERMOPLASTIC TUBING



## KWIK-SELECTOR

For application in low pressure circuitry, the use of thermoplastic tubing instead of metal tubing can effect substantial savings in both time and money.

The following comparative data will help you determine which type of tubing will meet your requirements most exactly.

	POLY-FLO (Polyethylene)	IMPOLENE (Polyallomer)	NYLO-SEAL (Nylon 11)					PVC (Polyvinyl Chloride)	EVA (Ethylene Vinyl Acetate)
			CN	F	NF	SN	NSR		
<b>TEMPERATURE RANGE</b>									
-100 to +175°F.	●								
-60 to +250°F.			● <sup>①</sup>	● <sup>①</sup>	● <sup>①</sup>	● <sup>①</sup>	● <sup>①</sup>		
-20 to +225°F.		● <sup>②</sup>							
-20 to +165°F.	●	●	●	●	●	●	●	●	●
<b>WORKING PRESSURES (4 to 1 safety factor)</b>									
to 50 psi	●	●	●	●	●	●	●	●	●
to 160 psi	●	●	●	●	●	●	●		
to 200 psi		●	●	●	●	●	●		
to 250 psi		●		●	●	●	●		
to 375 psi						●	●		
to 625 psi							●		
<b>CHEMICAL RESISTANCE</b>									
Weak Acids	●	●	●	●	●	●	●	●	●
Strong Acids	●	●	● <sup>③</sup>	● <sup>③</sup>	● <sup>③</sup>	● <sup>③</sup>	● <sup>③</sup>	●	●
Weak Base	●	●	●	●	●	●	●	●	●
Strong Base	●	●	●	●	●	●	●	●	●
Hydrocarbons		● <sup>③</sup>	●	●	●	●	●	●	●
Chlorinated Hydrocarbons		● <sup>③</sup>	●	●	●	●	●		
Ketones	● <sup>③</sup>	●	●	●	●	●	●		
Aromatic Hydrocarbons		● <sup>③</sup>	●	●	●	●	●		

① Continuous operation up to +180°F. Above this point becomes embrittled.

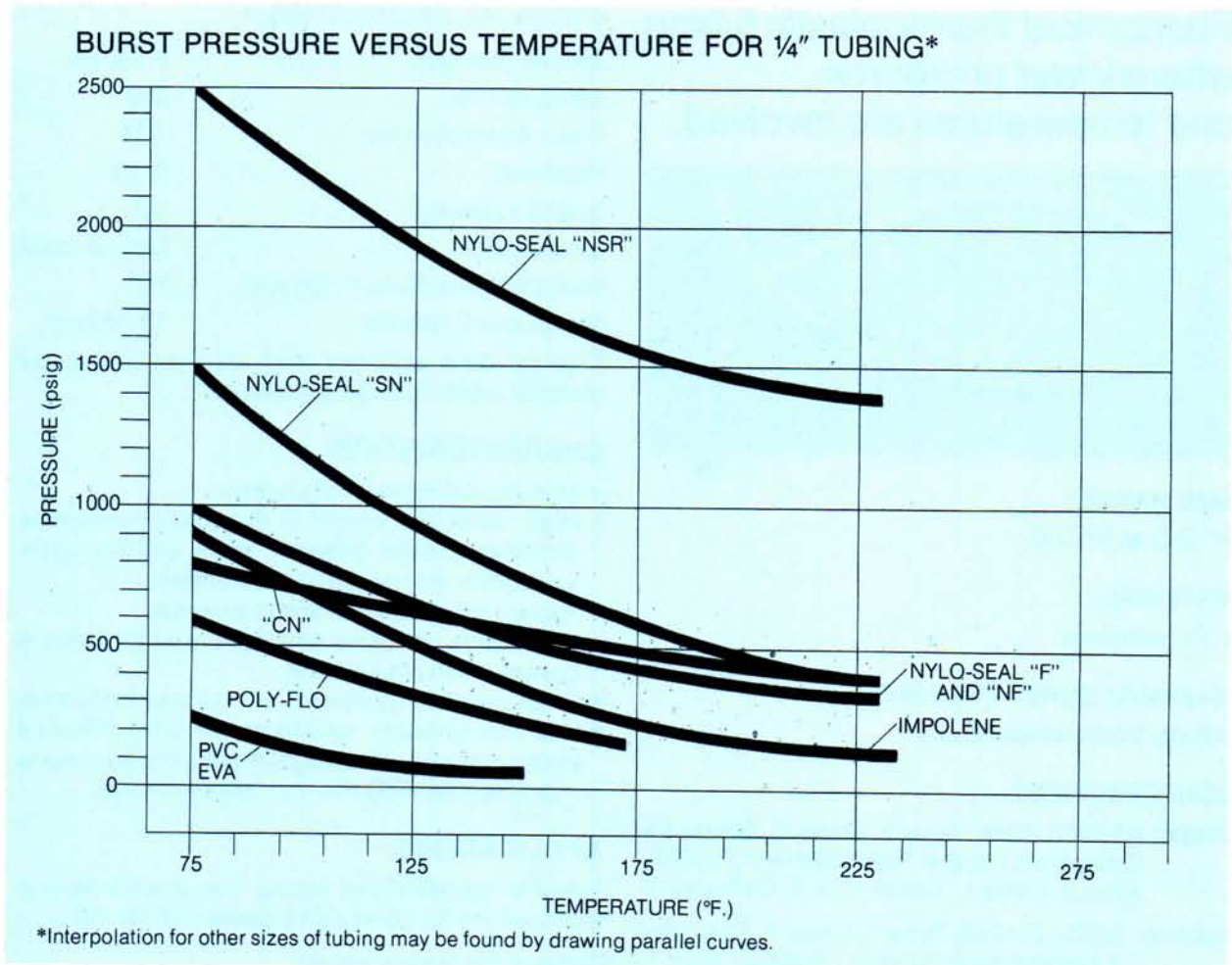
② Continuous operation up to +200°F. Above this point becomes embrittled.

③ Varies.



# THERMOPLASTIC TUBING

COMPARATIVE DATA



## EXPOSURE TO SUNLIGHT

Black tubing should be used in installations where thermoplastic tubing is exposed to sunlight. Ultraviolet radiation has a degrading effect on nearly all types of thermoplastic tubing unless the tubing has the protection of dark coloring. The amount of protection varies with the density of color, and for this reason, black is the prime choice where sunlight exposure is encountered.

## CONDUCTING FLUIDS FOR HUMAN CONSUMPTION

For applications conducting fluids which will be taken internally into the human body, regulations such as FDA or National Sanitary Foundation may be required and should be investigated before using.

Economical thermoplastic tubing where lower pressures and temperatures are involved.



**SIZE RANGE:**

1/8" O.D. to 1/2" O.D.

**MATERIAL:**

- Polyethylene.

**MAXIMUM BURST PRESSURE:**

600 psi (room temperature).

**CONFORMANCES:**

**Black:** ASTM D-1248, Type 1, Class C, Grade E5  
Category 5 Federal Specification LP-390C,  
Type 3, Class L, Grade 2, 3, 4, Category 5.

**Natural:** ASTM D-1248, Type 1, Class A, Category  
4 Federal Specification LP-390C, Type 1,  
Class L, Grade 2, Category 4.

**Colors:** ASTM D-1248, Type 1, Class B, Category  
4 Federal Specification LP-390C, Type 1,  
Class L, Grade 2, Category 4.

**PHYSICAL PROPERTIES:\***

Tensile Strength:	2,100 psi
Elongation %:	600
Water Absorption %:	.014
Hardness:	R-10
Specific Gravity:	.92
Izod Impact:	Did not break
Heat Distortion Point F° (66 psi):	107
Modulus of Elasticity:	13,000 psi

\*Typical data obtained from tests on tubing raw material under A.S.T.M. procedure.

**CHARACTERISTICS:**

- Has great dimensional stability.
- High molecular weight of Poly-Flo polyethylene provides greater strength, more uniform structure, better resistance to the elements.
- Resists most solvents and chemicals.
- Withstands corrosive atmosphere when fitting is covered with plastic tape.
- Is not attacked by vermin, will not support fungus.
- Has the greatest resistance to environmental stress cracking of all regular polyethylene resins – greater than 500 hours in Igepal solution.

**APPLICATIONS:**

Poly-Flo polyethylene tubing has a wide field of applications for conducting gases and liquids.

Some of the many uses are:

- Chemical plants
- Instrumentation
- Metal working plants
- Paper mills

**SPECIFY CATALOG NUMBER, QUANTITY AND COLOR WHEN ORDERING.**

Catalog Number	Tube O.D.	Color	Coil Length	Tube Wall Thickness	Tube Wall Tolerance	Burst Pressure psi	Minimum Bend Radius	Weight (Lbs. Per 100 Ft.)
22-P	1/8"	Natural and black	1000 Ft.	.020"	±.002	500	1/2"	.29
33-P	3/16"	Natural and black	1000 Ft.	.030"	±.002	500	3/4"	.65
44-P	1/4"	Natural, black, blue, red, green, purple, orange, yellow, gray.	Natural and Black – 1000 Ft. Other colors – 500 Ft.	.040"	±.003	400	1"	1.1
55-P	5/16"	Black	500 Ft.	.062"	±.003	600	1 1/8"	1.9
66-P	3/8"	Natural, black, blue, red, green, purple, orange, yellow, gray.	500 Ft.	.062"	±.003	350	1 1/4"	2.5
88-P	1/2"	Natural and black	250 Ft.	.062"	+.002 -.004	250	2 1/2"	3.4

"Poly-Flo" – Marca Registrada

# SPECIFICATIONS

# POLY-FLO

## POLY-FLO FLAME RETARDANT POLYETHYLENE TUBING

Flame retardant thermoplastic tubing for use where chance of combustion must be minimized.



### SIZE RANGE:

1/4" O.D. to 1/2" O.D.

### MATERIAL:

Polyethylene

### MAXIMUM BURST PRESSURE:

400 psi

### CONFORMANCES

ASTM D635. Self extinguishing.

### PHYSICAL PROPERTIES\*

Tensile Strength	1900 psi
Elongation %:	450
Water Absorption %:	0.9
Specific Gravity	1.11
Izod Impact	Did not break
Heat Distortion Point	107° F.
Brittleness Temperature	0° F.
Flammability Characteristic per ASTM D635-76	.040" Thickness Average burning rate 3.9 cm/min. .062" Thickness Average time of burning: 2.0 min. Average extent: 6 cm

\*Typical data obtained from tests on tubing raw material under A.S.T.M. procedures.

### CHARACTERISTICS

- Excellent corrosion resistance for most chemicals and solvents.
- Withstands corrosive atmosphere.
- Is not attacked by vermin, will not support fungus or bacterial growth.
- Excellent resistance to environmental stress cracking of all regular polyethylene resins—greater than 500 hours in Igepal solution.
- Is self-extinguishing.

### APPLICATIONS

Ideal in a wide variety of gas and liquid conducting applications where chance of combustion must be minimized or eliminated.

Some of the many uses are:

- Heating control services
- Municipal buildings
- Schools
- Chemical conduit
- High rise dwellings
- Hospitals
- Data control equipment

SPECIFY CATALOG NUMBER, QUANTITY AND COLOR WHEN ORDERING.

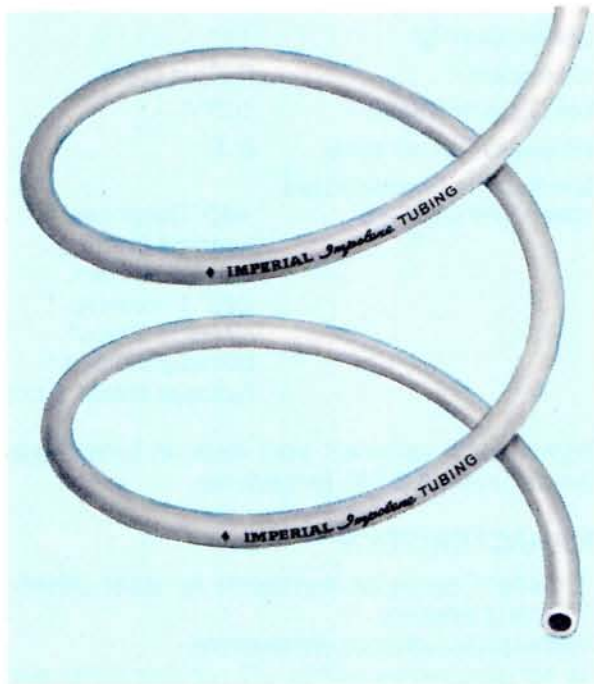
Catalog Number	Tube O.D.	Color	Coil Length	Tube Wall Thickness	Tube Wall Tolerance	Burst Pressure psi	Minimum Bend Radius	Weight (Lbs. Per 100 Ft.)
44-PF	1/4"	Black	1,000 Ft.	.040"	±.006	400	1"	1.1
66-PF	3/8"	Black	500 Ft.	.062"	±.006	350	1 1/4"	2.5
88-PF	1/2"	Black	250 Ft.	.062"	±.010	250	2 1/2"	3.9

# IMPOLENE

# SPECIFICATIONS

IMPOLENE POLYALLOMER TUBING

Ideally suited for use at higher temperatures to 225°F.



#### SIZE RANGE:

1/8" O.D. to 1/2" O.D.

#### MATERIAL:

- Polyallomer

#### MAXIMUM WORKING PRESSURE:

300 psi

#### PHYSICAL PROPERTIES:\*

Tensile Strength:	3,800 psi
Elongation %:	120
Water Absorption %:	.01
Hardness:	R-75
Specific Gravity:	.905
IZOD Impact:	16
Heat Distortion °F (66 psi):	230
Modulus of Elasticity:	130,000 psi

\*Typical data shown obtained from tests on tubing raw material under A.S.T.M. procedure.

#### CHARACTERISTICS:

- Especially suitable for use at higher temperatures—can be used under operating conditions at temperatures from -20 to 225°F.
- Can be repeatedly steam sterilized.
- Excellent corrosion resistance. In some applications can be used with a greater range of liquids and gases than Nylon or polyethylene. Withstands boiling sulfuric acid, concentrated hydrochloric acid up to the boiling point, and saline solutions over 212°F.
- Has high surface hardness and elasticity, which provide good abrasion resistance.
- Not subject to environmental stress cracking.
- Water absorption is less than .01%; extremely low absorption of mineral and vegetable oils.
- Has dimensional stability and low diametrical expansion.
- Outstanding resistance to sunlight and with black tubing.

#### APPLICATIONS:

Impolene polyallomer tubing has a wide range of application possibilities.

Such as:

- Instrument, pneumatic, lubricant lines.
- Low pressure hydraulic lines.
- Process lines for gases, chemicals, solvents.

SPECIFY CATALOG NUMBER, QUANTITY AND COLOR WHEN ORDERING.

Catalog Number	Tube O.D. In.	Color	Coil Length	Tube Wall Thickness In. (±.003)	Burst Pressure psi	Minimum Bend Radius In.	Weight (Lbs. Per 100 Ft.)
22-PP	1/8	White or black	1000 Ft.	.023	900	1/2	.28
33-PP	3/16	White or black	500 Ft.	.034	900	3/4	.63
44-PP	1/4	White or black	500 Ft.	.040	900	1	1.1
66-PP	3/8	White or black	500 Ft.	.062	900	1 1/4	2.4
88-PP	1/2	White or black	250 Ft.	.062	750	2 1/2	3.3

Designed for a broad range of installations including food conducting applications.



#### SIZE RANGE:

1/8" O.D. to 1/2" O.D.

#### MATERIAL:

- Nylon 11

#### MAXIMUM WORKING PRESSURE:

"SN" Type	—	375 psi
"NSR" Type	—	625 psi
"NF" Type	—	250 psi
"F" Type	—	250 psi
"CN" Type	—	200 psi

#### CONFORMANCES:

SN & NSR Types (natural color) comply with the following:

FDA: Section 121.2502, resin #5.2 for conducting liquid food from one point to another. Not for storage.

NSF: National Sanitation Foundation approval for potable water supply.

#### PHYSICAL PROPERTIES:\*

	(Types SN, NSR, & CN)	(Types F and NF)
Tensile Strength:	8,500 psi	6,800 psi
Elongation %:	160	300
Water Absorption:	.4	.4
Hardness:	R-86	R-70
Specific Gravity:	1.04	1.05
Izod Impact:	4.0	4.8
Heat Distortion Point °F:	302	285
(66 psi)		
Modulus of elasticity:	177,000 psi	85,000 psi

\*Typical data shown obtained from tests on tubing raw material under A.S.T.M. procedure.

#### CHARACTERISTICS:

- Constructed of Nylon 11. Eliminates problems of embrittlement or swelling which often occur with ordinary nylon tubing.
- Extremely low moisture absorption. Absorbs only a maximum of 1.9% moisture as compared to 16% for other nylons.
- Does not require moisture for flexibility because of unique molecular structure. Tubing cannot become brittle.
- Maintains advantages of other nylons—toughness, burst pressure, excellent resilience, and chemical compatibility.
- High corrosion resistance—not affected by common solvents, alkalis, dilute mineral acids, most organic acids, petroleum oils, greases, and photographic solutions.
- Excellent resistance to flexural fatigue. Can be used where there is vibration or tube movement.
- Black tubing has excellent resistance to sunlight.
- Ignored by vermin and rodents.

#### APPLICATIONS:

- Instrument, lubricant, air and hydrocarbon fuel lines.
- Process lines for gases, chemicals and oils.
- Fuel and oil.
- Coolant lines for air conditioning and refrigeration equipment.
- Low pressure hydraulic lines.
- Food and beverages (see conformances).

#### FITTINGS

Nylo-Seal fittings provide a completely corrosion resistant system for connecting SN, NSR and NF tubing. An insert should be used with SN tubing when temperature exceeds 180°F., and with NF tubing under all temperature conditions.

Hi-Duty and Hi-Seal fittings can be used to couple SN and NSR tubing when metal fittings are desired. An insert should be used with SN tubing when temperature exceeds 180°F., or when there is a temperature variation of 120°F. or more. (The insert helps to stabilize the difference in expansion and contraction rates of fittings and plastic tubing.)

Poly-Flo fittings with the universal brass sleeve provide good connections with SN and NF tubing.

Type F (C9) nylon is coupled with the FP series couplings.

Type CN nylon is coupled with the N series fittings.

# NYLO-SEAL

# SPECIFICATIONS

## NYLON 11 TUBING

SPECIFY CATALOG NUMBER, QUANTITY AND COLOR WHEN ORDERING

### "SN" SEMI-RIGID NYLO-SEAL TUBING

Catalog Number	Tube O.D. In.	Color	Coil Length	Tube Wall Thickness In.	Burst Pressure psi	Minimum Bend Radius In.	Weight (Lbs. Per 100 Ft.)
22-SN	1/8	Natural or black	500 Ft.	.017	1500	1/2	.26
33-SN	3/16	Natural or black	350 Ft.	.024	1500	3/4	.6
44-SN	1/4	Natural or black	200 Ft.	.033	1500	1	1.0
55-SN	5/16	Natural	150 Ft.	.040	1500	1 1/2	1.5
66-SN	3/8	Natural or black	100 Ft.	.048	1500	1 3/4	2.2
88-SN	1/2	Natural or black	100 Ft.	.062	1500	2 3/8	3.2

### "NSR" SEMI-RIGID NYLO-SEAL TUBING

Catalog Number	Tube O.D. In.	Color	Coil Length	Tube Wall Thickness In.	Burst Pressure psi	Minimum Bend Radius In.	Weight (Lbs. Per 100 Ft.)
22-NSR	1/8	Natural or black	500 Ft.	.026	2500	3/8	.37
33-NSR	3/16	Natural	350 Ft.	.039	2500	5/8	.81
44-NSR	1/4	Natural or black	200 Ft.	.050	2500	7/8	1.4
66-NSR	3/8	Natural or black	100 Ft.	.075	2500	1 1/2	3.19
88-NSR	1/2	Natural or black	100 Ft.	.075	2500	2 1/2	4.50

### "NF" FLEXIBLE NYLO-SEAL TUBING

Catalog Number	Tube O.D. In.	Color	Coil Length	Tube Wall Thickness In.	Burst Pressure psi	Minimum Bend Radius In.	Weight (Lbs. Per 100 Ft.)
22-NF	1/8	Natural or black	500 Ft.	.023	1000	3/8	.33
33-NF	3/16	Natural or black	350 Ft.	.024	1000	5/8	.54
44-NF	1/4	Natural or black	200 Ft.	.033	1000	7/8	1.02
440-NF	1/4	Natural or black	200 Ft.	.040	1200	1/2	1.20
55-NF	5/16	Natural or black	150 Ft.	.040	1000	1 1/4	1.56
66-NF	3/8	Natural or black	100 Ft.	.048	1000	1 1/2	2.24
660-NF	3/8	Natural or black	100 Ft.	.060	1200	3/4	2.78
88-NF	1/2	Natural or black	100 Ft.	.062	1000	2	3.89

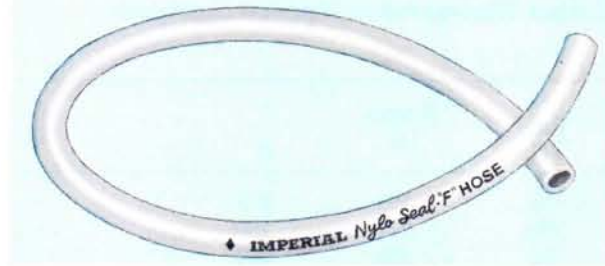


# SPECIFICATIONS

# NYLO-SEAL

## NYLON HOSE/COUPLINGS – TUBE/FITTINGS

### NYLO-SEAL "F" THERMOPLASTIC FLEXIBLE HOSE



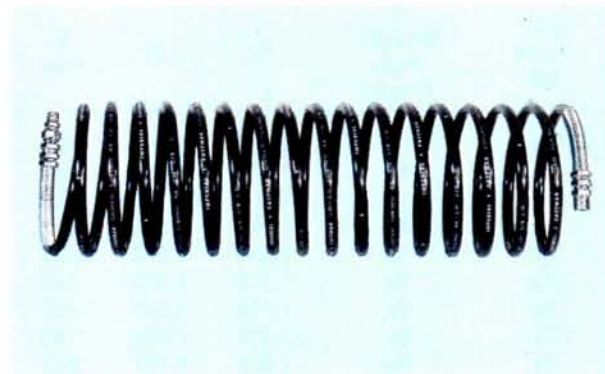
Nylo-Seal "F" non-reinforced hose retains all the other advantages of Nylo-Seal while offering the additional advantage of greater flexibility.

For couplings information, see page 42.

SPECIFY CATALOG NUMBER, COLOR AND QUANTITY WHEN ORDERING.

Catalog Number	Hose I.D.	Color	Coil Length	Tube Wall Thickness	Tube Wall Tolerance	Burst Pressure psi	Minimum Bend Radius	Weight (Lbs. Per 100 Ft.)
C902	1/8"	Natural	200 Ft.	.031	±.0025	1000	1/2"	.69
C903	3/16"	Natural	200 Ft.	.038	+ .001 - .003	1000	3/4"	1.2
C904	1/4"	Natural	200 Ft.	.050	±.0025	1000	1 1/4"	2.2
C906	3/8"	Natural	200 Ft.	.0625	±.0025	900	1 3/4"	3.9
C908	1/2"	Natural	100 Ft.	.071	±.003	800	2 1/8"	6.2

### NYLO-SEAL "CN" THERMOPLASTIC SELF-STORING TUBING (NYLON 11)



This tubing is used wherever shop air is conducted from the main line to portable air operated tools, air blow guns, air nozzles, etc. Can also be used for low pressure hydraulics and other applications where the advantages of a self-retrieving tubing are desired.

Tubing is furnished in coils of 12, 25 or 50 linear feet with fittings assembled or bulk coils of 100 linear feet without fittings. Furnished in Tan color. 12, 25 and 50 foot coils have No. 168-N male pipe thread fitting on both ends.

For fittings information, see page 43.

SPECIFY CATALOG NUMBER AND QUANTITY WHEN ORDERING.



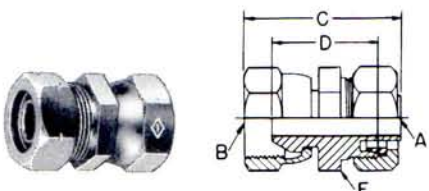
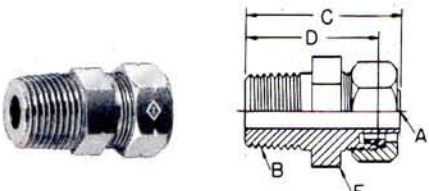
Catalog Number	Tube I.D. In.	Male Pipe Thread End Fittings	Linear Feet	Wall Thickness In.	Coil O.D. In.	Coil Overall Length	Burst Pressure psi	Weight Lbs. Per 100 Ft.
244-CN-12	1/4	1/4	12	.030	3 1/2	5	700	1.24
244-CN-25	1/4	1/4	25	.030	3 1/2	10	700	1.24
244-CN-50	1/4	1/4	50	.030	3 1/2	20	700	1.24
266-CN-12	3/8	3/8	12	.045	6	4	700	2.77
266-CN-25	3/8	3/8	25	.045	6	8 1/2	700	2.77
266-CN-50	3/8	3/8	50	.045	6	17	700	2.77
288-CN-12	1/2	1/2	12	.062	8	4	700	5.28
288-CN-25	1/2	1/2	25	.062	8	8 1/2	700	5.28
288-CN-50	1/2	1/2	50	.062	8	17	700	5.28
264-CN-12	3/8	1/4	12	.045	6	4	700	2.77
264-CN-25	3/8	1/4	25	.045	6	8 1/2	700	2.77
44-CN-100	1/4	—	100	.030	3 1/2	40	700	1.24
66-CN-100	3/8	—	100	.045	6	34	700	2.77
88-CN-100	1/2	—	100	.062	8	34	700	4.93

# NYLO-SEAL F

## HOSE COUPLINGS

# DIMENSIONAL DATA

The following couplings were designed specifically for Nylo-Seal "F" hose to assure ease of installation and maximum dependability. Made of brass and nickel plated. Sleeves made of acetal copolymer.






		Catalog Number	A Tube I.D.	Sleeve I.D.	B				
<b>SLEEVES</b> 		FP-231-73	1/8	.195	.218				
		FP-338-73	3/16	.271	.250				
		FP-450-73	1/4	.358	.250				
		FP-662-73	3/8	.507	.250				
		FP-875-73	1/2	.658	.250				
		Catalog Number	Tube I.D.	A Thread	B	C Hex			
<b>COUPLING NUT</b> 		FP02-56	1/8	3/8-24	.375	.437			
		FP03-56	3/16	7/16-24	.375	.500			
		FP04-56	1/4	1/2-24	.375	.562			
		FP06-56	3/8	1 1/16-24	.375	.375			
		FP08-56	1/2	1 3/16-20	.500	.875			
		Catalog Number	A Tube I.D.	B Straight Pipe Thread	C	D	E Hex.		
<b>FEMALE SWIVEL (NPSM)</b> 		FP02-04NK	1/8	1/4	1.218	1.015	.500		
		FP02-06NK	1/8	3/8	1.218	1.078	.562		
		FP03-04NK	3/16	1/4	1.218	1.015	.500		
		FP03-06NK	3/16	3/8	1.218	1.078	.562		
		FP04-04NK	1/4	1/4	1.218	1.015	.562		
		FP04-06NK	1/4	3/8	1.218	1.078	.562		
		FP06-04NK	3/8	1/4	1.218	1.015	.750		
		FP06-06NK	3/8	3/8	1.218	1.078	.750		
		FP08-06NK	1/2	3/8	1.328	1.187	.812		
		FP08-08NK	1/2	1/2	1.640	1.312	.812		
		Catalog Number	A Tube I.D.	B Straight Pipe Thread	C	D	E Hex.		
<b>MALE PIPE (NPTF)</b> 		FP02-02MB	1/8	1/8	1.093	.906	.437		
		FP03-02MB	3/16	1/8	1.062	.875	.437		
		FP03-04MB	3/16	1/4	1.250	1.062	.562		
		FP04-02MB	1/4	1/8	1.093	.906	.500		
		FP04-04MB	1/4	1/4	1.281	1.093	.562		
		FP04-06MB	1/4	3/8	1.281	1.093	.687		
		FP06-04MB	3/8	1/4	1.312	1.125	.687		
		FP06-06MB	3/8	3/8	1.312	1.125	.687		
		FP08-06MB	1/2	3/8	1.343	1.156	.812		
		FP08-08MB	1/2	1/2	1.562	1.375	.875		

# DIMENSIONAL DATA

# NYLO-SEAL CN

TUBE/FITTINGS

Designed for use with Nylo-Seal "CN" self-storing tubing. The fittings are made of brass and nickel plated. Sleeves are made of acetal copolymer. Furnished with spring guard.

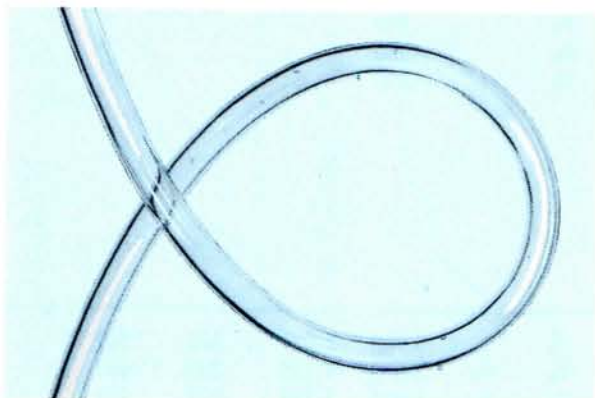
	Catalog Number	Tube I.D.	Pipe Thread	A	B	C	D	E
<b>160-N SLEEVE</b>  	160-N-04	1/4		.250				
	160-N-06	3/8		.250				
	160-N-08	1/2		.250				
<b>168-N MALE PIPE CONNECTOR</b>  	168-N-04x04	1/4	1/4	3.968	1.031	.562	.562	
	168-N-06x06	3/8	3/8	3.875	1.125	.750	.687	
	168-N-08x08	1/2	1/2	4.062	1.375	.875	.875	
<b>178-N MALE PIPE SWIVEL</b>  	178-N-04x04	1/4	1/4	3.968	1.640	.562	.625	.625
	178-N-06x06	3/8	3/8	3.875	1.640	.562	.625	.625
	178-N-08x08	1/2	1/2	4.062	1.640	.562	.625	.625
<b>176-N FEMALE NPSM SWIVEL</b>  	176-N-04x04	1/4	1/4	3.968	1.046	.562	.562	.625
	176-N-06x06	3/8	3/8	3.875	1.093	.750	.750	.750
	176-N-08x08	1/2	1/2	4.062	1.437	.875	.812	1.000
<b>169-N MALE PIPE ELBOW</b>  	169-N-04x04	1/4	1/4	3.968	.656	.562	.937	
	169-N-06x06	3/8	3/8	3.875	.750	.750	1.125	
	169-N-08x08	1/2	1/2	4.062	.875	.875	1.312	

# PVC

POLYVINYL CHLORIDE TUBING

# SPECIFICATIONS

Clear, extremely flexible tubing ideally suited to low pressure applications



#### SIZE RANGE:

1/4" O.D. to 1/2" O.D.

#### MATERIAL:

- Polyvinyl Chloride

#### MAXIMUM WORKING PRESSURE:

50 psi

#### PHYSICAL PROPERTIES\*

Tensile Strength:	2050 psi
Elongation %:	400
Water Absorption %:	.45
Hardness:	A-75
Specific Gravity:	1.21

\*Typical data shown obtained from facts on tubing raw material under A.S.T.M. procedures.

#### CHARACTERISTICS

- Extremely flexible — bends to a very short radius without collapsing.
- Water clear to permit visual inspection of flow and cleanliness. (Contact with oils, greases, paint, rubber, perspiration and hand creams may affect the clarity.)
- Smooth hose provides excellent flow characteristics, is easily flushed clean.
- Comparatively tough and abrasion resistant. (Dragging the tubing over concrete surfaces or sharp objects may produce minute scratches which will affect its clearness and gloss.)
- Operating temperature range -20° to 165°F.
- Resists wide range of chemicals.
- Non-Toxic and non-contaminating, tasteless and practically odorless.

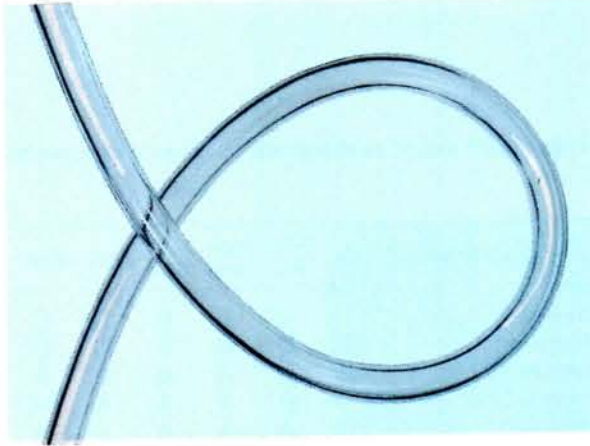
#### BURST PRESSURE/TEMPERATURE RATINGS

Temp	75°F	100°F	125°F	140°F
44-PVC	200 psi	140 psi	75 psi	50 psi
66-PVC	160 psi	90 psi	60 psi	40 psi
88-PVC	140 psi	80 psi	40 psi	30 psi

#### SPECIFY CATALOG NUMBER AND QUANTITY WHEN ORDERING

Catalog Number	Tube O.D., In.	Color	Coil Length	Tube Wall Thickness, In.	Burst Pressure psi	Minimum Bend Radius, In.	Weight (Lbs. Per 100 Ft.)
44-PVC	1/4	Clear	250 Ft.	.040	200	1/2	1.3
66-PVC	3/8	Clear	100 Ft.	.062	160	1	3.2
88-PVC	1/2	Clear	75 Ft.	.062	140	2	4.5

### Extra flexible, non-toxic tubing



#### SIZE RANGE:

1/4" O.D. to 1/2" O.D.

#### MATERIAL:

- Ethylene Vinyl Acetate

#### MAXIMUM WORKING PRESSURE:

65 psi

#### CONFORMANCES:

FDA: Fabricated from material that complies with Food and Drug Administration requirement for handling of foods and beverages. Section 121.2570.

#### PHYSICAL PROPERTIES:\*

Tensile Strength:	3400 psi
Elongation %:	640
Water Absorption %:	.04
Hardness:	A-95
Specific Gravity:	.93

\*Typical data shown obtained from facts on tubing raw material under A.S.T.M. procedure.

#### CHARACTERISTICS

- Extremely flexible – even at low temperatures.
- Milky white translucent color permits visual inspection of colored fluids.
- Smooth bore is non-sticking and easily flushed clean.
- Operating temperature range –65° to 165°F.
- Excellent chemical resistance.
- Non-toxic, tasteless, odorless.

#### BURST PRESSURE/TEMPERATURE RATING

Temp.	75°F	100°F	125°F	140°F
44-EVA	265 psi	160 psi	100 psi	70 psi
66-EVA	210 psi	110 psi	85 psi	60 psi
88-EVA	160 psi	90 psi	70 psi	40 psi

#### SPECIFY CATALOG NUMBER AND QUANTITY WHEN ORDERING.

Catalog Number	Tube O.D., In.	Color	Coil Length	Tube Wall Thickness, In.	Burst Pressure psi	Minimum Bend Radius, In.	Weight (Lbs. Per 100 Ft.)
44-EVA	1/4	Clear	250 Ft.	.040	265	1/2	1.2
66-EVA	3/8	Clear	100 Ft.	.062	210	1	2.5
88-EVA	1/2	Clear	75 Ft.	.062	160	2	3.5

# CHEMICAL RESISTANCE



## THERMOPLASTIC TUBING

### KEY

A—Excellent. Little or no swelling or softening.

B—Good. Swelling or softening is moderate.

C—Fair. Conditional service may be expected.

D—Unsatisfactory. Not recommended.

NT—Not tested.

Test data at 73°F. This listing should be considered as a guide. Each application should be tested prior to its use in commercial systems. Elevated temperatures will lower chemical resistance.

Chemical	Poly Flo	Impo-lene	Nylo-Seal	PVC	EVA
Acetaldehyde	NT	A	A	D	B-C
Acetate solvents—crude	A	A	A	D	A
Acetate solvents—pure	A	A	A	D	A
Acetic Acid 20%	A	A	A	A	A
Acetic Acid 50%	D	A	A	A	D
Acetic Acid—pure	D	A	B	C	D
Acetone	B	A	A	D	B-C
Acetophenone	B	A	NT	NT	B-C
Acetylene	A	A	A	NT	A
Air	A	A	A	A	A
Alcohols	A	A	A	A	A
Aluminum chloride	B	A	A	A	B
Aluminum sulphate	A	A	A	A	A
Alums	A	A	A	A	A
Ammonia (gas-liquid)	A	A	A	B	A
Ammonium acetate	A	A	A	A	A
Ammonium carbonate	A	A	A	A	A
Ammonium chloride	A	A	A	A	A
Ammonium hydroxide	A	A	A	A	A
Ammonium nitrate	A	A	A	A	A
Ammonium phosphate	A	A	A	A	A
Ammonium sulfate	A	A	A	A	A
Amyl acetate	C	D	A	D	C
Amyl alcohol	B	B	A	A	B
Amyl chloride	C	NT	A	C	C-D
Aniline	B	B	B	D	C
Asphalt	A	A	A	NT	A
Barium salts	A	A	A	A	A
Beer	A	A	A	NT	A
Beet sugar liquors	A	A	A	NT	A
Benzaldehyde	C	A	A	D	C-D
Benzene or benzol	D	B	A	C	D
Benzoic acid	A	A	A	A	A
Borax	A	A	B	A	A
Boric acid	A	A	B	A	A
Brandy	A	A	B	NT	B
Bromine water, saturated	NT	D	D	D	D
Butane	C	B	A	C	A
Butter	A	A	A	A	B
Butyl acetate	C	C	A	D	C-D
Calcium bisulfite	A	A	A	D	A
Calcium hypochlorite	A	A	A	NT	A
Calcium salts	A	A	A	A	A
Cane sugar liquors	A	A	A	NT	A
Carbon dioxide	A	A	A	A	A
Carbon dioxide (dry)	A	A	A	A	A
Carbon dioxide (wet)	A	A	A	A	A
Carbon tetrachloride	C	C	B	C	D
Carrot	A	A	A	A	A

Chemical	Poly Flo	Impo-lene	Nylo-Seal	PVC	EVA
Chlorine	D	D	D	D	C
Chloroform	D	C	B	C	D
Chocolate syrup	A	A	A	A	A
Chromic acid	B	A	A	A	B-C
Citric acid	A	A	A	A	A
Coke oven gas	B	A	NT	NT	B-C
Copper salts	B	A	A	A	B
Copper sulfate	B	A	A	NT	B
Core oils	B	A	A	NT	C
Cottonseed oil	A	A	A	NT	B
Creosote	A	A	C	NT	C
Cyclohexanol	C	A	A	NT	D
Cyclohexanone	C	B	A	D	D
Dibutyl phthalate	C	A	A	NT	C
Dichloroethylene	NT	A	C	NT	D
Dioxane	D	C	A	NT	D
Ethers	B	C	A	C	C
Ethyl acetate	A	B	A	D	A
Ethyl alcohol	A	A	A	C	A
Ethylene glycol	A	A	A	A	A
Ferric chloride	A	A	A	A	A
Ferric sulfate	A	A	A	A	A
Ferrous chloride	A	A	A	A	A
Ferrous sulfate	A	A	A	A	A
Formaldehyde	A	A	A	A	A
Formic acid	A	A	A	A	A
Freon	A	B	A	D	B
Furfural	A	D	B	NT	B
Gasoline (sour)	D	D	A	D	D
Gasoline (refined)	D	D	A	D	D
Gelatin	A	A	A	NT	A
Glucose	A	A	A	A	A
Glue	A	A	A	A	A
Glycerin or glycerol	A	A	A	A	A
Hydraulic fluid	A	A	A	NT	C
Hydraulic fluid (fire res.)	A	A	A	NT	C
Hydrochloric acid 30%	A	A	B	A	A
Hydrochloric acid 50%	A	A	C	A	A
Hydrocyanic acid	A	A	NT	A	A
Hydrofluoric acid (dil.)	A	A	C	A	C
Hydrofluoric acid 38-40%	A	A	D	A	D
Hydrofluoric acid 50%	A	A	D	A	D
Hydrogen fluoride	B	A	D	NT	NT
Hydrogen	A	A	A	NT	A
Hydrogen peroxide	B	A	A	A	C
Hydrogen sulfide (dry)	A	A	C	A	A
Hydrogen sulfide (wet)	A	A	C	A	A
Iodine (in alcohol)	B	A	A	A	B
Isopropanol	B	A	A	NT	B

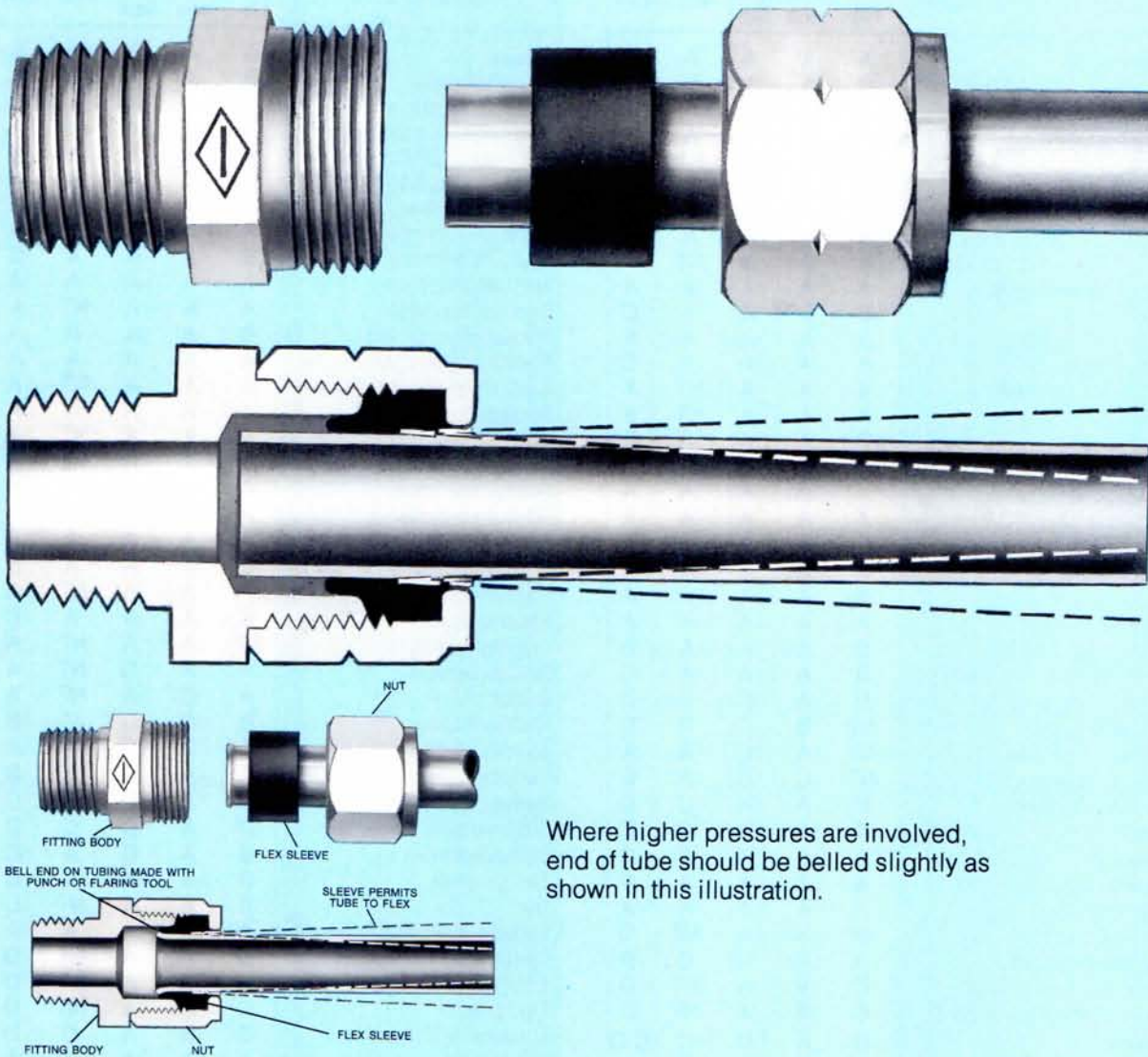


# CHEMICAL RESISTANCE

THERMOPLASTIC TUBING

Chemical	Poly-Flo	Impo-lene	Nylo-Seal	PVC	EVA
Karo syrup	A	A	A	A	A
Lacquer and solvents	B	A	A	D	C-D
Lactic acid	C	A	A	A	C-D
Lead acetate	A	A	A	A	A
Lime sulfur	A	A	A	NT	A
Linseed oil	B	A	A	A	C-D
Machine oil	C	A	A	NT	D
Magnesium chloride	A	A	A	A	A
Magnesium hydroxide	A	A	A	NT	A
Magnesium sulfate	A	A	A	A	A
Malic acid	B	B	A	A	C
Manganese salts	A	A	A	A	A
Mayonnaise	A	A	A	A	C
Mercuric chloride	A	A	A	NT	A
Mercury	A	A	A	NT	A
Methanol	B	A	A	NT	B
Methylene chloride	C	C	A	NT	D
Milk	A	A	A	A	A
Molasses	A	A	A	A	A
Natural gas	C	B	A	A	C
Nickel chloride	A	A	A	A	A
Nickel salts	A	A	A	A	A
Nickel sulfate	A	A	A	A	A
Nitric acid (dil.)	B	A	A	A	B
Nitric acid (med. conc.)	B	A	A	A	C
Nitric acid (conc.)	D	A	C	C	D
Nitrobenzene	NT	B	C	D	D
Nitrogen oxides	NT	A	NT	A	A
Nitrous acids	NT	C	D	A	B
Oils, vegetable	B	A	A	C	C
Oleic acid	B	A	A	C	C
Olive oil	A	A	A	C	C
Oxalic acid	A	A	A	A	A
Oxygen gas	A	A	A	A	A
Palmitic acid	B	A	A	NT	C
Perchloric acid	A	A	D	D	B
Petroleum oils (sour)	C	B	A	NT	D
Petroleum oils (refined)	C	B	A	NT	D
Phenol	B	A	D	C	C-D
Phosphoric acid 25%	A	A	A	A	A
Phosphoric acid 25-50%	B	A	A	A	B
Phosphoric acid 50-85%	B	A	C	A	C
Picric acid	B	A	B	NT	C
Potassium carbonate	A	A	A	A	A
Potassium chlorate	A	A	A	A	A
Potassium chloride	A	A	A	NT	A
Potassium hydroxide	A	A	A	A	A
Potassium iodide	B	A	A	B	B
Potassium sulfate	A	A	A	NT	A
Propane	C	B	B	NT	D
Pyridine	NT	A	C	D	B
Rosin (light)	A	A	A	NT	A
Sauerkraut	A	A	A	A	A

Chemical	Poly-Flo	Impo-lene	Nylo-Seal	PVC	EVA
Shellac	A	A	A	NT	B
Silver nitrate	B	A	A	A	B
Soap solutions	C	A	A	A	B
Sodium bicarbonate	A	A	A	A	A
Sodium bisulfate	A	A	A	A	A
Sodium bisulfite	A	A	A	A	A
Sodium borate	A	A	A	A	A
Sodium carbonate	A	A	A	A	A
Sodium chlorate	B	A	A	A	B
Sodium chloride	A	A	A	A	A
Sodium cyanide	A	A	A	NT	A
Sodium hydroxide	B	A	A	A	A
Sodium hypochlorite	A	A	A	A	A
Sodium metaphosphate	A	A	A	NT	A
Sodium nitrate	A	A	A	A	A
Sodium perborate	A	A	A	NT	A
Sodium phosphate	A	A	A	NT	A
Sodium silicate	A	A	A	A	A
Sodium sulfate	A	A	A	NT	A
Sodium sulfide	A	A	A	A	A
Sodium sulfite	B	A	A	A	B
Sodium thiosulfate (hypo)	A	A	A	NT	A
Stearic acid	B	A	A	A	C
Succinic acid	NT	A	A	NT	A
Sulfate liquors	A	A	C	NT	A
Sulfur	A	C	A	NT	A
Sulfur chloride	B	C	D	C	B
Sulfur dioxide	A	A	C	A	A
Sulfuric acid 10%	A	A	C	A	B
Sulfuric acid 10-75%	B	A	D	B	C
Sulfuric acid 75-98%	D	A	D	C	D
Sulfurous acid	B	A	C	A	C
Tannic acid	B	A	A	A	C
Tar	B	A	A	NT	C
Tartaric acid	A	A	A	A	A
Tetrahydrofurane	D	A	A	NT	D
Tetralin	D	D	A	NT	D
Thiopen	D	B	A	NT	D
Toluene or Toluol	C	B	A	D	D
Tomato	A	A	A	A	A
Trichloroethylene	D	B	C	NT	D
Turpentine	D	A	A	A	D
Urea	A	A	A	A	A
Varnish	A	A	A	NT	B
Vinegar	B	A	A	A	C
Water (fresh)	A	A	A	A	A
Water (salt)	A	A	A	A	A
Whiskey	A	A	A	NT	B
Wines	A	A	A	NT	B
Xylene or Xylol	D	C	A	D	D
Zinc chloride	A	A	A	A	A
Zinc sulfate	A	A	A	NT	A



Where higher pressures are involved, end of tube should be belled slightly as shown in this illustration.

Provides tight, reliable seal under extreme vibration conditions, mechanical shock or major tube movement.

**SIZE RANGE:** Tube – 1/8" to 7/8" O.D.  
Port – 1/8" to 3/4" NPTF

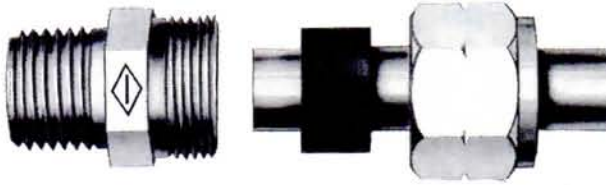
**MAXIMUM WORKING PRESSURE:** 2000 psi

**MATERIALS:** Brass bodies and nuts—Special composition sleeves

**COMPATIBLE TUBING:** All types of seamed and seamless metal tubing:  
Copper, Aluminum, Thin Wall Steel (Bundy or G.M.), Stainless Steel and Glass

See following data for specific information





### SLEEVE CUSHIONS TUBING

The sleeve of the Flex fitting is made of a special composition elastic sealing material. This elastic sleeve forms a cushion between tubing and fitting and while assuring a positive, pressure-tight seal, permits the tube to flex back and forth in the fitting.

### PREVENTS VIBRATION FAILURE

Studies of tubing failure resulting from vibration have shown this failure in the majority of cases to be caused by fracture of the tubing at the point of connection. These fractures are the result of either fatigue of the metal caused by constant vibration and shock, or of distortion of the tube in making the joint.

The Flex fitting makes a joint that is virtually indestructible by vibration and will withstand considerable shock and major tube movement. In the Flex fitting, the tubing is cushioned against all such damage by the elastic sleeve.

### COMPARATIVE VIBRATION TESTS

Type of Fitting	Number of Cycles Withstood
Flare	72,450
Compression	79,350
Hi-Duty	401,925
Flex	21,424,500 (No Failure)

(Conditions of test. One end of  $\frac{5}{16}$ " O.D., .035" wall, annealed copper tubing, 11" long was held stationary; other end was flexed  $\frac{5}{16}$ " at 1725 cycles per minute. Liquid pressure in tube was 25 psi and tensile pull was 10 lbs.)

### WITHSTANDS MISALIGNMENT

The unique elastic sleeve will make a tight, leak-free joint even if there is a slight misalignment of the tubing from the axis of the fitting. Flex will also make tight joints even with scored tubing, or tubing with other surface defects.

### POSITIVE REMAKE CAPABILITIES

Any Flex fitting joint can be disconnected and reconnected repeatedly without danger of leakage.

Should it be necessary to replace the sleeve, all that is required is to disassemble the nut, remove the old sleeve and replace with the new. This will return old fittings to the original high performance standards.

### SLEEVE RESISTS DETERIORATION

The Flex special elastic sleeve retains its flexibility even at sub-zero temperatures and has extreme resistance to deterioration by oil and gasoline, and will show minimum cold flow even at elevated temperatures.

### WIDE RANGE OF APPLICATIONS

Successful service in actual installations has shown that Flex fittings are exceptionally well adapted to gasoline, oil, Diesel fuel, lubricants, vacuum, air and water lines on trucks, tractors, power units, buses, construction equipment and other low and medium pressure applications. Ideally suited where vibration and shock conditions are present. Standard Flex fittings are suitable for use at temperatures from sub-zero to 275°F.

### HIGH TEMPERATURE FITTINGS AVAILABLE

Flex fittings for use at temperatures up to 450°F can be furnished on special order. These high temperature fittings have sleeves made of Viton\* and not only resist heat degradation but also widen the range of fluid systems suitable for the fittings.

\*Viton is a Du Pont registered trademark.

## FLARELESS TUBE FITTINGS

### RECOMMENDED MAXIMUM WORKING PRESSURES – psi

FITTING MATERIAL: BRASS

TUBING MATERIAL: ALL TYPES

SERVICE CONDITIONS	TUBE O.D.	TUBING NOT BELLED*	ALL TUBING BELLED (PSI)*
STATIC PRESSURE	1/8"	1000	2000
	3/16"	750	1500
Very Minor Surges	1/4"	500	1000
	5/16"	450	900
Minor Line Vibration	3/8"	350	700
	1/2"	200	500
	5/8"		400
	3/4"		350
	7/8"		300
<hr/>			
STATIC PRESSURE	1/8"	800	1600
	3/16"	600	1200
Minor Surges	1/4"	400	800
	5/16"	325	700
Severe Vibration	3/8"	225	500
	1/2"	150	375
	5/8"		300
	3/4"		250
	7/8"		200
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Very Severe Vibration	1/8"	600	1200
	3/16"	450	900
Minor Tube Movement	1/4"	300	600
	5/16"	225	500
Mechanical Shock	3/8"	175	400
	1/2"	100	250
	5/8"		200
	3/4"		150
	7/8"		100

\*Where higher application pressures are involved, and on all sizes larger than 1/2" O.D., the end of the tube should be slightly belled.

### HOW FURNISHED

A three-piece tube fitting with special composition elastic sleeve.

### MATERIALS

- Elbows and Tees: Brass Forgings – S.A.E. CA377
- Connectors, Unions, Nuts: Stress relieved bar stock – S.A.E. 360
- Sleeves: Special elastic sealing material can be used for temperatures up to 275°F. It retains its flexibility even at sub-zero temperatures. The sleeve has extreme resistance to deterioration by oil and gasoline, and will show minimum cold flow even at elevated temperatures (color coded with green Diamond I). High temperature sleeves made of Viton\* for use up to 450°F. can be furnished on special order (color coded with red Diamond I).

\*Viton is a DuPont registered trademark.

### PIPE THREADS

Long length Dryseal American (National) Standard Taper pipe threads.

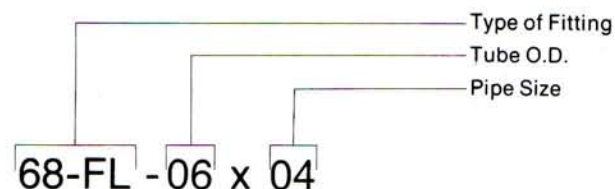
### ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

#### EXAMPLE:

3/8" O.D. tube x 1/4" pipe thread male connector




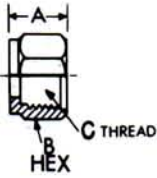

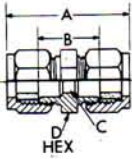

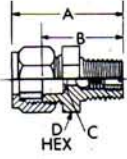

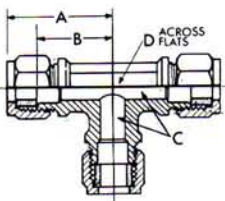

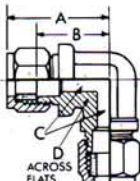
68-FL-06 x 04.




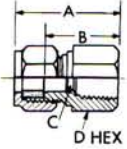

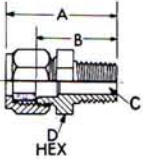

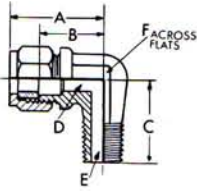

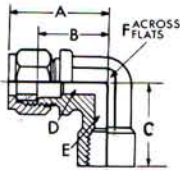
# DIMENSIONAL DATA

# FLEX

## FLARELESS TUBE FITTINGS

		Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>60-FL SLEEVE</b>  		60-FL-02	1/8		.203				
		60-FL-03	3/16		.197				
		60-FL-04	1/4		.213				
		60-FL-05	5/16		.244				
		60-FL-06	3/8		.250				
		60-FL-08	1/2		.356				
		60-FL-10	5/8		.479				
		60-FL-12	3/4		.594				
		60-FL-14	7/8		.625				
<b>61-FL NUT</b>  		61-FL-02	1/8		.437	.437	3/8-24		
		61-FL-03	3/16		.468	.500	7/16-24		
		61-FL-04	1/4		.500	.562	1/2-24		
		61-FL-05	5/16		.531	.625	9/16-24		
		61-FL-06	3/8		.531	.687	5/8-24		
		61-FL-08	1/2		.671	.937	1 3/16-18		
		61-FL-10	5/8		.875	1.125	1-18		
		61-FL-12	3/4		.984	1.250	1 1/8-18		
		61-FL-14	7/8		1.015	1.375	1 1/4-16		
<b>62-FL UNION</b>  		62-FL-02	1/8		1.078	7.03	.093	.437	
		62-FL-03	3/16		1.140	7.03	.125	.500	
		62-FL-04	1/4		1.203	7.65	.187	.562	
		62-FL-05	5/16		1.296	7.96	.250	.625	
		62-FL-06	3/8		1.296	7.96	.312	.687	
		62-FL-08	1/2		1.591	9.37	.437	.875	
		62-FL-10	5/8		2.046	1.109	.562	1.062	
		62-FL-12	3/4		2.265	1.171	.687	1.187	
	<b>63-FL CHECK</b>  		63-FL-04x02	1/4	1/8	1.234	.843	.136	.562
		63-FL-06x04	3/8	1/4	1.656	1.062	.187	.687	
<b>64-FL UNION TEE</b>  		64-FL-03	3/16		.906	.687	.156	.437	
		64-FL-04	1/4		.968	.750	.187	.437	
		64-FL-06	3/8		1.250	1.000	.312	.625	
		64-FL-08	1/2		1.484	1.156	.437	.812	
<b>65-FL UNION ELBOW</b>  		65-FL-04	1/4		.968	.750	.187	.500	
		65-FL-05	5/16		1.125	.875	.250	.562	
		65-FL-06	3/8		1.187	.937	.312	.687	
		65-FL-08	1/2		1.390	1.094	.437	.812	

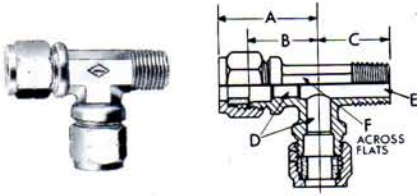
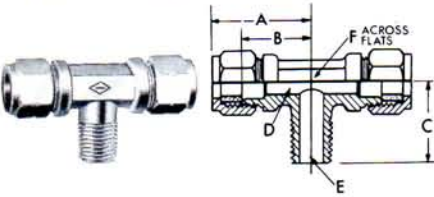
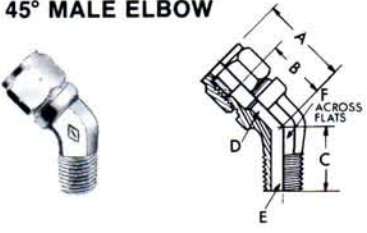
## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>66-FL FEMALE CONNECTOR</b>									
 	66-FL-02x02	1/8	1/8	.937	.750	.093	.500		
	66-FL-03x02	3/16	1/8	1.000	.781	.125	.500		
	66-FL-04x02	1/4	1/8	1.000	.781	.187	.562		
	66-FL-05x02	5/16	1/8	1.031	.781	.250	.625		
	66-FL-06x04	3/8	1/4	1.218	.968	.312	.687		
	66-FL-08x06	1/2	3/8	1.421	1.093	.437	.875		
	66-FL-10x08	5/8	1/2	1.750	1.281	.562	1.062		
<b>68-FL MALE CONNECTOR</b>									
 	68-FL-02x02	1/8	1/8	1.000	.812	.093	.437		
	68-FL-03x02	3/16	1/8	1.031	.812	.125	.500		
	68-FL-04x02	1/4	1/8	1.062	.843	.187	.562		
	68-FL-04x04	1/4	1/4	1.250	1.031	.187	.562		
	68-FL-05x02	5/16	1/8	1.125	.875	.218	.625		
	68-FL-05x04	5/16	1/4	1.312	1.062	.250	.625		
	68-FL-06x02	3/8	1/8	1.125	.875	.218	.687		
	68-FL-06x04	3/8	1/4	1.312	1.062	.312	.687		
	68-FL-06x06	3/8	3/8	1.312	1.062	.312	.687		
	68-FL-08x06	1/2	3/8	1.484	1.156	.406	.875		
	68-FL-08x08	1/2	1/2	1.671	1.343	.406	.875		
	68-FL-10x08	5/8	1/2	1.906	1.437	.562	1.062		
	68-FL-12x08	3/4	1/2	2.015	1.468	.562	1.187		
	68-FL-14x12	7/8	3/4	2.109	1.562	.750	1.312		
<b>69-FL MALE ELBOW</b>									
 	69-FL-02x02	1/8	1/8	.906	.718	.718	.120	.187	.375
	69-FL-03x02	3/16	1/8	.906	.687	.750	.156	.218	.437
	69-FL-04x02	1/4	1/8	.844	.625	.781	.187	.218	.500
	69-FL-04x04	1/4	1/4	1.062	.843	1.000	.187	.312	.562
	69-FL-05x02	5/16	1/8	.937	.687	.843	.250	.218	.437
	69-FL-05x04	5/16	1/4	1.062	.812	1.000	.250	.312	.562
	69-FL-06x02	3/8	1/8	1.093	.843	.906	.312	.218	.625
	69-FL-06x04	3/8	1/4	1.093	.843	1.062	.312	.312	.625
	69-FL-06x06	3/8	3/8	1.187	.937	1.125	.312	.406	.625
	69-FL-08x06	1/2	3/8	1.328	1.000	1.062	.437	.406	.687
	69-FL-08x08	1/2	1/2	1.390	1.062	1.437	.437	.531	.750
	69-FL-10x08	5/8	1/2	1.750	1.281	1.468	.562	.562	1.000
	69-FL-12x08	3/4	1/2	1.796	1.250	1.468	.687	.562	1.000
	69-FL-12x12	3/4	3/4	1.796	1.250	1.468	.687	.750	1.000
<b>70-FL FEMALE ELBOW</b>									
 	70-FL-03x02	3/16	1/8	.906	.687	.750	.125	.125	.437
	70-FL-04x02	1/4	1/8	.968	.750	.750	.187	.187	.687
	70-FL-05x02	5/16	1/8	1.062	.812	1.000	.250	.250	.562
	70-FL-06x04	3/8	1/4	1.156	.906	1.062	.312	.312	.687
	70-FL-08x06	1/2	3/8	1.390	1.062	1.218	.437	.437	.875
	70-FL-10x08	5/8	1/2	1.750	1.281	1.343	.562	.562	1.000

# DIMENSIONAL DATA

# FLEX

## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>71-FL MALE RUN TEE</b> 	71-FL-04x02	1/4	1/8	.968	.750	.781	.187	.218	.500
	71-FL-04x04	1/4	1/4	1.062	.843	.937	.187	.281	.437
	71-FL-06x04	3/8	1/4	1.125	.875	1.000	.312	.312	.562
<b>72-FL MALE BRANCH TEE</b> 	72-FL-03x02	3/16	1/8	.906	.687	.750	.156	.218	.437
	72-FL-04x02	1/4	1/8	.968	.750	.781	.187	.218	.500
	72-FL-05x02	5/16	1/8	1.125	.875	.843	.250	.250	.562
	72-FL-06x04	3/8	1/4	1.156	.906	1.000	.312	.312	.562
	72-FL-08x06	1/2	3/8	1.453	1.125	1.156	.437	.406	.812
	72-FL-10x08	5/8	1/2	1.718	1.250	1.437	.562	.562	1.000
	72-FL-12x08	3/4	1/2	1.937	1.375	1.531	.687	.562	1.250
<b>94-FL 45° MALE ELBOW</b> 	94-FL-03x02	3/16	1/8	.906	.687	.687	.125	.187	.437
	94-FL-04x02	1/4	1/8	.968	.750	.687	.187	.218	.437
	94-FL-04x04	1/4	1/4	.968	.750	.843	.187	.250	.562
	94-FL-05x02	5/16	1/8	.937	.687	.687	.250	.218	.437
	94-FL-05x04	5/16	1/4	1.031	.781	.843	.250	.312	.562
	94-FL-06x04	3/8	1/4	.968	.718	.843	.312	.312	.562
	94-FL-08x06	1/2	3/8	1.046	.718	1.062	.437	.406	.812
	94-FL-10x08	5/8	1/2	1.218	.750	1.187	.562	.562	1.062
	94-FL-12x08	3/4	1/2	1.703	1.156	1.437	.687	.562	1.296



### SPECIAL SLEEVE GRIPS ALL TUBING

This compression-type tube fitting design with a sleeve made of special resilient sealing material assures a tight, leak-free grip on all types of seamed and seamless metal tubing—copper, aluminum, stainless steel, thin wall brazed steel (such as Bundy or GM) and glass.

### WITHSTANDS VIBRATION CONDITIONS

The Mini-Flex sleeve cushions the tubing, preventing metal to metal contact between tubing and fitting. This vibration absorbing action insures a perfect seal under operating conditions where ordinary fittings fail. The elastic quality of the sleeve also helps to make tight connections on tubing with slight surface imperfections.

#### COMPARATIVE VIBRATION TESTS

Type of Fitting	Number of Test Cycles Withstood
Flare	72,450
Compression	79,350
Mini-Flex	10,694,350 (No Failure)

(Condition of test. One end of 5/16" O.D., .035" wall, annealed copper tubing 11" long was held stationary; other end was flexed 5/16" at 1725 cycles per minute. Liquid pressure in tube was 25 psi and tensile pull was 10 lbs.)

### ASSEMBLES QUICKLY AND EASILY

Nut, sleeve and body are furnished assembled. Just push the tubing into the fitting and tighten the nut. Simple—fast—no fumbling for a loose sleeve. No need to disassemble fitting. No flaring or special preparation of the tubing required. These are the reasons why Mini-Flex reduces installation time 36% compared to compression fittings and 77% compared to flared fittings.

Mini-Flex connections can be disassembled and reconnected repeatedly without any deterioration of gripping or sealing strength.

### APPLICATIONS UNLIMITED

The variety of applications for which Mini-Flex can be used is almost endless. These fittings give superior performance in many pneumatic, vacuum and vibration applications.

Some ideal applications include:

- Industrial plants for air, water, lubrication, coolant
- Internal combustion engines
- Air compressors
- Pumps
- Material handling equipment
- Appliances
- Packaging equipment
- Laboratories

### RECOMMENDED MAXIMUM WORKING PRESSURES

Working pressure in pounds per square inch at 70°F.

Tube O.D. In.	Recommended Maximum Working Pressures
1/8"	1650
3/16"	1150
1/4"	850
5/16"	650
3/8"	550
1/2"	500

### WIDE TEMPERATURE RANGE

Designed for temperatures of -40° to 210°F.

### INSTALLATION INSTRUCTION

1. Before pushing the tubing into the fitting, the nut should be backed off from a tight position.
2. Push the tubing into the fitting until it "bottoms" against the tube stop in the fitting body.
3. Tighten nut as indicated in the table below.

Tube O.D. In.	Number of Turns Past "Snug"
1/8"	1 1/2
3/16"	2
1/4"	2
5/16"	2 3/4
3/8"	2 3/4
1/2"	2 3/4

# SPECIFICATIONS

# MINI-FLEX

FLARELESS TUBE FITTINGS

A three-piece tube fitting, furnished assembled.

## MATERIALS

- Elbows and Tees: Brass Forgings—S.A.E. CA377
- Connectors, Unions, Nuts: Stress relieved brass bar stock—S.A.E. CA360 or equal
- Sleeves: Special molded Buna-N compound

## PIPE THREADS

Long length Dryseal American (National) Standard Taper pipe threads

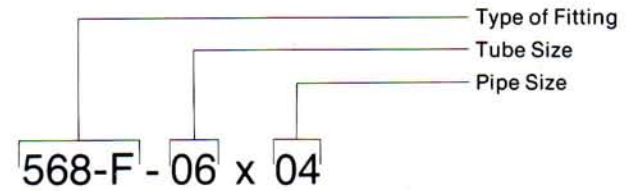
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

## EXAMPLE:

$\frac{3}{8}$ " O.D. tube x  $\frac{1}{4}$ " pipe thread male connector.

568-F-06 x 04.



## TUBE END DIMENSIONS




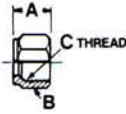

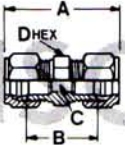

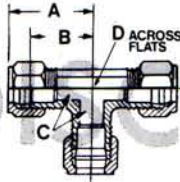

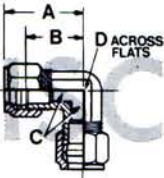

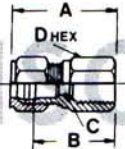


Tube O.D.	A	B Thread
$\frac{1}{8}$	.188	$\frac{5}{16}$ -24
$\frac{3}{16}$	.219	$\frac{3}{8}$ -24
$\frac{1}{4}$	.250	$\frac{7}{16}$ -24
$\frac{5}{16}$	.281	$\frac{1}{2}$ -24
$\frac{3}{8}$	.313	$\frac{9}{16}$ -24
$\frac{1}{2}$	.375	$1\frac{1}{16}$ -20


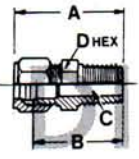

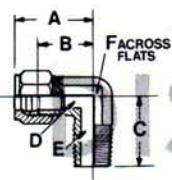

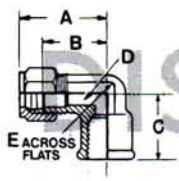

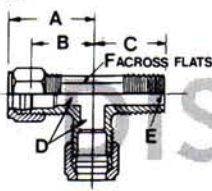

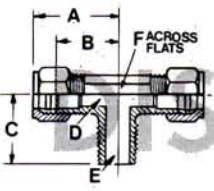
# MINI-FLEX

FLARELESS TUBE FITTINGS

# DIMENSIONAL DATA

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>560-F SLEEVE</b>								
 	560-F-02	1/8		.210				
	560-F-03	3/16		.230				
	560-F-04	1/4		.260				
	560-F-05	5/16		.260				
	560-F-06	3/8		.300				
	560-F-08	1/2		.435				
<b>61-F NUT</b>								
 	61-F-02	1/8		.375	.375	5/16-24		
	61-F-03	3/16		.406	.438	3/8-24		
	61-F-04	1/4		.438	.500	7/16-24		
	61-F-05	5/16		.438	.562	1/2-24		
	61-F-06	3/8		.469	.625	9/16-24		
	61-F-08	1/2		.625	.812	1 1/16-20		
<b>562-F UNION</b>								
 	562-F-02	1/8		1.219	.656	.093	.312	
	562-F-03	3/16		1.312	.750	.125	.375	
	562-F-04	1/4		1.500	.812	.188	.438	
	562-F-05	5/16		1.562	.875	.250	.500	
	562-F-06	3/8		1.734	.984	.312	.562	
	562-F-08	1/2		2.125	1.093	.406	.688	
<b>564-F UNION TEE</b>								
 	564-F-02	1/8		.906	.625	.093	.312	
	564-F-03	3/16		.906	.625	.125	.312	
	564-F-04	1/4		.969	.625	.188	.438	
	564-F-05	5/16		1.031	.688	.250	.438	
	564-F-06	3/8		1.156	.781	.312	.500	
	564-F-08	1/2		1.453	.938	.406	.625	
<b>565-F UNION ELBOW</b>								
 	565-F-02	1/8		.906	.625	.093	.312	
	565-F-03	3/16		.906	.625	.125	.375	
	565-F-04	1/4		.969	.625	.188	.375	
	565-F-05	5/16		1.031	.688	.250	.438	
	565-F-06	3/8		1.156	.781	.312	.500	
	565-F-08	1/2		1.453	.938	.406	.625	
<b>566-F FEMALE CONNECTOR</b>								
 	566-F-02x02	1/8	1/8	1.031	.750	.093	.562	
	566-F-03x02	3/16	1/8	1.062	.781	.125	.562	
	566-F-03x04	3/16	1/4	1.250	.969	.125	.688	
	566-F-04x02	1/4	1/8	1.125	.781	.188	.562	
	566-F-04x04	1/4	1/4	1.375	1.031	.188	.688	
	566-F-05x02	5/16	1/8	1.156	.812	.250	.562	
	566-F-05x04	5/16	1/4	1.375	1.031	.250	.688	
	566-F-06x02	3/8	1/8	1.219	.844	.250	.562	
	566-F-06x04	3/8	1/4	1.438	1.062	.312	.688	
	566-F-08x06	1/2	3/8	1.641	1.125	.406	.875	
566-F-08x08	1/2	1/2	1.859	1.344	.406	1.000		

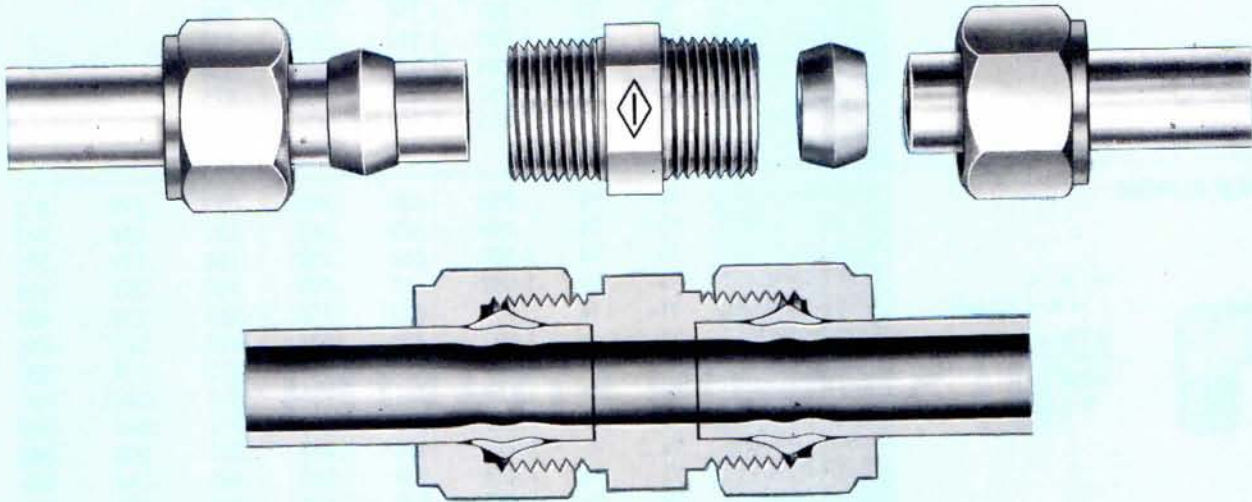


	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F	
<b>568-F MALE CONNECTOR</b>										
 	568-F-02x02	1/8	1/8	1.078	.797	.093	.438			
	568-F-03x02	3/16	1/8	1.141	.859	.125	.438			
	568-F-04x02	1/4	1/8	1.219	.875	.188	.438			
	568-F-04x04	1/4	1/4	1.406	1.062	.188	.562			
	568-F-05x02	5/16	1/8	1.250	.906	.250	.500			
	568-F-05x04	5/16	1/4	1.438	1.093	.250	.562			
	568-F-06x02	3/8	1/8	1.344	.969	.250	.562			
	568-F-06x04	3/8	1/4	1.531	1.156	.312	.562			
	568-F-06x06	3/8	3/8	1.531	1.156	.312	.688			
	568-F-06x08	3/8	1/2	1.750	1.375	.312	.875			
	568-F-08x06	1/2	3/8	1.734	1.219	.406	.688			
	568-F-08x08	1/2	1/2	1.953	1.438	.406	.875			
568-F-08x12	1/2	3/4	2.015	1.500	.406	1.125				
<b>569-F MALE ELBOW</b>										
 	569-F-02x02	1/8	1/8	.906	.625	.688	.093	.219	.312	
	569-F-03x02	3/16	1/8	.906	.625	.688	.125	.219	.375	
	569-F-04x02	1/4	1/8	1.000	.656	.750	.188	.219	.375	
	569-F-04x04	1/4	1/4	1.062	.719	.938	.188	.281	.438	
	569-F-05x02	5/16	1/8	.969	.625	.750	.250	.234	.438	
	569-F-05x04	5/16	1/4	1.093	.750	.938	.250	.281	.438	
	569-F-06x02	3/8	1/8	1.125	.750	.844	.312	.219	.500	
	569-F-06x04	3/8	1/4	1.156	.781	.938	.312	.344	.500	
	569-F-06x06	3/8	3/8	1.250	.875	1.000	.312	.344	.562	
	569-F-06x08	3/8	1/2	1.312	.938	1.250	.312	.500	.688	
	569-F-08x04	1/2	1/4	1.453	.938	1.062	.406	.344	.625	
	569-F-08x06	1/2	3/8	1.453	.938	1.125	.406	.406	.625	
569-F-08x08	1/2	1/2	1.516	1.000	1.250	.406	.500	.688		
569-F-08x12	1/2	3/4	1.641	1.125	1.281	.406	.750	.750		
<b>570-F FEMALE ELBOW</b>										
 	570-F-02x02	1/8	1/8	.969	.688	.547	.093	.562		
	570-F-03x02	3/16	1/8	1.000	.719	.547	.125	.562		
	570-F-04x02	1/4	1/8	1.093	.750	.547	.188	.562		
	570-F-04x04	1/4	1/4	1.219	.875	.719	.188	.688		
	570-F-05x02	5/16	1/8	1.032	.688	.688	.250	.438		
	570-F-06x04	3/8	1/4	1.219	.844	.875	.312	.500		
	570-F-08x06	1/2	3/8	1.547	1.031	.906	.406	.625		
	570-F-08x08	1/2	1/2	1.641	1.125	1.188	.406	.688		
	<b>571-F MALE RUN TEE</b>									
	 	571-F-02x02	1/8	1/8	.906	.625	.688	.093	.188	.312
571-F-03x02		3/16	1/8	.906	.625	.688	.125	.188	.312	
571-F-04x02		1/4	1/8	1.031	.688	.750	.188	.188	.375	
571-F-05x02		5/16	1/8	1.000	.656	.750	.250	.219	.438	
571-F-06x04		3/8	1/4	1.156	.781	.938	.312	.312	.500	
571-F-08x06		1/2	3/8	1.453	.938	1.093	.406	.406	.625	
<b>572-F MALE BRANCH TEE</b>										
 	572-F-02x02	1/8	1/8	.906	.625	.688	.093	.188	.312	
	572-F-03x02	3/16	1/8	.906	.625	.688	.125	.188	.312	
	572-F-04x02	1/4	1/8	1.031	.688	.750	.188	.219	.375	
	572-F-04x04	1/4	1/4	1.062	.719	.938	.188	.312	.500	
	572-F-05x02	5/16	1/8	1.000	.656	.750	.250	.234	.438	
	572-F-06x04	3/8	1/4	1.156	.781	.938	.312	.312	.500	
	572-F-08x06	1/2	3/8	1.453	.938	1.093	.406	.406	.625	
	572-F-08x08	1/2	1/2	1.516	1.000	1.344	.406	.562	.812	

# COMPRESSION

# SPECIFICATIONS

FLARELESS TUBE FITTINGS  
AND THREADED SLEEVE



Simple, efficient, low cost general purpose tube fitting.

**SIZE RANGE:** Tube —  $\frac{1}{8}$ " to  $\frac{3}{4}$ " O.D.  
Port —  $\frac{1}{8}$ " to  $\frac{3}{4}$ " NPTF

**MAXIMUM  
WORKING PRESSURE:** 400 psi

**MATERIALS:** Brass Bodies, Nuts  
and Sleeves

**COMPATIBLE  
TUBING:** Copper, Aluminum,  
Brass, Seamless Steel  
and Tinned Thinwall  
Brazed Steel

**CONFORMANCES:**

S.A.E.: *SAE J512 Automotive tube fitting standards*

A.N.S.I. and A.S.M.E.: Code for pressure piping

See following data for specific information.



### INDUSTRY STANDARD

The compression type fitting is extensively used because of its simplicity, efficiency, low-cost and ease of assembly. Originated by Imperial in 1907, it has been one of the basic fittings for tubing connection work ever since for a wide variety of general service applications.

### EASY TO ASSEMBLE

No flaring, soldering or other special preparation of the tubing is necessary before assembly. Simply slip the nut and sleeve over the tubing. (Be sure the end of the tube has been cut off squarely and any burrs removed.) Insert tubing into the fitting body until it rests against the shoulder. Move sleeve into position and tighten the nut.

### FORGED BODIES ON ELBOWS AND TEES

Compression fittings marked with the Imperial-Eastman Diamond "I" have become known as the finest of this type of fitting. Elbow and tee bodies are made from brass forgings. The exceptional strength of forged fittings (over 80% stronger than brass castings) provides an extra safety factor. Extra toughness makes forged fittings stand up better under hard knocks, mechanical shock and vibration.

The extremely close grained structure of forgings assures against blow holes or other concealed defects and against seepage of hard-to-hold liquids and gases. Wrench flats and the greater uniformity provided by forgings facilitate quick, secure wrench grip and speed installation.

### APPLICATIONS

This fitting is widely used for connecting gasoline, grease, oil, water, vacuum and air lines and other medium and low pressure tubing connections where excessive vibration or tube movement is not involved.

### QUICK TUBE SIZE IDENTIFICATION



Tubing size is marked on the nut to give quick size identification. Imperial-Eastman fittings are known for their accurate machining and liberal wall thicknesses. Threads are sharp, clean and true with the axis of the fitting.

### RECOMMENDED MAXIMUM WORKING PRESSURES – psi

FITTING MATERIAL: BRASS

TUBING MATERIAL: COPPER – DEAD SOFT AND HALF HARD – BRAZED STEEL

SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS													
		COPPER – DEAD SOFT (SEAMLESS)					COPPER – HALF HARD (SEAMLESS)					BRAZED STEEL* (ANNEALED) (SUCH AS BUNDY OR GM)			
		.030"	.032"	.035"	.049"	.065"	.032"	.035"	.042"	.049"	.065"	.028"	.032"	.035"	.049"
Static	1/8	400	400	400			400							400	
Pressure	3/16	400	400	400			400							400	
or very	1/4	300	300	300			300							300	300
Minor	5/16		300	300			300							300	300
Surges	3/8			200			200	200						200	200
Minor Line	1/2			200		200	200	200							200 200
Vibration	5/8			150	150	150	150				150	150			150 150
	3/4					100	100				100	100			

\*End must be tinned.

This fitting is not recommended where severe line vibration or severe hydraulic surges may be present.

# COMPRESSION

# SPECIFICATIONS

## FLARELESS TUBE FITTINGS

A three-piece tube fitting.

### MATERIALS

- Elbow and Tees: Brass Forgings—S.A.E. CA 377.
- Connectors, Unions and Nuts: Stress relieved brass bar stock—S.A.E. CA 360 or equal.

### PIPE THREADS

Long length Dryseal American (National) Standard taper pipe threads.

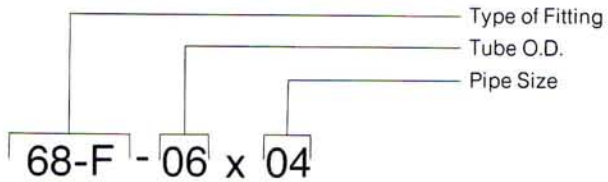
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

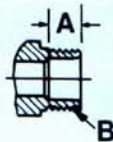
### EXAMPLE:

3/8" O.D. Tube x 1/4" Pipe Thread Male Connector.

68-F-06 x 04.



### TUBE END DIMENSIONS


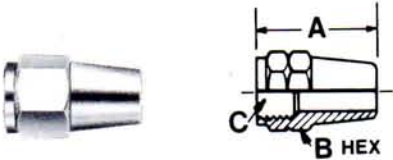
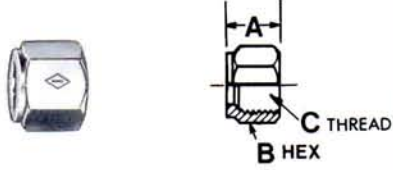
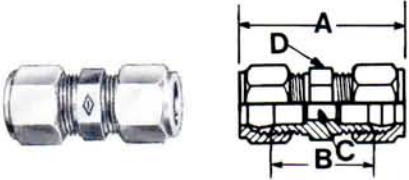
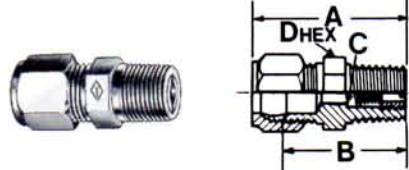


Tube O.D.	A	B
1/8	.188	5/16-24
5/32	.188	5/16-24
3/16	.219	3/8-24
1/4	.250	7/16-24
5/16	.281	1/2-24
3/8	.313	9/16-24
7/16	.344	5/8-24
1/2	.375	11/16-20
5/8	.438	13/16-18
3/4	.563	1-18

# DIMENSIONAL DATA

# COMPRESSION


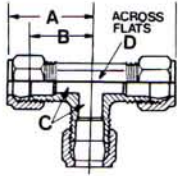

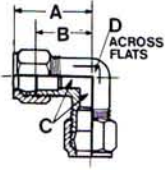

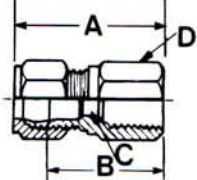

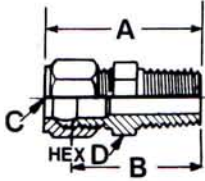
## FLARELESS TUBE FITTINGS


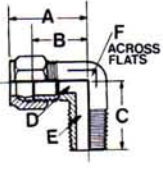

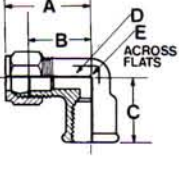

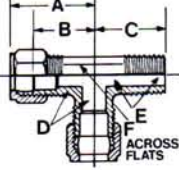

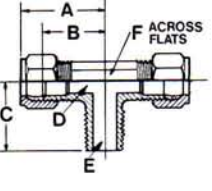
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	
<b>60-F SLEEVE</b>  	60-F-02	1/8		.188					
	60-F-156	5/32		.188					
	60-F-03	3/16		.219					
	60-F-04	1/4		.250					
	60-F-05	5/16		.250					
	60-F-06	3/8		.250					
	60-F-07	7/16		.312					
	60-F-08	1/2		.375					
	60-F-10	5/8		.438					
	60-F-12	3/4		.500					
	<b>161-F LONG NUT</b>  	161-F-03	3/16		.625	.438	3/8-24		
		161-F-04	1/4		.750	.562	7/16-24		
161-F-05		5/16		.875	.625	1/2-24			
161-F-06		3/8		1.125	.625	9/16-24			
161-F-08		1/2		1.250	.812	1 1/16-20			
161-F-10		5/8		1.375	.938	1 3/16-18			
161-F-12		3/4		1.562	1.125	1-18			
<b>61-F NUT</b>  		61-F-02	1/8		.375	.375	5/16-24		
	61-F-156	5/32		.344	.375	5/16-24			
	61-F-03	3/16		.406	.438	3/8-24			
	61-F-04	1/4		.438	.500	7/16-24			
	61-F-05	5/16		.438	.562	1/2-24			
	61-F-06	3/8		.469	.625	9/16-24			
	61-F-07	7/16		.500	.688	5/8-24			
	61-F-08	1/2		.625	.812	1 1/16-20			
	61-F-10	5/8		.740	.938	1 3/16-18			
	61-F-12	3/4		.810	1.125	1-18			
<b>62-F UNION</b>  	62-F-02	1/8		1.125	.656	.093	.312		
	62-F-156	5/32		1.125	.656	.109	.312		
	62-F-03	3/16		1.250	.750	.125	.375		
	62-F-04	1/4		1.438	.812	.188	.438		
	62-F-05	5/16		1.469	.875	.250	.500		
	62-F-06	3/8		1.578	.984	.312	.562		
	62-F-07	7/16		1.719	1.031	.312	.625		
	62-F-08	1/2		1.938	1.093	.406	.688		
	62-F-10	5/8		2.359	1.450	.531	.812		
	62-F-12	3/4		2.562	1.620	.656	1.000		
	<b>63-F BALL CHECK</b>  	63-F-02x02	1/8	1/8	1.015	.781	.093	.438	
		63-F-03x02	3/16	1/8	1.093	.844	.136	.438	
63-F-04x02		1/4	1/8	1.188	.875	.136	.438		
63-F-05x02		5/16	1/8	1.203	.906	.136	.500		
63-F-06x04		3/8	1/4	1.453	1.156	.188	.562		
63-F-08x06		1/2	3/8	1.641	1.219	.250	.688		

# COMPRESSION

# DIMENSIONAL DATA

## FLARELESS TUBE FITTINGS


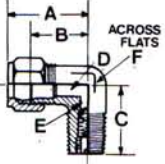
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	
<b>64-F UNION TEE</b>									
 	64-F-02	1/8		.859	.625	.093	.312		
	64-F-03	3/16		.875	.625	.125	.312		
	64-F-04	1/4		.938	.625	.188	.438		
	64-F-05	5/16		.984	.688	.250	.438		
	64-F-06	3/8		1.078	.781	.312	.500		
	64-F-07	7/16		1.219	.875	.312	.500		
	64-F-08	1/2		1.359	.938	.406	.625		
	64-F-10	5/8		1.594	1.130	.531	.812		
	64-F-12	3/4		1.781	1.312	.656	1.000		
	<b>65-F UNION ELBOW</b>								
 	65-F-02	1/8		.859	.625	.093	.312		
	65-F-03	3/16		.875	.625	.125	.375		
	65-F-04	1/4		.938	.625	.188	.375		
	65-F-05	5/16		.984	.688	.250	.438		
	65-F-06	3/8		1.078	.781	.312	.500		
	65-F-08	1/2		1.359	.938	.406	.625		
	65-F-10	5/8		1.547	1.093	.531	.812		
	65-F-12	3/4		1.750	1.281	.656	1.000		
	<b>66-F FEMALE CONNECTOR</b>								
	 	66-F-02x02	1/8	1/8	.984	.750	.093	.562	
66-F-03x02		3/16	1/8	1.031	.781	.125	.562		
66-F-03x04		3/16	1/4	1.219	.969	.125	.688		
66-F-04x02		1/4	1/8	1.093	.781	.188	.562		
66-F-04x04		1/4	1/4	1.344	1.031	.188	.688		
66-F-05x02		5/16	1/8	1.109	.812	.250	.562		
66-F-05x04		5/16	1/4	1.328	1.031	.250	.688		
66-F-06x02		3/8	1/8	1.141	.844	.250	.562		
66-F-06x04		3/8	1/4	1.359	1.062	.312	.688		
66-F-07x04		7/16	1/4	1.438	1.093	.312	.688		
66-F-08x06		1/2	3/8	1.547	1.125	.406	.875		
66-F-08x08		1/2	1/2	1.766	1.344	.406	1.000		
66-F-10x06		5/8	3/8	1.797	1.340	.531	.875		
66-F-10x08		5/8	1/2	1.969	1.510	.531	1.062		
66-F-12x08		3/4	1/2	2.062	1.580	.656	1.062		
<b>68-F MALE CONNECTOR</b>									
 	68-F-02x02	1/8	1/8	1.031	.797	.093	.438		
	68-F-03x02	3/16	1/8	1.109	.859	.125	.438		
	68-F-04x02	1/4	1/8	1.187	.875	.188	.438		
	68-F-04x04	1/4	1/4	1.375	1.062	.188	.562		
	68-F-05x02	5/16	1/8	1.203	.906	.250	.500		
	68-F-05x04	5/16	1/4	1.391	1.093	.250	.562		
	68-F-06x02	3/8	1/8	1.266	.969	.250	.562		
	68-F-06x04	3/8	1/4	1.453	1.156	.312	.562		
	68-F-06x06	3/8	3/8	1.453	1.156	.312	.688		
	68-F-06x08	3/8	1/2	1.672	1.375	.312	.875		
	68-F-07x04	7/16	1/4	1.531	1.188	.312	.625		
	68-F-08x06	1/2	3/8	1.641	1.219	.406	.688		
	68-F-08x08	1/2	1/2	1.859	1.438	.406	.875		
	68-F-08x12	1/2	3/4	1.922	1.500	.406	1.125		
	68-F-10x08	5/8	1/2	2.062	1.610	.531	.875		
68-F-10x12	5/8	3/4	2.093	1.640	.531	1.125			
68-F-12x08	3/4	1/2	2.188	1.710	.531	1.000			
68-F-12x12	3/4	3/4	2.188	1.710	.656	1.125			


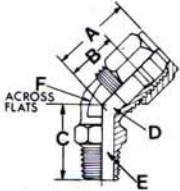
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>69-F MALE ELBOW</b>  	69-F-02x02	1/8	1/8	.859	.625	.688	.093	.219	.312
	69-F-03x02	3/16	1/8	.875	.625	.688	.125	.219	.375
	69-F-04x02	1/4	1/8	.969	.656	.750	.188	.219	.375
	69-F-04x04	1/4	1/4	1.031	.719	.938	.188	.281	.438
	69-F-05x02	5/16	1/8	.922	.625	.750	.250	.234	.438
	69-F-05x04	5/16	1/4	1.046	.750	.938	.250	.281	.438
	69-F-06x02	3/8	1/8	1.046	.750	.844	.312	.219	.500
	69-F-06x04	3/8	1/4	1.078	.781	.938	.312	.344	.500
	69-F-06x06	3/8	3/8	1.172	.875	1.000	.312	.344	.562
	69-F-06x08	3/8	1/2	1.234	.938	1.250	.312	.500	.688
	69-F-07x04	7/16	1/4	1.188	.844	1.000	.312	.344	.688
	69-F-08x04	1/2	1/4	1.359	.938	1.062	.406	.344	.625
	69-F-08x06	1/2	3/8	1.359	.938	1.125	.406	.406	.625
	69-F-08x08	1/2	1/2	1.422	1.000	1.250	.406	.500	.688
	69-F-08x12	1/2	3/4	1.547	1.125	1.281	.406	.750	.750
69-F-10x08	5/8	1/2	1.594	1.130	1.280	.531	.531	.812	
69-F-10x12	5/8	3/4	1.719	1.260	1.500	.531	.656	.938	
69-F-12x08	3/4	1/2	1.672	1.200	1.340	.656	.531	.875	
<b>70-F FEMALE ELBOW</b>  	70-F-02x02	1/8	1/8	.922	.688	.547	.093	.562	
	70-F-03x02	3/16	1/8	.969	.719	.547	.125	.562	
	70-F-04x02	1/4	1/8	1.062	.750	.547	.188	.562	
	70-F-04x04	1/4	1/4	1.188	.875	.719	.188	.688	
	70-F-05x02	5/16	1/8	.984	.688	.688	.250	.438	
	70-F-06x04	3/8	1/4	1.141	.844	.875	.312	.500	
	70-F-08x06	1/2	3/8	1.453	1.031	.906	.406	.625	
	70-F-08x08	1/2	1/2	1.547	1.125	1.188	.406	.688	
	70-F-10x08	5/8	1/2	1.828	1.375	1.172	.531	1.188	
	<b>71-F MALE RUN TEE</b>  	71-F-02x02	1/8	1/8	.859	.625	.688	.093	.188
71-F-03x02		3/16	1/8	.875	.625	.688	.125	.188	.312
71-F-04x02		1/4	1/8	1.000	.688	.750	.188	.188	.375
71-F-05x02		5/16	1/8	.953	.656	.750	.250	.219	.438
71-F-06x04		3/8	1/4	1.078	.781	.938	.312	.312	.500
71-F-08x06		1/2	3/8	1.359	.938	1.093	.406	.406	.625
71-F-10x08		5/8	1/2	1.562	1.100	1.280	.531	.531	.812
71-F-12x08		3/4	1/2	1.781	1.312	1.406	.656	.562	1.000
<b>72-F MALE BRANCH TEE</b>  		72-F-02x02	1/8	1/8	.859	.625	.688	.093	.188
	72-F-03x02	3/16	1/8	.875	.625	.688	.125	.188	.312
	72-F-04x02	1/4	1/8	1.000	.688	.750	.188	.219	.375
	72-F-04x04	1/4	1/4	1.031	.719	.938	.188	.312	.500
	72-F-05x02	5/16	1/8	.953	.656	.750	.250	.234	.438
	72-F-06x04	3/8	1/4	1.078	.781	.938	.312	.312	.500
	72-F-08x06	1/2	3/8	1.359	.938	1.093	.406	.406	.625
	72-F-08x08	1/2	1/2	1.422	1.000	1.344	.406	.562	.812
	72-F-10x08	5/8	1/2	1.562	1.110	1.280	.531	.531	.812
	72-F-12x08	3/4	1/2	1.781	1.312	1.406	.656	.562	1.000


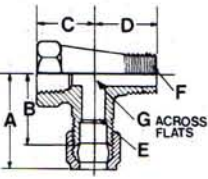
# COMPRESSION


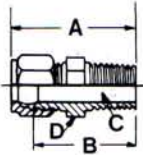
# DIMENSIONAL DATA

## FLARELESS TUBE FITTINGS

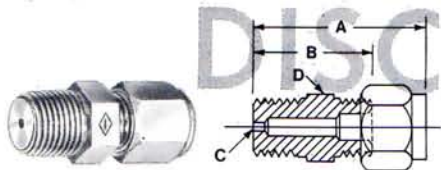
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>73-F ELBOW CHECK</b>  	73-F-02x02	1/8	1/8	.859	.625	.688	.093	.136	.375
	73-F-03x02	3/16	1/8	.875	.625	.688	.125	.136	.375
	73-F-04x02	1/4	1/8	.969	.656	.750	.188	.136	.375
	73-F-05x02	5/16	1/8	.922	.625	.750	.250	.136	.438
	73-F-06x04	3/8	1/4	1.078	.781	.938	.312	.188	.500

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>74-F 45° MALE ELBOW</b>  	74-F-08x06	1/2	3/8	1.109	.688	.875	.406	.406	.625
	74-F-10x08	5/8	1/2	1.391	.940	1.170	.531	.531	.812

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F	G
<b>76-F TEE</b>  	76-F-02x02	1/8	1/8	.953	.719	.531	.688	.093	.188	.562
	76-F-03x02	3/16	1/8	1.031	.781	.531	.688	.125	.188	.562
	76-F-04x02	1/4	1/8	1.093	.781	.531	.719	.188	.219	.562
	76-F-05x02	5/16	1/8	1.078	.781	.594	.719	.219	.219	.562
	76-F-06x04	3/8	1/4	1.234	.938	.750	.844	.312	.312	.750

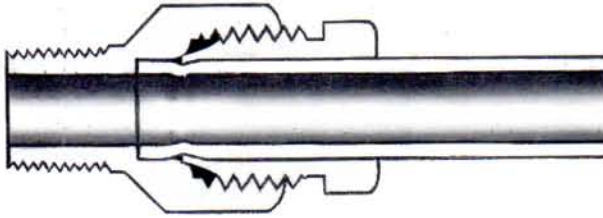
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>80-F STRAIGHT THROUGH TANK FITTING</b>  	80-F-04x04	1/4	1/4	1.375	1.062	.257	.562		
	80-F-06x06	3/8	3/8	1.453	1.156	.382	.688		
	80-F-06x08	3/8	1/2	1.672	1.375	.382	.875		
	80-F-08x08	1/2	1/2	1.859	1.438	.516	.875		

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>88-F RESTRICTED FLOW CONNECTOR</b> Replaces Chevrolet No. 836823	88-F-03x02	3/16	1/8	1.093	.844	.062	.438		



DISCONTINUED





Two-piece compression type fitting for low and medium pressure work, where reassembly is not an important consideration.

### RECOMMENDED MAXIMUM WORKING PRESSURES – psi

FITTING MATERIAL: BRASS

TUBING MATERIAL: COPPER – DEAD SOFT AND HALF HARD – BRAZED STEEL

SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS												
		COPPER – DEAD SOFT (SEAMLESS)				COPPER – HALF HARD (SEAMLESS)			BRAZED STEEL* (ANNEALED) (SUCH AS BUNDY OR GM)					
		.030"	.032"	.035"	.065"	.032"	.035"	.065"	.028"	.032"	.035"	.049"		
Static	1/8	400	400	400		400			400					
Pressure	3/16	400	400	400		400			400					
or Very	1/4	300	300	300		300			300	300				
Minor Surges	5/16		300	300		300			300	300				
Minor Line	3/8			200		200	200		200	200				
Vibration	1/2			200	200	200	200	200			200	200		

\*End must be tinned.

This fitting is not recommended where severe vibration or severe hydraulic surges may be present.

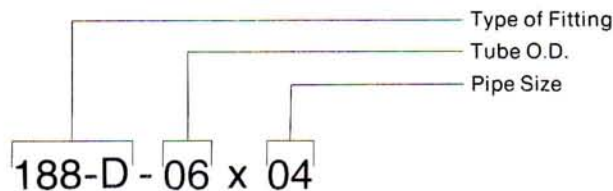
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

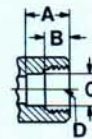
### EXAMPLE:

3/8" O.D. Tube x 1/4" Pipe Thread Male Connector.

188-D-06 x 04.



### TUBE END DIMENSIONS


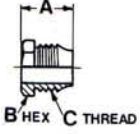

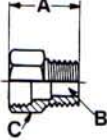

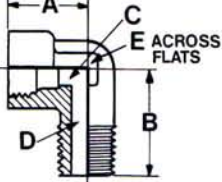


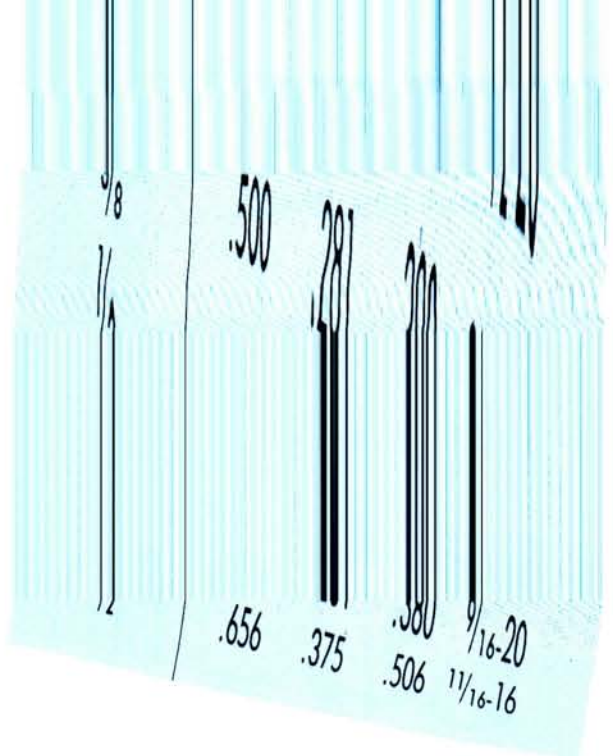
Tube O.D.	A	B	C	D
1/8	.406	.219	.130	5/16-24
3/16	.438	.250	.193	3/8-24
1/4	.469	.250	.255	7/16-24
5/16	.469	.281	.318	1/2-20
3/8	.500	.281	.380	9/16-20
1/2	.656	.375	.506	1 1/16-16

# COMPRESSION

# DIMENSIONAL DATA

## THREADED SLEEVE TUBE FITTING

		Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>181-D NUT</b>   		181-D-02	1/8		.500	.312	5/16-24		
		181-D-03	3/16		.531	.375	3/8-24		
		181-D-04	1/4		.562	.437	7/16-24		
		181-D-05	5/16		.609	.500	1/2-20		
		181-D-06	3/8		.609	.562	9/16-20		
		181-D-08	1/2		.781	.687	1 1/16-16		
<b>188-D MALE CONNECTOR</b>   		188-D-02x02	1/8	1/8	.625	.078	.437		
		188-D-03x02	3/16	1/8	.687	.140	.437		
		188-D-04x02	1/4	1/8	.750	.187	.500		
		188-D-05x02	5/16	1/8	.875	.218	.562		
		188-D-06x04	3/8	1/4	.812	.312	.625		
<b>189-D MALE ELBOW</b>   		189-D-02x02	1/8	1/8	.625	.687	.078	.218	.375
		189-D-03x02	3/16	1/8	.625	.750	.140	.218	.437
		189-D-04x02	1/4	1/8	.656	.750	.187	.218	.437
		189-D-05x02	5/16	1/8	.687	.781	.250	.218	.500
		189-D-06x04	3/8	1/4	.781	1.000	.312	.312	.562



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## Long nut compression fittings designed for dependable automotive air brake line connections.

A three-piece compression fitting manufactured to S.A.E. standards.

### SIZE RANGE:

Tube — 1/4" to 1" O.D.  
Port — 1/8" to 1" NPTF

### MAXIMUM WORKING PRESSURE:

400 psi

### MATERIALS

- Elbows and Tees: Brass forgings — S.A.E. CA377
- Connectors, Unions, and Nuts: Stress relieved brass bar stock — S.A.E. CA360 or equal.

### CONFORMANCES:

S.A.E.: SAE J246 Air brake tube fitting standards

### PIPE THREADS:

Long length Dryseal American (National) Standard taper pipe threads.

### COMPATIBLE TUBING:

Imperial-Eastman C6 Nylon Air Brake tubing, Copper, Aluminum, Brass, Seamless Steel, Tinned Thinwall Brazed Steel

See following data for specific information.

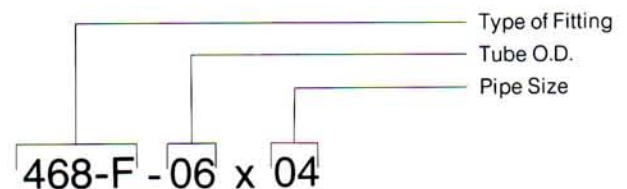
## ORDERING INFORMATION

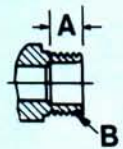
To order, simply specify catalog number for configuration and size desired.

### EXAMPLE:

3/8" O.D. tube x 1/4" pipe thread Male Connector.

468-F-06 x 04.

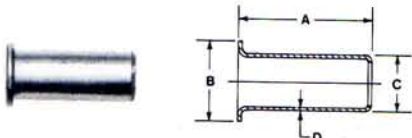
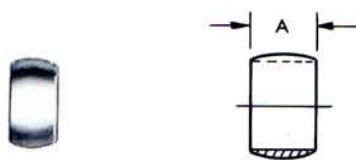
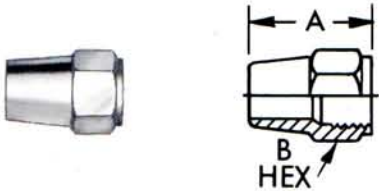
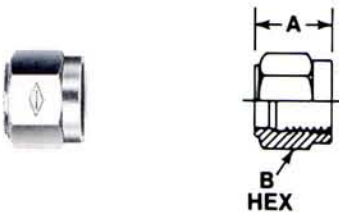
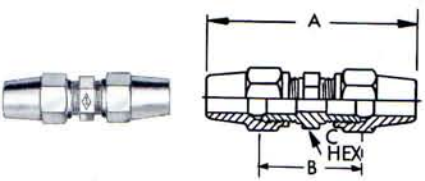


TUBE END DIMENSIONS	Tube O.D.	B	
		A	Thread
	1/4	.250	7/16-24
	3/8	.310	17/32-24
	1/2	.440	1 1/16-20
	5/8	.440	1 3/16-18
	3/4	.560	1-18
	1	.780	1 1/4-16

# AIR BRAKE

FLARELESS TUBE FITTINGS

# DIMENSIONAL DATA

	Catalog Number	Tube O.D.	A	B	C	D	E
<b>459-F EYELET</b> (for use with C6 Tubing)	459-F-04	1/4	.515	.218	.163	.017	
	459-F-06	3/8	.640	.343	.245	.018	
	459-F-08	1/2	.812	.437	.370	.018	
	459-F-10	5/8	.859	.562	.435	.018	
	459-F-12	3/4	1.062	.687	.559	.020	
							
<b>460-F SLEEVE</b>	460-F-04	1/4	.250				
	460-F-06	3/8	.313				
	460-F-08	1/2	.375				
	460-F-10	5/8	.438				
	460-F-12	3/4	.500				
							
<b>461-F LONG NUT</b>	461-F-04	1/4	.750	.562			
	461-F-06	3/8	1.130	.625			
	461-F-08	1/2	1.250	.812			
	461-F-10	5/8	1.380	.937			
	461-F-12	3/4	1.560	1.125			
							
<b>461-FS SHORT NUT</b>	461-FS-04	1/4	.450	.562			
	461-FS-06	3/8	.630	.625			
	461-FS-08	1/2	.720	.812			
	461-FS-10	5/8	.770	.937			
	461-FS-12	3/4	.810	1.125			
							
<b>462-F UNION</b>	462-F-04	1/4	2.050	.870	.437		
	462-F-06	3/8	2.940	1.120	.562		
	462-F-08	1/2	3.210	1.330	.687		
	462-F-10	5/8	3.570	1.450	.812		
	462-F-12	3/4	4.120	1.620	1.000		
							

**DIMENSIONAL DATA**

**AIR BRAKE**

FLARELESS TUBE FITTINGS





Long nut compression fittings designed for dependable automotive air brake line connections.

A three-piece compression fitting manufactured to S.A.E. standards.

#### SIZE RANGE:

Tube — 1/4" to 1" O.D.  
Port — 1/8" to 1" NPTF

#### MAXIMUM WORKING PRESSURE:

400 psi

#### MATERIALS

- Elbows and Tees: Brass forgings — S.A.E. CA377
- Connectors, Unions, and Nuts: Stress relieved brass bar stock — S.A.E. CA360 or equal.

#### CONFORMANCES:

S.A.E.: SAE J246 Air brake tube fitting standards

#### PIPE THREADS:

Long length Dryseal American (National) Standard taper pipe threads.

#### COMPATIBLE TUBING:

Imperial-Eastman C6 Nylon Air Brake tubing, Copper, Aluminum, Brass, Seamless Steel, Tinned Thinwall Brazed Steel

See following data for specific information.

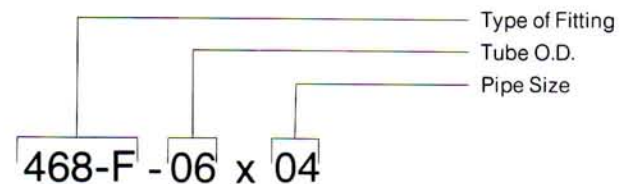
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

#### EXAMPLE:

3/8" O.D. tube x 1/4" pipe thread Male Connector.

468-F-06 x 04.

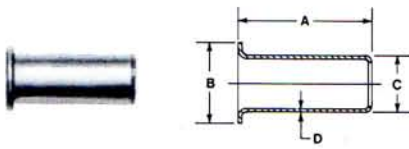

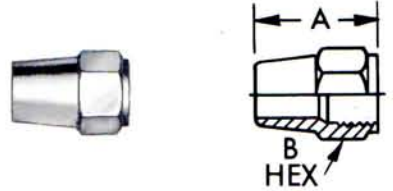
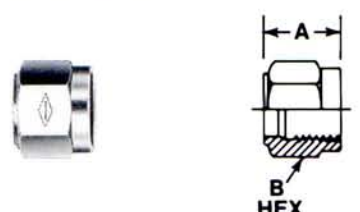
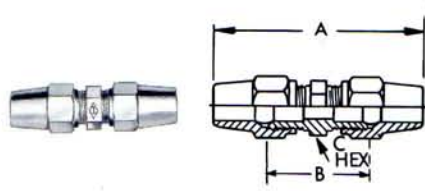


TUBE END DIMENSIONS	Tube O.D.	Thread	
		A	B
	1/4	.250	7/16-24
	3/8	.310	17/32-24
	1/2	.440	1 1/16-20
	5/8	.440	1 3/16-18
	3/4	.560	1-18
	1	.780	1 1/4-16

# AIR BRAKE

# DIMENSIONAL DATA

## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E
<b>459-F EYELET</b> (for use with C6 Tubing)	459-F-04	1/4	.515	.218	.163	.017	
	459-F-06	3/8	.640	.343	.245	.018	
	459-F-08	1/2	.812	.437	.370	.018	
	459-F-10	5/8	.859	.562	.435	.018	
	459-F-12	3/4	1.062	.687	.559	.020	
							
<b>460-F SLEEVE</b>	460-F-04	1/4	.250				
	460-F-06	3/8	.313				
	460-F-08	1/2	.375				
	460-F-10	5/8	.438				
	460-F-12	3/4	.500				
							
<b>461-F LONG NUT</b>	461-F-04	1/4	.750	.562			
	461-F-06	3/8	1.130	.625			
	461-F-08	1/2	1.250	.812			
	461-F-10	5/8	1.380	.937			
	461-F-12	3/4	1.560	1.125			
							
<b>461-FS SHORT NUT</b>	461-FS-04	1/4	.450	.562			
	461-FS-06	3/8	.630	.625			
	461-FS-08	1/2	.720	.812			
	461-FS-10	5/8	.770	.937			
	461-FS-12	3/4	.810	1.125			
							
<b>462-F UNION</b>	462-F-04	1/4	2.050	.870	.437		
	462-F-06	3/8	2.940	1.120	.562		
	462-F-08	1/2	3.210	1.330	.687		
	462-F-10	5/8	3.570	1.450	.812		
	462-F-12	3/4	4.120	1.620	1.000		
							

# DIMENSIONAL DATA

# AIR BRAKE

## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E	F
	<b>464-F UNION TEE</b>							
	464-F-04x04x04	1/4x1/4x1/4	.630	.630	.630	2.440	1.220	.437
	464-F-06x04x06	3/8x1/4x3/8	.830	.718	.830	3.048	1.740	.500
	464-F-06x06x04	3/8x3/8x1/4	.830	.830	.718	3.480	1.308	.500
	464-F-06x06x06	3/8x3/8x3/8	.830	.830	.830	3.480	1.740	.500
	464-F-06x06x08	3/8x3/8x1/2	.906	.906	.970	3.632	1.910	.625
	464-F-06x06x10	3/8x3/8x5/8	.980	.980	1.130	3.780	2.190	.812
	464-F-08x06x08	1/2x3/8x1/2	.970	.906	.970	3.726	1.910	.625
	464-F-08x06x10	1/2x3/8x5/8	1.070	.980	1.130	3.900	2.190	.812
	464-F-08x08x06	1/2x1/2x3/8	.970	.970	.906	3.820	1.816	.625
	464-F-08x08x08	1/2x1/2x1/2	.970	.970	.970	3.820	1.910	.625
	464-F-10x06x10	5/8x3/8x5/8	1.130	.980	1.130	4.080	2.190	.812
	464-F-10x08x06	5/8x1/2x3/8	1.130	1.070	.980	4.200	1.890	.812
	464-F-10x10x06	5/8x5/8x3/8	1.130	1.130	.980	4.380	1.890	.812
	464-F-10x10x08	5/8x5/8x1/2	1.130	1.130	1.070	4.380	2.010	.812
464-F-10x10x10	5/8x5/8x5/8	1.130	1.130	1.130	4.380	2.190	.812	

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C
	<b>465-F UNION ELBOW</b>					
	465-F-04	1/4		1.250	.660	.375
	465-F-06	3/8		1.710	.800	.500
	465-F-08	1/2		1.910	.970	.625
	465-F-10	5/8		2.190	1.130	.750

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C
	<b>466-F FEMALE CONNECTOR</b>					
	466-F-04x02	1/4	1/8	1.440	.850	.562
	466-F-04x04	1/4	1/4	1.670	1.080	.687
	466-F-06x02	3/8	1/8	1.810	.900	.562
	466-F-06x04	3/8	1/4	2.100	1.190	.687
	466-F-06x06	3/8	3/8	2.100	1.190	.875
	466-F-06x08	3/8	1/2	2.275	1.365	1.062
	466-F-08x04	1/2	1/4	2.220	1.280	.687
	466-F-08x06	1/2	3/8	2.220	1.280	.875
	466-F-08x08	1/2	1/2	2.390	1.450	1.062
	466-F-08x12	1/2	3/4	2.420	1.480	1.312
	466-F-10x06	5/8	3/8	2.400	1.340	.875
	466-F-10x08	5/8	1/2	2.570	1.510	1.062
466-F-10x12	5/8	3/4	2.600	1.540	1.312	
466-F-12x08	3/4	1/2	2.830	1.580	1.062	
466-F-12x12	3/4	3/4	2.860	1.610	1.312	

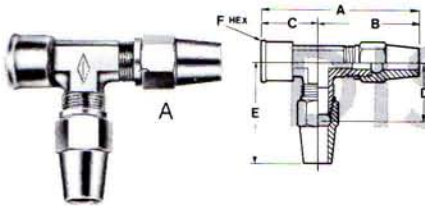


# AIR BRAKE

FLARELESS TUBE FITTINGS

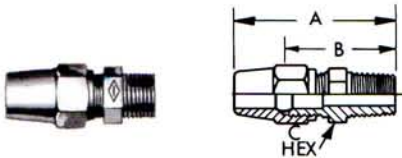
# DIMENSIONAL DATA

	Catalog Number	A			A	B	C	D	E	F
		Tube O.D.	Fem. Pipe	Tube O.D.						
<b>467-F FEMALE RUN TEE</b>	467-F-06x02x06	3/8	1/8	3/8	2.660	.870	.880	.870	1.780	.437
	467-F-10x08x06	5/8	1/2	3/8	3.370	1.250	1.060	1.120	2.030	1.000

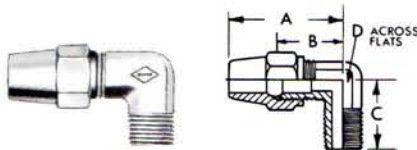


DISCONTINUED

	Catalog Number	Tube Pipe		A	B	C	D	E	F
		O.D.	Thread						
<b>468-F MALE CONNECTOR</b>	468-F-04x02	1/4	1/8	1.510	.920	.437			
	468-F-04x04	1/4	1/4	1.720	1.130	.562			
	468-F-06x02	3/8	1/8	1.940	1.030	.562			
	468-F-06x04	3/8	1/4	2.150	1.240	.562			
	468-F-06x06	3/8	3/8	2.150	1.240	.687			
	468-F-06x08	3/8	1/2	2.370	1.460	.875			
	468-F-08x04	1/2	1/4	2.300	1.360	.687			
	468-F-08x06	1/2	3/8	2.300	1.360	.687			
	468-F-08x08	1/2	1/2	2.490	1.550	.875			
	468-F-08x12	1/2	3/4	2.520	1.580	1.125			
	468-F-10x06	5/8	3/8	2.480	1.420	.812			
	468-F-10x08	5/8	1/2	2.670	1.610	.875			
	468-F-10x12	5/8	3/4	2.700	1.640	1.125			
	468-F-12x08	3/4	1/2	2.960	1.710	1.000			
468-F-12x12	3/4	3/4	2.970	1.720	1.062				




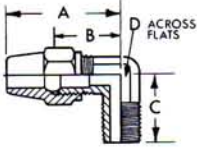
	Catalog Number	Tube Pipe		A	B	C	D	E	F
		O.D.	Thread						
<b>469-F MALE ELBOW</b>	469-F-04x02	1/4	1/8	1.220	.630	.670	.375		
	469-F-04x04	1/4	1/4	1.340	.750	.930	.437		
	469-F-06x02	3/8	1/8	1.740	.830	.880	.500		
	469-F-06x04	3/8	1/4	1.740	.830	.960	.500		
	469-F-06x06	3/8	3/8	1.850	.940	1.100	.687		
	469-F-06x08	3/8	1/2	1.910	1.000	1.280	.750		
	469-F-08x04	1/2	1/4	1.910	.970	1.100	.625		
	469-F-08x06	1/2	3/8	1.880	.940	1.100	.687		
	469-F-08x08	1/2	1/2	2.010	1.070	1.250	.750		
	469-F-08x12	1/2	3/4	2.100	1.160	1.500	.937		
	469-F-10x06	5/8	3/8	2.190	1.130	1.130	.750		
	469-F-10x08	5/8	1/2	2.190	1.130	1.250	.750		
	469-F-10x12	5/8	3/4	2.320	1.260	1.500	.937		
	469-F-12x08	3/4	1/2	2.450	1.200	1.340	.875		
469-F-12x12	3/4	3/4	2.580	1.330	1.500	.937			


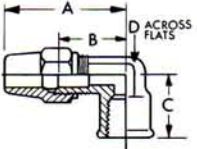



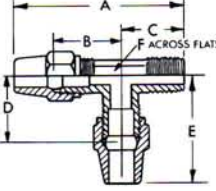
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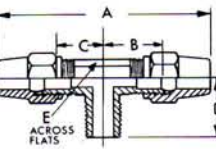
# AIR BRAKE

## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>469LL-F LONG MALE ELBOW</b>  	469LL-F-06x02	3/8	1/8	1.740	.830	1.880	.500		
	469LL-F-06x04	3/8	1/4	1.740	.830	1.440	.500		
	469LL-F-08x06	1/2	3/8	2.190	1.250	1.380	.625		
	469LL-F-08x08	1/2	1/2	2.158	1.218	1.810	.875		
	469LL-F-12x08	3/4	1/2	2.560	1.310	1.810	.875		

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>470-F FEMALE ELBOW</b>  	470-F-04x02	1/4	1/8	1.320	.730	.570	.562		
	470-F-06x02	3/8	1/8	1.810	.900	.810	.500		
	470-F-06x04	3/8	1/4	1.810	.900	.810	.500		
	470-F-06x06	3/8	3/8	1.890	.980	.860	.625		
	470-F-08x06	1/2	3/8	1.980	1.040	.860	.625		
	470-F-08x08	1/2	1/2	2.080	1.140	1.188	.687		
	470-F-10x08	5/8	1/2	2.290	1.230	1.080	1.187		

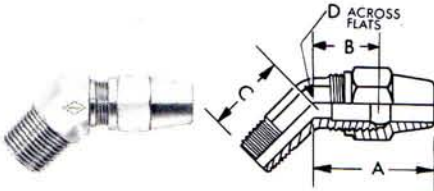
	Catalog Number	Tube O.D.	Pipe Thread	Tube O.D.	A	B	C	D	E	F
<b>471-F MALE RUN TEE</b>  	471-F-04x02x04	1/4	1/8	1/4	1.920	.630	.700	.630	1.220	.437
	471-F-06x04x04	3/8	1/4	1/4	2.670	.830	.930	.720	1.310	.500
	471-F-06x04x06	3/8	1/4	3/8	2.670	.830	.930	.830	1.740	.500
	471-F-06x06x06	3/8	3/8	3/8	2.900	.890	1.100	.890	1.800	.625
	471-F-06x06x08	3/8	3/8	1/2	2.900	.890	1.100	.910	1.910	.750
	471-F-08x06x06	1/2	3/8	3/8	3.010	.970	1.100	.890	1.800	.750
	471-F-08x06x08	1/2	3/8	1/2	3.010	.970	1.100	.910	1.910	.750
	471-F-08x08x08	1/2	1/2	1/2	3.290	1.070	1.280	1.070	2.010	.812
	471-F-06x08x10	3/8	1/2	5/8	3.440	1.100	1.280	1.100	2.160	.812

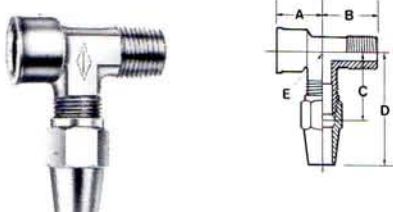
	Catalog Number	Tube O.D.	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>472-F MALE BRANCH TEE</b>  	472-F-04x04x02	1/4	1/4	1/8	2.440	.630	.630	.700	.437	
	472-F-06x06x02	3/8	3/8	1/8	3.480	.830	.830	.810	.500	
	472-F-06x06x04	3/8	3/8	1/4	3.480	.830	.830	.930	.500	
	472-F-06x04x04	3/8	1/4	1/4	3.050	.720	.830	.960	.500	
	472-F-06x06x06	3/8	3/8	3/8	3.540	.860	.860	1.100	.625	
	472-F-06x06x08	3/8	3/8	1/2	3.940	1.060	1.060	1.280	.812	
	472-F-08x06x06	1/2	3/8	3/8	3.650	.830	.970	1.100	.750	
	472-F-08x06x08	1/2	3/8	1/2	3.910	.990	1.070	1.250	.812	
	472-F-08x08x06	1/2	1/2	3/8	3.820	.970	.970	1.100	.750	
	472-F-08x08x08	1/2	1/2	1/2	4.020	1.070	1.070	1.250	.812	
	472-F-10x06x08	5/8	3/8	1/2	4.130	1.060	1.100	1.280	.812	
	472-F-10x08x08	5/8	1/2	1/2	4.140	1.040	1.100	1.280	.812	
	472-F-10x10x04	5/8	5/8	1/4	4.380	1.130	1.130	1.092	.812	
	472-F-10x10x08	5/8	5/8	1/2	4.320	1.100	1.100	1.280	.812	

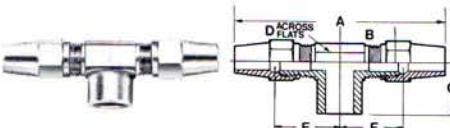
# AIR BRAKE


# DIMENSIONAL DATA

## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>474-F 45° MALE ELBOW</b> 	474-F-04x04	1/4	1/4	1.200	.610	.860	.500		
	474-F-06x04	3/8	1/4	1.630	.720	.860	.500		
	474-F-06x06	3/8	3/8	1.600	.690	.910	.625		
	474-F-06x08	3/8	1/2	1.630	.720	1.170	.812		
	474-F-08x06	1/2	3/8	1.790	.850	.950	.625		
	474-F-08x08	1/2	1/2	1.790	.850	.981	.812		
	474-F-10x08	5/8	1/2	2.000	.940	1.170	.812		

	Catalog Number	Tube O.D.	Male Pipe Thread	Female Pipe Thread	A	B	C	D	E Across Flats	F
<b>476-F TEE</b> 	476-F-04x04x04	1/4	1/4	1/4	.750	.844	.780	1.370	.750	
	476-F-06x04x02	3/8	1/4	1/8	.750	1.130	.930	1.840	.750	
	476-F-06x04x04	3/8	1/4	1/4	.750	1.130	.930	1.840	.750	
	476-F-06x06x08	3/8	3/8	1/2	1.310	.940	1.120	2.030	1.125	
	476-F-08x06x04	1/2	3/8	1/4	1.120	.880	1.130	2.070	.812	
	476-F-10x08x08	5/8	1/2	1/2	1.060	1.280	1.220	2.280	1.125	

	Catalog Number	Tube O.D.	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>477-F FEMALE BRANCH TEE</b> 	477-F-06x06x04	3/8	3/8	1/4	3.620	.900	.780	.750		
	477-F-08x08x06	1/2	1/2	3/8	4.260	1.190	1.120	.812		
	477-F-10x10x04	5/8	5/8	1/4	4.620	1.250	1.000	.812		

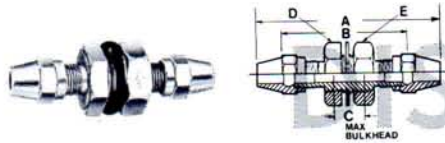
	Catalog Number	Tube O.D.	Female Pipe Thread	Male Pipe Thread	A	B	C	D	E	F
<b>479-F ADAPTER TEE</b> 	479-F-06x04x04	3/8	1/4	1/4	2.571	.911	.750	.970	.750	
	479-F-06x04x06	3/8	1/4	3/8	2.590	.930	.750	1.030	.750	
	479-F-10x04x08	5/8	1/4	1/2	3.310	1.250	1.000	1.280	.812	
	479-F-10x08x12	5/8	1/2	3/4	3.500	1.380	1.060	1.380	1.000	

# DIMENSIONAL DATA

# AIR BRAKE

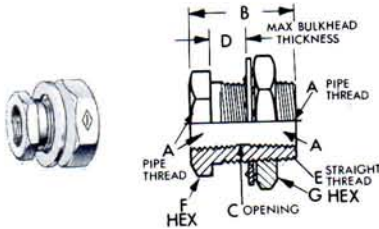
## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E	F
<b>482-F BULKHEAD UNION</b>	482-F-04x04	1/4x1/4	2.836	1.656	.312	.875	.937	

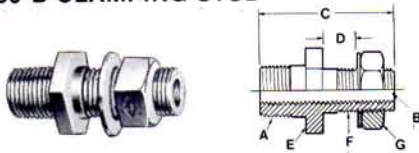


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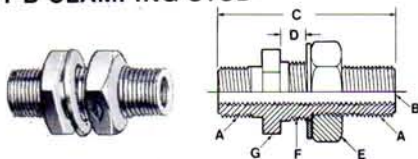
	Catalog Number	Size	A Pipe Thread	B Length	C	D	E	F	G
<b>129-B ANCHOR COUPLING</b>	129-B-02x24	1/8x1 1/2	1/8	1 1/2	.320	.875	5/8-18	.875	.937
	129-B-04x15	1/4x1 5/16	1/4	1 5/16	.421	.250	3/4-16	1.000	1.125
	129-B-04x24	1/4x1 1/2	1/4	1 1/2	.421	.312	3/4-16	1.000	1.125
	129-B-06x21	3/8x1 5/16	3/8	1 5/16	.562	.500	1-14	1.125	1.437
	129-B-08x24	1/2x1 1/2	1/2	1 1/2	.687	.623	1 1/8-14	1.250	1.500



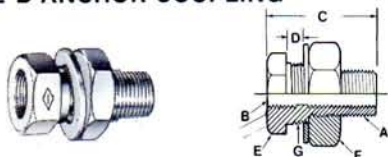
	Catalog Number	Size	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F	G
<b>130-B CLAMPING STUD</b>	130-B-08x04x35	1/2x1/4x2 5/32	1/2	1/4	2 5/32	.687	1.250	3/4-16	1.125
	130-B-08x04x41	1/2x1/4x2 17/32	1/2	1/4	2 17/32	1.062	1.250	3/4-16	1.125



	Catalog Number	Size	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F	G
<b>131-B CLAMPING STUD</b>	131-B-08x04x47	1/2x1/4x2 15/16	1/2	1/4	2 15/16	1.312	1.437	1-14	1.250
	131-B-08x04x63	1/2x1/4x3 15/16	1/2	1/4	3 15/16	2.313	1.437	1-14	1.250



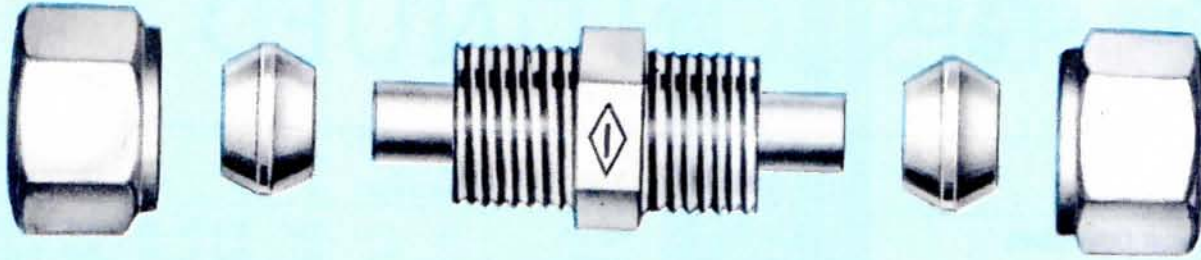
	Catalog Number	Size	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F	G
<b>132-B ANCHOR COUPLING</b>	132-B-06	3/8	3/8	3/8	2.000	.937	1.000	1.125	3/4-16



# AIR BRAKE

# SPECIFICATIONS

FLARELESS TUBE FITTINGS  
FOR NYLON C6 AIR BRAKE TUBING—SAE J844



Air brake fitting specially designed for use with Hytron C6 thermoplastic air brake tubing.

A three piece compression fitting manufactured to S.A.E. standards. Includes pressed in insert.

**SIZE RANGE:**

Tube— $\frac{1}{4}$ " to  $\frac{3}{4}$ " O.D.  
Port— $\frac{1}{8}$ " to  $\frac{3}{4}$ " NPTF

**MAXIMUM WORKING PRESSURE:**

350 psi

**MATERIALS:**

- Elbows and Tees: Brass forgings—S.A.E. CA377
- Connectors, Unions, and Nuts: Stress relieved brass bar stock—S.A.E. CA360 or equal.

**CONFORMANCES:**

S.A.E.: S.A.E. J246 air brake tube fitting standards.  
FMVSS (DOT) 106

**PIPE THREADS:**

Long length Dryseal American (National) standard taper pipe threads.

**COMPATIBLE TUBING:**

Imperial-Eastman Hytron C6 nylon brake tubing.

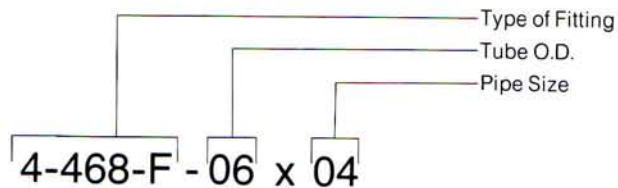
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

**EXAMPLE:**

$\frac{3}{8}$ " O.D. tube x  $\frac{1}{4}$ " pipe thread male connector

4-468F-06 x 04.



TUBE END DIMENSIONS	Tube O.D.	A B	
		A	Thread
	$\frac{1}{4}$	.250	$\frac{7}{16}$ -24
	$\frac{3}{8}$	.310	$\frac{17}{32}$ -24
	$\frac{1}{2}$	.440	$\frac{11}{16}$ -20
	$\frac{5}{8}$	.440	$\frac{13}{16}$ -18
	$\frac{3}{4}$	.560	1-18
	1	.780	$1\frac{1}{4}$ -16

1.52-B ANCHOR COUPLING

1.52-B-00

.8

.8

.8

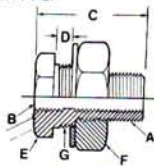
2.00

.95

1.00

1.25

4-6



# DIMENSIONAL DATA

# AIR BRAKE

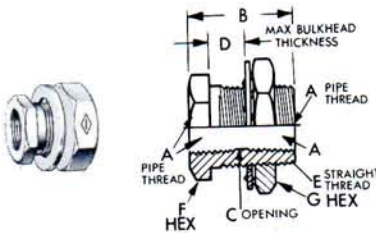
## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E	F
<b>482-F BULKHEAD UNION</b>	482-F-04x04	1/4x1/4	2.836	1.656	.312	.875	.937	

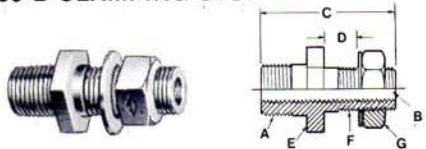


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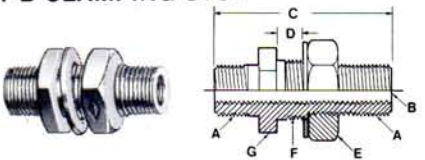
	Catalog Number	Size	A Pipe Thread	B Length	C	D	E	F	G
<b>129-B ANCHOR COUPLING</b>	129-B-02x24	1/8x1 1/2	1/8	1 1/2	.320	.875	3/8-18	.875	.937
	129-B-04x15	1/4x1 5/16	1/4	1 5/16	.421	.250	3/4-16	1.000	1.125
	129-B-04x24	1/4x1 1/2	1/4	1 1/2	.421	.312	3/4-16	1.000	1.125
	129-B-06x21	3/8x1 5/16	3/8	1 5/16	.562	.500	1-14	1.125	1.437
	129-B-08x24	1/2x1 1/2	1/2	1 1/2	.687	.623	1 1/8-14	1.250	1.500



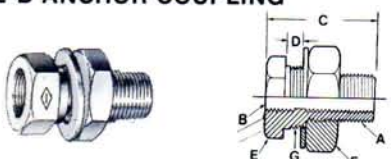
	Catalog Number	Size	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F	G
<b>130-B CLAMPING STUD</b>	130-B-08x04x35	1/2x1/4x2 5/32	1/2	1/4	2 5/32	.687	1.250	3/4-16	1.125
	130-B-08x04x41	1/2x1/4x2 17/32	1/2	1/4	2 17/32	1.062	1.250	3/4-16	1.125



	Catalog Number	Size	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F	G
<b>131-B CLAMPING STUD</b>	131-B-08x04x47	1/2x1/4x2 15/16	1/2	1/4	2 15/16	1.312	1.437	1-14	1.250
	131-B-08x04x63	1/2x1/4x3 15/16	1/2	1/4	3 15/16	2.313	1.437	1-14	1.250



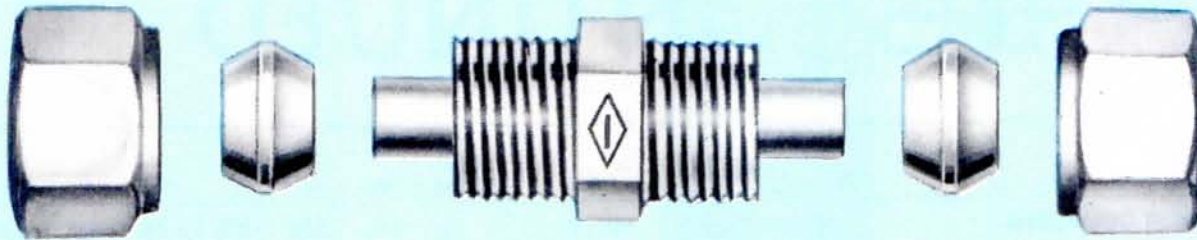
	Catalog Number	Size	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F	G
<b>132-B ANCHOR COUPLING</b>	132-B-06	3/8	3/8	3/8	2.000	.937	1.000	1.125	3/4-16



# AIR BRAKE

# SPECIFICATIONS

FLARELESS TUBE FITTINGS  
FOR NYLON C6 AIR BRAKE TUBING—SAE J844



Air brake fitting specially designed for use with Hytron C6 thermoplastic air brake tubing.

A three piece compression fitting manufactured to S.A.E. standards. Includes pressed in insert.

#### SIZE RANGE:

Tube— $\frac{1}{4}$ " to  $\frac{3}{4}$ " O.D.  
Port— $\frac{1}{8}$ " to  $\frac{3}{4}$ " NPTF

#### MAXIMUM WORKING PRESSURE:

350 psi

#### MATERIALS:

- Elbows and Tees: Brass forgings—S.A.E. CA377
- Connectors, Unions, and Nuts: Stress relieved brass bar stock—S.A.E. CA360 or equal.

#### CONFORMANCES:

S.A.E.: S.A.E. J246 air brake tube fitting standards.  
FMVSS (DOT) 106

#### PIPE THREADS:

Long length Dryseal American (National) standard taper pipe threads.

#### COMPATIBLE TUBING:

Imperial-Eastman Hytron C6 nylon brake tubing.

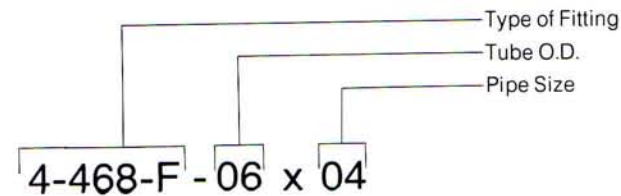
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

#### EXAMPLE:

$\frac{3}{8}$ " O.D. tube x  $\frac{1}{4}$ " pipe thread male connector

4-468F-06 x 04.



TUBE END DIMENSIONS	Tube O.D.	A	B Thread
	$\frac{1}{4}$	.250	$\frac{7}{16}$ -24
	$\frac{3}{8}$	.310	$\frac{17}{32}$ -24
	$\frac{1}{2}$	.440	$\frac{11}{16}$ -20
	$\frac{5}{8}$	.440	$\frac{13}{16}$ -18
	$\frac{3}{4}$	.560	1-18
	1	.780	$1\frac{1}{4}$ -16

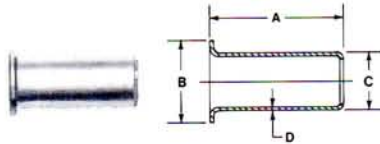


# DIMENSIONAL DATA

# AIR BRAKE

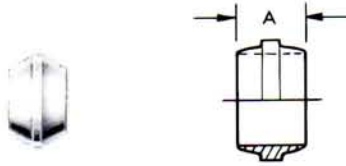
FLARELESS TUBE FITTINGS  
FOR NYLON C6 AIR BRAKE TUBING – S.A.E. J844

	Catalog Number	Tube O.D.	A	B	C	D
<b>459-F EYELET</b> (for use with C6 Tubing)	459-F-04	1/4	.515	.218	.163	.017
	459-F-06	3/8	.640	.343	.245	.018
	459-F-08	1/2	.812	.437	.370	.018
	459-F-10	5/8	.859	.562	.435	.018
	459-F-12	3/4	1.062	.687	.559	.020



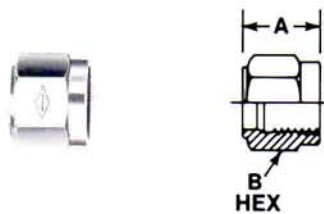
## 4-460-F SLEEVE

4-460-F-04	1/4	.310
4-460-F-06	3/8	.390
4-460-F-08	1/2	.430
4-460-F-10	5/8	.446
4-460-F-12	3/4	.540



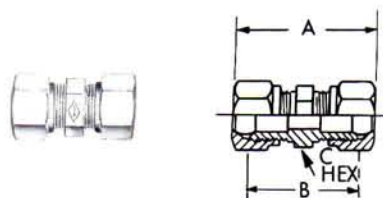
## 461-FS SHORT NUT

461-FS-04	1/4	.450	.562
461-FS-06	3/8	.560	.625
461-FS-08	1/2	.660	.812
461-FS-10	5/8	.740	.937
461-FS-12	3/4	.810	1.125



## 4-462-F UNION

4-462-F-04	1/4	1.450	.870	.437
4-462-F-06	3/8	1.800	1.120	.562
4-462-F-08	1/2	2.030	1.330	.687
4-462-F-10	5/8	2.290	1.450	.812
4-462-F-12	3/4	2.620	1.620	1.000



# AIR BRAKE

# DIMENSIONAL DATA

FLARELESS TUBE FITTINGS  
FOR NYLON C6 AIR BRAKE TUBING—S.A.E. J844

	Catalog Number	Tube O.D.	A	B	C	D	E	F	G
	4-464-F-04x04x04	1/4x1/4x1/4	.630	.630	.630	1.840	.920	.437	.920
	4-464-F-06x04x06	3/8x1/4x3/8	.830	.718	.830	2.178	1.008	.500	1.170
	4-464-F-06x06x04	3/8x3/8x1/4	.830	.830	.718	2.340	1.170	.500	1.008
	4-464-F-06x06x06	3/8x3/8x3/8	.830	.830	.830	2.340	1.170	.500	1.170
	4-464-F-06x06x08	3/8x3/8x1/2	.906	.906	.970	2.492	1.246	.625	1.320
	4-464-F-06x06x10	3/8x3/8x5/8	.980	.980	1.130	2.640	1.320	.812	1.550
	4-464-F-08x06x08	1/2x3/8x1/2	.970	.906	.970	2.566	1.246	.625	1.320
	4-464-F-08x06x10	1/2x3/8x5/8	1.070	.980	1.130	2.740	1.320	.812	1.550
	4-464-F-08x08x06	1/2x1/2x3/8	.970	.970	.906	2.640	1.320	.625	1.246
	4-464-F-08x08x08	1/2x1/2x1/2	.970	.970	.970	2.640	1.320	.625	1.320
	4-464-F-10x06x10	5/8x3/8x5/8	1.130	.980	1.130	2.870	1.320	.812	1.550
	4-464-F-10x08x06	5/8x1/2x3/8	1.130	1.070	.980	2.970	1.420	.812	1.320
	4-464-F-10x10x06	5/8x5/8x3/8	1.130	1.130	.980	3.100	1.550	.812	1.320
	4-464-F-10x10x08	5/8x5/8x1/2	1.130	1.130	1.070	3.100	1.550	.812	1.420
	4-464-F-10x10x10	5/8x5/8x5/8	1.130	1.130	1.130	3.100	1.550	.812	1.550

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C
	4-465-F-04	1/4		.950	.660	.375
	4-465-F-06	3/8		1.140	.800	.500
	4-465-F-08	1/2		1.320	.970	.625
	4-465-F-10	5/8		1.550	1.130	.750

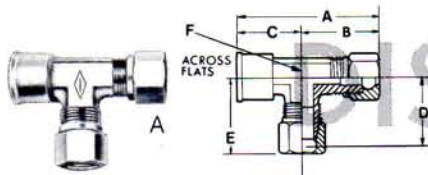
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C
	4-466-F-04x02	1/4	1/8	1.140	.850	.562
	4-466-F-04x04	1/4	1/4	1.370	1.080	.687
	4-466-F-06x02	3/8	1/8	1.240	.900	.562
	4-466-F-06x04	3/8	1/4	1.530	1.190	.687
	4-466-F-06x06	3/8	3/8	1.530	1.190	.875
	4-466-F-06x08	3/8	1/2	1.705	1.365	1.062
	4-466-F-08x04	1/2	1/4	1.630	1.280	.687
	4-466-F-08x06	1/2	3/8	1.630	1.280	.875
	4-466-F-08x08	1/2	1/2	1.800	1.450	1.062
	4-466-F-08x12	1/2	3/4	1.830	1.480	1.312
	4-466-F-10x06	5/8	3/8	1.760	1.340	.875
	4-466-F-10x08	5/8	1/2	1.930	1.510	1.062
4-466-F-10x12	5/8	3/4	1.960	1.540	1.312	
4-466-F-12x08	3/4	1/2	2.080	1.580	1.062	
4-466-F-12x12	3/4	3/4	2.110	1.610	1.312	

# DIMENSIONAL DATA

# AIR BRAKE

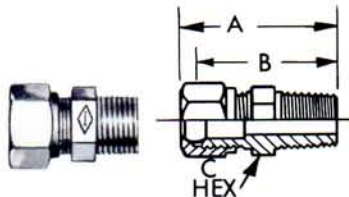
FLARELESS TUBE FITTINGS  
FOR NYLON C6 AIR BRAKE TUBING—S.A.E. J844

	Catalog Number	A		Tube O.D.	A	B	C	D	E	F
		Tube O.D.	Fem. Pipe							
<b>4-467-F FEMALE RUN TEE</b>	4-467-F-06x02x06	3/8	1/8	3/8	2.090	.870	.880	.870	1.210	.437
	4-467-F-10x08x06	5/8	1/2	3/8	2.730	1.250	1.060	1.120	1.460	1.000

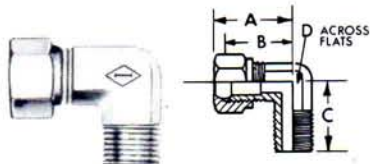


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	Catalog Number	Tube Pipe		A	B	C	D	E	F
		O.D.	Thread						
<b>4-468-F MALE CONNECTOR</b>	4-468-F-04x02	1/4	1/8	1.210	.920	.437			
	4-468-F-04x04	1/4	1/4	1.420	1.130	.562			
	4-468-F-06x02	3/8	1/8	1.370	1.030	.562			
	4-468-F-06x04	3/8	1/4	1.580	1.240	.562			
	4-468-F-06x06	3/8	3/8	1.580	1.240	.687			
	4-468-F-06x08	3/8	1/2	1.800	1.460	.875			
	4-468-F-08x04	1/2	1/4	1.710	1.360	.687			
	4-468-F-08x06	1/2	3/8	1.710	1.360	.687			
	4-468-F-08x08	1/2	1/2	1.900	1.550	.875			
	4-468-F-08x12	1/2	3/4	1.930	1.580	1.125			
	4-468-F-10x06	5/8	3/8	1.840	1.420	.812			
	4-468-F-10x08	5/8	1/2	2.030	1.610	.875			
	4-468-F-10x12	5/8	3/4	2.060	1.640	1.125			
	4-468-F-12x08	3/4	1/2	2.210	1.710	1.000			
4-468-F-12x12	3/4	3/4	2.220	1.720	1.062				



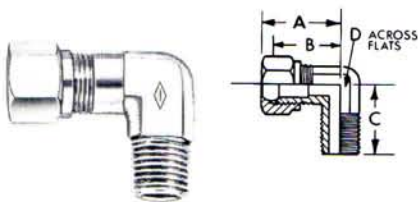
	Catalog Number	Tube O.D.	Fem. Pipe	Tube O.D.	A	B	C	D	E	F
<b>4-469-F MALE ELBOW</b>	4-469-F-04x02	1/4	1/8		.920	.630	.670	.375		
	4-469-F-04x04	1/4	1/4		1.040	.750	.930	.437		
	4-469-F-06x02	3/8	1/8		1.170	.830	.880	.500		
	4-469-F-06x04	3/8	1/4		1.170	.830	.960	.500		
	4-469-F-06x06	3/8	3/8		1.280	.940	1.100	.687		
	4-469-F-06x08	3/8	1/2		1.340	1.000	1.280	.750		
	4-469-F-08x04	1/2	1/4		1.320	.970	1.100	.625		
	4-469-F-08x06	1/2	3/8		1.290	.940	1.100	.687		
	4-469-F-08x08	1/2	1/2		1.420	1.070	1.250	.750		
	4-469-F-08x12	1/2	3/4		1.510	1.160	1.500	.937		
	4-469-F-10x06	5/8	3/8		1.550	1.130	1.130	.812		
	4-469-F-10x08	5/8	1/2		1.550	1.130	1.280	.812		
	4-469-F-10x12	5/8	3/4		1.680	1.260	1.500	.937		
	4-469-F-12x08	3/4	1/2		1.700	1.200	1.340	.875		
4-469-F-12x12	3/4	3/4		1.830	1.330	1.500	.937			

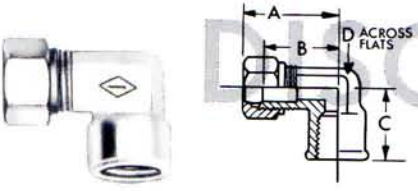


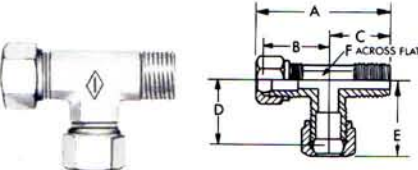
# AIR BRAKE

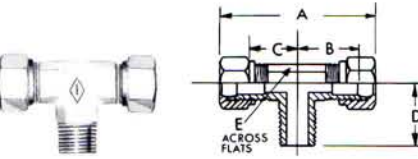
# DIMENSIONAL DATA

FLARELESS TUBE FITTINGS  
FOR NYLON C6 AIR BRAKE TUBING—S.A.E. J844

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>4-469LL-F LONG MALE ELBOW</b> 	4-469LL-F-06x02	3/8	1/8	1.170	.830	1.880	.500		
	4-469LL-F-06x04	3/8	1/4	1.170	.830	1.440	.500		
	4-469LL-F-08x06	1/2	3/8	1.600	1.250	1.380	.625		
	4-469LL-F-08x08	1/2	1/2	1.568	1.218	1.810	.875		
	4-469LL-F-12x08	3/4	1/2	1.810	1.310	1.810	.875		

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>4-470-F FEMALE ELBOW</b> 	4-470-F-04x02	1/4	1/8	1.020	.730	.570	.562		
	4-470-F-06x02	3/8	1/8	1.240	.900	.810	.500		
	4-470-F-06x04	3/8	1/4	1.240	.900	.810	.500		
	4-470-F-06x06	3/8	3/8	1.320	.980	.860	.625		
	4-470-F-08x06	1/2	3/8	1.390	1.040	.860	.625		
	4-470-F-08x08	1/2	1/2	1.490	1.140	1.188	.687		
	4-470-F-10x08	5/8	1/2	1.650	1.230	1.080	1.187		


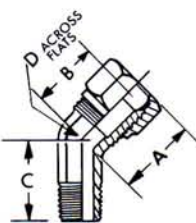
	Catalog Number	Tube O.D.	Pipe Thread	Tube O.D.	A	B	C	D	E	F
<b>4-471-F MALE RUN TEE</b> 	4-471-F-04x02x04	1/4	1/8	1/4	1.620	.630	.700	.630	.920	.437
	4-471-F-06x04x04	3/8	1/4	1/4	2.100	.830	.930	.720	1.010	.500
	4-471-F-06x04x06	3/8	1/4	3/8	2.100	.830	.930	.830	1.170	.500
	4-471-F-06x06x06	3/8	3/8	3/8	2.330	.890	1.100	.890	1.230	.625
	4-471-F-06x06x08	3/8	3/8	1/2	2.330	.890	1.100	.910	1.260	.750
	4-471-F-08x06x06	1/2	3/8	3/8	2.420	.970	1.100	.890	1.230	.750
	4-471-F-08x06x08	1/2	3/8	1/2	2.420	.970	1.100	.910	1.260	.750
	4-471-F-08x08x08	1/2	1/2	1/2	2.700	1.070	1.280	1.070	1.420	.812
	4-471-F-10x08x10	5/8	1/2	5/8	2.800	1.100	1.280	1.100	1.520	.812


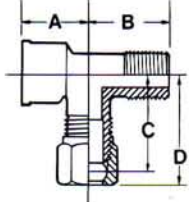
	Catalog Number	Tube O.D.	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>4-472-F MALE BRANCH TEE</b> 	4-472-F-04x04x02	1/4	1/4	1/8	1.840	.630	.630	.700	.437	
	4-472-F-06x04x04	3/8	1/4	1/4	2.180	.720	.830	.960	.500	
	4-472-F-06x06x02	3/8	3/8	1/8	2.340	.830	.830	.810	.500	
	4-472-F-06x06x04	3/8	3/8	1/4	2.340	.830	.830	.930	.500	
	4-472-F-06x06x06	3/8	3/8	3/8	2.400	.860	.860	1.100	.625	
	4-472-F-06x06x08	3/8	3/8	1/2	2.800	1.060	1.060	1.280	.812	
	4-472-F-08x06x06	1/2	3/8	3/8	2.490	.830	.970	1.100	.750	
	4-472-F-08x06x08	1/2	3/8	1/2	2.750	.990	1.070	1.250	.812	
	4-472-F-08x08x06	1/2	1/2	3/8	2.640	.970	.070	1.100	.750	
	4-472-F-08x08x08	1/2	1/2	1/2	2.840	1.070	1.070	1.250	.812	
	4-472-F-10x06x08	5/8	3/8	1/2	2.920	1.060	1.100	1.280	.812	
	4-472-F-10x08x08	5/8	1/2	1/2	2.910	1.040	1.100	1.280	.812	
	4-472-F-10x10x04	5/8	5/8	1/4	3.100	1.130	1.130	1.092	.812	
	4-472-F-10x10x08	5/8	5/8	1/2	3.040	1.100	1.100	1.280	.812	


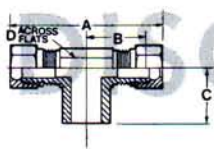
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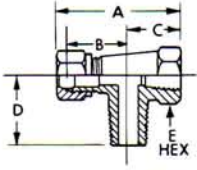
# AIR BRAKE


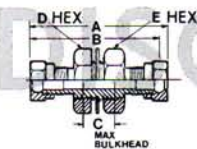
FLARELESS TUBE FITTINGS  
FOR NYLON C6 AIR BRAKE TUBING S.A.E. J844

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	4-474-F-04x04	1/4	1/4	.900	.610	.860	.500		
	4-474-F-06x04	3/8	1/4	1.060	.720	.860	.500		
	4-474-F-06x06	3/8	3/8	1.030	.690	.910	.625		
	4-474-F-06x08	3/8	1/2	1.060	.720	1.170	.812		
	4-474-F-08x06	1/2	3/8	1.200	.850	.950	.625		
	4-474-F-08x08	1/2	1/2	1.200	.850	.981	.812		
	4-474-F-10x08	5/8	1/2	1.360	.940	1.170	.812		

	Catalog Number	Tube O.D.	Male Pipe Thread	Female Pipe Thread	A	B	C	D	E Across Flats	F
 	4-476-F-04x04x04	1/4	1/4	1/4	.750	.844	.780	1.070	.750	
	4-476-F-06x04x02	3/8	1/4	1/8	.750	1.130	.930	1.270	.750	
	4-476-F-06x04x04	3/8	1/4	1/4	.750	1.130	.930	1.270	.750	
	4-476-F-06x06x08	3/8	3/8	1/2	1.310	.940	1.120	1.460	1.125	
	4-476-F-08x06x04	1/2	3/8	1/4	1.120	.880	1.130	1.480	.812	
	4-476-F-10x08x08	5/8	1/2	1/2	1.060	1.280	1.220	1.640	1.125	

	Catalog Number	Tube O.D.	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	4-477-F-06x06x04	3/8	3/8	1/4	2.480	.900	.780	.750		
	4-477-F-08x08x06	1/2	1/2	3/8	3.080	1.190	1.120	.812		
	4-477-F-10x10x04	5/8	5/8	1/4	3.340	1.250	1.000	.812		

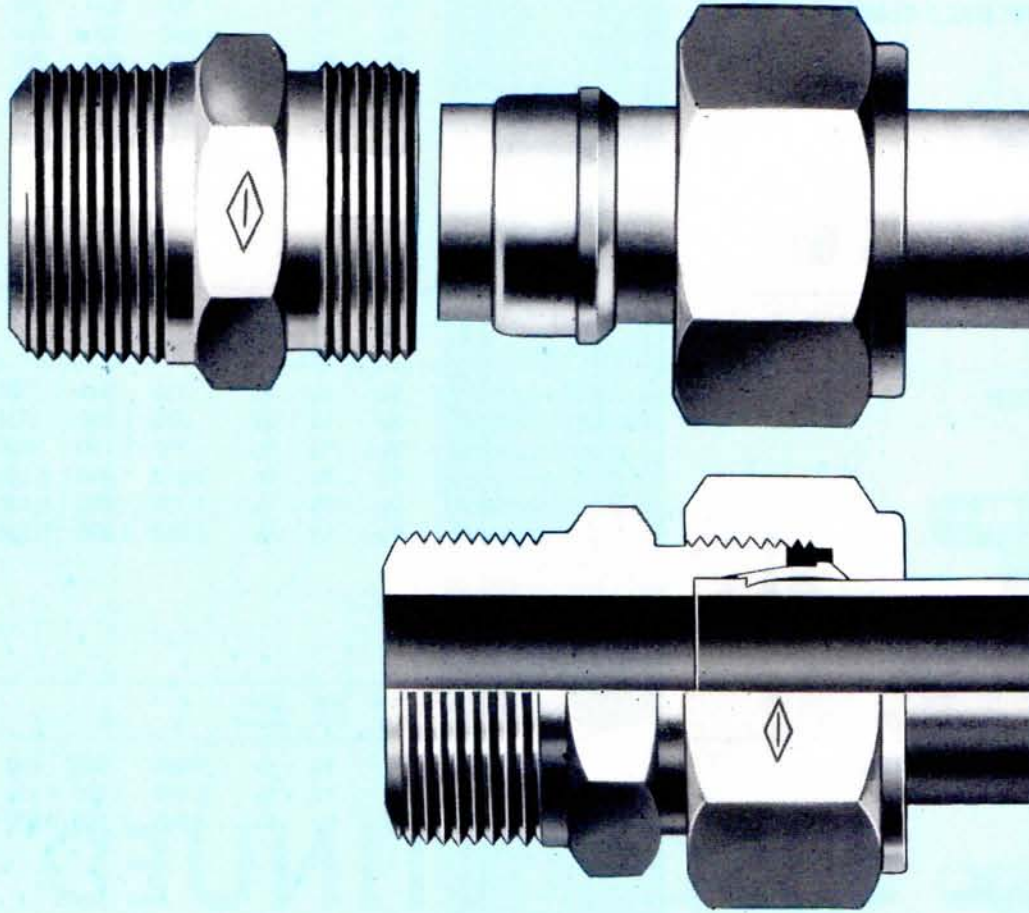
	Catalog Number	Tube O.D.	Female Pipe Thread	Male Pipe Thread	A	B	C	D	E	F
 	4-479-F-06x04x04	3/8	1/4	1/4	2.001	.911	.750	.970	.750	
	4-479-F-06x04x06	3/8	1/4	3/8	2.020	.930	.750	1.030	.750	
	4-479-F-10x04x08	5/8	1/4	1/2	2.670	1.250	1.000	1.280	.812	
	4-479-F-10x08x12	5/8	1/2	3/4	2.860	1.380	1.060	1.380	1.000	

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
 	4-482-F-04x04	1/4	1/4	2.236	1.656	.312	.875	.937	

# SERIES 1900

FLARELESS TUBE FITTINGS

# SPECIFICATIONS



Designed to provide safe joints which will withstand high pressures, severe vibration and elevated temperatures.

**SIZE RANGE:** Tube— $\frac{1}{4}$ " to 1" O.D.  
Port— $\frac{1}{8}$ " to 1" NPTF

**MAXIMUM WORKING PRESSURE:** 7300 psi

**MATERIALS:** Steel bodies, nuts and sleeves. Buna-N O-Rings

**COMPATIBLE TUBING:** Steel, Brass, Monel  
Chrome Molysteel  
Aluminum, Copper—  
hard or soft temper.

**CONFORMANCES:**

S.A.E. J514—Hydraulic Tube Fitting Standards.

J.I.C.—Hydraulic and Pneumatic Standards.

N.F.P.A.—Performance Standards. No. T3.8.70.2./  
T3.8.70.3.

A.N.S.I.—B31.1 Codes for Pressure Piping.

A.S.M.E.—Boiler and Pressure Vessel Code.

See following data for specific information.



### RELIABLE, LEAKPROOF SERVICE

These fittings make safe connections which hold tight beyond the burst strength of the tubing.

As the nut is tightened front end of the sleeve contracts, forcing cutting edge of the hardened steel sleeve to bite into the outer surface of the tube, while the bevel at rear of the sleeve clamps it tightly against the tube.

### EXCEPTIONAL RESISTANCE TO VIBRATION

Series 1900 Fittings withstand severe vibration because of multiple points of tube support—at the beveled rear of the sleeve, at its forward bite, and at the shoulder in the base of the body.

The sleeve design is another important advantage in vibration resistance. When the nut is fully tightened, the sleeve is bowed slightly, causing it to maintain a constant tension between the body and the nut. This tension prevents the nut from loosening under severe vibration or pressure surge.

### EASY TO INSTALL

Series 1900 Fittings require no special tools for installation—just cut tubing square, deburr and assemble. The sleeve is permanently attached to the tubing after the first assembly. When it is necessary to disassemble a fitting it can be reassembled and still maintain its strength and sealing qualities.

### BROAD RANGE OF APPLICATIONS

Applications include hydraulic controls, pneumatic controls, machine tools, diesel engines, compressors, blowers, pumps, air operated equipment, steam and gas turbines, pressurized lubrication systems, processing plants, and many others.

### TYPES OF TUBING

Series 1900 Fittings can be used with steel, copper, brass, monel, chrome molysteel and aluminum tubing. The biting action of the sleeve permits use with tubing which has some surface imperfections.



Hardened steel sleeve bites into tube surface to make a tight joint even though tube surface is rough.

### TEMPERATURES

Can be used at temperatures of  $-65^{\circ}\text{F.}$  to  $+400^{\circ}\text{F.}$  at full nominal operating pressure. May be used as high as  $+800^{\circ}\text{F.}$  with appropriate pressure derating factors.

# SERIES 1900

# SPECIFICATIONS

FLARELESS TUBE FITTINGS

## RECOMMENDED MAXIMUM WORKING PRESSURES – PSI

FITTING MATERIAL: STEEL

TUBING MATERIAL: SEAMLESS STEEL – S.A.E. 1010, DEAD SOFT

BRAZED STEEL – ANNEALED.

SERVICE CONDITIONS	TUBE O.D.	COMMERCIALY AVAILABLE TUBING WALL THICKNESSES												
		SEAMLESS STEEL – S.A.E. 1010 – DEAD SOFT, COLD DRAWN (HYDRAULIC LINE)								BRAZED STEEL – ANNEALED (SUCH AS BUNDY OR GM)				
		.028	.035	.049	.065	.083	.095	.109	.120	.028	.035	.049		
MINOR SURGES Safety Factor 4 – 1	1/4"	3350	3800	6210	7330							3350	3800	6210
	5/16"	2630	3340	5190	5850							2630	3340	4850
	3/8"	2160	2760	3960	5430	7100						2160	2760	3960
	1/2"		2020	2900	3940	5160	6000	6980	7750				2020	2900
	5/8"		1580	2280	3100	4040	4680	5450	6070					2280
	3/4"		1320	1880	2540	3310	3840	4460	5370					
1"		986	1390	1860	2430	2810	3260	3620						
SURGES Up to 50% Safety Factor 6 – 1	1/4"	2240	2530	4070	4880							2240	2530	4070
	5/16"	1750	2230	3450	3900							1750	2230	3240
	3/8"	1440	1840	2740	3620	4740						1440	1840	2740
	1/2"		1350	1930	2630	3440	4000	4650	5160				1350	1930
	5/8"		1050	1520	2060	2690	3120	3630	4050					1520
	3/4"		880	1250	1690	2200	2560	2980	3550					
1"		657	926	1240	1620	1870	2180	2410						
SURGES of 50% to 100% Safety Factor 8 – 1	1/4"	1680	1900	3110	3665							1680	1900	3110
	5/16"	1320	1670	2590	2925							1320	1670	2420
	3/8"	1080	1380	1980	2660	3650						1080	1380	1980
	1/2"		1010	1450	1970	2580	3000	3490	3880				1010	1450
	5/8"		790	1140	1550	2020	2340	2720	3040					1140
	3/4"		660	940	1270	1660	1920	2230	2660					
1"		493	700	930	1220	1400	1630	1810						
SURGES of 100% to 150% Safety Factor 10 – 1	1/4"	1340	1520	2490	2930							1340	1520	2490
	5/16"	1050	1340	2080	2340							1050	1340	1940
	3/8"	865	1110	1580	2170	2840						865	1110	1580
	1/2"		808	1160	1580	2060	2400	2790	3100				808	1160
	5/8"		632	912	1240	1620	1870	2180	2430					912
	3/4"		528	745	1020	1330	1540	1790	2130					
1"		394	556	745	973	1120	1300	1450						



# SPECIFICATIONS

# SERIES 1900

FLARELESS TUBE FITTINGS

A three piece fitting consisting of body, nut and sleeve. Furnished assembled.

## MATERIALS

- Elbows and Tees: Steel forgings—12L14
- Connectors, Unions and Nuts: Steel Bar Stock—12L14
- Sleeves: Steel Bar Stock—B-1113, case hardened
- O-Rings: Buna-N
- Finish: Black Phosphate.

## PIPE THREADS

Long length Dryseal American (National) Standard taper pipe threads.

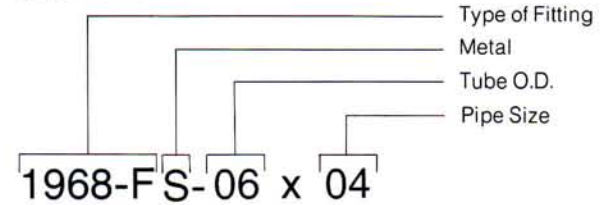
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired.

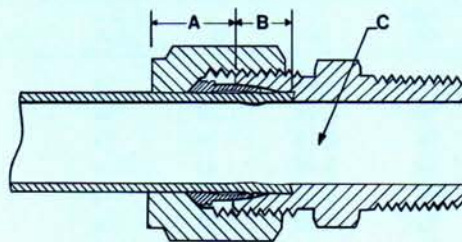
### EXAMPLE:

3/8" O.D. tube x 1/4" pipe thread Male Connector

1968-FS-06 x 04.

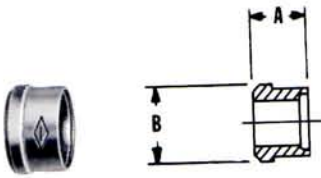


## TUBE END DIMENSIONS



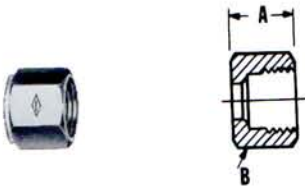
Tube O.D.	Straight Thread	A	B	C Min. Bore
1/4	7/16-20	.42	.234	.203
5/16	1/2-20	.42	.250	.234
3/8	9/16-18	.47	.250	.281
1/2	3/4-16	.50	.305	.422
5/8	7/8-14	.53	.350	.500
3/4	1 1/16-12	.56	.350	.656
1	1 5/16-12	.66	.415	.875

**1960-FS SLEEVE**



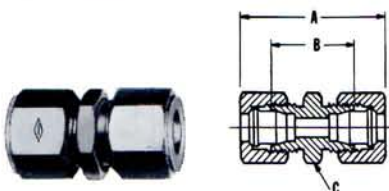
Catalog Number	Tube O.D.	A Min.	A Max.	B	C	D
1960-FS-04	1/4	.333	.339	.359		
1960-FS-05	5/16	.333	.339	.422		
1960-FS-06	3/8	.372	.378	.484		
1960-FS-08	1/2	.372	.378	.625		
1960-FS-10	5/8	.412	.418	.750		
1960-FS-12	3/4	.412	.418	.875		
1960-FS-16	1	.412	.418	1.125		

**1961-FS NUT**



Catalog Number	Tube O.D.	A	B Hex	C	D	E
1961-FS-04	1/4	.70	9/16			
1961-FS-05	5/16	.72	5/8			
1961-FS-06	3/8	.75	11/16			
1961-FS-08	1/2	.84	7/8			
1961-FS-10	5/8	.92	1			
1961-FS-12	3/4	.97	1 1/4			
1961-FS-16	1	1.05	1 1/2			

**1962-FS UNION  
Tube to Tube**

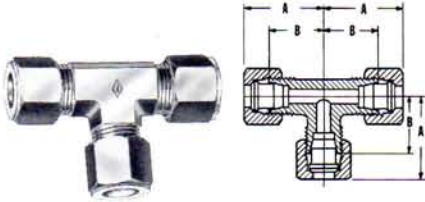
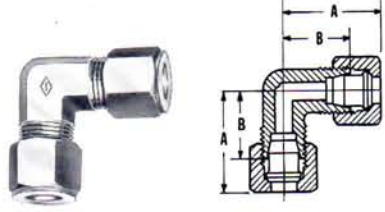
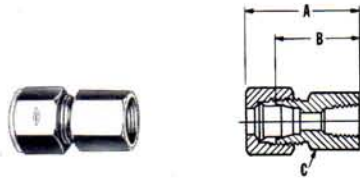
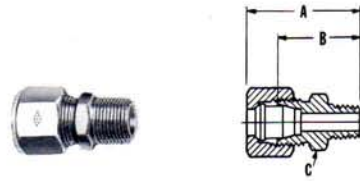


Catalog Number	Tube O.D.	A	B	Hex	D	E
1962-FS-04	1/4	2.02	1.18	1/2		
1962-FS-05	5/16	2.02	1.18	9/16		
1962-FS-06	3/8	2.18	1.24	5/8		
1962-FS-08	1/2	2.42	1.42	13/16		
1962-FS-10	5/8	2.67	1.61	15/16		
1962-FS-12	3/4	2.93	1.81	1 1/8		
1962-FS-16	1	3.13	1.81	1 3/8		

# DIMENSIONAL DATA

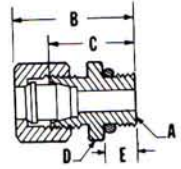
# SERIES 1900

## FLARELESS TUBE FITTINGS

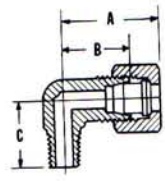
		Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E		
<b>1964-FS UNION TEE</b> Tube to Tube to Tube		1964-FS-04	1/4		1.31	.89					
		1964-FS-06	3/8		1.52	1.05					
		1964-FS-08	1/2		1.75	1.25					
		1964-FS-10	5/8		1.95	1.42					
		1964-FS-12	3/4		2.14	1.58					
		1964-FS-16	1		2.39	1.73					
		<b>1965-FS UNION ELBOW</b> Tube to Tube		1965-FS-04	1/4		1.31	.89			
		1965-FS-05	5/16		1.37	.95					
		1965-FS-06	3/8		1.52	1.05					
		1965-FS-08	1/2		1.75	1.25					
		1965-FS-10	5/8		1.95	1.42					
		1965-FS-12	3/4		2.14	1.58					
		1965-FS-16	1		2.39	1.73					
		<b>1966-FS FEMALE CONNECTOR</b> Tube to Female P.T.		1966-FS-04x02	1/4	1/8	1.51	1.09	9/16		
		1966-FS-04x04	1/4	1/4	1.71	1.29	3/4				
		1966-FS-05x02	5/16	1/8	1.50	1.08	9/16				
		1966-FS-05x04	5/16	1/4	1.71	1.29	3/4				
		1966-FS-06x04	3/8	1/4	1.78	1.31	3/4				
		1966-FS-06x06	3/8	3/8	1.85	1.38	7/8				
		1966-FS-08x06	1/2	3/8	1.97	1.47	7/8				
		1966-FS-08x08	1/2	1/2	2.20	1.70	1 1/8				
		1966-FS-10x08	5/8	1/2	2.29	1.76	1 1/8				
		1966-FS-12x12	3/4	3/4	2.45	1.89	1 3/8				
		1966-FS-16x16	1	1	2.79	2.13	1 5/8				
		<b>1968-FS MALE CONNECTOR</b> Tube to Male P.T.		1968-FS-04x02	1/4	1/8	1.54	1.12	1/2		
				1968-FS-04x04	1/4	1/4	1.75	1.33	9/16		
1968-FS-05x02	5/16			1/8	1.54	1.12	9/16				
1968-FS-05x04	5/16			1/4	1.75	1.33	9/16				
1968-FS-06x04	3/8			1/4	1.81	1.34	5/8				
1968-FS-06x06	3/8			3/8	1.82	1.35	3/4				
1968-FS-06x08	3/8			1/2	2.07	1.60	15/16				
1968-FS-08x04	1/2			1/4	1.94	1.44	13/16				
1968-FS-08x06	1/2			3/8	1.94	1.44	13/16				
1968-FS-08x08	1/2			1/2	2.19	1.69	15/16				
1968-FS-10x08	5/8			1/2	2.28	1.75	15/16				
1968-FS-12x08	3/4			1/2	2.37	1.81	1 1/8				
1968-FS-12x12	3/4			3/4	2.44	1.88	1 1/8				
1968-FS-16x12	1			3/4	2.55	1.88	1 3/8				
1968-FS-16x16	1			1	2.73	2.07	1 3/8				

## FLARELESS TUBE FITTINGS

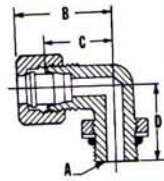
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D Hex	E
<b>1968-FSO MALE CONNECTOR</b> Tube to Straight Thread with O-Ring	1968-FSO-04	1/4	7/16-20	1.55	1.13		9/16	.360
	1968-FSO-06	3/8	9/16-18	1.68	1.21		1 1/16	.391
	1968-FSO-08	1/2	3/4-16	1.88	1.38		7/8	.438
	1968-FSO-12	3/4	1 1/16-12	2.35	1.79		1 1/4	.594
	1968-FSO-16	1	1 5/16-12	2.48	1.82		1 1/2	.594



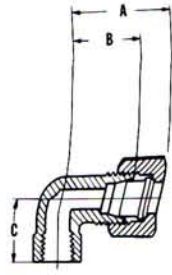
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>1969-FS MALE ELBOW</b> Tube to Male P.T.	1969-FS-04x02	1/4	1/8	1.31	.89	.78		
	1969-FS-04x04	1/4	1/4	1.45	1.03	1.09		
	1969-FS-05x02	5/16	1/8	1.37	.95	.78		
	1969-FS-05x04	5/16	1/4	1.45	1.03	1.09		
	1969-FS-06x04	3/8	1/4	1.52	1.05	1.09		
	1969-FS-06x06	3/8	3/8	1.61	1.14	1.22		
	1969-FS-06x08	3/8	1/2	1.71	1.24	1.47		
	1969-FS-08x04	1/2	1/4	1.75	1.25	1.22		
	1969-FS-08x06	1/2	3/8	1.75	1.25	1.22		
	1969-FS-08x08	1/2	1/2	1.85	1.35	1.47		
	1969-FS-10x08	5/8	1/2	1.95	1.42	1.47		
	1969-FS-12x12	3/4	3/4	2.14	1.58	1.59		
	1969-FS-16x16	1	1	2.39	1.73	1.97		



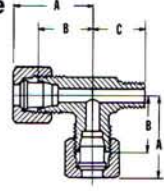
<b>1969-FSO MALE ELBOW</b> Tube to Straight Thread with O-Ring, Back-up Washer and Lock Nut	1969-FSO-04	1/4	7/16-20	1.31	.89	1.03		
	1969-FSO-06	3/8	9/16-18	1.52	1.05	1.25		
	1969-FSO-08	1/2	3/4-16	1.77	1.27	1.45		
	1969-FSO-12	3/4	1 1/16-12	2.14	1.58	1.94		
	1969-FSO-16	1	1 5/16-12	2.39	1.73	2.05		



<b>1970-FS FEMALE ELBOW</b> Tube to Female P.T.	1970-FS-04x02	1/4	1/8	1.31	.89	.66		
	1970-FS-04x04	1/4	1/4	1.45	1.03	.88		
	1970-FS-06x04	3/8	1/4	1.52	1.05	.88		
	1970-FS-08x06	1/2	3/8	1.73	1.23	1.02		
	1970-FS-08x08	1/2	1/2	1.85	1.35	1.23		
	1970-FS-10x08	5/8	1/2	1.95	1.42	1.23		
1970-FS-12x12	3/4	3/4	2.14	1.58	1.36			
1970-FS-16x16	1	1	2.39	1.73	1.62			




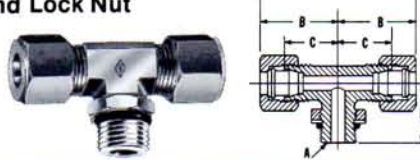
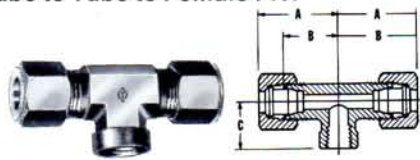
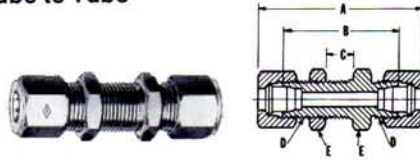
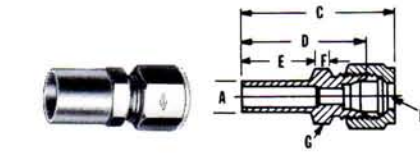
<b>1971-FS MALE RUN TEE</b> Tube to Male P.T. to Tube	1971-FS-04x02	1/4	1/8	1.31	.89	.78		
	1971-FS-04x04	1/4	1/4	1.42	1.00	.78		
	1971-FS-06x04	3/8	1/4	1.52	1.05	1.09		
	1971-FS-08x06	1/2	3/8	1.75	1.25	1.22		
	1971-FS-08x08	1/2	1/2	1.85	1.35	1.47		
	1971-FS-10x08	5/8	1/2	1.95	1.42	1.47		
	1971-FS-12x12	3/4	3/4	2.14	1.58	1.59		
	1971-FS-16x16	1	1	2.39	1.73	1.97		



# DIMENSIONAL DATA

# SERIES 1900

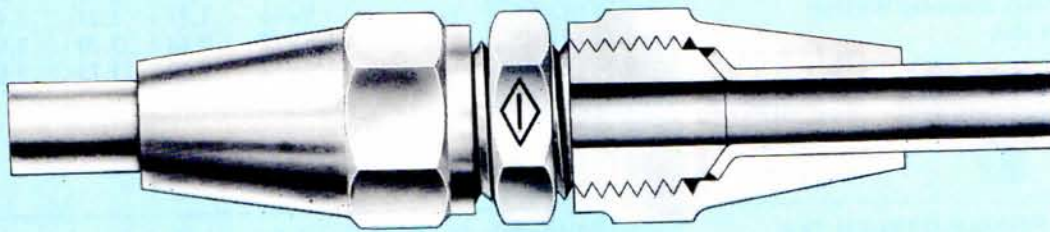
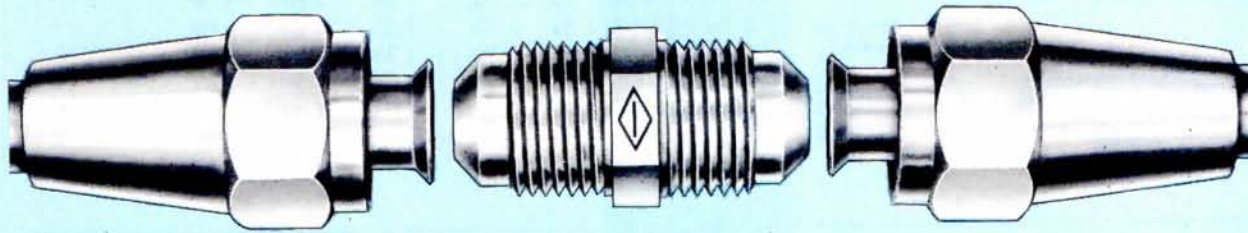
## FLARELESS TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>1972-FS MALE BRANCH TEE</b> Tube to Tube to Male P.T. 	1972-FS-04x02	1/4	1/8	1.31	.89	.78		
	1972-FS-04x04	1/4	1/4	1.45	1.03	1.09		
	1972-FS-06x04	3/8	1/4	1.52	1.05	1.09		
	1972-FS-08x06	1/2	3/8	1.75	1.25	1.22		
	1972-FS-08x08	1/2	1/2	1.85	1.35	1.47		
	1972-FS-10x08	5/8	1/2	1.95	1.42	1.47		
	1972-FS-12x12	3/4	3/4	2.14	1.58	1.59		
1972-FS-16x16	1	1	2.39	1.73	1.97			
<b>1972-FSO MALE BRANCH TEE</b> Tube to Tube to Straight Thread with O-Ring, Back-up Washer and Lock Nut 	1972-FSO-04	1/4	7/16-20	1.31	.89	1.03		
	1972-FSO-06	3/8	9/16-18	1.52	1.05	1.25		
	1972-FSO-08	1/2	3/4-16	1.77	1.27	1.45		
	1972-FSO-12	3/4	1 1/16-12	2.14	1.58	1.94		
	1972-FSO-16	1	1 5/16-12	2.39	1.73	2.05		
<b>1977-FS FEMALE BRANCH TEE</b> Tube to Tube to Female P.T. 	1977-FS-04x02	1/4	1/8	1.31	.89	.66		
	1977-FS-06x04	3/8	1/4	1.52	1.05	.88		
	1977-FS-08x06	1/2	3/8	1.73	1.23	1.02		
	1977-FS-12x12	3/4	3/4	2.14	1.58	1.36		
	1977-FS-16x16	1	1	2.39	1.73	1.62		
<b>1982-FS BULKHEAD UNION</b> Tube to Tube 	1982-FS-04	1/4		2.73	1.89	.50	7/16-20	1 1/16
	1982-FS-06	3/8		2.92	1.98	.56	9/16-18	1 3/16
	1982-FS-08	1/2		3.22	2.22	.56	3/4-16	1
<b>1983-FS REDUCER</b> 	1983-FS-06x04	3/8	1/4	2.03	1.61	.88	.22	1/2
	1983-FS-08x04	1/2	1/4	2.15	1.73	1.00	.22	9/16
	1983-FS-08x06	1/2	3/8	2.24	1.77	1.00	.25	5/8
	1983-FS-12x06	3/4	3/8	2.40	1.93	1.16	.25	13/16
	1983-FS-12x08	3/4	1/2	2.53	2.03	1.16	.25	13/16

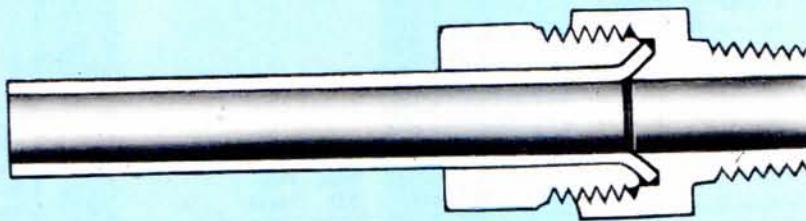
# 45° FLARED

# SPECIFICATIONS

AND INVERTED FLARE TUBE FITTINGS



45° FLARED TUBE FITTING



45° INVERTED FLARE TUBE FITTING

Industry standard fitting well adapted to high pressure service with exceptional resistance to mechanical pull out.

**SIZE RANGE:** Tube:  $\frac{1}{8}$ " to  $\frac{7}{8}$ " O.D.  
Port:  $\frac{1}{8}$ " to  $\frac{3}{4}$ " NPTF

**MAXIMUM WORKING**

**PRESSURE:** 7,000 psi

**MATERIALS:** Brass

**COMPATIBLE TUBING:** Copper, Aluminum, Brass, Thin-wall Soft Steel (seamed or seamless)

## CONFORMANCES:

S.A.E.: Meet S.A.E. J512 automotive tube fitting standards.

A.N.S.I. — B31.1 codes for Pressure Piping.

A.S.M.E. — Boiler and Pressure Vessel Code.

See following data for specific information

# SPECIFICATIONS

# 45° FLARED TUBE FITTINGS



## IDEAL FOR HIGH PRESSURE SERVICE

Flared fittings make joints which are well adapted to high pressure service and have exceptional resistance to mechanical pull out. They are especially adapted for use where a joint is to be subjected to periodical disassembly as they will give repeated tight connections.

The positive nature of the joint, with the flare on the tube clamped between the nut and the body, makes for extreme dependability and safety.

## EASY SIZE IDENTIFICATION

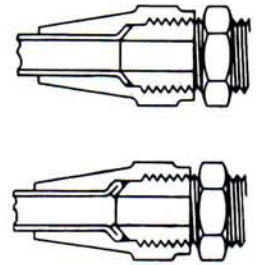
Tubing size is marked on the nut for quick size identification.

## APPLICATIONS

Widely used on high, medium, and low pressure lines where excessive vibration or tube movement is not involved. Proven on mobile equipment, machinery, air compressors, oil burners, refrigeration, air conditioning, marine and LP gas applications.

## SINGLE OR DOUBLE FLARES

Tubing may be either "single" or "double flared" for maximum reliability. When working with Bundy steel or similar tubing, the double flare is recommended to insure against cracking or splitting of the tubing in flaring. Single flares are most commonly used today in connecting copper, and aluminum tubing.



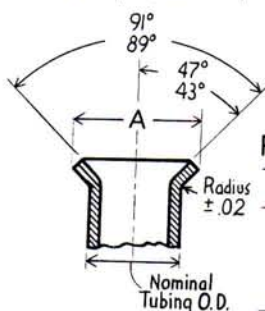
## DOUBLE FLARE ELIMINATES OVER-TIGHTENING DANGER

One of the advantages of a double-flare is that an effective seal is secured with specified wrench torques, and yet maximum wrench torques for single flares can be exceeded by a considerable margin without "ironing out" or "washing out" the flare. The double flare compensates for this over-torquing while maintaining a reliable seal. The double-flare is also desirable for tubing joints which must be taken apart and reassembled frequently, especially on tube size 3/8" O.D. or smaller.

## COMPARATIVE VIBRATION DATA

Type of Fitting	Type of Tubing	Type of Flare	Duration of Test Cycles	Result
Flared	20 ga. Copper	Single	72,450	Failed
Flared	.028 wall Bundy steel	Double	193,200	Failed
Compression	20 ga. Copper	—	79,350	Failed
Hi-Duty	20 ga. Copper	—	401,925	Failed
Flex	20 ga. Copper	—	21,424,500	No Failure

One end of 5/16" O.D. tube, 11" long held stationary, other end flexed 5/16" at 1725 cycles per minute. Liquid pressure in tube 25 psi, tensile pull 10 lbs.



## RECOMMENDED S.A.E. SINGLE FLARE SIZES

O.D. TUBE		1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"
Flare Diameter (A)	Max.	.200	.280	.360	.430	.490	.660	.790	.950	1.070
	Min.	.180	.260	.340	.400	.460	.630	.760	.920	1.040
Radius		.03	.03	.03	.03	.04	.06	.06	.08	.08

# 45° FLARED

# SPECIFICATIONS

## TUBE FITTINGS

### RECOMMENDED MAXIMUM WORKING PRESSURES

FITTING MATERIAL: BRASS  
 TUBING MATERIAL: COPPER – DEAD SOFT, COPPER – HALF HARD

SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS												
		COPPER – DEAD SOFT (SEAMLESS)					COPPER – HALF HARD (SEAMLESS)							
		.030"	.032"	.035"	.049"	.065"	.032"	.035"	.042"	.049"	.065"			
Safety Factor 4-1	1/8"	4300		5000			5000							
	3/16"	2850		3300			3400							
	1/4"	2100		2500			2500							
	5/16"		2250	2000			2000							
	3/8"		1800	1650			1700	1850						
	1/2"		1500	1250		2000	1250	1400						2600
	5/8"		1100	1000	1400	1800	1000				1500			2000
	3/4"			850	1150	1500				1100				1700
Safety Factor 6-1	1/8"	2800		3350			3400							
	3/16"	1900		2200			2250							
	1/4"	1430	1500	1650			1700							
	5/16"		1200	1300			1350							
	3/8"		1000	1100			1100	1200						
	1/2"		750	825		1550	850	925						1750
	5/8"			650	930	1200	675				1000			1350
	3/4"			550	775	1000				725				1100
7/8"										750			1000	

FITTING MATERIAL: BRASS  
 TUBING MATERIAL: STEEL SAE 1010 – DEAD SOFT, BRAZED STEEL

SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS													
		STEEL – SAE 1010 – DEAD SOFT COLD DRAWN – (SEAMLESS)					BRAZED STEEL* (Bundy or GM) (ANNEALED)								
		.032"	.035"	.049"	.065"	.083"	.095"	.028"	.032"	.035"	.049"				
Safety Factor 4-1	1/8"	7000									6000				
	3/16"	4600									4100				
	1/4"		3800								3100	3500			
	5/16"		3000	4300							2600	2800			
	3/8"		2500	3600							2000	2350	2500		
	1/2"		1900	2650	3500								1900	2700	
	5/8"			2100	2800	3600								1550	2100
	3/4"			1800	2300		3400								
Safety Factor 6-1	1/8"	4600									4150				
	3/16"	3000									2750				
	1/4"		2550								2050	2350			
	5/16"		2000	2850							1750	1900			
	3/8"		1700	2400							1350	1550	1700		
	1/2"		1250	1750	2300								1250	1800	
	5/8"			1400	1900	2400							1000	1400	
	3/4"			1200	1550		2150								
7/8"				1350	1650										

\*Double lap flare.



# SPECIFICATIONS

# 45° FLARED

TUBE FITTINGS

A two piece tube fitting, an industry standard introduced by Imperial-Eastman in 1905.

## MATERIALS

- Elbows and Tees: Brass Forgings – S.A.E. CA377
- Connectors, Unions Nuts: Stress relieved brass bar stock – S.A.E. CA360

## PIPE THREADS

Long length Dryseal American (National) Standard Taper pipe threads.

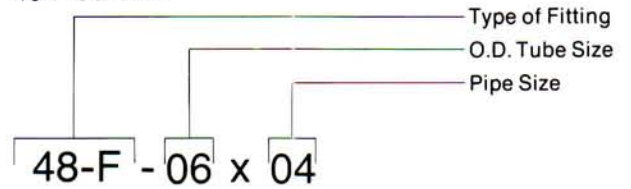
## ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired. Nuts must be ordered separately.

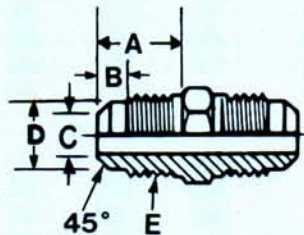
### EXAMPLE:

3/8" O.D. Tube x 1/4" Pipe Thread Male Connector.

48-F-06 x 04.



## TUBE END DIMENSIONS


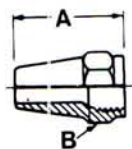

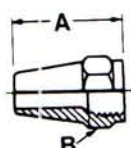

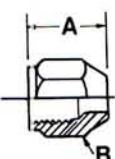

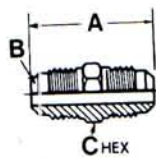

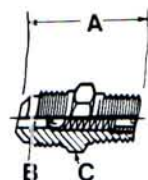

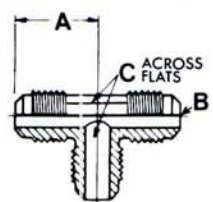


Tube O.D.	A	B	C	D	E Thread
1/8	.38	.12	.109	.234	5/16-24
3/16	.44	.12	.156	.297	3/8-24
1/4	.50	.16	.219	.344	7/16-20
5/16	.56	.19	.250	.406	1/2-20
3/8	.62	.22	.312	.531	5/8-18
7/16	.69	.25	.344	.578	11/16-16
1/2	.75	.25	.438	.641	3/4-16
5/8	.88	.28	.531	.750	7/8-14
3/4	1.00	.28	.719	.938	1 1/16-14
7/8	1.12	.38	.797	1.125	1 1/4-12

# 45° FLARED

TUBE FITTINGS

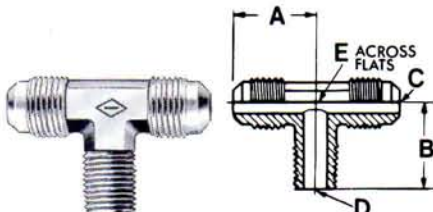
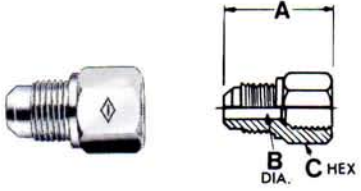
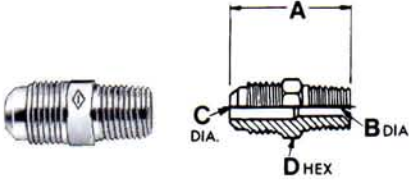
# DIMENSIONAL DATA

		Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	
 	<b>41-F UNION NUT STANDARD LENGTH</b>	41-F-02	1/8		.750	.375				
		41-F-03	3/16		.810	.437				
		41-F-04	1/4		.940	.562				
		41-F-05	5/16		1.120	.625				
		41-F-06	3/8		1.310	.750				
		41-F-07	7/16		1.500	.812				
		41-F-08	1/2		1.620	.875				
		41-F-10	5/8		1.880	1.062				
		41-F-12	3/4		2.190	1.250				
		41-F-14	7/8		2.310	1.500				
	 	<b>41-FS UNION NUT SHORT LENGTH</b>	41-FS-02	1/8		.500	.375			
			41-FS-03	3/16		.620	.437			
			41-FS-04	1/4		.750	.562			
			41-FS-05	5/16		.880	.625			
		41-FS-06	3/8		1.000	.750				
		41-FS-07	7/16		1.060	.812				
		41-FS-08	1/2		1.120	.875				
		41-FS-10	5/8		1.310	1.062				
		41-FS-12	3/4		1.500	1.250				
		41-FS-14	7/8		1.620	1.500				
 		<b>511-GS SHORT NUT</b>	511-GS-04	1/4		.500	.562			
			511-GS-06	3/8		.687	.750			
			511-GS-08	1/2		.812	.875			
			511-GS-10	5/8		1.000	1.062			
 	<b>42-F UNION</b>	42-F-02	1/8		.920	.078	.312			
		42-F-03	3/16		1.060	.125	.375			
		42-F-04	1/4		1.190	.188	.437			
		42-F-05	5/16		1.340	.219	.500			
		42-F-06	3/8		1.500	.281	.625			
		42-F-07	7/16		1.660	.312	.687			
		42-F-08	1/2		1.810	.406	.750			
		42-F-10	5/8		2.120	.500	.875			
		42-F-12	3/4		2.440	.625	1.062			
	 	<b>43-F BALL CHECK</b>	43-F-02x02	1/8	1/8	.920	.078	.438		
		43-F-03x02	3/16	1/8	1.000	.125	.438			
		43-F-04x02	1/4	1/8	1.060	.136	.438			
		43-F-05x02	5/16	1/8	1.160	.136	.500			
		43-F-06x04	3/8	1/4	1.440	.187	.625			
		43-F-07x04	7/16	1/4	1.530	.187	.688			
		43-F-08x06	1/2	3/8	1.620	.250	.750			
 	<b>44-F UNION TEE</b>	44-F-02	1/8		.620	.078	.312			
		44-F-03	3/16		.750	.125	.375			
		44-F-04	1/4		.880	.188	.375			
		44-F-05	5/16		.910	.219	.437			
		44-F-06	3/8		1.060	.281	.500			
		44-F-07	7/16		1.120	.312	.625			
		44-F-08	1/2		1.220	.406	.625			
		44-F-10	5/8		1.410	.500	.812			
		44-F-12	3/4		1.660	.625	1.000			

# DIMENSIONAL DATA

# 45° FLARED

## TUBE FITTINGS

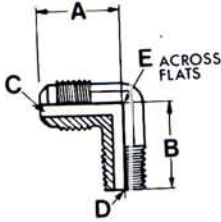
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
	<b>45-F MALE BRANCH TEE</b>							
	45-F-03x02	3/16	1/8	.750	.750	.125	.219	.375
	45-F-04x02	1/4	1/8	.810	.780	.188	.219	.375
	45-F-04x04	1/4	1/4	.910	.940	.188	.312	.437
	45-F-05x02	5/16	1/8	.910	.780	.219	.219	.437
	45-F-06x04	3/8	1/4	1.030	1.060	.281	.312	.500
	45-F-06x06	3/8	3/8	1.060	1.090	.281	.406	.625
	45-F-07x04	7/16	1/4	1.120	1.060	.312	.312	.625
	45-F-08x06	1/2	3/8	1.220	1.120	.406	.406	.625
	45-F-08x08	1/2	1/2	1.280	1.380	.406	.562	.812
	45-F-10x08	5/8	1/2	1.410	1.380	.500	.562	.812
	45-F-12x08	3/4	1/2	1.620	1.500	.625	.562	1.000
45-F-12x12	3/4	3/4	1.620	1.620	.625	.750	1.000	
	<b>46-F FEMALE CONNECTOR</b>							
	46-F-03x02	3/16	1/8	.970	.125	.562		
	46-F-04x02	1/4	1/8	1.030	.188	.562		
	46-F-04x04	1/4	1/4	1.250	.188	.688		
	46-F-05x02	5/16	1/8	1.060	.219	.562		
	46-F-05x04	5/16	1/4	1.280	.219	.688		
	46-F-06x02	3/8	1/8	1.120	.281	.625		
	46-F-06x04	3/8	1/4	1.310	.281	.688		
	46-F-06x06	3/8	3/8	1.380	.281	.812		
	46-F-06x08	3/8	1/2	1.620	.281	1.000		
	46-F-06x12	3/8	3/4	1.660	.281	1.250		
	46-F-07x04	7/16	1/4	1.410	.312	.688		
	46-F-08x06	1/2	3/8	1.500	.406	.812		
	46-F-08x08	1/2	1/2	1.750	.406	1.000		
46-F-08x12	1/2	3/4	1.810	.406	1.250			
46-F-10x06	5/8	3/8	1.590	.500	.875			
46-F-10x08	5/8	1/2	1.810	.500	1.000			
46-F-10x12	5/8	3/4	1.910	.500	1.250			
46-F-12x08	3/4	1/2	1.910	.625	1.062			
46-F-12x12	3/4	3/4	1.970	.625	1.250			
	<b>48-F MALE CONNECTOR</b>							
	48-F-02x02	1/8	1/8	.920	.219	.078	.438	
	48-F-03x02	3/16	1/8	1.000	.219	.125	.438	
	48-F-04x02	1/4	1/8	1.060	.219	.188	.438	
	48-F-04x04	1/4	1/4	1.250	.312	.188	.562	
	48-F-04x06	1/4	3/8	1.310	.406	.188	.688	
	48-F-04x08	1/4	1/2	1.560	.562	.188	.875	
	48-F-05x02	5/16	1/8	1.160	.219	.219	.500	
	48-F-05x04	5/16	1/4	1.340	.312	.219	.562	
	48-F-06x02	3/8	1/8	1.250	.219	.281	.625	
	48-F-06x04	3/8	1/4	1.440	.312	.281	.625	
	48-F-06x06	3/8	3/8	1.440	.406	.281	.688	
	48-F-06x08	3/8	1/2	1.690	.562	.281	.875	
	48-F-06x12	3/8	3/4	1.810	.750	.281	1.062	
	48-F-07x04	7/16	1/4	1.530	.312	.312	.688	
	48-F-08x04	1/2	1/4	1.620	.312	.406	.750	
	48-F-08x06	1/2	3/8	1.620	.406	.406	.750	
	48-F-08x08	1/2	1/2	1.810	.562	.406	.875	
48-F-08x12	1/2	3/4	1.940	.750	.406	1.062		
48-F-10x06	5/8	3/8	1.810	.406	.500	.875		
48-F-10x08	5/8	1/2	2.000	.562	.500	.875		
48-F-10x12	5/8	3/4	2.060	.750	.500	1.062		
48-F-12x08	3/4	1/2	2.190	.562	.625	1.062		
48-F-12x12	3/4	3/4	2.190	.750	.625	1.062		
48-F-14x12	7/8	3/4	2.370	.750	.750	1.250		

# 45° FLARED

# DIMENSIONAL DATA

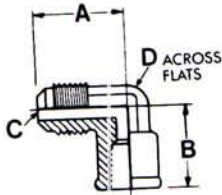
## TUBE FITTINGS

### 49-F MALE ELBOW



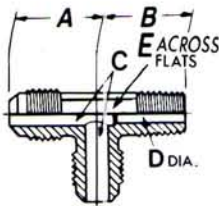
Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
49-F-02x02	1/8	1/8	.650	.690	.078	.219	.375
49-F-03x02	3/16	1/8	.750	.750	.125	.219	.406
49-F-04x02	1/4	1/8	.825	.780	.188	.219	.406
49-F-04x04	1/4	1/4	.910	.940	.188	.312	.500
49-F-04x06	1/4	3/8	.940	1.030	.188	.406	.625
49-F-05x02	5/16	1/8	.910	.780	.219	.219	.437
49-F-05x04	5/16	1/4	.970	.940	.219	.312	.437
49-F-06x02	3/8	1/8	1.030	.910	.281	.219	.500
49-F-06x04	3/8	1/4	1.000	1.060	.281	.312	.500
49-F-06x06	3/8	3/8	1.060	1.090	.281	.406	.562
49-F-06x08	3/8	1/2	1.160	1.280	.281	.500	.750
49-F-06x12	3/8	3/4	1.250	1.280	.281	.750	.937
49-F-07x04	7/16	1/4	1.120	1.060	.312	.312	.500
49-F-08x04	1/2	1/4	1.250	1.120	.406	.312	.687
49-F-08x06	1/2	3/8	1.220	1.120	.406	.406	.625
49-F-08x08	1/2	1/2	1.280	1.380	.406	.562	.812
49-F-08x12	1/2	3/4	1.410	1.410	.406	.750	1.000
49-F-10x08	5/8	1/2	1.410	1.380	.500	.562	.812
49-F-10x12	5/8	3/4	1.470	1.500	.500	.750	.937
49-F-12x08	3/4	1/2	1.620	1.500	.625	.562	.937
49-F-12x12	3/4	3/4	1.620	1.620	.625	.750	1.000
49-F-14x12	7/8	3/4	1.750	1.690	.750	.750	1.312

### 50-F FEMALE ELBOW



50-F-03x02	3/16	1/8	.812	.440	.125	.562	
50-F-04x02	1/4	1/8	.880	.470	.188	.562	
50-F-04x04	1/4	1/4	.970	.660	.188	.688	
50-F-05x02	5/16	1/8	.940	.470	.219	.562	
50-F-05x04	5/16	1/4	1.030	.660	.219	.688	
50-F-06x04	3/8	1/4	1.090	.690	.281	.688	
50-F-06x06	3/8	3/8	1.160	.690	.281	.875	
50-F-06x08	3/8	1/2	1.250	.880	.281	1.000	
50-F-06x12	3/8	3/4	1.410	.880	.281	1.250	
50-F-08x06	1/2	3/8	1.280	.750	.406	1.000	
50-F-08x08	1/2	1/2	1.380	.940	.406	1.000	
50-F-08x12	1/2	3/4	1.530	.940	.406	1.250	
50-F-10x06	5/8	3/8	1.410	.810	.500	.938	
50-F-10x08	5/8	1/2	1.500	1.000	.500	1.000	
50-F-10x12	5/8	3/4	1.660	1.000	.500	1.250	
50-F-12x08	3/4	1/2	1.620	1.060	.625	1.125	

### 51-F MALE RUN TEE

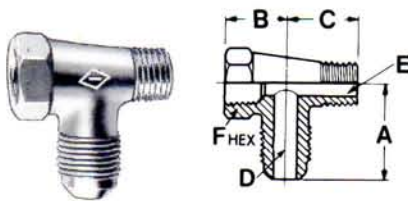
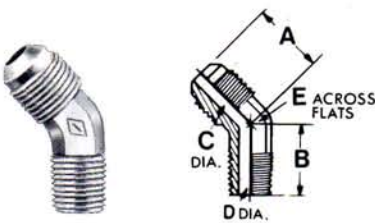
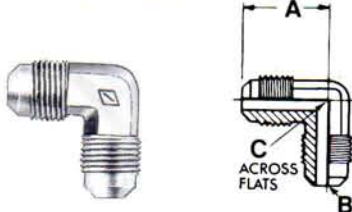


51-F-03x02	3/16	1/8	.750	.750	.125	.219	.375
51-F-04x02	1/4	1/8	.880	.780	.188	.219	.375
51-F-05x02	5/16	1/8	.910	.780	.219	.219	.438
51-F-05x04	5/16	1/4	.970	.940	.219	.312	.500
51-F-06x04	3/8	1/4	1.060	1.060	.281	.312	.500
51-F-06x06	3/8	3/8	1.060	1.090	.281	.406	.625
51-F-08x06	1/2	3/8	1.220	1.120	.406	.406	.625
51-F-08x08	1/2	1/2	1.280	1.380	.406	.562	.812
51-F-10x08	5/8	1/2	1.410	1.380	.500	.562	.812
51-F-12x08	3/4	1/2	1.660	1.500	.625	.562	1.000

# DIMENSIONAL DATA

# 45° FLARED

## TUBE FITTINGS

		Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>53-F TEE</b> 		53-F-03x02	3/16	1/8	.810	.531	.720	.125	.219	.562
		53-F-04x02	1/4	1/8	.880	.590	.720	.188	.219	.562
		53-F-05x02	5/16	1/8	.940	.590	.720	.219	.219	.562
		53-F-06x04	3/8	1/4	1.120	.750	.840	.281	.312	.750
<b>54-F 45° MALE ELBOW</b> 		54-F-03x02	3/16	1/8	.625	.656	.125	.218	.437	
		54-F-04x02	1/4	1/8	.687	.656	.187	.218	.437	
		54-F-04x04	1/4	1/4	.750	.875	.187	.281	.500	
		54-F-05x02	5/16	1/8	.750	.656	.218	.218	.437	
		54-F-06x04	3/8	1/4	.875	.875	.281	.281	.500	
		54-F-08x06	1/2	3/8	1.000	.875	.406	.406	.625	
		54-F-10x08	5/8	1/2	1.125	1.156	.500	.562	.812	
		54-F-12x08	3/4	1/2	1.312	1.218	.625	.562	1.062	
		54-F-12x12	3/4	3/4	1.312	1.218	.625	.750	1.062	
<b>55-F UNION ELBOW</b> 		55-F-04	1/4		.880	.188	.437			
		55-F-05	5/16		.940	.219	.437			
		55-F-06	3/8		1.060	.281	.500			
		55-F-07	7/16		1.150	.312	.687			
		55-F-08	1/2		1.250	.406	.687			
		55-F-10	5/8		1.440	.500	.812			
		55-F-12	3/4		1.690	.625	1.000			

# 45° INVERTED

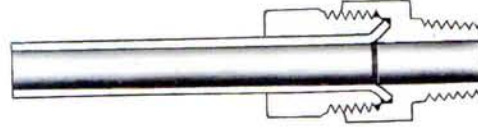
# SPECIFICATIONS

## INVERTED FLARE TUBE FITTINGS

Regular 45° flare, except flare seat is inside body. Seat and threads are protected. For copper, aluminum and Bundy, GM or Avon steel tubing.

### RECOMMENDED MAXIMUM WORKING PRESSURES

FITTING MATERIAL: BRASS  
 TUBING MATERIAL: COPPER—DEAD SOFT (SEAMLESS)  
 COPPER—HALF HARD (SEAMLESS)



SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS									
		COPPER—DEAD SOFT (SEAMLESS)					COPPER—HALF HARD (SEAMLESS)				
		.030"	.032"	.035"	.049"	.065"	.032"	.035"	.042"	.049"	.065"
STATIC PRESSURE	1/8"	2100		2500			2500				
	3/16"	1400		1650			1700				
Minor Line	1/4"	1050	1100	1250			1250				
	5/16"		900	1000			1000				
Vibration	3/8"		750	825			850	925			
	1/2"		575	625		1150	650	700			1300
	5/8"			500	700	900	500			775	1000

FITTING MATERIAL: BRASS  
 TUBING MATERIAL: BRAZED STEEL\* (ANNEALED)

SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS			
		BRAZED STEEL (ANNEALED)			
		.028"	.032"	.035"	.049"
STATIC PRESSURE	1/8"	2500			
	3/16"	2000			
Minor Line	1/4"	1550	1750		
	5/16"	1300	1400		
Vibration	3/8"	1000	1150	1250	
	1/2"			950	1350
	5/8"			775	1050

\*Double lap flare.

### MATERIALS:

- Elbows and Tees: Brass Forgings—S.A.E. CA377
- Connectors, Unions, No. 41-WB Nuts: Stress relieved brass bar stock—S.A.E. CA360
- No. 41-W Nuts: Steel bar stock—12L14

### PIPE THREADS

Long length Dryseal American (National) Standard Taper pipe threads.

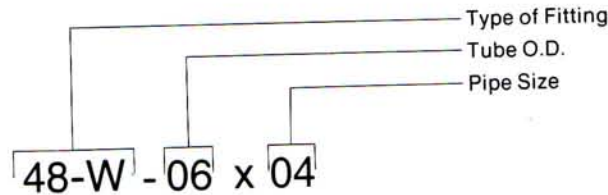
### ORDERING INFORMATION

To order, simply specify catalog number for configuration and size desired. Nuts must be ordered separately.

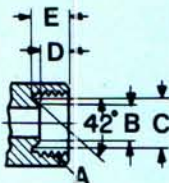
#### EXAMPLE:

3/8" O.D. Tube x 1/4" pipe thread male connector.

48-W-06 x 04



### TUBE END DIMENSIONS


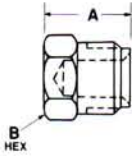

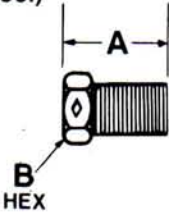

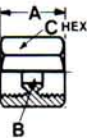
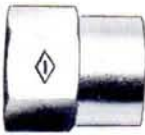
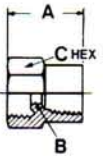


Tube O.D.	A	B	C	D	E
1/8	5/16-28	.104	.218	.187	.250
3/16	3/8-24	.151	.265	.203	.266
1/4	7/16-24	.214	.328	.203	.266
5/16	1/2-20	.276	.390	.234	.297
3/8	5/8-18	.342	.484	.266	.344
1/2	3/4-18	.467	.609	.312	.391
5/8	7/8-18	.592	.734	.328	.406
3/4	1 1/16-16	.703	.903	.359	.469

# DIMENSIONAL DATA

# 45° INVERTED


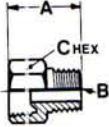

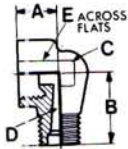

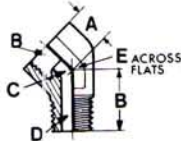
## INVERTED FLARE TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>39-W PLUG (Steel)</b>   	39-W-03	3/16		.530	.375			
	39-W-04	1/4		.540	.437			
	39-W-05	5/16		.590	.500			
<b>41-W NUT</b> Zinc plated steel. For brass nuts, specify 41WB, except 3/4" size.	41-W-02	1/8		.520	.312	5/16-28		
	41-W-03	3/16		.560	.375	3/8-24		
	41-W-04	1/4		.560	.437	7/16-24		
	41-W-05	5/16		.620	.500	1/2-20		
	41-W-06	3/8		.660	.625	5/8-18		
	41-W-08	1/2		.740	.750	3/4-18		
	41-W-10	5/8		.800	.875	7/8-18		
	41-W-12	3/4		.880	1.062	1-1/16-16		
<b>41-WL LONG NUT (Steel)</b>   	41-WL-03	3/16		.690	.375			
	41-WL-04	1/4		.690	.437			
<b>42-W UNION</b>   	42-W-02	1/8		.590	.078	.406		
	42-W-03	3/16		.620	.125	.468		
	42-W-04	1/4		.620	.188	.531		
	42-W-05	5/16		.700	.219	.593		
	42-W-06	3/8		.800	.281	.750		
	42-W-08	1/2		.910	.406	.906		
	42-W-10	5/8		.970	.531	1.062		
<b>46-W FEMALE CONNECTOR</b>   	46-W-03x02	3/16	1/8	.750	.125	.500		
	46-W-04x02	1/4	1/8	.750	.188	.531		
	46-W-05x02	5/16	1/8	.780	.219	.593		
	46-W-06x04	3/8	1/4	1.030	.281	.750		
	46-W-08x06	1/2	3/8	1.090	.406	.906		
	46-W-10x08	5/8	1/2	1.310	.531	1.062		

# 45° INVERTED

INVERTED FLARE TUBE FITTINGS

# DIMENSIONAL DATA

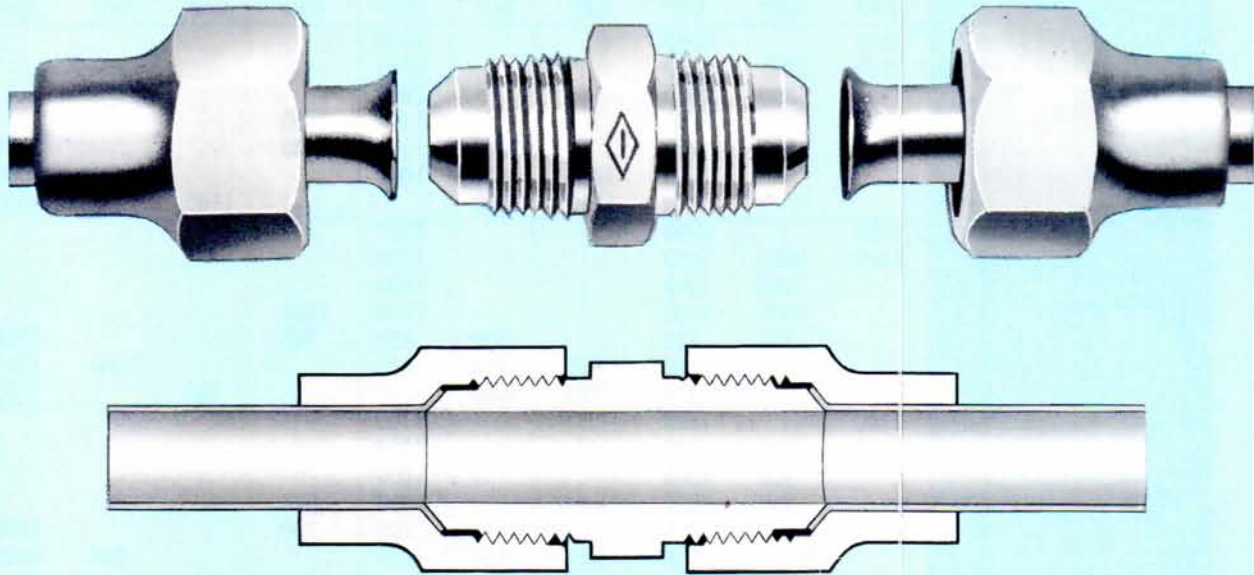
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
 	48-W-02x02	1/8	1/8	.620	.078	.406		
	48-W-03x02	3/16	1/8	.690	.125	.468		
	48-W-04x02	1/4	1/8	.730	.188	.531		
	48-W-04x04	1/4	1/4	.937	.187	.562		
	48-W-05x02	5/16	1/8	.780	.219	.593		
	48-W-05x04	5/16	1/4	.970	.219	.593		
	48-W-06x02	3/8	1/8	.875	.218	.718		
	48-W-06x04	3/8	1/4	1.020	.281	.750		
	48-W-06x06	3/8	3/8	1.031	.281	.687		
	48-W-08x06	1/2	3/8	1.060	.406	.906		
	48-W-10x08	5/8	1/2	1.310	.531	1.062		
	48-W-12x12	3/4	3/4	1.380	.625	1.250		
 	49-W-02x02	1/8	1/8	.375	.625	.078	.128	.500
	49-W-03x02	3/16	1/8	.375	.625	.125	.128	.500
	49-W-04x02	1/4	1/8	.390	.687	.187	.180	.562
	49-W-04x04	1/4	1/4	.406	.781	.187	.187	.625
	49-W-05x02	5/16	1/8	.453	.718	.218	.218	.625
	49-W-05x04	5/16	1/4	.453	.781	.218	.218	.625
	49-W-06x02	3/8	1/8	.531	.843	.281	.187	.812
	49-W-06x04	3/8	1/4	.531	.875	.281	.250	.812
	49-W-06x06	3/8	3/8	.500	.968	.281	.281	.812
	49-W-08x06	1/2	3/8	.625	1.062	.406	.406	.937
49-W-10x08	5/8	1/2	1.187	1.375	.531	.531	.875	
 	94-W-03x02	3/16	1/8	.312	.500	.125	.156	.562
	94-W-04x02	1/4	1/8	.312	.500	.187	.187	.562
	94-W-05x02	5/16	1/8	.375	.562	.218	.218	.625
	94-W-06x04	3/8	1/4	.437	.750	.281	.281	.812
	94-W-08x06	1/2	3/8	.562	.812	.406	.406	.937



# SPECIFICATIONS

# 45° FLARED

HEAVY DUTY TUBE FITTINGS



Forged flared nuts provide extra protection . . . especially in refrigeration applications.

**SIZE RANGE:** Tube —  $\frac{3}{16}$ " to  $\frac{3}{4}$ " O.D.  
Port —  $\frac{1}{8}$ " to  $\frac{3}{4}$ " NPTF.

**MAXIMUM WORKING PRESSURE:** 4,600 psi.

**MATERIALS:** Brass.

**COMPATIBLE TUBING:** Copper, Aluminum, Brass, Thin-wall Soft Steel (seamed and seamless)

**CONFORMANCES:**

S.A.E.: Meets J513 standards for heavy duty marine and refrigeration service.

A.N.S.I.: B31.1 codes for pressure piping. B70.1 Refrigeration Tube Fittings.

A.S.M.E.: Boiler and Pressure Vessel Code.

See following data for specific information.

# 45° FLARED

# SPECIFICATIONS

## HEAVY DUTY FLARED TUBE FITTINGS

### RECOMMENDED MAXIMUM WORKING PRESSURES

FITTING MATERIAL: BRASS

TUBING MATERIAL: COPPER—DEAD SOFT  
COPPER—HALF HARD

SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS									
		COPPER—DEAD SOFT (SEAMLESS)					COPPER—HALF HARD (SEAMLESS)				
		.030"	.032"	.035"	.049"	.065"	.032"	.035"	.042"	.049"	.065"
Safety Factor 4-1	3/16"	2850		3300			3400				
	1/4"	2100	2250	2500			2500				
	5/16"		1800	2000			2000				
	3/8"		1500	1650			1700	1850			
	1/2"		1100	1250		2300	1250	1400		1500	2600
	5/8"			1000	1400	1800	1000				2000
	3/4"			850	1150	1500			1100		1700
Safety Factor 6-1	3/16"	1900		2200			2250				
	1/4"	1400	1500	1650			1700				
	5/16"		1200	1300			1300				
	3/8"		1000	1100			1100	1200			
	1/2"		750	825		1500	850	925		1000	1700
	5/8"			650	925	1200	675				1350
	3/4"			550	775	1000			725		1150
Safety Factor 8-1	3/16"	1400		1675			1700				
	1/4"	1075	1100	1250			1250				
	5/16"		900	1000			1000				
	3/8"		750	825			850	925			
	1/2"		575	625		1150	625	700		800	1300
	5/8"			500	700	900	500				1000
	3/4"			400	575	775			550		850

\*Double Lap Flare.

FITTING MATERIAL: BRASS

TUBING MATERIAL: STEEL—COLD DRAWN  
BRAZED STEEL

SERVICE CONDITIONS	TUBE O.D.	TYPE OF TUBING AND WALL THICKNESS									
		STEEL—S.A.E. 1010—DEAD SOFT COLD DRAWN (SEAMLESS)						BRAZED STEEL* (BUNDY OR GM) (ANNEALED)			
		.032"	.035"	.049"	.065"	.083"	.095"	.028"	.032"	.035"	.049"
Safety Factor 4-1	3/16"	4600						4000			
	1/4"		3800					3000	3500		
	5/16"		3000	4300				2600	2850		
	3/8"		2500	3600				2000	2350	2500	2700
	1/2"		1900	2650	3500					1900	2100
	5/8"			2100	2800	3600				1500	
	3/4"			1800	2300		3400				
Safety Factor 6-1	3/16"	3000						2700			
	1/4"		2500					3000	3500		
	5/16"		2000	2900				1700	1900		
	3/8"		1700	2400				1350	1550	1700	
	1/2"		1300	1800	2300					1250	1800
	5/8"			1400	1900	2450				1000	1400
	3/4"			1200	1550		2300				
Safety Factor 8-1	3/16"	2300						2000			
	1/4"		1900					1550	1750		
	5/16"		1500	2200				1300	1400		
	3/8"		1250	1800				900	1150	1250	
	1/2"		950	1300	1750					950	1350
	5/8"			1000	1400	1800				775	1050
	3/4"			900	1150		1700				

\*Double Lap Flare.

# SPECIFICATIONS

# 45° FLARED

## HEAVY DUTY TUBE FITTINGS

A two piece tube fitting ideally suited to process piping, oil, instrument lines, mobile or stationary refrigeration units. Furnished with plastic caps to protect flare seats and threads.

### MATERIALS:

- Elbows, Tees, Nuts: Brass forgings—S.A.E. CA377
- Connectors, Unions: Stress relieved brass bar stock S.A.E. CA360.

### PIPE THREADS:

Long length Dryseal American (National) Standard taper pipe threads.

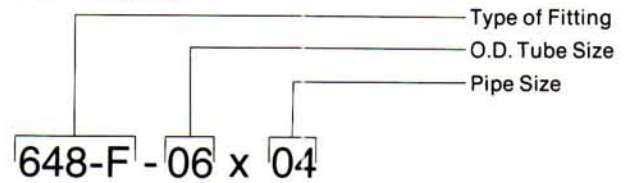
### ORDERING INFORMATION:

To order, simply specify catalog number for configuration and size desired. Nuts must be ordered separately.

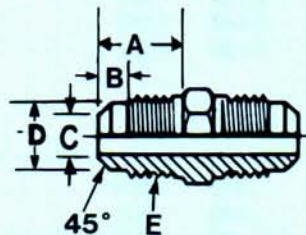
### EXAMPLE:

3/8" O.D. tube x 1/4" pipe thread Male Connector.

648-F-06 x 04.



TUBE END DIMENSIONS


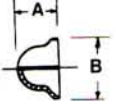

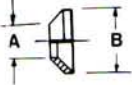



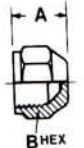



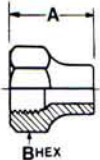


Tube O.D.	A	B	C	D	E Thread
3/16	.44	.12	.156	.297	3/8-24
1/4	.50	.16	.219	.344	7/16-20
5/16	.56	.19	.250	.406	1/2-20
3/8	.62	.22	.312	.531	5/8-18
1/2	.75	.25	.438	.641	3/4-16
5/8	.88	.28	.531	.750	7/8-14
3/4	1.00	.28	.719	.938	1 1/16-14

# 45° FLARED

HEAVY DUTY TUBE FITTINGS




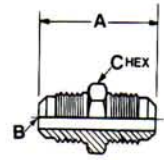

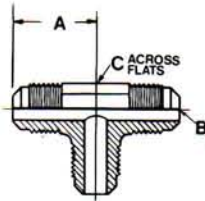

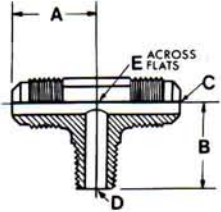
# DIMENSIONAL DATA

		Catalog Number	Tube O.D.	A	B	C	D	E
 		64-C-03	3/16	.156	.312			
		64-C-04	1/4	.218	.359			
		64-C-05	5/16	.281	.406			
		64-C-06	3/8	.343	.531			
		64-C-08	1/2	.406	.640			
		64-C-10	5/8	.437	.765			
		64-C-12	3/4	.562	.953			
 		625-F-03	3/16	.12	.310			
		625-F-04	1/4	.19	.360			
		625-F-05	5/16	.22	.420			
		625-F-06	3/8	.28	.550			
		625-F-08	1/2	.41	.660			
		625-F-10	5/8	.50	.770			
		625-F-12	3/4	.62	.950			
 		639-F-03	3/16	.590	.375			
		639-F-04	1/4	.690	.437			
		639-F-05	5/16	.780	.500			
		639-F-06	3/8	.880	.625			
		639-F-08	1/2	1.060	.750			
		639-F-10	5/8	1.190	.875			
		639-F-12	3/4	1.310	1.062			
 		640-FB-03	3/16	.470	.500			
		640-FB-04	1/4	.530	.562			
		640-FB-05	5/16	.620	.625			
		640-FB-06	3/8	.690	.750			
		640-FB-08	1/2	.840	.875			
		640-FB-10	5/8	.970	1.062			
		640-FB-12	3/4	1.090	1.312			
 		641-F-04	1/4	.940	.625			
		641-F-05	5/16	.940	.687			
		641-F-06	3/8	1.060	.812			
		641-F-08	1/2	1.190	.937			
		641-F-10	5/8	1.440	1.062			
		641-F-12	3/4	1.750	1.312			
	 		641-FS-03	3/16	.530	.500		
		641-FS-04	1/4	.590	.625			
		641-FS-05	5/16	.620	.687			
		641-FS-06	3/8	.690	.812			
		641-FS-08	1/2	.810	.937			
		641-FS-10	5/8	.940	1.062			
		641-FS-12	3/4	1.120	1.312			

# DIMENSIONAL DATA

# 45° FLARED


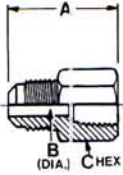
## HEAVY DUTY TUBE FITTINGS


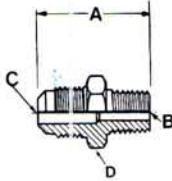
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>641-FSH HEAVY SHORT FORGED NUT</b>								
 	641-FSH-04	1/4		.594	.750			
	641-FSH-05	5/16		.625	.750			
	641-FSH-06	3/8		.688	.875			
	641-FSH-08	1/2		.812	1.000			
	641-FSH-10	5/8		.938	1.125			
	641-FSH-12	3/4		1.125	1.375			
<b>642-F UNION</b>								
 	642-F-03	3/16		1.060	.125	.375		
	642-F-04	1/4		1.190	.188	.437		
	642-F-05	5/16		1.340	.219	.500		
	642-F-06	3/8		1.500	.281	.625		
	642-F-08	1/2		1.810	.406	.750		
	642-F-10	5/8		2.120	.500	.875		
642-F-12	3/4		2.440	.625	1.062			
<b>644-F UNION TEE</b>								
 	644-F-03	3/16		.750	.125	.375		
	644-F-04	1/4		.880	.188	.375		
	644-F-05	5/16		.910	.219	.437		
	644-F-06	3/8		1.060	.281	.500		
	644-F-08	1/2		1.220	.406	.625		
	644-F-10	5/8		1.410	.500	.812		
644-F-12	3/4		1.660	.625	1.000			
<b>645-F MALE BRANCH TEE</b>								
 	645-F-03x02	3/16	1/8	.750	.750	.125	.219	.375
	645-F-04x02	1/4	1/8	.810	.780	.188	.219	.375
	645-F-04x04	1/4	1/4	.910	.940	.188	.312	.437
	645-F-05x02	5/16	1/8	.910	.780	.219	.219	.437
	645-F-05x04	5/16	1/4	.970	.940	.219	.312	.500
	645-F-06x04	3/8	1/4	1.030	1.060	.281	.312	.500
	645-F-06x06	3/8	3/8	1.060	1.090	.281	.406	.625
	645-F-08x04	1/2	1/4	1.220	1.190	.406	.312	.625
	645-F-08x06	1/2	3/8	1.220	1.120	.406	.406	.625
	645-F-08x08	1/2	1/2	1.280	1.380	.406	.562	.812
	645-F-10x08	5/8	1/2	1.410	1.380	.500	.562	.812
	645-F-12x08	3/4	1/2	1.620	1.500	.625	.562	1.000
645-F-12x12	3/4	3/4	1.620	1.620	.625	.750	1.000	

# 45° FLARED

HEAVY DUTY TUBE FITTINGS

# DIMENSIONAL DATA

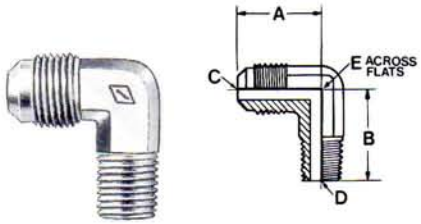
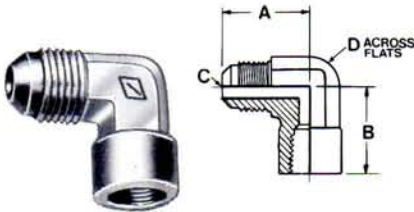
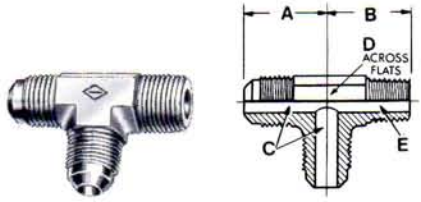
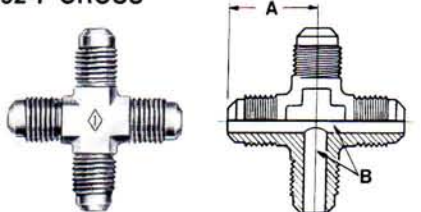
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>646-F FEMALE CONNECTOR</b>   	646-F-03x02	3/16	1/8	.970	.125	.562		
	646-F-04x02	1/4	1/8	1.030	.188	.562		
	646-F-04x04	1/4	1/4	1.250	.188	.688		
	646-F-04x06	1/4	3/8	1.280	.188	.812		
	646-F-05x02	5/16	1/8	1.060	.219	.562		
	646-F-05x04	5/16	1/4	1.280	.219	.688		
	646-F-06x02	3/8	1/8	1.120	.281	.625		
	646-F-06x04	3/8	1/4	1.310	.281	.688		
	646-F-06x06	3/8	3/8	1.380	.281	.812		
	646-F-06x08	3/8	1/2	1.620	.281	1.000		
	646-F-08x04	1/2	1/4	1.410	.406	.750		
	646-F-08x06	1/2	3/8	1.500	.406	.812		
	646-F-08x08	1/2	1/2	1.750	.406	1.000		
	646-F-10x06	5/8	3/8	1.590	.500	.875		
	646-F-10x08	5/8	1/2	1.810	.500	1.000		
	646-F-10x12	5/8	3/4	1.910	.500	1.250		
	646-F-12x08	3/4	1/2	1.910	.625	1.062		
	646-F-12x12	3/4	3/4	1.970	.625	1.250		

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>648-F MALE CONNECTOR</b>   	648-F-03x02	3/16	1/8	1.000	.219	.125	.438	
	648-F-04x02	1/4	1/8	1.060	.219	.188	.438	
	648-F-04x04	1/4	1/4	1.250	.312	.188	.562	
	648-F-04x06	1/4	3/8	1.310	.406	.188	.688	
	648-F-04x08	1/4	1/2	1.560	.562	.188	.875	
	648-F-05x02	5/16	1/8	1.160	.219	.219	.500	
	648-F-05x04	5/16	1/4	1.340	.312	.219	.562	
	648-F-05x06	5/16	3/8	1.380	.406	.219	.688	
	648-F-06x02	3/8	1/8	1.250	.219	.281	.625	
	648-F-06x04	3/8	1/4	1.440	.312	.281	.625	
	648-F-06x06	3/8	3/8	1.440	.406	.281	.688	
	648-F-06x08	3/8	1/2	1.690	.562	.281	.875	
	648-F-06x12	3/8	3/4	1.810	.750	.281	1.062	
	648-F-08x02	1/2	1/8	1.440	.219	.406	.750	
	648-F-08x04	1/2	1/4	1.620	.312	.406	.750	
	648-F-08x06	1/2	3/8	1.620	.406	.406	.750	
	648-F-08x08	1/2	1/2	1.810	.562	.406	.875	
	648-F-08x12	1/2	3/4	1.940	.750	.406	1.062	
	648-F-10x04	5/8	1/4	1.810	.312	.500	.875	
	648-F-10x06	5/8	3/8	1.810	.406	.500	.875	
	648-F-10x08	5/8	1/2	2.000	.562	.500	.875	
	648-F-10x12	5/8	3/4	2.060	.750	.500	1.062	
	648-F-12x08	3/4	1/2	2.190	.562	.625	1.062	
648-F-12x12	3/4	3/4	2.190	.750	.625	1.062		

# DIMENSIONAL DATA

# 45° FLARED

## HEAVY DUTY TUBE FITTINGS

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E
<b>649-F MALE ELBOW</b>								
	649-F-03x02	3/16	1/8	.750	.750	.125	.219	.406
	649-F-04x02	1/4	1/8	.825	.780	.188	.219	.437
	649-F-04x04	1/4	1/4	.910	.940	.188	.312	.500
	649-F-04x06	1/4	3/8	.940	1.030	.188	.406	.625
	649-F-05x02	5/16	1/8	.910	.780	.219	.219	.437
	649-F-05x04	5/16	1/4	.970	.940	.219	.312	.437
	649-F-05x06	5/16	3/8	1.000	1.030	.219	.406	.562
	649-F-06x02	3/8	1/8	1.030	.910	.281	.219	.500
	649-F-06x04	3/8	1/4	1.000	1.060	.281	.312	.500
	649-F-06x06	3/8	3/8	1.060	1.090	.281	.406	.562
	649-F-06x08	3/8	1/2	1.160	1.280	.281	.562	.750
	649-F-06x12	3/8	3/4	1.250	1.280	.281	.562	.750
	649-F-08x04	1/2	1/4	1.250	1.190	.406	.312	.687
	649-F-08x06	1/2	3/8	1.220	1.120	.406	.406	.625
	649-F-08x08	1/2	1/2	1.280	1.380	.406	.562	.812
649-F-08x12	1/2	3/4	1.410	1.410	.406	.750	1.000	
649-F-10x06	5/8	3/8	1.410	1.250	.500	.406	.750	
649-F-10x08	5/8	1/2	1.410	1.380	.500	.562	.812	
649-F-10x12	5/8	3/4	1.470	1.500	.500	.750	.937	
649-F-12x08	3/4	1/2	1.620	1.500	.625	.562	.937	
649-F-12x12	3/4	3/4	1.620	1.620	.625	.750	1.000	
<b>650-F FEMALE ELBOW</b>								
	650-F-03x02	3/16	1/8	.812	.440	.125	.562	
	650-F-04x02	1/4	1/8	.880	.470	.188	.562	
	650-F-04x04	1/4	1/4	.970	.660	.188	.688	
	650-F-04x06	1/4	3/8	1.030	.660	.188	.875	
	650-F-05x02	5/16	1/8	.940	.470	.219	.562	
	650-F-05x04	5/16	1/4	1.030	.660	.219	.688	
	650-F-06x02	3/8	1/8	1.060	.500	.281	.625	
	650-F-06x04	3/8	1/4	1.090	.690	.281	.688	
	650-F-06x06	3/8	3/8	1.160	.690	.281	.875	
	650-F-08x06	1/2	3/8	1.280	.750	.406	1.000	
	650-F-08x08	1/2	1/2	1.380	.940	.406	1.000	
	650-F-10x06	5/8	3/8	1.410	.810	.500	.938	
	650-F-10x08	5/8	1/2	1.500	1.000	.500	1.000	
650-F-12x08	3/4	1/2	1.620	1.060	.625	1.125		
<b>651-F MALE RUN TEE</b>								
	651-F-03x02	3/16	1/8	.750	.750	.125	.375	.219
	651-F-04x02	1/4	1/8	.880	.780	.188	.375	.219
	651-F-04x04	1/4	1/4	.910	.940	.188	.500	.312
	651-F-05x02	5/16	1/8	.910	.780	.219	.438	.219
	651-F-05x04	5/16	1/4	.970	.940	.219	.500	.312
	651-F-06x04	3/8	1/4	1.060	1.060	.281	.500	.312
	651-F-06x06	3/8	3/8	1.060	1.090	.281	.625	.406
	651-F-08x06	1/2	3/8	1.220	1.120	.406	.625	.406
	651-F-08x08	1/2	1/2	1.280	1.380	.406	.812	.562
	651-F-10x08	5/8	1/2	1.410	1.380	.500	.812	.562
	651-F-12x08	3/4	1/2	1.660	1.500	.625	1.000	.562
<b>652-F CROSS</b>								
	652-F-04	1/4		.880	.188			
	652-F-06	3/8		1.060	.281			
	652-F-08	1/2		1.220	.406			
	652-F-10	5/8		1.410	.500			

# 45° FLARED

## HEAVY DUTY TUBE FITTINGS

# DIMENSIONAL DATA

		Catalog Number	Tube O.D.	A	B	C	D	E
<b>655-F UNION ELBOW</b>		655-F-03	3/16	.750	.125	.437		
	655-F-04	1/4	.880	.188	.437			
	655-F-05	5/16	.940	.219	.437			
	655-F-06	3/8	1.060	.281	.500			
	655-F-08	1/2	1.250	.406	.687			
	655-F-10	5/8	1.440	.500	.812			
	655-F-12	3/4	1.690	.625	1.000			
	<b>656-F REDUCING UNION</b>		656-F-04x03	1/4x3/16	1.120	.188	.125	.437
	656-F-05x04	5/16x1/4	1.280	.219	.188	.500		
	656-F-06x04	3/8x1/4	1.380	.281	.188	.625		
	656-F-06x05	3/8x5/16	1.440	.281	.219	.625		
	656-F-08x04	1/2x1/4	1.560	.406	.188	.750		
	656-F-08x06	1/2x3/8	1.690	.406	.281	.750		
	656-F-10x06	5/8x3/8	1.880	.500	.281	.875		
	656-F-10x08	5/8x1/2	2.000	.500	.406	.875		
	656-F-12x08	3/4x1/2	2.190	.625	.406	1.062		
<b>657-F REDUCING UNION ELBOW</b>		657-F-06x04	3/8x1/4	1.060	.910	.281	.188	.562
	657-F-08x04	1/2x1/4	1.220	.970	.406	.188	.625	
	657-F-08x06	1/2x3/8	1.220	1.090	.406	.281	.625	
	657-F-10x08	5/8x1/2	1.410	1.280	.500	.406	.812	
	657-F-12x10	3/4x5/8	1.660	1.500	.625	.500	1.000	
	<b>659-F REDUCING UNION TEE</b>		659-F-06x06x04	3/8x3/8x1/4	1.060	.910	.281	.188
	659-F-08x08x04	1/2x1/2x1/4	1.220	.970	.406	.188	.625	
	659-F-08x08x06	1/2x1/2x3/8	1.220	1.090	.406	.281	.625	
	659-F-10x10x06	5/8x5/8x3/8	1.410	1.160	.500	.281	.812	
	659-F-10x10x08	5/8x5/8x1/2	1.410	1.280	.500	.406	.812	
	659-F-12x12x10	3/4x3/4x5/8	1.660	1.441	.625	.500	1.000	
	<b>660-F FEMALE UNION (Includes Gaskets)</b>		660-F-03	3/16	.880	.188	.500	
	660-F-04	1/4	1.000	.250	.625			
	660-F-05	5/16	1.060	.312	.687			
	660-F-06	3/8	1.250	.375	.812			
	660-F-08	1/2	1.440	.500	.937			
	660-F-10	5/8	1.690	.625	1.062			
	660-F-12	3/4	2.000	.750	1.312			

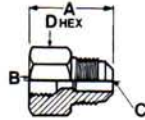


# DIMENSIONAL DATA

# 45° FLARED

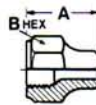
## HEAVY DUTY TUBE FITTINGS

	Catalog Number	Tube O.D.	A	B	C	D	E
<b>661-FA REDUCER</b> (Includes Gasket)	661-FA-03x04	3/16x1/4	.970	.188	.188	.500	
	661-FA-04x03	1/4x3/16	1.030	.125	.125	.625	
	661-FA-04x05	1/4x5/16	1.090	.219	.219	.625	
	661-FA-04x06	1/4x3/8	1.120	.250	.281	.625	
	661-FA-04x08	1/4x1/2	1.250	.250	.406	.750	
	661-FA-05x04	5/16x1/4	1.120	.188	.188	.687	
	661-FA-05x06	5/16x3/8	1.190	.281	.281	.687	
	661-FA-06x04	3/8x1/4	1.220	.188	.188	.812	
	661-FA-06x05	3/8x5/16	1.250	.219	.219	.812	
	661-FA-06x08	3/8x1/2	1.410	.375	.406	.812	
	661-FA-08x04	1/2x1/4	1.380	.188	.188	.937	
	661-FA-08x06	1/2x3/8	1.440	.281	.281	.937	
	661-FA-08x10	1/2x5/8	1.620	.500	.500	.937	
	661-FA-08x12	1/2x3/4	1.690	.500	.625	1.062	
	661-FA-10x08	5/8x1/2	1.690	.406	.406	1.062	
	661-FA-10x12	5/8x3/4	1.880	.625	.625	1.062	
661-FA-12x10	3/4x5/8	1.970	.500	.500	1.312		



### 662-F LONG FORGED REDUCING NUT

662-F-04x03	1/4x3/16	.940	.625		
662-F-05x04	5/16x1/4	.940	.687		
662-F-06x04	3/8x1/4	1.060	.812		
662-F-06x05	3/8x5/16	1.060	.812		
662-F-08x06	1/2x3/8	1.190	.937		
662-F-10x08	5/8x1/2	1.440	1.062		

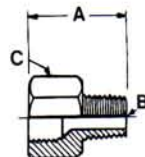


### 662-FS SHORT FORGED REDUCING NUT

662-FS-04x03	1/4x3/16	.590	.625		
662-FS-05x04	5/16x1/4	.620	.687		
662-FS-06x04	3/8x1/4	.690	.812		
662-FS-06x05	3/8x5/16	.690	.812		
662-FS-08x06	1/2x3/8	.810	.937		
662-FS-10x08	5/8x1/2	.940	1.062		
662-FS-12x10	3/4x5/8	1.120	1.312		



	Catalog Number	Tube O.D.	Pipe Thread	A	B	C
<b>664-F FEMALE COUPLING</b> (Includes Gasket)	664-F-04x02	1/4	1/8	.910	.219	.625
	664-F-04x04	1/4	1/4	1.030	.312	.625
	664-F-06x04	3/8	1/4	1.280	.344	.812
	664-F-08x06	1/2	3/8	1.380	.406	.938

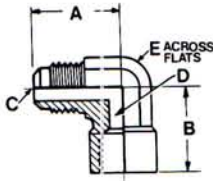


# 45° FLARED


HEAVY DUTY TUBE FITTINGS

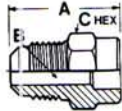
# DIMENSIONAL DATA

	Catalog Number	Tube O.D.	A	B	C	D	E
<b>669-F FEMALE FLARE ELBOW</b> (Includes Gasket)	669-F-04	1/4	.940	.780	.188	.180	.500
	669-F-06	3/8	1.160	.970	.281	.305	.875
	669-F-08	1/2	1.340	1.120	.406	.430	.812




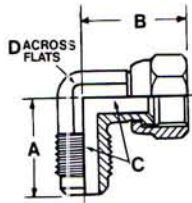
## 672-FS FLARE TO SOLDER UNION

	Catalog Number	Flare End	Solder End	A	B	C	D	E
	672-FS-04x04	1/4	1/4	1.000	.188	.437		
	672-FS-04x06	1/4	3/8	1.000	.188	.500		
	672-FS-06x06	3/8	3/8	1.190	.281	.625		
	672-FS-06x08	3/8	1/2	1.250	.281	.625		
	672-FS-08x08	1/2	1/2	1.440	.406	.750		
	672-FS-08x10	1/2	5/8	1.560	.406	.750		
	672-FS-10x10	5/8	5/8	1.750	.500	.875		



## 679-F FEMALE SWIVEL ELBOW

	Catalog Number	Tube O.D.	A	B	C	D	E
	679-F-06	3/8	1.000	1.265	.281	.500	
	679-F-08	1/2	1.218	1.437	.406	.625	
	679-F-10	5/8	1.437	1.593	.500	.750	



## 682-F FEMALE TEE

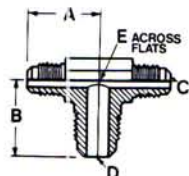
(Includes Gaskets)

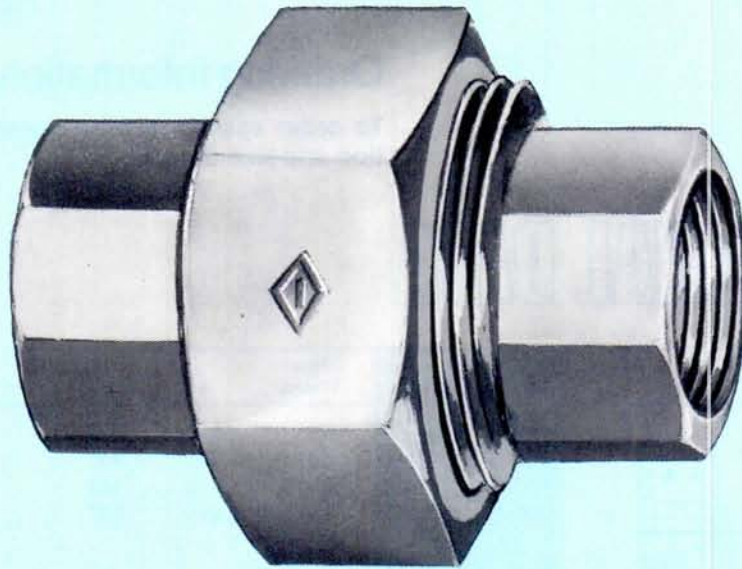
	682-F-04	1/4	.940	.812	.188	.500	
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## 684-F REDUCING UNION TEE

	684-F-04x04x06	1/4x1/4x3/8	.880	1.060	.188	.281	.500
	684-F-06x06x08	3/8x3/8x1/2	1.060	1.220	.281	.406	.625





Compact and easy to install with wrench pads on elbows and tees

**SIZE RANGE:**  $\frac{1}{8}$ " to  $\frac{3}{4}$ " NPTF (Brass)  
 $\frac{1}{8}$ " to  $1\frac{1}{4}$ " NPTF (Steel)

**MAXIMUM WORKING PRESSURE:** Brass—3,000 psi; Steel—3,500 psi

**MATERIALS:** Brass, Steel

See following data for specific information.

# PIPE FITTINGS

# SPECIFICATIONS

## BRASS

Imperial-Eastman pipe fittings are far more compact and easier to install than ordinary pipe fittings. The wrench pads provided on elbows and tees facilitate assembly.

### MATERIALS:

- Elbows, tees and crosses (most): Brass forgings — S.A.E. CA377.
- Straight fittings: Stress relieved bar stock — S.A.E. CA360 or equal.

### RECOMMENDED MAXIMUM WORKING PRESSURES:

1/8" through 3/8" sizes 3,000 psi  
 1/2" size 2,000 psi

#### Exceptions:


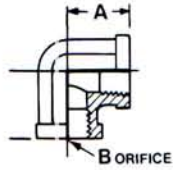

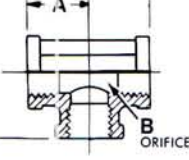

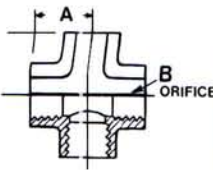


3/8" size and smaller 1/2" size

101-B — 2500 psi	102-B — 1000 psi
102-B — 2500 psi	104-B — 625 psi
104-B — 1500 psi	108-B — 1500 psi
	116-B — 1500 psi
	122-B — 1500 psi

### Ordering Information

To order specify catalog number for configuration and size desired.

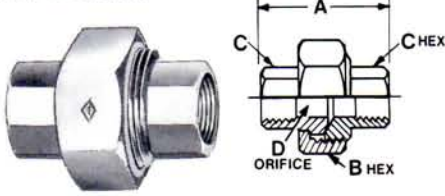
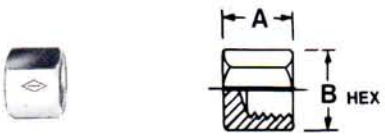
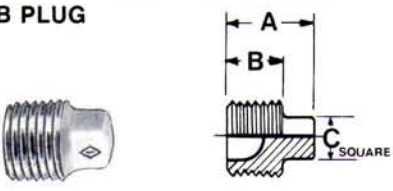
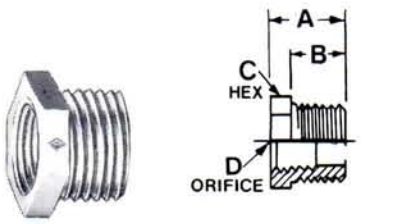
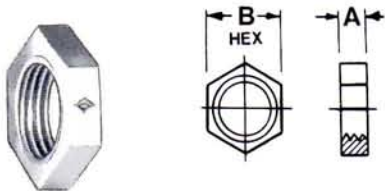
## DIMENSIONAL DATA

		Catalog Number	Pipe Thread	A	B	C	D	E
<b>100-B ELBOW</b>  		100-B-02	1/8	.546	.328			
		100-B-04	1/4	.781	.437			
		100-B-06	3/8	.812	.562			
		100-B-08	1/2	1.015	.687			
<b>101-B TEE</b>  		101-B-02	1/8	.546	.328			
		101-B-04	1/4	.718	.437			
		101-B-06	3/8	.750	.562			
		101-B-08	1/2	1.230	.687			
<b>102-B CROSS</b>  		102-B-02	1/8	.546	.328			
		102-B-04	1/4	.781	.421			
		102-B-06	3/8	.840	.562			
		102-B-08	1/2	1.090	.687			
<b>103-B COUPLING</b>  		103-B-02	1/8	.750	.562			
		103-B-04	1/4	.875	.687			
		103-B-06	3/8	1.000	.875			
		103-B-08	1/2	1.125	1.062			

# DIMENSIONAL DATA

# PIPE FITTINGS


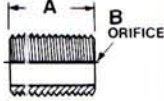
BRASS


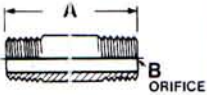
		Catalog Number	Pipe Thread	A	B	C	D	E
<b>104-B UNION</b> 		104-B-02	1/8	1.312	.875	.562	.328	
		104-B-04	1/4	1.468	1.062	.687	.437	
		104-B-06	3/8	1.625	1.312	.875	.562	
		104-B-08	1/2	1.890	1.562	1.062	.687	
<b>108-B CAP</b> 		108-B-02	1/8	.500	.500			
		108-B-04	1/4	.593	.687			
		108-B-06	3/8	.781	.875			
		108-B-08	1/2	.875	1.062			
<b>109-B PLUG</b> 		109-B-02	1/8	.609	.340	.281		
		109-B-04	1/4	.813	.500	.375		
		109-B-06	3/8	.844	.483	.375		
		109-B-08	1/2	1.078	.678	.563		
<b>110-B BUSHING</b> 		110-B-04x02	1/4	1/8	.625	.437	.562	.312
		110-B-06x02	3/8	1/8	.687	.500	.687	.328
		110-B-06x04	3/8	1/4	.687	.500	.687	.437
		110-B-08x02	1/2	1/8	.750	.531	.875	.328
		110-B-08x04	1/2	1/4	.750	.531	.875	.437
		110-B-08x06	1/2	3/8	.750	.531	.875	.562
		110-B-12x06	3/4	3/8	.875	.625	1.125	.562
		110-B-12x08	3/4	1/2	.875	.625	1.125	.687
<b>111-B LOCK NUT</b> 		111-B-02	1/8	.187	.625			
		111-B-04	1/4	.250	.637			
		111-B-06	3/8	.250	.937			
		111-B-08	1/2	.250	1.125			


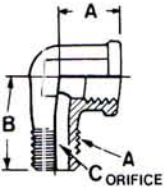
# PIPE FITTINGS



# DIMENSIONAL DATA

BRASS

	Catalog Number	Pipe Thread	A	B	C	D	E
<b>112-B CLOSE NIPPLE</b>  	112-B-02	1/8	.750	.265			
	112-B-04	1/4	.937	.359			
	112-B-06	3/8	1.000	.500			
	112-B-08	1/2	1.187	.625			

	Catalog Number	Pipe Thread	A	B	C	D	E
<b>113-B LONG NIPPLE</b>  	113-B-02x24	1/8	1.500	.265			
	113-B-04x24	1/4	1.500	.358			
	113-B-06x24	3/8	1.500	.500			
	113-B-08x24	1/2	1.500	.625			
	113-B-02x32	1/8	2.000	.265			
	113-B-04x32	1/4	2.000	.375			
	113-B-06x32	3/8	2.000	.500			
	113-B-08x32	1/2	2.000	.625			
	113-B-02x40	1/8	2.500	.281			
	113-B-04x40	1/4	2.500	.375			
	113-B-06x40	3/8	2.500	.500			
	113-B-08x40	1/2	2.500	.625			
	113-B-02x48	1/8	3.000	.281			
	113-B-04x48	1/4	3.000	.375			
	113-B-06x48	3/8	3.000	.500			
	113-B-08x48	1/2	3.000	.625			
113-B-02x56	1/8	3.500	.281				
113-B-04x56	1/4	3.500	.375				
113-B-06x56	3/8	3.500	.500				
113-B-08x56	1/2	3.500	.625				

	Catalog Number	Pipe Thread	A	B	C	D	E
<b>116-B STREET ELBOW</b>  	116-B-02	1/8	.546	.812	.218		
	116-B-04	1/4	.718	1.031	.312		
	116-B-06	3/8	.812	1.187	.437		
	116-B-08	1/2	1.171	1.437	.562		

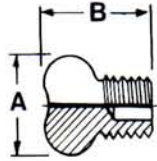
	Catalog Number	Pipe Thread	A	B	C	D	E
<b>117-B PLUG</b>  	117-B-02	1/8	.312				
	117-B-04	1/4	.375				
	117-B-06	3/8	.437				

# DIMENSIONAL DATA

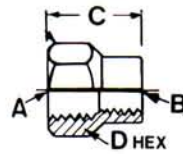
# PIPE FITTINGS

BRASS

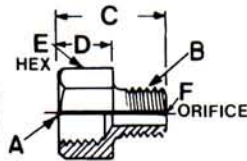
	Catalog Number	Pipe Thread	A	B	C	D	E
<b>118-B WING PLUG</b>	118-B-02	1/8	1.125	.875			
	118-B-04	1/4	.875	.937			
	118-B-06	3/8	1.125	1.125			
	118-B-08	1/2	1.437	1.218			



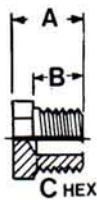
	Catalog Number	A Pipe Thread	B Pipe Thread	C	D	E	F
<b>119-B REDUCING BUSHING</b>	119-B-04x02	1/4	1/8	.875	.687		
	119-B-06x04	3/8	1/4	1.000	.875		
	119-B-08x06	1/2	3/8	1.125	1.062		



<b>120-B ADAPTER</b>	120-B-02x02	1/8	1/8	.906	.531	.500	.191
	120-B-04x02	1/4	1/8	1.000	.500	.687	.209
	120-B-04x04	1/4	1/4	1.000	.562	.750	.312
	120-B-06x04	3/8	1/4	1.062	.625	.875	.312
	120-B-08x06	1/2	3/8	1.250	.656	1.062	.406




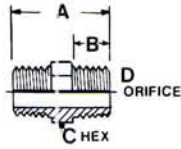
	Catalog Number	Pipe Thread	A	B	C	D	E
<b>121-B PLUG</b>	121-B-02	1/8	.531	.375	.437		
	121-B-04	1/4	.625	.437	.562		
	121-B-06	3/8	.687	.437	.687		
	121-B-08	1/2	.812	.562	.875		
	121-B-12	3/4	.937	.625	1.062		


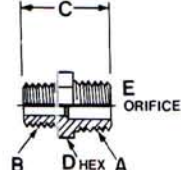



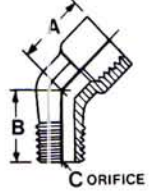
# PIPE FITTINGS

# DIMENSIONAL DATA

BRASS

	Catalog Number	Pipe Thread	A	B	C	D	E
<b>122-B HEX NIPPLE</b>  	122-B-02	1/8	.906	.375	.437	.187	
	122-B-04	1/4	1.125	.437	.562	.343	
	122-B-06	3/8	1.312	.500	.687	.468	
	122-B-08	1/2	1.500	.562	.875	.593	

	Catalog Number	A Pipe Thread	B Pipe Thread	C	D	E	F
<b>123-B REDUCING NIPPLE</b>  	123-B-04x02	1/4	1/8	1.000	.562	.218	
	123-B-06x04	3/8	1/4	1.187	.687	.343	

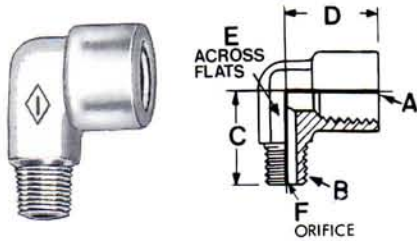
	Catalog Number	Pipe Thread	A	B	C	D	E
<b>124-B 45° STREET ELBOW</b>  	124-B-02	1/8	.750	.687	.218		
	124-B-04	1/4	.781	.781	.312		
	124-B-06	3/8	.875	1.031	.406		
	124-B-08	1/2	1.125	1.218	.500		

	Catalog Number	Pipe Thread	A	B	C	D	E
<b>126-B ELBOW</b>  	126-B-02	1/8	.390	.687	.125		

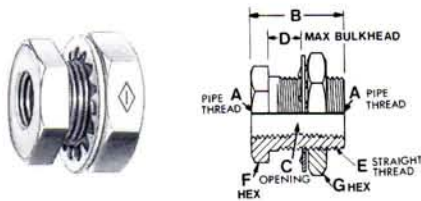
	Catalog Number	Pipe Thread	A	B	C	D	E
<b>127-B TEE</b>  	127-B-02	1/8	.750	.750	.187		
	127-B-04	1/4	.937	.875	.312		



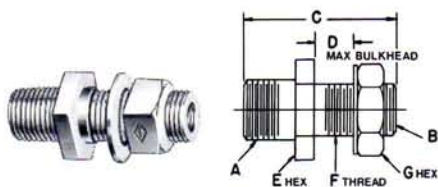
	Catalog Number	A Female Pipe Thread	B Male Pipe Thread	C	D	E	F
<b>128-B REDUCING STREET ELBOW</b>	128-B-04x02	1/4	1/8	.843	.875	.500	.218



	Catalog Number	A Pipe Thread	B Length	C	D	E	F	G
<b>129-B BULKHEAD ADAPTER</b>	129-B-02x24	1/8	1 1/2	.328	.875	5/8-18	.875	.937
	129-B-04x15	1/4	1 5/16	.421	.250	3/4-16	1.000	1.125
	129-B-04x24	1/4	1 1/2	.421	.812	3/4-16	1.000	1.125
	129-B-06x21	3/8	1 5/16	.562	.500	1-14	1.125	1.437
	129-B-08x24	1/2	1 1/2	.687	.625	1 1/8-14	1.250	1.500



	Catalog Number	A Male Pipe Thread	B Female Pipe Thread	C	D	E	F	G
<b>130-B CLAMPING STUD</b>	130-B-08x04x35	1/2	1/4	2 5/32	.687	1.250	3/4-16	1.125
	130-B-08x04x41	1/2	1/4	2 17/32	1.062	1.250	3/4-16	1.125



# PIPE FITTINGS

# SPECIFICATIONS

STEEL

## MATERIALS:

- Elbows, tees and crosses: Steel forgings—S.A.E. 12L14 or equal
- Straight fittings: Steel bar stock S.A.E.—12L14 or equal

(Cadmium or zinc plated with clear chromate finish for added corrosion resistance. Furnished with long Dryseal pipe threads.)

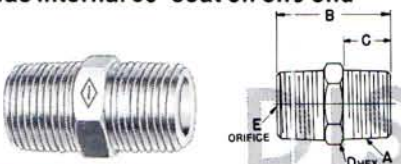

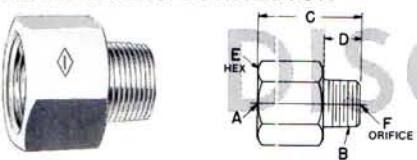
## RECOMMENDED MAXIMUM WORKING PRESSURES:

1/8" through 1" sizes 3,500 psi  
1 1/4" size 2,500 psi

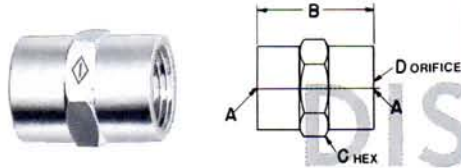
## ORDERING INFORMATION

To order, specify catalog number for configuration and size desired.

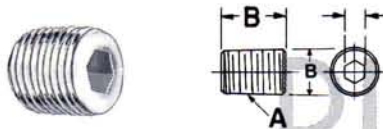
## DIMENSIONAL DATA

	Catalog Number	A Pipe Thread NPTF	B	C	D	E	F
<b>24SA NIPPLE</b> Has internal 30° seat on one end 	24SA-02	1/8	.968	.375	.437	.219	
	24SA-04	1/4	1.375	.562	.562	.312	
	24SA-06	3/8	1.406	.562	.687	.437	
	24SA-08	1/2	1.812	.750	.875	.562	
	24SA-12	3/4	1.812	.750	1.125	.718	
	24SA-16	1	2.250	.937	1.375	.906	
	24SA-20	1 1/4	2.312	.968	1.750	1.250	
	Catalog Number	A Male Pipe Thread NPTF	B Female Pipe Thread NPTF	C	D	E	F
<b>24SB REDUCER</b> 	24SB-04×02	1/4	1/8	.750	.562	.562	.328
	24SB-06×02	3/8	1/8	.750	.562	.687	.328
	24SB-06×04	3/8	1/4	.750	.562	.750	.421
	24SB-08×02	1/2	1/8	1.000	.750	.875	.328
	24SB-08×04	1/2	1/4	1.000	.750	.875	.421
	24SB-08×06	1/2	3/8	1.000	.750	.875	.562
	24SB-12×04	3/4	1/4	1.000	.750	1.125	.421
	24SB-12×06	3/4	3/8	1.000	.750	1.125	.562
	24SB-12×08	3/4	1/2	1.000	.750	1.125	.687
	24SB-16×06	1	3/8	1.312	.937	1.437	.562
	24SB-16×08	1	1/2	1.312	.937	1.437	.687
	24SB-16×12	1	3/4	1.312	.937	1.437	.890
24SB-20×12	1 1/4	3/4	1.375	.968	1.750	.890	
		A Female Pipe Thread NPTF	B Male Pipe Thread NPTF				
<b>24SG REDUCING CONNECTOR</b> 	24SG-08×02	1/2	1/8	1.500	.375	1.062	.219
	24SG-08×04	1/2	1/4	1.500	.562	1.062	.312
	24SG-08×06	1/2	3/8	1.468	.562	1.062	.437
	24SG-12×04	3/4	1/4	1.625	.562	1.375	.312
	24SG-12×08	3/4	1/2	1.687	.750	1.375	.562
	24SG-16×08	1	1/2	1.875	.750	1.625	.562
24SG-16×12	1	3/4	1.875	.750	1.625	.750	

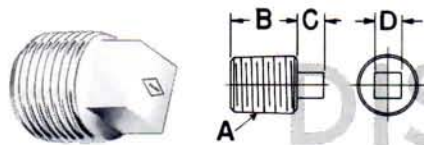
	Catalog Number	A Pipe Thread NPTF	B	C	D	E	F
<b>24SJ CONNECTOR</b>	24SJ-02	1/8	.750	.562	.328		
	24SJ-04	1/4	1.125	.750	.421		
	24SJ-06	3/8	1.125	.875	.562		
	24SJ-08	1/2	1.500	1.062	.687		
	24SJ-12	3/4	1.625	1.375	.890		
	24SJ-16	1	1.937	1.625	1.125		
	24SJ-20	1 1/4	1.937	2.000	1.468		



<b>24SR HEX HEAD PLUG</b>	24SR-02	1/8	.312	.187		
	24SR-04	1/4	.468	.250		

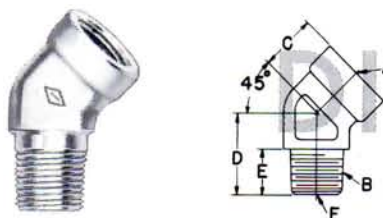


<b>25SP SQUARE HEAD PLUG</b>	25SP-02	1/8	.375	.250	.219	
	25SP-04	1/4	.515	.219	.375	
	25SP-06	3/8	.500	.312	.437	
	25SP-08	1/2	.578	.375	.562	
	25SP-12	3/4	.625	.437	.625	
	25SP-16	1	.750	.500	.812	
	25SP-20	1 1/4	.812	.562	.937	



	Catalog Number	A Pipe Thread NPTF	B Pipe Thread NPTF	C	D	E	F
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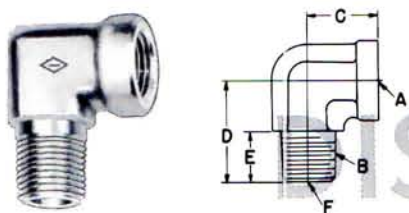
<b>25TG 45° STREET ELBOW</b>	25TG-02	1/8	1/8	.468	.718	.437	.203
	25TG-04	1/4	1/4	.625	1.046	.609	.281
	25TG-06	3/8	3/8	.718	1.062	.656	.421
	25TG-08	1/2	1/2	.906	1.328	.968	.500
	25TG-12	3/4	3/4	.968	1.375	.875	.718
	25TG-16	1	1	1.125	1.718	.968	.906
	25TG-20	1 1/4	1 1/4	1.156	1.875	1.281	1.250

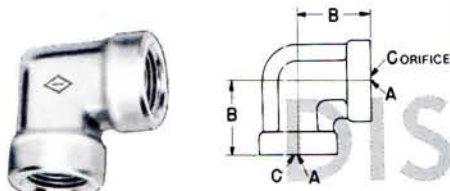


# PIPE FITTINGS

# DIMENSIONAL DATA

STEEL

	Catalog Number	A Pipe Thread NPTF	B Pipe Thread NPTF	C	D	E	F
<b>25UG STREET ELBOW</b> 	25UG-02	1/8	1/8	.660	.859	.421	.203
	25UG-04	1/4	1/4	.880	1.218	.625	.281
	25UG-06	3/8	3/8	1.020	1.296	.687	.421
	25UG-08	1/2	1/2	1.230	1.609	.921	.500
	25UG-12	3/4	3/4	1.360	1.734	.890	.718
	25UG-16	1	1	1.620	2.109	1.078	.906
	25UG-20	1 1/4	1 1/4	1.750	2.250	1.062	1.250

	Catalog Number	A Pipe Thread NPTF	B	C	D	E	F
<b>25UJ ELBOW</b> 	25UJ-02	1/8	.660	.328			
	25UJ-04	1/4	.880	.421			
	25UJ-06	3/8	1.020	.562			
	25UJ-08	1/2	1.230	.687			
	25UJ-12	3/4	1.360	.890			
	25UJ-16	1	1.620	1.125			
	25UJ-20	1 1/4	1.687	1.468			

	Catalog Number	A Pipe Thread NPTF	B	C	D	E	F
<b>25VJ TEE</b> 	25VJ-02	1/8	.640	.328			
	25VJ-04	1/4	.890	.421			
	25VJ-06	3/8	.968	.562			
	25VJ-08	1/2	1.234	.687			
	25VJ-12	3/4	1.343	.890			
	25VJ-16	1	1.625	1.125			
	25VJ-20	1 1/4	1.687	1.468			

	Catalog Number	A Pipe Thread NPTF	B	C	D	E	F
<b>25WJ CROSS</b> 	25WJ-02	1/8	.640	.328			
	25WJ-04	1/4	.890	.421			
	25WJ-06	3/8	.968	.562			
	25WJ-08	1/2	1.234	.687			
	25WJ-12	3/4	1.343	.890			



Wide variety of hoses and couplings for low pressure and air brake applications.

SIZE RANGE:  $\frac{3}{16}$ " I.D. to  $\frac{3}{4}$ " I.D. Hose  
 $\frac{3}{16}$ " O.D. to  $\frac{3}{4}$ " O.D. Couplings

MAXIMUM  
WORKING PRESSURE: 400 psi

MATERIALS: Hose: Rubber, Thermoplastic; Couplings: Brass

CONFORMANCES: See individual hose types.

See following data for specific information.

## LOW PRESSURE

### REDI-SEAL® PUSH-ON HOSE C1 COTTON COVERED

#### MATERIAL:

- Tube: Buna N Mandrel Made
- Reinforcement: Synthetic Yarn
- Cover: Weather resistant cotton braid impregnated with Neoprene.

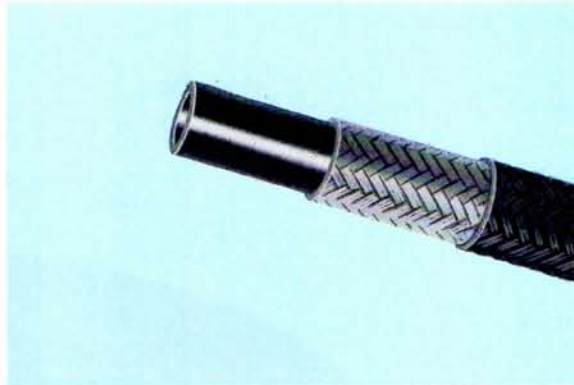
#### COUPLINGS:

KA Redi-Seal.

#### TEMPERATURE RANGE:

-40°F. to +200°F.

FOR CONDUCTING OIL, GASOLINE, AIR, WATER, COOLANT.



CATALOG NUMBER	HOSE I.D. IN.	HOSE O.D. IN.	RECD. MAX. WKG. PRES. PSI	MIN. BURST PRES. PSI	MIN. BEND RADIUS IN.
C104	1/4	1/2	250	1,000	3
C105	5/16	9/16	250	1,000	3
C106	3/8	5/8	250	1,000	3
C108	1/2	3/4	250	1,000	5
C110	5/8	29/32	250	1,000	6
C112	3/4	1 1/32	250	1,000	7

Furnished in packages containing not less than 48 feet, nor more than 57 feet, in not more than two lengths, no length less than 10 feet.

### REDI-SEAL® PUSH-ON HOSE B7 RUBBER COVERED

#### MATERIAL:

- Tube: Buna N Mandrel made.
- Reinforcement: Synthetic Yarn.
- Cover: Neoprene.

#### COUPLINGS:

KA Redi-Seal.

#### TEMPERATURE RANGE:

-40°F. to +200°F.

FOR CONDUCTING OIL, GASOLINE, AIR, WATER, COOLANT.



CATALOG NUMBER	HOSE I.D. IN.	HOSE O.D. IN.	RECD. MAX. WKG. PRES. PSI	MIN. BURST PRES. PSI	MIN. BEND RADIUS IN.
B704	1/4	1/2	250	1,000	3
B705	5/16	9/16	250	1,000	3
B706	3/8	5/8	250	1,000	3
B708	1/2	3/4	250	1,000	5
B710	5/8	29/32	250	1,000	6
B712	3/4	1 1/32	250	1,000	7

Furnished in packages containing not less than 48 feet, nor more than 57 feet, in not more than two lengths, no length less than 10 feet.

## Redi-Seal® Push-On Hose B9 Urethane Rubber Covered

### MATERIALS:

- Tube: Seamless Urethane
- Reinforcement: 1 Rayon Braid
- Cover: Urethane. Furnished in red or black as standard. Please specify color with catalog number. (Other colors such as green, blue, orange, grey, etc. are available on special order.)



### COUPLINGS:

KA Redi-Seal (requires clamp when working pressure is greater than 100 psi or elevated temperatures are expected.) KF Barbed Inserts

**TEMPERATURE RANGE:** -40°F. to 200°F.

**ECONOMICAL HOSE FOR USE WITH AIR, OIL, GASOLINE, WATER AND COOLANT FLUIDS.**

CATALOG NUMBER				HOSE	HOSE	REC'D	MIN.	MIN.
50 FT. SPOOL*	COLOR AVAILABLE	250 OR 500 FT. PACKAGE**	COLOR AVAILABLE	I.D. IN.	O.D. IN.	MAX. WKG. PRESS. PSI	BURST PRESS. PSI.	BEND RADIUS IN.
B903-50	B	B903-500	B	1/4	.445	250	1,000	1 1/2
B904-50	B-R	B904-250	B-R	1/4	.445	250	1,000	1 1/2
		B904-500	B-R	1/4	.445	250	1,000	1 1/2
B905-50	B			5/16		250	1,000	2
B906-50	B-R	B906-250	B-R	3/8	.625	250	1,000	3
		B906-500	B-R	3/8	.625	250	1,000	3
B908-50	B-R	B908-250	B-R	1/2	.770	250	1,000	3
		B910-250	B	1/2	.770	250	1,000	3

\*50 Ft. Spools are one continuous length.

\*\*250 Ft. and 500 Ft. packages furnished in three lengths with no length shorter than 25 Ft.

# HOSE

# SPECIFICATIONS

LOW PRESSURE

## C4 RUBBER COVERED HOSE

### MATERIALS:

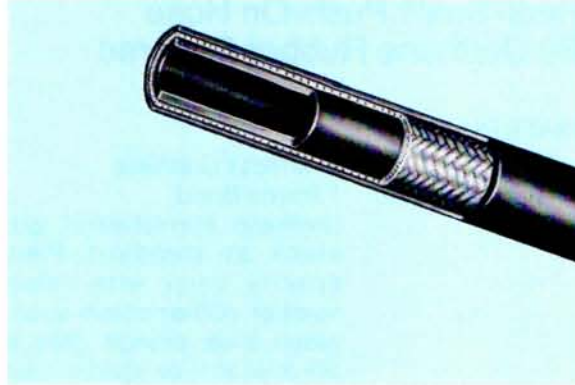
- Tube: Buna N.
- Reinforcement: 1 Rayon Braid.
- Cover: Neoprene.

### COUPLINGS:

FN Reusable.  
 KA Redi-Seal (not to exceed 150 psi working pressure).  
 KF Barbed Inserts.

### TEMPERATURE RANGE:

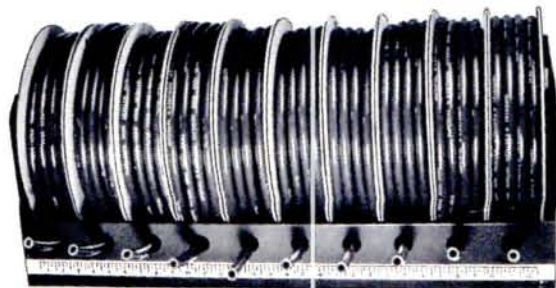
-40°F. to +200°F.



FOR USE WITH OIL, GASOLINE, AIR, WATER, CUTTING OIL, DIESEL OIL AND HYDRAULIC FLUIDS. EXTREMELY FLEXIBLE. WILL TAKE BEND AS SMALL AS 1" RADIUS.

CATALOG NUMBER			HOSE	HOSE	RECD.	MIN.	MIN.
25 FT.	50 FT.	100 FT.	I.D.	O.D.	MAX. WKG.	BURST	BEND
COILS	SPOOLS	COILS	IN.	IN.	PRES. PSI	PRES. PSI	RADIUS IN.
C403	C403-50	C403-100	3/16	23/64	400	1,600	1
C404	C404-50	C404-100	1/4	27/64	375	1,500	1 1/2
C405	C405-50	C405-100	5/16	33/64	250	1,000	2
C406	C406-50	C406-100	3/8	39/64	250	1,000	3
C408	C408-50		1/2	3/4	250	1,000	3
C410			5/8	7/8	250	1,000	3

C403, C404, C405, C406 furnished in boxes containing exactly 25 or 100 feet, and in spools containing 50 feet. 100 ft. coils furnished in not more than two lengths, with no length less than 15 feet. C408 furnished in boxes containing 25 feet and spools containing 50 feet. C410 furnished in boxes containing 25 feet.



Size: 32" x 11 1/2" x 11 5/8"

## 10-M HOSE DISPENSER

Provides a convenient means of storing and dispensing low pressure hose. Specially designed to hold ten 50 ft. spools of hose. All steel dispensers can be wall mounted or used on counter or bench. Features 30" ruler across front of cabinet. Ideal for use with 50 ft. spools of Imperial B9 and C4 hose.



# SPECIFICATIONS

# COUPLINGS

KA REDI-SEAL® PUSH-ON



For C1, B7, C4 and B9 hose. (When used with C4 hose, working pressure should not exceed 150 psi. When used with B9 hose working pressure should not exceed 100 psi.)

Four barb step-up design assures reliable sealing and extra gripping power along with ease of assembly. Works well with any push-on type hose. Made of brass with plastic hose protector cap.

## DIMENSIONAL DATA

	Catalog Number	Hose I.D.	A Male NPTF	B	C	D	E
	KA04-02MB	1/4	1/8	.188	1.469	.656	.438
	KA04-04MB	1/4	1/4	.188	1.656	.844	.562
	KA05-02MB	5/16	1/8	.203	1.500	.583	.438
	KA05-04MB	5/16	1/4	.250	1.688	.875	.562
	KA06-04MB	3/8	1/4	.297	1.688	.875	.562
	KA06-06MB	3/8	3/8	.297	1.729	.906	.688
	KA08-06MB	1/2	3/8	.422	1.859	.906	.688
	KA08-08MB	1/2	1/2	.422	2.093	1.141	.875
	KA10-08MB	5/8	1/2	.547	2.594	1.141	.875
	KA12-12MB	3/4	3/4	.656	2.719	1.266	1.062


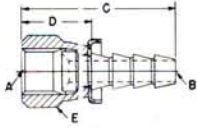
	Catalog Number	Hose I.D.	Tube O.D.	A Thread Size	B	C	D	E
	KA04-03MF	1/4	3/16	3/8-24	.125	1.688	.875	.375
	KA04-04MF	1/4	1/4	7/16-24	.188	1.719	.906	.438
	KA04-05MF	1/4	5/16	1/2-20	.188	1.781	.969	.500
	KA05-04MF	5/16	1/4	7/16-24	.188	1.719	.906	.438
	KA05-05MF	5/16	5/16	1/2-20	.250	1.781	.969	.500
	KA05-06MF	5/16	3/8	5/8-18	.250	1.969	1.156	.625
	KA06-06MF	3/8	3/8	5/8-18	.297	2.000	1.188	.625
	KA08-08MF	1/2	1/2	3/4-18	.422	2.234	1.281	.750
	KA10-10MF	5/8	5/8	7/8-18	.531	2.781	1.328	.875

	Catalog Number	Hose I.D.	Tube O.D.	A Thread Size	B	C	D	E
	KA04-03NG	1/4	3/16	3/8-24	.125	1.250	.438	.438
	KA04-04NG	1/4	1/4	7/16-24	.188	1.250	.438	.500
	KA04-05NG	1/4	5/16	1/2-20	.188	1.281	.469	.562
	KA06-06NG	3/8	3/8	5/8-18	.281	1.312	.500	.719


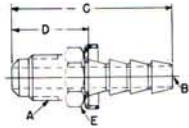
# COUPLINGS


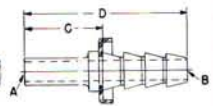
# DIMENSIONAL DATA

KA REDI-SEAL® PUSH-ON

	Catalog Number	Hose I.D.	A		B	C	D	E
			Tube O.D.	Thread Size				
<b>FEMALE 45° &amp; 37° FLARE SWIVEL</b>   	KA04-04NL*	1/4	1/4	7/16-20	.188	1.500	.688	.562
	KA04-05NL	1/4	5/16	1/2-20	.188	1.562	.750	.625
	KA05-06NS	5/16	3/8	5/8-18	.188	1.609	.797	.750
	KA06-06NS	3/8	3/8	5/8-18	.297	1.609	.734	.750
	KA06-06NJ	3/8	3/8	9/16-18	.297	1.547	.703	.688
	KA08-08NL	1/2	1/2	3/4-16	.438	1.766	.812	.875
	KA10-10NL	5/8	5/8	7/8-14	.531	2.328	.875	1.000
	KA12-12NS	3/4	3/4	1 1/16-14	.656	2.328	1.093	1.250
	KA12-12NJ	3/4	3/4	1 1/16-12	.656	2.547	1.093	1.250

\*"NL" designates universal end for use with both 45° SAE and 37° JIC flare. "NS" end for use with 45° SAE flare only; "NJ" end style for use with 37° JIC flare only.

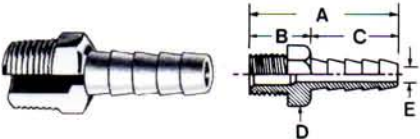
	Catalog Number	Hose I.D.	A		B	C	D	E
			Tube O.D.	Thread Size				
<b>MALE 45° SAE FLARE</b>   	KA04-04MS	1/4	1/4	7/16-20	.188	1.562	.750	.438
	KA04-05MS	1/4	5/16	1/2-20	.188	1.656	.844	.500
	KA06-06MS	3/8	3/8	5/8-18	.281	1.750	.938	.625

	Catalog Number	Hose I.D.	A		B	C	D
			O.D.	Tube Size			
<b>RIGID TUBE</b>   	KA04-03RL	1/4		3/16	.125	1.125	1.938
	KA04-04RL	1/4		1/4	.188	1.188	2.000
	KA04-05RL	1/4		5/16	.188	1.218	2.031
	KA06-06RL	3/8		3/8	.297	1.344	2.156
	KA08-08RL	1/2		1/2	.438	1.484	2.438
	KA10-10RL	5/8		5/8	.547	1.719	3.172


	Catalog Number	Hose I.D.	A	B	D	G
	KA05-05RM	5/16	1.875	.250	.250	.750
	KA06-06RM	3/8	1.906	.297	.281	.812
	KA08-08RM	1/2	2.219	.422	.281	.875
	KA10-10RM	5/8	3.250	.547	.343	1.000
	KA12-12RM	3/4	3.375	.656	.469	1.125

FOR C4 AND B9 HOSE—KF barbed inserts provide a secure grip and seal for both C4 rubber and B9 thermoplastic hose. Made of brass.

## DIMENSIONAL DATA

	Catalog Number	Hose I.D.	Male PTF	A	B Hose Cut-Off	C	D	E
<b>MALE PIPE THREAD</b>  	KF02-02PS*	1/8	1/8	1.187	.500	.687	.437	.125
	KF03-02PS	3/16	1/8	1.187	.500	.687	.437	.156
	KF03-04PS	3/16	1/4	1.375	.687	.687	.562	.156
	KF04-02PS	1/4	1/8	1.468	.500	.968	.437	.187
	KF04-04PS	1/4	1/4	1.718	.750	.968	.562	.187
	KF04-06PS	1/4	3/8	1.718	.750	.968	.687	.187
	KF05-02PS	5/16	1/8	1.468	.500	.968	.437	.250
	KF05-04PS	5/16	1/4	1.718	.750	.968	.562	.250
	KF06-02PS	3/8	1/8	1.531	.562	.968	.562	.250
	KF06-04PS	3/8	1/4	1.718	.750	.968	.562	.312
	KF06-06PS	3/8	3/8	1.718	.750	.968	.687	.312
	KF06-08PS	3/8	1/2	1.875	.906	.968	.875	.281
	KF07-04PS	7/16	1/4	1.718	.750	.968	.562	.343
	KF08-04PS	1/2	1/4	1.718	.750	.968	.625	.312
	KF08-06PS	1/2	3/8	1.718	.750	.968	.687	.406
	KF08-08PS	1/2	1/2	1.875	.906	.968	.875	.406
	KF08-12PS	1/2	3/4	1.937	.968	.968	1.062	.406
	KF10-06PS	5/8	3/8	1.718	.750	.968	.750	.437
	KF10-08PS	5/8	1/2	1.875	.906	.968	.875	.531
	KF10-12PS	5/8	3/4	1.875	.906	.968	1.062	.531
KF12-08PS	3/4	1/2	1.875	.906	.968	.875	.562	
KF12-12PS	3/4	3/4	1.875	.906	.968	1.062	.656	

\*For use with C403 hose.

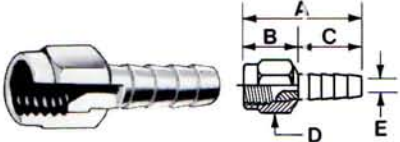
	Catalog Number	Hose I.D.	Female PTF	A	B Hose Cut-Off	C	D	E
<b>FEMALE PIPE THREAD</b>  	KF02-02RS*	1/8	1/8	1.109	.421	.687	.500	.125
	KF03-02RS	3/16	1/8	1.109	.421	.687	.500	.156
	KF04-02RS	1/4	1/8	1.390	.421	.968	.500	.187
	KF04-04RS	1/4	1/4	1.593	.625	.968	.562	.187
	KF05-02RS	5/16	1/8	1.390	.421	.968	.500	.250
	KF05-04RS	5/16	1/4	1.593	.625	.968	.625	.250
	KF06-02RS	3/8	1/8	1.390	.421	.968	.500	.281
	KF06-04RS	3/8	1/4	1.593	.625	.968	.625	.281
	KF06-06RS	3/8	3/8	1.625	.656	.968	.781	.281
	KF08-04RS	1/2	1/4	1.531	.562	.968	.687	.406
	KF08-06RS	1/2	3/8	1.625	.656	.968	.781	.406
	KF08-08RS	1/2	1/2	1.765	.796	.968	.937	.406

\*For use with C403 hose.

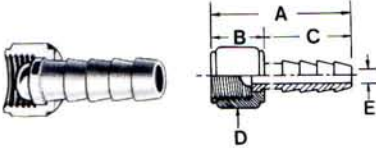
# CONNECTORS

# DIMENSIONAL DATA

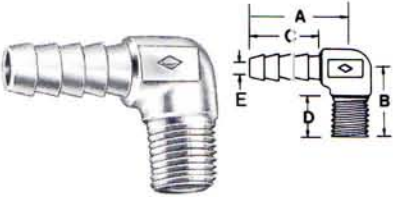
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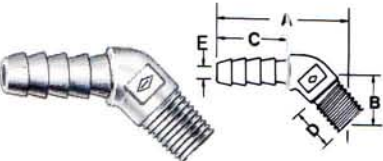
	Catalog Number	Hose I.D.	Tube O.D.	Thread Size	A	B Hose Cut-Off	C	D	E
<b>FEMALE 45° SAE AND 37° JIC FLARE SWIVEL</b>  	KF03-03NL*	3/16	3/16	3/8-24	1.218	.531	.687	.437	.140
	KF03-04NL	3/16	1/4	7/16-20	1.311	.624	.687	.562	.156
	KF04-04NL	1/4	1/4	7/16-20	1.530	.562	.968	.562	.187
	KF04-05NL	1/4	5/16	1/2-20	1.593	.625	.968	.625	.187
	KF04-06NS	1/4	3/8	5/8-18	1.655	.687	.968	.750	.187
	KF05-05NL	5/16	5/16	1/2-20	1.593	.625	.968	.625	.250
	KF06-06NS	3/8	3/8	5/8-18	1.655	.687	.968	.750	.281
	KF06-08NL	3/8	1/2	3/4-16	1.686	.718	.968	.937	.281
	KF08-08NL	1/2	1/2	3/4-16	1.686	.718	.968	.937	.406
	KF10-10NL	5/8	5/8	7/8-14	1.749	.781	.968	1.000	.531

\*"NL" designates universal end for use with both 45° SAE and 37° JIC flare. "NS" end style for use with 45° SAE flare only; "NJ" end style for use with 37° JIC flare only.

	Catalog Number	Hose I.D.	Swivel Female NPSM	A	B Hose Cut-Off	C	D	E
<b>SWIVEL FEMALE BALL END</b>  	KF02-02RV*	1/8	1/8	1.187	.500	.687	.500	.125
	KF03-02RV	3/16	1/8	1.187	.500	.687	.500	.140
	KF03-04RV	3/16	1/4	1.249	.562	.687	.625	.156
	KF04-04RV	1/4	1/4	1.499	.531	.968	.625	.187
	KF05-04RV	5/16	1/4	1.499	.531	.968	.625	.250
	KF06-04RV	3/8	1/4	1.499	.531	.968	.625	.250
	KF06-06RV	3/8	3/8	1.499	.531	.968	.750	.281
	KF08-08RV	1/2	1/2	1.624	.656	.968	.906	.406
	KF10-12RV	5/8	3/4	1.686	.718	.968	1.125	.531
	KF12-12RV	3/4	3/4	1.655	.687	.968	1.125	.656

\*For use with C403 hose.

	Catalog Number	Hose I.D.	Male NPTF	Hose Cut-Off	A	B	C	D	E
<b>MALE PIPE THREAD 90° ELBOW</b>  	KF04-02PS90	1/4	1/8	.437	1.406	.781	.968	.375	.187
	KF04-04PS90	1/4	1/4	.437	1.406	.937	.968	.562	.187
	KF05-02PS90	5/16	1/8	.437	1.406	.781	.968	.375	.250
	KF06-04PS90	3/8	1/4	.437	1.406	.937	.968	.562	.281
	KF06-06PS90	3/8	3/8	.531	1.500	1.062	.968	.562	.281
	KF08-06PS90	1/2	3/8	.562	1.531	1.062	.968	.562	.406
	KF10-06PS90	5/8	3/8	.562	1.531	1.093	.968	.562	.531

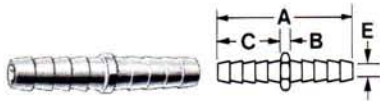
	Catalog Number	Hose I.D.	Male NPTF	Hose Cut-Off	A	B	C	D	E
<b>MALE PIPE THREAD 45° ELBOW</b>  	KF04-02PS45	1/4	1/8	.705	1.673	.486	.968	.375	.187
	KF04-04PS45	1/4	1/4	.838	1.806	.619	.968	.562	.187
	KF06-04PS45	3/8	1/4	.838	1.806	.619	.968	.562	.281
	KF06-06PS45	3/8	3/8	.922	1.890	.640	.968	.562	.281
	KF08-06PS45	1/2	3/8	.953	1.921	.640	.968	.562	.406

# DIMENSIONAL DATA

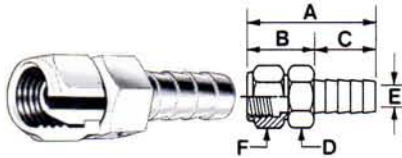
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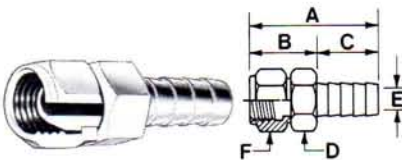
	Catalog Number	Hose I.D.	A	B	C	E
<b>HOSE MENDER</b>	KF03-03RM	3/16	1.437	.062	.687	.156
	KF04-04RM	1/4	2.000	.062	.968	.185
	KF05-05RM	5/16	2.000	.062	.968	.250
	KF06-06RM	3/8	2.000	.062	.968	.281
	KF08-08RM	1/2	2.000	.062	.968	.406



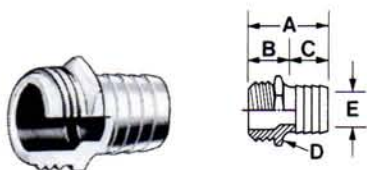
	Catalog Number	Hose I.D.	Thread Size	A	B Hose Cut-Off	C	D	E	F
<b>SWIVEL FEMALE THREAD</b>	KF04-06RF	1/4	9/16-20 UN	1.781	.813	.968	.562	.187	.625
	KF05-06RF	5/16	9/16-20 UN	1.781	.813	.968	.562	.250	.625
	KF06-06RF	3/8	9/16-20 UN	1.781	.813	.968	.562	.265	.625
	KF06-08RF	3/8	5/8-18 UNF	1.781	.813	.968	.562	.281	.750



	Catalog Number	Hose I.D.	Thread Size	A	B Hose Cut-Off	C	D	E	F
<b>SWIVEL FEMALE NPSM THREAD</b>	KF04-04RH	1/4	1/4-18	1.781	.813	.968	.562	.187	.625
	KF04-06RH	1/4	3/8-18	1.788	.820	.968	.562	.187	.750
	KF05-04RH	5/16	1/4-18	1.781	.813	.968	.562	.250	.625
	KF05-06RH	5/16	3/8-18	1.788	.820	.968	.562	.250	.750
	KF06-04RH	3/8	1/4-18	1.781	.813	.968	.562	.265	.625
	KF06-06RH	3/8	3/8-18	1.788	.820	.968	.562	.281	.750
	KF08-04RH	1/2	1/4-18	1.781	.820	.968	.687	.406	.625
	KF08-06RH	1/2	3/8-18	1.788	.820	.968	.687	.406	.750



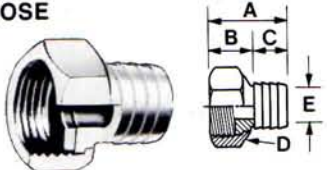
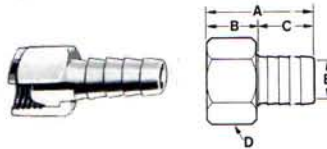
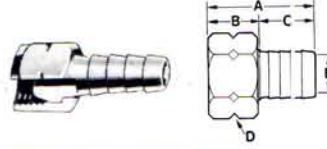
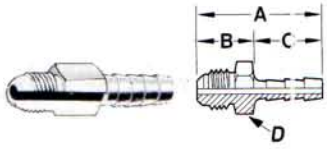
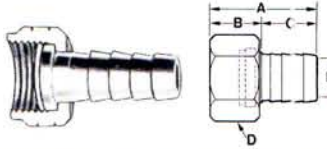
	Catalog Number	Hose I.D.	Male Thread	A	B Hose Cut-Off	C	F	E
<b>MALE GARDEN HOSE</b>	KF06-12PY	3/8	3/4	1.593	.625	.968	1.062	.281
	KF08-12PY	1/2	3/4	1.593	.625	.968	1.062	.406
	KF10-12PY	5/8	3/4	1.593	.625	.968	1.062	.531
	KF12-12PY	3/4	3/4	1.593	.625	.968	1.062	.656



# CONNECTORS

# DIMENSIONAL DATA

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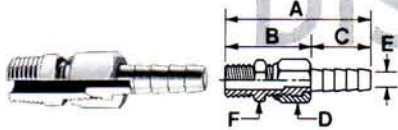
	Catalog Number	Hose I.D.	Female Thread	A	B Hose Cut-Off	C	D	E	
<b>FEMALE GARDEN HOSE</b> 	KF06-12RY	3/8	3/4	1.655	.687	.968	1.187	.281	
	KF08-12RY	1/2	3/4	1.655	.687	.968	1.187	.406	
	KF10-12RY	5/8	3/4	1.655	.687	.968	1.187	.531	
	KF12-12RY	3/4	3/4	1.655	.687	.968	1.187	.656	
Furnished with rubber gasket.									
	Catalog Number	Hose I.D.	Thread Size	A	B Hose Cut-Off	C	D	E	
<b>SWIVEL FEMALE OXYGEN (Right Hand)</b> 	KF03-03PE	3/16	3/8-24	1.218	.531	.685	.437	.125	
	KF03-05PE	3/16	9/16-18	1.343	.656	.685	.685	.125	
	KF04-05PE	1/4	9/16-18	1.593	.625	.968	.685	.156	
	KF05-05PE	5/16	9/16-18	1.593	.625	.968	.685	.250	
	KF06-05PE	3/8	9/16-18	1.593	.625	.968	.685	.265	
	Catalog Number	Hose I.D.	Thread Size	A	B Hose Cut-Off	C	D	E	
<b>SWIVEL FEMALE ACETYLENE (Left Hand)</b> 	KF03-03RE	3/16	3/8-24	1.218	.531	.687	.437	.125	
	KF03-05RE	3/16	9/16-18	1.343	.656	.687	.687	.125	
	KF04-05RE	1/4	9/16-18	1.593	.625	.968	.687	.156	
	KF05-05RE	5/16	9/16-18	1.593	.625	.968	.687	.250	
	KF06-05RE	3/8	9/16-18	1.593	.625	.968	.687	.265	
	Catalog Number	Hose I.D.	Tube O.D.	Thread Size	A	B Hose Cut-Off	C	D	E
<b>MALE 45° SAE FLARE</b> 	KF03-03MS	3/16	3/16	3/8-24	1.312	.562	.687	.437	.125
	KF04-04MS	1/4	1/4	7/16-20	1.718	.750	.968	.437	.187
	KF04-05MS	1/4	5/16	1/2-20	1.781	.875	.968	.500	.187
	KF04-06MS	1/4	3/8	5/8-18	1.843	.875	.968	.625	.187
	KF06-06MS	3/8	3/8	5/8-18	1.843	.937	.968	.625	.281
	KF06-08MS	3/8	1/2	3/4-16	1.968	1.000	.968	.750	.281
	KF08-08MS	1/2	1/2	3/4-16	1.968	.687	.968	.750	.406
	KF10-10MS	5/8	5/8	7/8-14	2.156	.812	.968	.875	.500
		Catalog Number	Hose I.D.	Swivel Female NPSM	A	B Hose Cut-Off	C	D	E
<b>SWIVEL/FEMALE FLAT SEAT</b> 	KF03-02RN	3/16	1/8	1.187	.500	.687	.500	.140	
	KF04-04RN	1/4	1/4	1.500	.531	.968	.625	.187	
	KF06-04RN	3/8	1/4	1.593	.562	.968	.625	.265	
	KF06-06RN	3/8	3/8	1.500	.531	.968	.750	.281	
	KF08-08RN	1/2	1/2	1.625	.656	.968	.906	.406	
	KF12-12RN	3/4	3/4	1.656	.687	.968	1.125	.656	

# DIMENSIONAL DATA

# CONNECTORS

## WM PAINT SPRAY ADAPTERS

	Catalog Number	Hose I.D.	Male PTF	A	B Hose Cut-Off	C	D	E	F
<b>COUPLING WITH MALE PIPE ADAPTER</b>	737-WM	1/8	1/8	1.765	1.078	.687	.500	.125	.500
	738-WM	3/16	1/8	1.765	1.078	.687	.500	.140	.500
	739-WM	3/16	1/4	2.155	1.468	.687	.625	.156	.562
	742-WM	5/16	1/4	2.420	1.452	.968	.625	.250	.562
	747-WM	3/8	1/4	2.483	1.515	.968	.625	.250	.562
	743-WM	3/8	3/8	2.499	1.531	.968	.750	.281	.687
	744-WM	1/2	1/2	2.593	1.625	.968	.906	.406	.843
	746-WM	3/4	3/4	2.624	1.656	.968	1.125	.656	1.062



	Catalog Number	Thread Size	A	B	C
<b>MALE ADAPTER</b>	888-WM	9/16-20 UN x 3/8-18 PTF	1.218	.688	.312
	890-WM	9/16-20 UN x 9/16-20 UN	1.188	.562	.313
	892-WM	9/16-20 UN x 1/4-18 NPSM	1.188	.562	.313
	893-WM	5/8-18 UNF x 5/8-18 UNF	1.188	.625	.344
	894-WM	5/8-18 UNF x 3/8-18 NPSM	1.188	.688	.344
	896-WM	1/4-18 NPSM x 1/4-18 NPSM	1.188	.562	.312
	897-WM	1/4-18 NPSM x 3/8-18 NPSM	1.188	.688	.312
	898-WM	1/4-18 NPSM x 5/8-18 UNF	1.188	.625	.312
	899-WM	3/8-18 NPSM x 3/8-18 NPSM	1.188	.688	.343



	Catalog Number	Thread Size	A	B	C
<b>ACETYLENE (Left Hand) and OXYGEN (Right Hand) Adapters</b>	895-WM	9/16-18UNF (RH) Male x 9/16-18UNF (RH) Male	1.125	.562	.312
	926-WM	9/16-18UNF (LH) Male x 1/4-18NPSM (RH) Male	1.187	.562	.312
	928-WM	9/16-18UNF (LH) Male x 9/16-18UNF (LH) Male	1.125	.562	.312
	929-WM*	9/16-18UNF (RH) Male x 1/4-18PTF (RH) Male	1.218	.562	.312
	930-WM*	9/16-18UNF (LH) Male x 1/4-18PTF (RH) Male	1.218	.562	.312
	933-WM*	9/16-18UNF (RH) Male x 1/8-27PTF (RH) Male	1.031	.562	.218
	931-WM*	1/4-18NPSM (RH) Female x 9/16-18UNF (RH) Male	1.000	.625	.281
	932-WM*	1/4-18NPSM (RH) Female x 9/16-18UNF (LH) Male	1.000	.625	.281



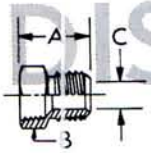
\*Female Tapers on 9/16-18 Male End Only

# CONNECTORS

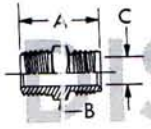
# DIMENSIONAL DATA

## WM ADAPTERS

	Catalog Number	Female	Male	A	B	C
<b>PAINT ADAPTERS</b>	900-WM	9/16-20UN	x 1/4-18NPSM	.906	.625	.313
	901-WM	9/16-20UN	x 3/8-18NPSM	.906	.687	.344
	902-WM	5/8-18UNF	x 9/16-20UN	.906	.718	.312
	903-WM	5/8-18UNF	x 1/4-18NPSM	.906	.718	.312
	904-WM	5/8-18UNF	x 3/8-18NPSM	.906	.718	.344
	905-WM	1/4-18NPSM	x 9/16-20UN	.906	.625	.313
	906-WM	3/8-18NPSM	x 9/16-20UN	.906	.750	.313
	907-WM	3/8-18NPSM	x 5/8-18UNF	.906	.750	.343
	908-WM	3/8-18NPSM	x 1/4-18NPSM	.906	.750	.313
	910-WM	9/16-20UN	x 9/16-20UN	.906	.625	.313

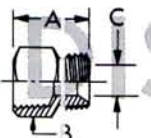


	Catalog Number	Thread Size	A	B	C
<b>MALE TAPER JOINT ADAPTERS</b>	832-WM	1/8-27NPSM x 1/8-27PTF	.750	.500	.203
	835-WM	1/4-18NPSM x 1/8-27PTF	1.031	.562	.218
	836-WM	1/4-18NPSM x 1/4-18PTF	1.156	.562	.281
	834-WM	3/8-18NPSM x 1/4-18PTF	1.187	.687	.313
	837-WM	3/8-18NPSM x 3/8-18PTF	1.218	.687	.406
	838-WM	1/2-14NPSM x 3/8-18PTF	1.187	.843	.406
	839-WM	1/2-14NPSM x 1/2-14PTF	1.343	.843	.531
	840-WM	3/4-14NPSM x 3/4-14PTF	1.343	1.062	.656
	914-WM	9/16-20UN x 1/8-27PTF	1.031	.562	.203
	915-WM	9/16-20UN x 1/4-18PTF	1.031	.562	.281
	935-WM*	1/4-18NPSM x 1/8-27PTF	1.031	.562	.187
	936-WM*	1/4-18NPSM x 1/4-18PTF	1.156	.562	.281



\*Steel Plated

	Catalog Number	PIPE THREAD		A	B	C
		Female	Male			
<b>FEMALE TAPER JOINT ADAPTERS</b>	860-WM*	1/4-18PTF	x 1/4-18NPSM	1.062	.625	.281
	861-WM*	3/8-18PTF	x 1/4-18NPSM	1.093	.750	.281
	862-WM*	3/8-18PTF	x 3/8-18NPSM	1.062	.750	.344
	864-WM*	1/2-14PTF	x 3/8-18NPSM	1.218	.937	.406
	865-WM*	1/2-14PTF	x 1/2-14NPSM	1.187	.937	.531
	869-WM*	3/4-14PTF	x 3/4-14NPSM	1.312	1.187	.656
	883-WM*	1/8-27PTF	x 1/4-18NPSM	.812	.562	.281
	884-WM*	1/4-18PTF	x 3/8-18NPSM	.718	.687	.344
	844-WM	1/4-18PTF	x 1/8-27PTF	.937	.625	.187
	1015-WM	3/8-18PTF	x 1/4-18PTF	1.125	.750	.281



\*Male Thread is Straight N.P.S.M. with Female Taper





### FERRULES

These aluminum ferrules are used with the barbed inserts shown on the preceding pages. The Imperial-Eastman Ferrule Vise enables you to make low pressure and general purpose hose assemblies quickly and economically.

Factory-made hose assemblies with these inserts and ferrules can also be furnished.

See page 134 for Ferrule Vise.

Catalog No.	For O.D. Hose	Length	Metal Thickness
KF-375-81	.37	.72	.02
KF-400-81	.40	.72	.02
KF-425-81	.42	.72	.02
KF-450-81	.45	.72	.02
KF-475-81	.47	.72	.02
KF-500-81	.50	.72	.02
KF-525-81	.52	.72	.02
KF-550-81	.55	.72	.02
KF-575-81	.57	.97	.02
KF-600-81	.60	.97	.02
KF-625-81	.62	.97	.02
KF-650-81	.65	.97	.02
KF-675-81	.67	.97	.02
KF-700-81	.70	.97	.02
KF-725-81	.72	.97	.02
KF-750-81	.75	.97	.02
KF-775-81	.77	.97	.02
KF-800-81	.80	.97	.02
KF-825-81	.82	.97	.02
KF-850-81	.85	.97	.02
KF-875-81	.87	.97	.02
KF-900-81	.90	.97	.02
KF-925-81	.92	.97	.02
KF-950-81	.95	.97	.02
KF-975-81	.97	.97	.04
KF-1000-81	1.00	.97	.04
KF-1025-81	1.02	.97	.04
KF-1050-81	1.05	.97	.04
KF-1075-81	1.07	.97	.04
KF-1100-81	1.10	.97	.04
KF-1125-81	1.12	.97	.04
KF-1150-81	1.15	.97	.04
KF-1175-81	1.17	.97	.04
KF-1200-81	1.20	.97	.04
KF-1225-81	1.22	.97	.04
KF-1250-81	1.25	.97	.04
KF-1325-81	1.32	.97	.04



# HOSE ASSEMBLY EQUIPMENT

FERRULE TOOLS

## No. 660-T FERRULE VISE

### No. 662-T DIES

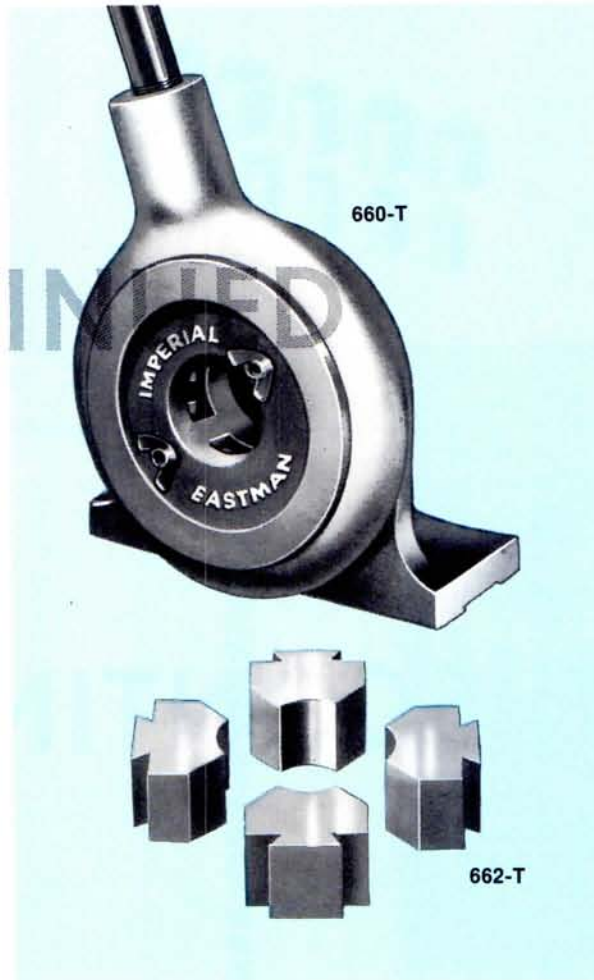
Vise used for making hose assemblies with barbed inserts and aluminum ferrules. Furnished with removable handle.

Dies must be ordered separately. Dies can also be used in the Schrader vise. The Schrader dies can be used in this vise.

When ordering dies specify size of ferrule with which they are to be used.

No. 660-T Ferrule Vise

No. 662-T Dies



## No. 206-T

### FERRULE CONSTRICTOR TOOL

Used for making low pressure hose assemblies using KF ferrules and barbed inserts. Rugged aluminum alloy body designed for handling ease. Has satin finish nickel-chrome plated body, polished handle. Length 4 7/8". Wt. 6 1/2 oz.

No. 206-T Ferrule Constrictor Tool. For use with ferrules 1/8" to 1 1/8" outside diameter.



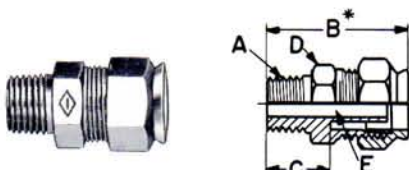
# SPECIFICATIONS


# COUPLINGS

RENEWABLE FN SERIES

FOR C4 HOSE—A simple, efficient brass coupling which can be assembled easily with a wrench. Can be removed from old hose and reused on new hose by replacing only the sleeve.

## DIMENSIONAL DATA

	Catalog Number	Hose I.D.	A Pipe Thread	B*	C	D	E	F
<b>MALE PIPE THREAD</b>								
	FN03-02MB	3/16	1/8	1.250	.562	.500	.141	
	FN03-04MB	3/16	1/4	1.250	.625	.562	.141	
	FN04-02MB	1/4	1/8	1.250	.562	.625	.203	
	FN04-04MB	1/4	1/4	1.250	.562	.625	.203	
	FN05-02MB	5/16	1/8	1.250	.594	.688	.218	
	FN05-04MB	5/16	1/4	1.281	.625	.688	.266	
	FN05-06MB	5/16	3/8	1.344	.688	.688	.266	
	FN06-06MB	3/8	3/8	1.406	.750	.812	.328	
	FN06-08MB	3/8	1/2	1.469	.812	.875	.328	
	FN08-06MB	1/2	3/8	1.562	.812	1.000	.406	
FN10-08MB	5/8	1/2	1.688	.875	1.125	.531		

<b>FEMALE PIPE THREAD</b>								
	FN03-02NB	3/16	1/8	1.156	.562	.562	.141	
	FN03-04NB	3/16	1/4	1.218	.625	.688	.141	
	FN04-02NB	1/4	1/8	1.156	.500	.625	.203	
	FN05-04NB	5/16	1/4	1.281	.625	.688	.266	
	FN06-06NB	3/8	3/8	1.343	.688	.938	.328	
	FN06-08NB	3/8	1/2	1.469	.812	1.062	.328	

<b>MALE PIPE THREAD ELBOW</b>								
	FN03-02MB90	3/16	1/8	1.031	.438	.875	.141	.218
	FN03-04MB90	3/16	1/4	1.031	.438	.812	.141	.281
	FN04-02MB90	1/4	1/8	1.156	.469	.812	.203	.218
	FN05-04MB90	5/16	1/4	1.093	.406	1.125	.266	.312
	FN05-06MB90	5/16	3/8	1.093	.406	1.125	.266	.406
	FN06-06MB90	3/8	3/8	1.344	.750	1.141	.328	.406
	FN06-08MB90	3/8	1/2	1.344	.688	1.438	.328	.500

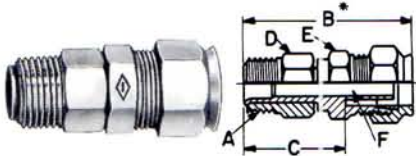
\*Approximate over-all length when made up with hose.

# COUPLINGS

RENEWABLE FN SERIES

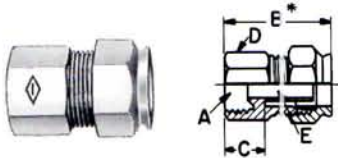
# DIMENSIONAL DATA

	Catalog Number	Hose I.D.	Tube O.D.	A Thread Size	B*	C	D	E	F
<b>INVERTED FLARE SWIVEL NUT</b>	FN03-03MF	3/16	3/16	3/8-24	1.500	.969	.375	.500	.125
	FN03-04MF	3/16	1/4	3/16-24	1.562	.969	.438	.500	.141
	FN03-05MF	3/16	5/16	1/2-20	1.625	1.031	.500	.500	.141
	FN04-05MF	1/4	5/16	1/2-20	1.656	1.000	.500	.625	.203
	FN05-06MF	5/16	3/8	5/8-18	1.844	1.188	.625	.688	.266



## FEMALE INVERTED FLARE

FN03-03NG	3/16	3/16	3/8-24	.969	.375	.500	.141
FN03-04NG	3/16	1/4	7/16-24	.969	.375	.500	.141
FN04-05NG	1/4	5/16	1/2-20	1.031	.375	.625	.203
FN04-06NG	1/4	3/8	5/8-18	1.156	.500	.688	.203
FN05-06NG	5/16	3/8	5/8-18	1.125	.469	.688	.266



## FEMALE 45° SAE FLARE SWIVEL

FN03-03NS	3/16	3/16	3/8-24	1.438	.688	.500	.500	.128
FN03-04NS	3/16	1/4	7/16-20	1.500	.750	.562	.562	.141
FN03-05NS	3/16	5/16	1/2-20	1.625	.906	.500	.625	.141
FN04-04NS	1/4	1/4	7/16-20	1.625	.875	.625	.562	.189
FN04-05NS	1/4	5/16	1/2-20	1.438	.844	.625	.625	.203
FN04-06NS	1/4	3/8	5/8-18	1.688	.906	.625	.750	.203
FN05-06NS	5/16	3/8	5/8-18	1.688	.969	.688	.750	.266
FN06-08NS	3/8	1/2	3/4-16	1.938	1.093	.812	.875	.328
FN08-08NS	1/2	1/2	3/4-16	2.093	1.125	1.000	.875	.422
FN10-10NS	5/8	5/8	7/8-14	2.250	1.218	1.125	1.000	.547

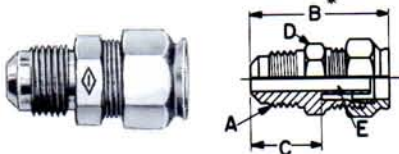


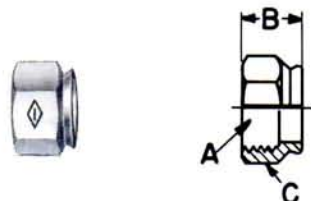


\*Approximate overall length when made up with hose.

# DIMENSIONAL DATA

# COUPLINGS

RENEWABLE FN SERIES

	Catalog Number	Hose I.D.	Tube O.D.	A Thread Size	B*	C	D	E	F
<b>MALE 45° FLARE</b> 	FN03-04MS	3/16	1/4	7/16-20	1.281	.688	.500	.141	
	FN03-05MS	3/16	5/16	1/2-20	1.531	.750	.500	.141	
	FN04-04MS	1/4	1/4	7/16-20	1.312	.656	.625	.203	
	FN04-05MS	1/4	5/16	1/2-20	1.531	.688	.625	.203	
	FN04-06MS	1/4	3/8	5/8-18	1.438	.781	.625	.203	
	FN05-06MS	5/16	3/8	5/8-18	1.469	.812	.688	.266	
	FN06-08MS	3/8	1/2	3/4-16	1.656	1.000	.812	.328	
<b>FEMALE 37° JIC FLARE SWIVEL</b> 	FN03-03NJ	3/16	3/16	3/8-24	1.469	.719	.500	.500	.125
	FN03-04NJ	3/16	1/4	7/16-20	1.625	.844	.562	.562	.141
	FN03-05NJ	3/16	5/16	1/2-20	1.625	.875	.500	.625	.141
	FN04-04NJ	1/4	1/4	7/16-20	1.688	.938	.625	.562	.188
	FN04-05NJ	1/4	5/16	1/2-20	1.500	.812	.625	.625	.203
	FN05-06NJ	5/16	3/8	9/16-18	1.688	.938	.688	.688	.266
	FN06-08NJ	3/8	1/2	3/4-16	1.875	1.000	.812	.875	.328
	FN08-08NJ	1/2	1/2	3/4-16	2.000	1.062	1.000	.875	.422
	FN10-10NJ	5/8	5/8	7/8-14	2.250	1.250	1.125	1.000	.547
	<b>SLEEVE</b> 	FN03-73	3/16		.222				
FN04-73		1/4		.222					
FN05-73		5/16		.255					
FN06-73		3/8		.281					
FN08-73		1/2		.312					
FN10-73		5/8		.344					
<b>NUT</b> 	FN03-56	3/16		1/2-27	.484	.625			
	FN04-56	1/4		5/8-24	.484	.750			
	FN05-56	5/16		11/16-24	.500	.812			
	FN06-56	3/8		13/16-20	.562	.938			
	FN08-56	1/2		1-18	.625	1.188			
	FN10-56	5/8		1 1/8-18	.688	1.312			

\*Approximate overall length when made up with hose.

# TUBING

# SPECIFICATIONS

## AIR BRAKE

### HYTRON® C6 AIR BRAKE TUBING

#### MATERIALS:

- Tube: Virgin Nylon.
- Reinforcement: Polyester braid.
- Cover: Virgin Nylon.

#### FITTINGS:

Standard Air Brake Fitting with 459-F eyelets.

#### CONFORMANCES:

Conforms to S.A.E. J844, Type 3 (A & B).

#### TEMPERATURE RANGE:

-40°F. to +200°F.

C6 is tough, but not rigid. Has a built-in, high resistance to road salt, gasoline and oil and shows practically no deterioration with age. This tubing can also take punishing abrasion far better than metal tubing or rubber hose.

C6 can be routed through frame and around corners in continuous lengths, reducing number of joints. In addition, C6 offers 75% weight reduction compared to metal tubing systems. Standard color: Black.



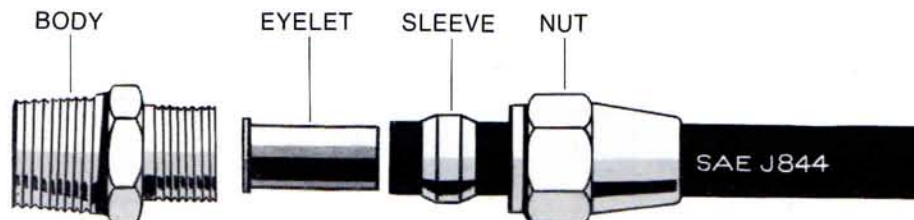
CATALOG NUMBER	LENGTH FT.	CATALOG NUMBER	LENGTH FT.	S.A.E. J844 TYPE	TUBE O.D. IN.	TUBE I.D. IN.	MAX. RECD. PRES. PSI	MIN. BURST PRES. PSI	MIN. BEND RADIUS IN.
C602-250	250**	C602-1000	1,000*	3A	1/8	.079	250	1,000	.37
C604-200	200**	C604-1000	1,000*	3A	1/4	.170	300	1,200	1.0
C605-200	200**			3A	5/16	.232	250	1,000	1.25
C606-100	100**	C606-1000	1,000*	3B	3/8	.251	350	1,400	1.5
C608-100	100**	C608-500	500*	3B	1/2	.376	235	950	2.0
C610-50	50**	C610-250	250*	3B	5/8	.441	210	850	2.5
C612-50	50**	C612-250	250*	3B	3/4	.556	200	800	3.0

\*Reels furnished in not more than three lengths, no length being less than 25 feet.

\*\*Coils furnished in not more than two lengths, no length being less than 25 feet.

#### FITTINGS:

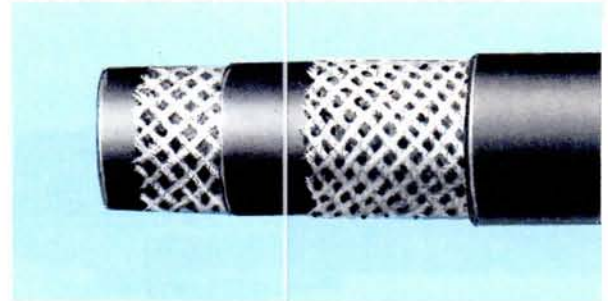
Standard Air Brake Compression fitting can be used with C6. Eyelet required. Specify Eyelet 459-F and size along with Air Brake Compression catalog number and size.



### Y1 AIR BRAKE HOSE

#### MATERIALS:

- Tube: Synthetic Rubber.
- Reinforcement: Braided Fiber.
- Cover: Synthetic Rubber.



#### COUPLINGS:

Type AB (see next page).

#### CONFORMANCES:

S.A.E. J1402, Table A.

#### TEMPERATURE:

To 275°F.

An economical, non-mandrel made hose. Tolerance is  $\pm 3/128$ ". Approved by the State of Pennsylvania for air brake service. Outer cover resists oils, grease, ozone, sunlight and abrasion. Furnished in 50 ft. cartons, 250 ft. box, and 500 ft. reel.

CATALOG NUMBER	LENGTH	HOSE I.D. IN.	HOSE O.D. IN.	MAX. RECD. WKG. PRES. PSI	MIN. BURST PRES. PSI	MIN. BEND RADIUS IN.
Y106-50	50 FT.	3/8	.750	225	900	3
Y108-50	50 FT.	1/2	.875	225	900	4
Y106-250	250 FT.	3/8	.750	225	900	3
Y108-250	250 FT.	1/2	.875	225	900	4
Y106-500	500 FT.	3/8	.750	225	900	3

50 ft. carton—Y106: 1 length (tolerance  $\pm 5$  ft.); Y107, Y108, Y110: Furnished in packages containing not less than 48 feet, nor more than 57 feet, in not more than two lengths, no length less than 10 feet.

250 ft. dispenser box— not more than 2 lengths, minimum length 25 ft. (tolerance  $\pm 25$  ft.).

500 ft. reel— not more than 3 lengths, minimum length 25 ft. (tolerance  $\pm 50$  ft.).

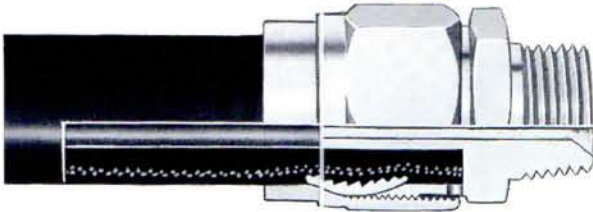
# COUPLINGS

FOR AIR BRAKE HOSE


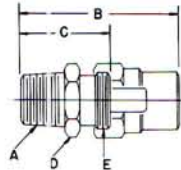

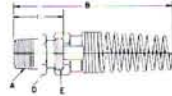

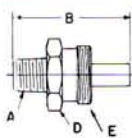

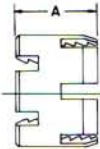

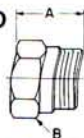

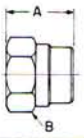

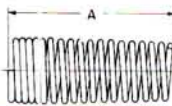
# SPECIFICATIONS

## COUPLINGS FOR AIR BRAKE HOSE STYLE Y1

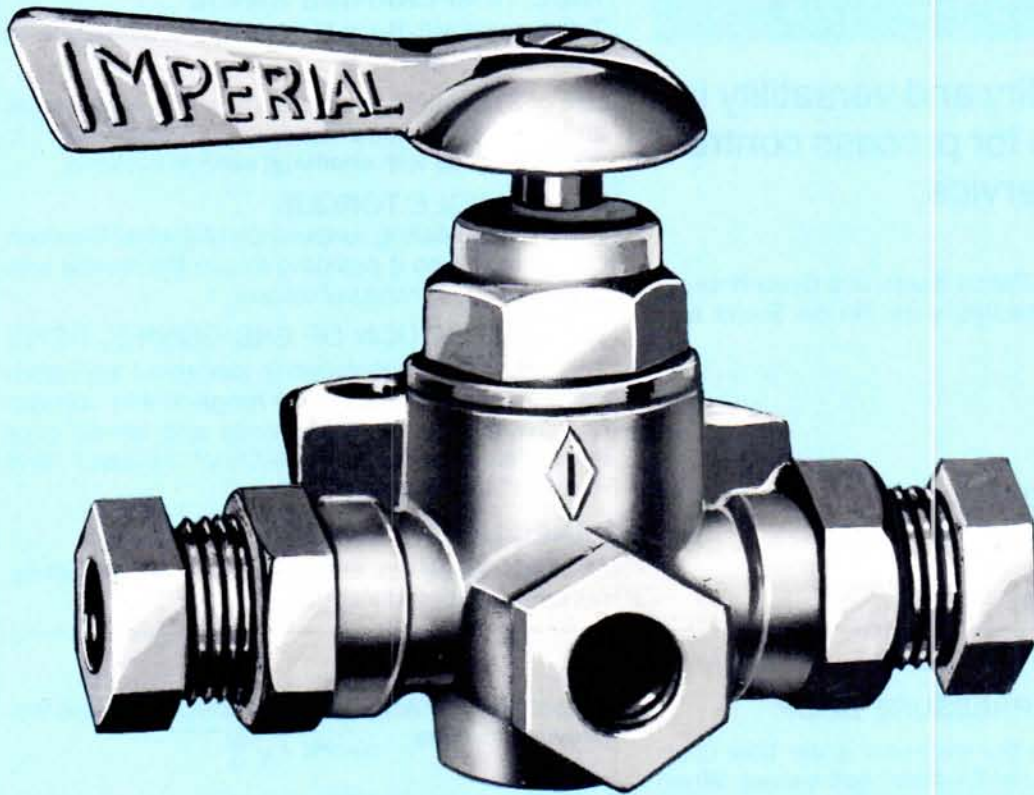
A 3-piece renewable brass coupling for use with type B Air Brake Hose. Can be removed from old hose and reused on new hose by replacing only the sleeve.



## DIMENSIONAL DATA

		Catalog No.	Hose I.D.	A Pipe Thread	B	C Hose Cut-Off	D	E
<b>MALE PIPE THREAD</b>  	AB06-04PR	3/8	1/4	2.187	.750	.968	31/32-20	
	AB06-06PR	3/8	3/8	2.187	.750	.968	31/32-20	
	AB06-08PR	3/8	1/2	2.343	.906	.968	31/32-20	
	AB08-06PR	1/2	3/8	2.469	.750	1.125	1 1/8-20	
<b>COUPLING WITH SPRING GUARD MALE PIPE THREAD</b>  	AB06-04PR-94	3/8	1/4	4.625	.750	.968	31/32-20	
	AB06-06PR-94	3/8	3/8	4.625	.750	.968	31/32-20	
	AB06-08PR-94	3/8	1/2	4.781	.906	.968	31/32-20	
	AB08-06PR-94	1/2	3/8	5.500	.750	1.125	1 1/8-20	
<b>BODY</b>  	AB06-04PR-85	3/8	1/4	1.906		.968	31/32-20	
	AB06-06PR-85	3/8	3/8	1.906		.968	31/32-20	
	AB06-08PR-85	3/8	1/2	2.062		.968	31/32-20	
	AB08-06PR-85	1/2	3/8	1.968		1.125	1 1/8-20	
<b>SLEEVE</b>  	AB06-73	3/8		.687				
	AB07-73	7/16		.984				
	AB08-73	1/2		1.046				
	AB10-73	5/8		1.187				
<b>SHELL FOR SPRING GUARD</b>  	AB06-82	3/8		1.187	1.062			
	AB07-82	7/16		1.375	1.125			
	AB08-82	1/2		1.375	1.187			
	AB10-82	5/8		1.375	1.375			
<b>SHELL</b>  	AB06-81	3/8		1.187	1.062			
	AB07-81	7/16		1.187	1.125			
	AB08-81	1/2		1.375	1.187			
	AB10-81	5/8		1.375	1.375			
<b>SPRING GUARD</b>  	AB06-95			2.750				
	AB07-95			3.500				
	AB08-95			3.500				
	AB10-95			3.500				



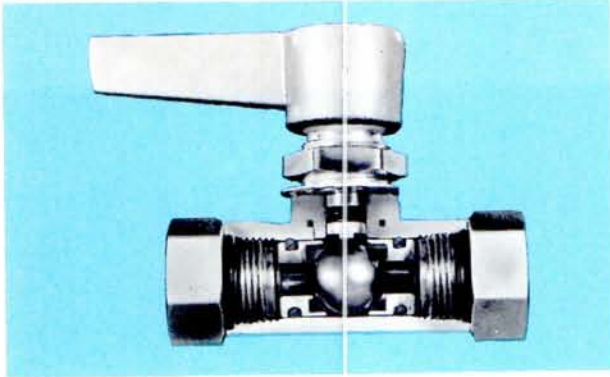


Wide assortment of miniature valves for a variety of fluid control and shut-off applications.

SIZE RANGES:  $\frac{3}{16}$ " to  $\frac{1}{2}$ " Tube O.D.  
 $\frac{1}{8}$ " to  $\frac{1}{2}$ " Port NPTF

MATERIALS: Brass, Stainless Steel.

TYPES AVAILABLE: Ball, Plug, Needle, Check, Fuel, Saddle, Water Drain Cocks, Priming Cups.  
See following data for specific information.



Extra reliability and versatility in small valves for process control or general service.

### MATERIALS

Brass Bodies with Teflon Seats and Buna-N seals.  
Stainless Steel Bodies with Teflon Seats and Viton Seals.

### SIZE RANGE

1/4" x 1/2" Tube O.D.  
1/8" to 1/2" Port NPTF

### RECOMMENDED MAXIMUM WORKING PRESSURE

500 psi 2 way  
125 psi 3 and 4 way

### MULTIPLE SPRING-LOADED SEATS

The ball fits securely between multiple spring-loaded seats (one at each orifice opening) which keep constant pressure against the ball. The springs compensate for any wear or fluctuations in pressure.

The valve can be installed with any side upstream, and the flow can be reversed without any change in the valve—because all sides have spring-loaded seats.

### WIDE TEMPERATURE RANGE

Teflon seats with Buna-N seals permit temperatures from -40°F. to 200°F.

Use of 316 stainless steel bodies with Teflon seats and Viton seals allow temperatures from -40°F. to 400°F. and use with chemical service systems.

### LOW HANDLE TORQUE

This unique floating suspension of the ball between the seats makes it possible to turn the handle with under 5 pound-inches of torque.

### WIDE SELECTION OF END CONNECTIONS

This valve can be installed in just about any application, because of the wide range of end connection availability, including male and female pipe ends, Imperial-Eastman Hi-Duty®, Hi-Seal® and Poly-Flo® tube ends.

### PANEL MOUNT FEATURE

All standard valves are furnished with a mounting nut for panel board installation.

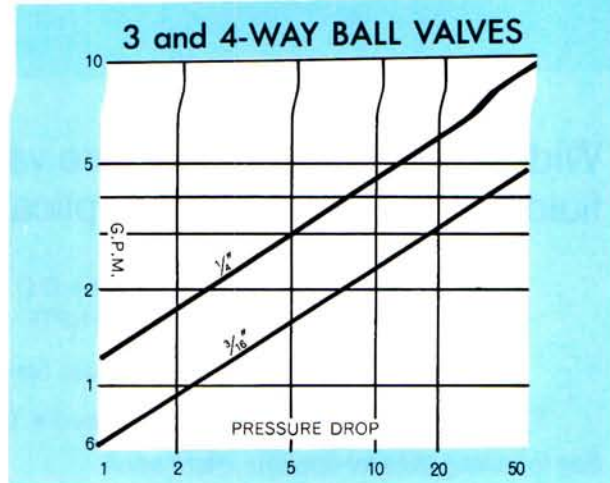
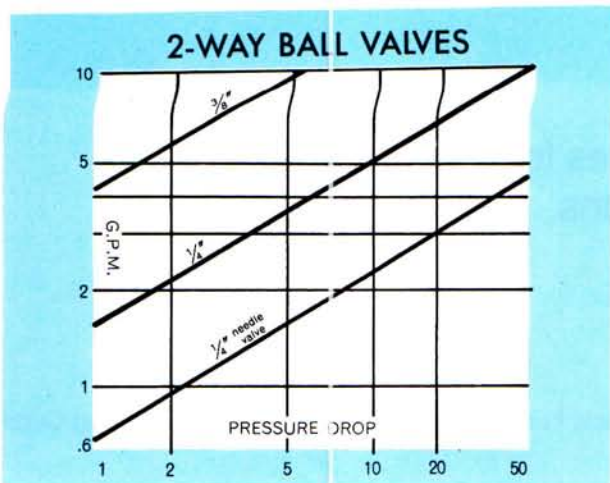
### FLOW RATE vs. PRESSURE DROP

These charts show the excellent water flow characteristics of Imperial-Eastman ball valves. When substituting a ball valve for a needle valve, you can use a smaller valve size and still get an equivalent flow... or you can even use less input capacity.

To apply the Cv factor to other applications, use the following formula:  $C_v = \text{GPM} / \sqrt{\frac{\Delta p}{G}}$

Water (at 60°F)  $\Delta p = P_1 - P_2$  in PSI  
 $P_1$  = Inlet Pressure PSIA  
 $P_2$  = Outlet Pressure PSIA  
 $G$  = Specific Gravity = 1.0  $T$  = Absolute temperature  
 Gas is based on air @ 14.7 PSIA and 60°F = 1.0

$$\text{SCFH} = 1360 \text{CV} \sqrt{\frac{\Delta p}{GT}} \sqrt{\frac{P_1 + P_2}{2}}$$



# SPECIFICATIONS

# VALVES

## ORDERING INFORMATION

Select valve required and specify appropriate catalog numbers.

### BRASS

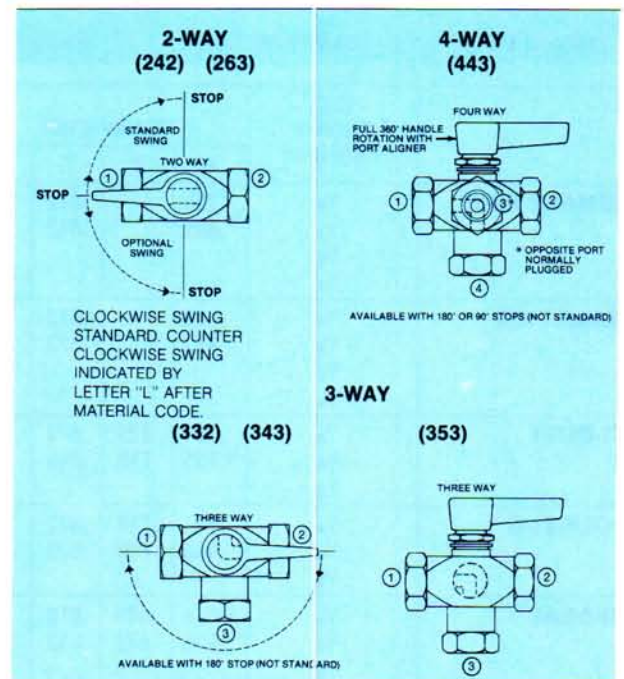
2-WAY				
Configuration	End Size	1/4" Orifice Cat. No.	3/8" Orifice Cat. No.	
Female Pipe	1/8	242-B-2A	—	
		242-BL-2A*	—	
	1/4	242-B-4A	263-B-4A	
		—	263-BL-4A*	
		—	263-B-6A	
	3/8	—	263-BL-6A*	
	1/2	—	263-B-8A	
Male Pipe	1/4	242-B-4B	263-B-4B	
	3/8	—	263-B-6B	
	1/2	—	263-B-8B	
Hi-Duty	1/4	242-B-4C	—	
	1/2	—	263-B-8C	
Hi-Seal	1/4	242-B-4D	—	
Poly-Flo	1/4	242-B-4E	—	
	3/8	242-B-6E	—	
Female Pipe x Male Pipe	1/8	242-B-2A x 2B	—	
	1/4	242-B-4A x 4B	263-B-4A x 4B	
Male Pipe		242-BL-4A x 4B*	—	
	3/8	—	263-B-6A x 6B	
Male Pipe x Poly-Flo	1/4	242-B-4B x 4E	—	
Male Pipe x Hi-Seal	3/8	—	263-B-6B x 6D	
Poly-Flo x Female Pipe	3/8 x 1/8	242-B-6E x 2A	—	

3-WAY				
Configuration	End Size	3/16" Orifice Cat. No.	1/4" Orifice Cat. No.	1/4" Orifice Bottom Entry Cat. No.
Female Pipe	1/8	332-B-2A	—	353-B-2A
	1/4	332-B-4A	343-B-4A	353-B-4A
	1/4 x 3/8 x 3/8	—	343-B-4A x 6A x 6A	—
		—	343-B-6A	353-B-6A
		1/2	—	343-B-8A
Male Pipe	1/4	—	343-B-4B	—
Hi-Duty	1/4	332-B-4C	—	—
Poly-Flo	1/4	332-B-4E	—	—

4-WAY		
Configuration	End Size	1/4" Orifice Cat. No.
Female Pipe	1/4	443-B-4A
Hi-Seal	3/8	443-B-6D

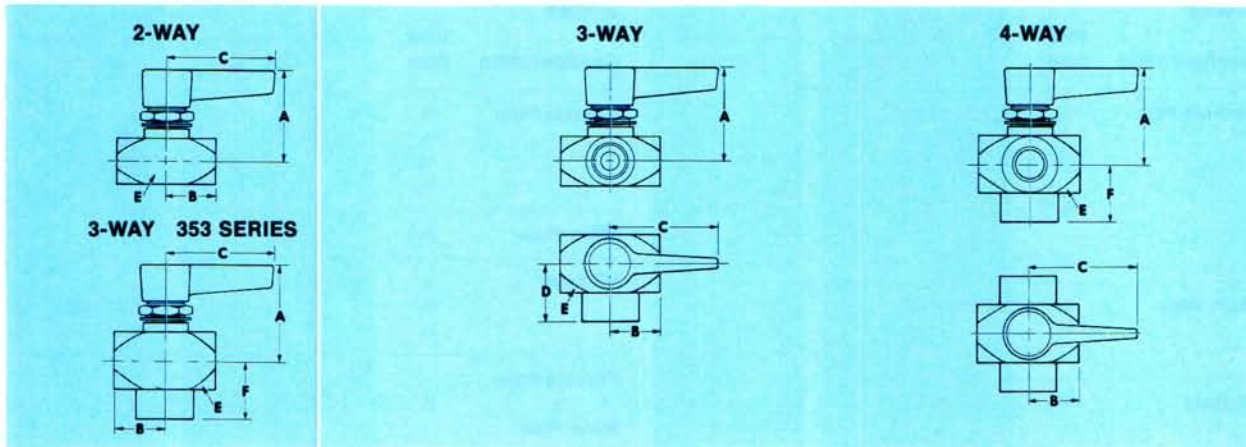
### STAINLESS STEEL

2-WAY				
Configuration	End Size	1/4" Orifice Cat. No.	3/8" Orifice Cat. No.	
Female Pipe	1/8	242-F-2A	—	
	1/4	242-F-4A	263-F-4A	
	3/8	—	263-F-6A	
	1/2	—	263-F-8A	
Male Pipe	1/4	242-F-4B	—	
Hi-Seal	1/4	242-F-4D	—	
	3/8	—	263-F-6D	
	1/2	—	263-F-8D	
Female Pipe x Male Pipe	1/4	242-F-4A x 4B	—	



\*Counter clockwise handle swing.

## BODY

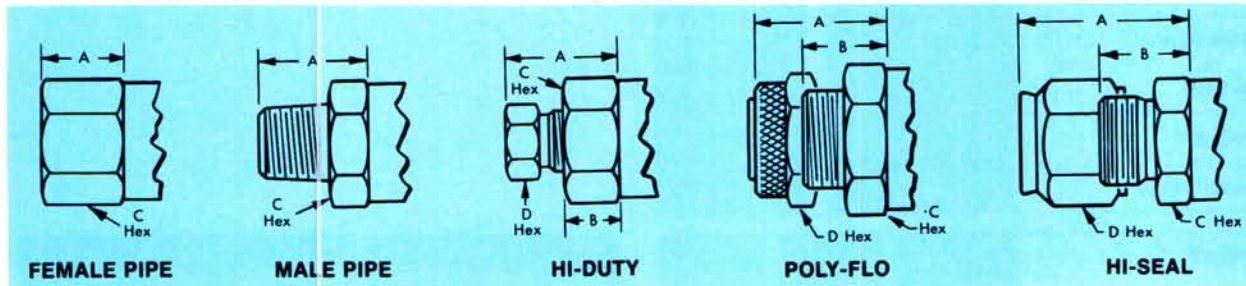


	A	B	C	D	E sq.	F
2 Way, 1/4" Orifice (242)	1.531	.867	1.750		.812	
2 Way, 3/8" Orifice (263)	1.640	.843	1.750		.937	
3 Way, 3/16" Orifice (332)	1.562	.800	1.750	.891	.812	
3 Way, 1/4" Orifice (343)	1.640	.843	1.750	.921	.937	
3 Way, 3/8" Orifice (353)	1.640	.843	1.750		.937	.921
4 Way, 1/4" Orifice (443)	1.640	.843	1.750	.921	.937	.921

Diameter of holes in panel boards: .625 with bonnet extender: .890.

Maximum bulkhead thickness: .250

## END CONNECTIONS



	O.D. Tube or Pipe Size	2 WAY (242)				2 WAY (263), 3 WAY (343), (353), 4 WAY (443)				3 WAY (332)			
		A	B	C	D	A	B	C	D	A	B	C	D
<b>FEMALE PIPE</b>	1/8	.250		.812		.250		.937		.250		.812	
	1/4	.625		.812		.375		.937		.625		.812	
	3/8					.625		.937					
	1/2					.843		1.062					
<b>MALE PIPE</b>	1/8	.625		.812		.625		.937		.625		.812	
	1/4	.812		.812		.875		.937		.812		.812	
	3/8					.875		.937					
	1/2					1.125		.937					
<b>HI-DUTY</b>	1/4	.781	.375	.812	.437	.937	.625	.937	.437	.781	.375	.812	.437
	3/8	1.125	.718	.812	.625	1.032	.625	.937	.625	1.125	.718	.812	.625
	1/2					1.062	.625	.937	.750				
<b>POLY-FLO</b>	1/4	.937	.718	.812	.437	.937	.718	.937	.437	.937	.718	.812	.437
	3/8	.968	.718	.812	.562	.968	.718	.937	.562	.968	.718	.812	.562
	1/2					1.093	.843	.937	.812				
<b>HI-SEAL</b>	1/4	1.016	.688	.812	.625	.984	.656	.937	.625	.984	.688	.812	.625
	3/8	1.078	.641	.812	.750	1.172	.734	.937	.750	1.046	.641	.812	.750
	1/2					1.328	.781	.937	.875				

### Positive plug type shut-off valve with Hi-Duty tube connection ends.

#### MATERIALS:

- Brass Bodies and Plugs

#### SIZE RANGE:

1/4" to 1/2" Tube O.D.

1/8" to 3/8" Port NPTF

#### RECOMMENDED MAXIMUM WORKING PRESSURE:

50 psi.

WOG Service.

A plug valve with solid bottom and O-ring stem seal which prevents leakage to, or from, the atmosphere.

Used for low pressures where quick on and off operation and generous flow are required. Port openings of Hi-Duty valves with tubing connections are equal to the opening through the tubing. Because of the large openings, there is a momentary

interconnection between the ports of most 3 and 4 way valves when switching from one port to another. (No. 128-HD does not have interconnection between port openings.)

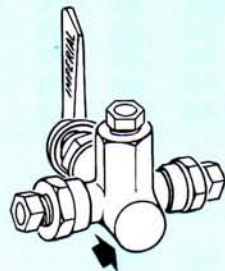
Indicating "click" on 3 and 4 way valves tells when handle is in full open or closed position. 2 way valves have positive stop to assure full openings. Valves with tubing connections have Hi-Duty ends and are furnished with 81-LB Hi-Duty nuts. Pipe threads are long Dryseal.

Packed with a special synthetic grease which resists gasoline, solvents water and air. Conforms to military specification MIL-G-6032. Non-drying and lasts up to 100 times longer than ordinary grease.

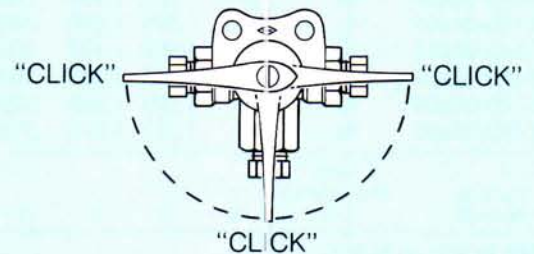
#### SOLUBILITY OF GREASE:

Gasoline .....	Nil
Oil .....	Nil
Water .....	Nil
Alcohol-Water .....	Nil
MIL-H-3136 .....	10%
Mixed Alcohols .....	31%
Mixed Keytones .....	45%
Toluene .....	90%
Benzene .....	100%
Carbon Tetrachloride .....	100%

Pat. No. 2,488,283.



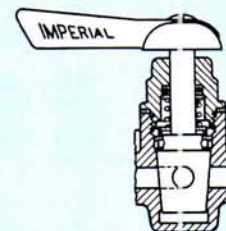
Solid bottom — to prevent leakage.



Indicating "click" on 3- and 4-way types — tells when handle is in full open or closed position. Pointer handle permits use with indicator plate.



Integral mounting bracket.



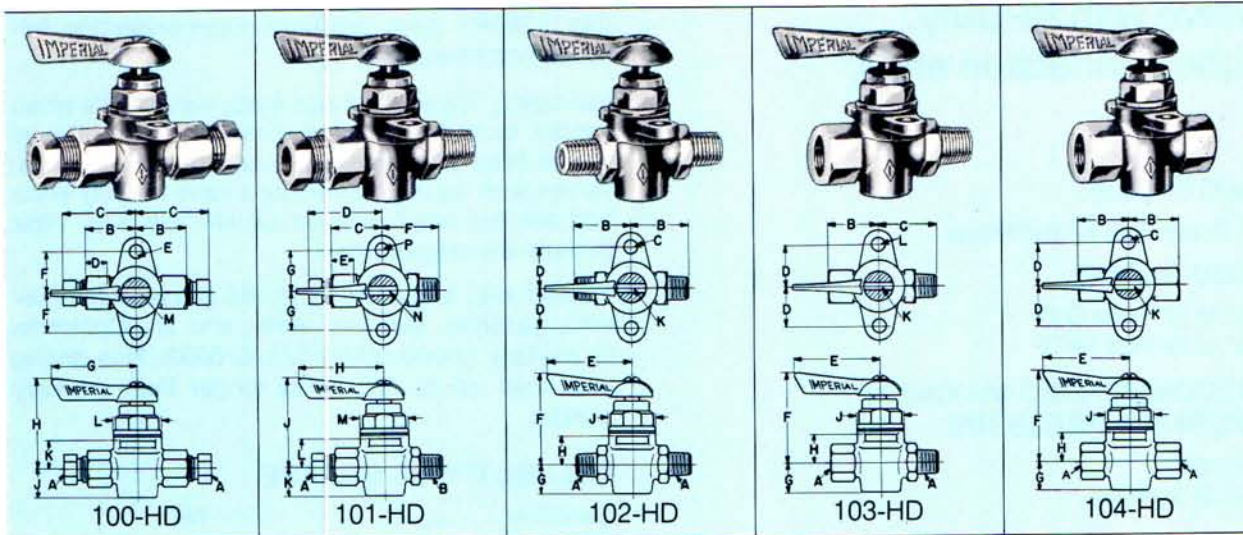
Floating stem with O-ring seal. Spring maintains proper tension on plug.

# VALVES

HI-DUTY SHUT-OFF

# DIMENSIONAL DATA

## TWO-WAY VALVES



Catalog Number	O.D. of Tube A	B	C	D	E	F	G	H	J	K	L	M
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### 100-HD Tube to Tube

100-HD-04	1/4	.875	1.312	.500	.265	.718	1.500	1.609	.500	.500	.843	.187
100-HD-05	5/16	1.000	1.437	.531	.265	.812	2.062	1.968	.656	.593	1.062	.250
100-HD-06	3/8	1.093	1.562	.625	.265	.812	2.062	1.968	.656	.593	1.062	.312
100-HD-08	1/2	1.312	1.812	.718	.265	.906	2.562	2.328	.718	.656	1.250	.437

Catalog Number	O.D. of Tube A	Male Pipe Thread B	C	D	E	F	G	H	J	K	L	M	N	P
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### 101-HD Tube to M.P.T.

101-HD-04x02	1/4	1/8	.875	1.250	.500	1.000	.718	1.500	1.609	.500	.500	.843	.218	.265
101-HD-04x04	1/4	1/4	.875	1.250	.500	1.000	.718	1.500	1.609	.500	.500	.843	.250	.265
101-HD-05x02	5/16	1/8	1.000	1.437	.531	1.125	.812	2.062	1.968	.656	.593	1.062	.218	.265
101-HD-05x04	5/16	1/4	1.000	1.437	.531	1.343	.812	2.062	1.968	.656	.593	1.062	.312	.265
101-HD-06x04	3/8	1/4	1.093	1.562	.625	1.343	.812	2.062	1.968	.656	.593	1.062	.312	.265
101-HD-08x06	1/2	3/8	1.312	1.812	.718	1.500	.906	2.562	2.328	.718	.656	1.250	.437	.265

Catalog Number	Male Pipe Thread A	B	C	D	E	F	G	H	J	K
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### 102-HD M.P.T. to M.P.T.

102-HD-02	1/8	1.000	.265	.718	1.500	1.609	.500	.500	.843	.218
102-HD-04	1/4	1.343	.265	.812	2.062	1.968	.656	.593	1.062	.312
102-HD-06	3/8	1.500	.265	.906	2.562	2.328	.718	.656	1.250	.437

Catalog Number	Female Pipe Thread A	Male Pipe Thread A	B	C	D	E	F	G	H	J	K	L
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### 103-HD F.P.T. to M.P.T.

103-HD-02x02	1/8	1/8	.875	1.000	.718	1.500	1.609	.500	.500	.843	.250	.265
103-HD-04x04	1/4	1/4	1.125	1.343	.812	2.062	2.375	.656	.593	1.062	.312	.265
103-HD-06x06	3/8	3/8	1.312	1.500	.906	2.562	2.328	.718	.656	1.250	.437	.265

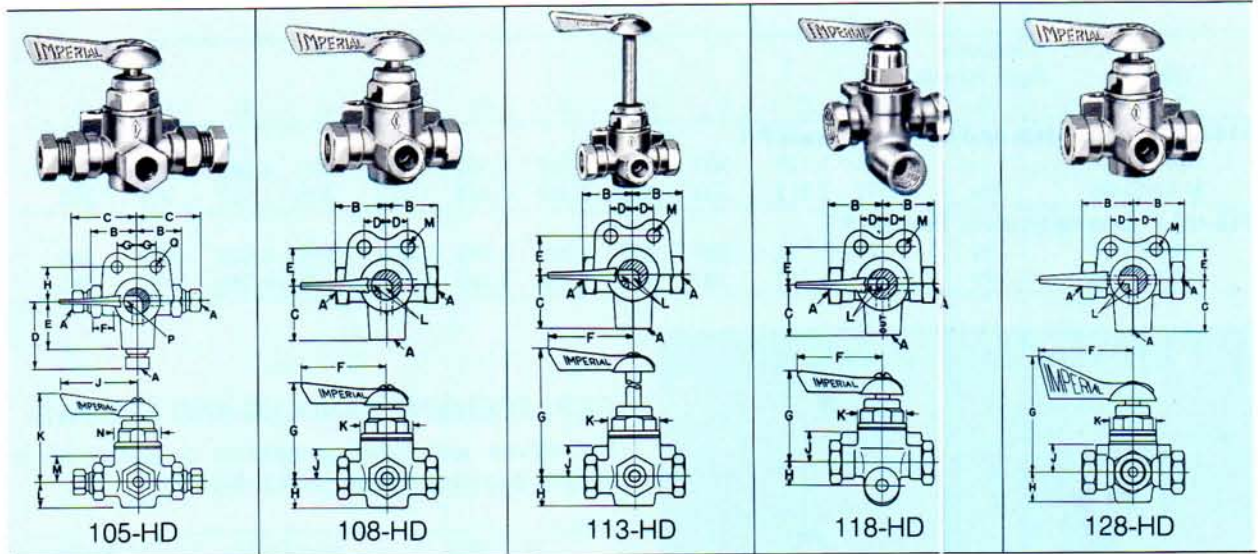
Catalog Number	Female Pipe Thread A	B	C	D	E	F	G	H	J	K
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### 104-HD F.P.T. to F.P.T.

104-HD-02	1/8	.875	.265	.718	1.500	1.609	.500	.500	.843	.250
104-HD-04	1/4	1.125	.265	.812	2.062	1.968	.656	.593	1.062	.312
104-HD-06	3/8	1.312	.265	.906	2.562	2.328	.718	.656	1.250	.437

### THREE-WAY VALVES

Flow of 3-way valves is from either side of line to branch.



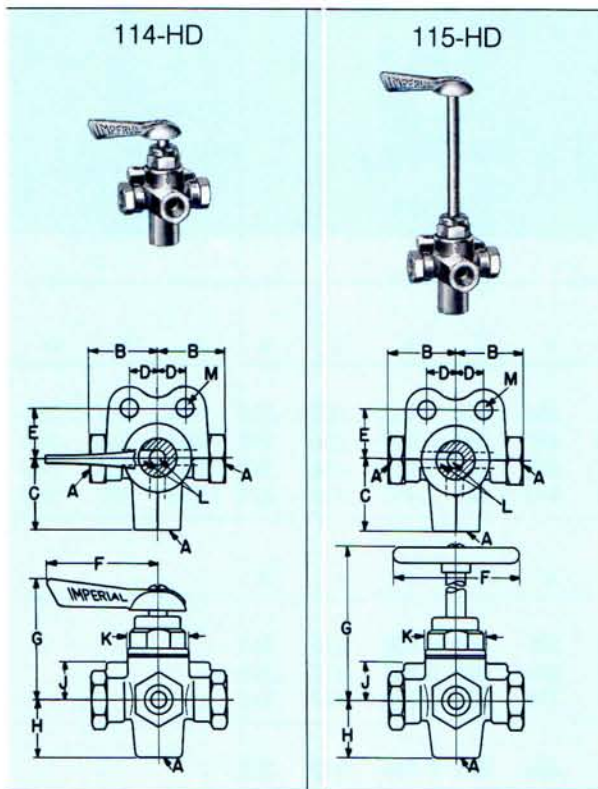
Catalog Number	Tube O.D. A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
<b>105-HD Tube to Tube to Tube</b>															
105-HD-04	1/4	.875	1.281	1.343	.937	.500	.375	.656	1.500	1.703	.500	.500	.906	.187	.265
105-HD-05	5/16	1.031	1.437	1.437	1.031	.531	.500	.687	2.062	2.062	.656	.593	1.062	.250	.265
105-HD-06	3/8	1.125	1.531	1.531	1.125	.625	.500	.687	2.062	2.062	.656	.593	1.062	.312	.265
105-HD-08	1/2	1.312	1.750	1.750	1.312	.718	.500	.843	2.562	2.453	.718	.625	1.250	.437	.265
Catalog Number	Female Pipe Thread A	B	C	D	E	F	G	H	J	K	L	M			
<b>108-HD F.P.T. to F.P.T. to F.P.T.</b>															
108-HD-02	1/8	.875	.937	.375	.656	1.500	1.703	.500	.500	.906	.250	.265			
108-HD-04	1/4	1.125	1.125	.500	.687	2.062	2.500	.656	.593	1.046	.312	.265			
108-HD-06	3/8	1.312	1.312	.500	.843	2.562	2.453	.718	.625	1.250	.437	.265			
<b>113-HD F.P.T. to F.P.T. to F.P.T.</b>															
113-HD-04	1/4	1.125	1.125	.500	.687	2.062	3.937	.656	.593	1.062	.312	.265			
<b>118-HD F.P.T. to F.P.T. to F.P.T.</b>															
118-HD-02	1/8	.906	.875	.375	.625	1.500	1.609	.968	.500	.843	.250	.265			
118-HD-04	1/4	1.125	1.125	.500	.687	2.062	1.968	.625	.593	1.031	.312	.265			
118-HD-06	3/8	1.312	1.312	.500	.843	2.562	2.312	.750	.625	1.250	.437	.265			
<b>128-HD F.P.T. to F.P.T. to F.P.T. — Has no interconnection between three port openings.</b>															
128-HD-04	1/4	1.125	1.125	.500	.687	2.062	2.500	.656	.593	1.046	.187	.265			

## HI-DUTY SHUT-OFF

### 4-WAY VALVES

For trucks and buses with 3 tanks. Used with 2 tanks by plugging one connection. Flow is from any side connection to bottom outlet.

Catalog Number	Female Pipe Thread	B	C	D	E	F	G	H	J	K	L	M
	A											
<b>114-HD Regular stem and handle. Female P.T.</b>												
114-HD-04	1/4	1.125	1.125	.500	.687	2.062	2.062	1.000	.593	1.062	.312	.265
114-HD-06	3/8	1.312	1.312	.500	.843	2.562	2.453	1.125	.625	1.235	.437	.265
<b>115-HD 3" Extension stem. Female P.T.</b>												
115-HD-04	1/4	1.125	1.125	.500	.687	2.000	4.093	1.000	.593	1.062	.312	.265
115-HD-06	3/8	1.312	1.312	.500	.843	1.812	4.765	1.125	.625	1.235	.437	.265



### REPLACEMENT HANDLES AND SCREWS

For valves with tube connection or combination of tube and pipe thread connection.

O.D. Size	Handle No.	Screw No.
1/8, 3/16, 1/4*	38486	39013
5/16, 3/8	38485	38532
1/2	60353	38532

For valves with pipe thread connections.

Pipe Size	Handle No.	Screw No.
1/8	38486	39013
1/4	38485	38532
3/8†	60353	38532

### EXCEPTIONS

Valve No.	Handle No.	Screw No.
*107-HD 1/4x1/4	38485	38532
†109-HD 3/8 and 115-HD 3/8	38485	38532

### HI-DUTY NUTS

Replacement nuts for Hi-Duty valves with tubing connections.

Catalog Number	Tube O.D.	A		B
		1	2	
81-LB-04	1/4	.734	.437	
81-LB-05	5/16	.765	.500	
81-LB-06	3/8	.843	.625	
81-LB-08	1/2	.921	.750	





# SPECIFICATIONS

# VALVES

## PLUG TWO-WAY AND THREE-WAY SHUT-OFF

Positive closure with forged bodies for extra strength

RECOMMENDED MAXIMUM WORKING PRESSURE:

30 psi WOG Service.

**MATERIALS:**

- Brass.

Individually ground plugs. Indicating "click" tells when valve is fully open or closed on Nos. 27-EF to 57-EF, 27-SAE to 57-SAE. 90° stop is provided on Nos. 28-EF to 58-EF, 28-SAE to 58-SAE, 39-E, 40-E, 165-SAE.

**SIZE RANGE:**

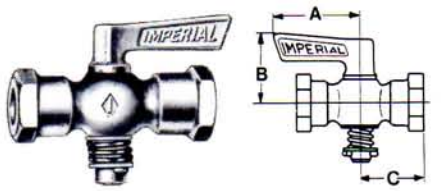
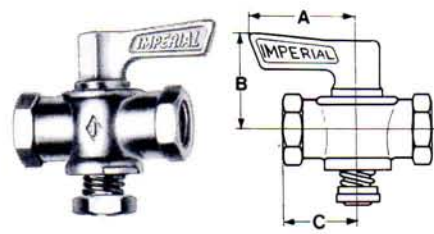
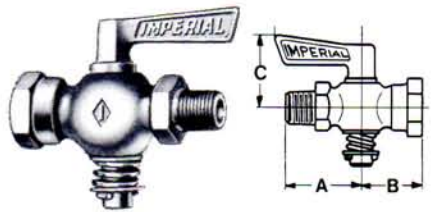
1/4" to 3/8" Tube O.D.

1/8" to 3/8" NPTF

Most types are forged brass. Long Dryseal pipe threads. Valves are packed with special synthetic grease which resists gasoline, solvents and water.

# DIMENSIONAL DATA

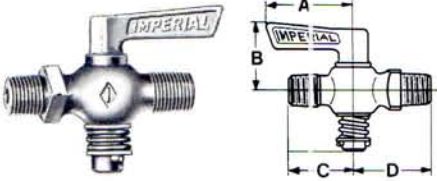
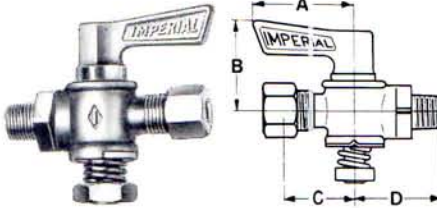
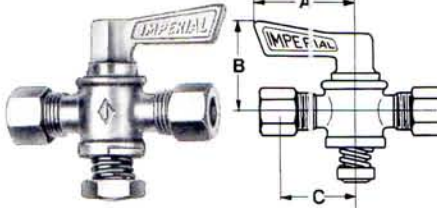
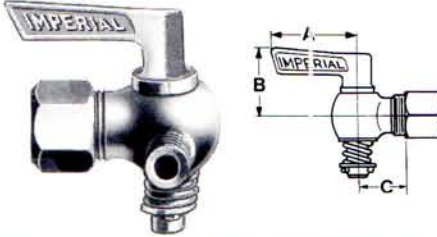
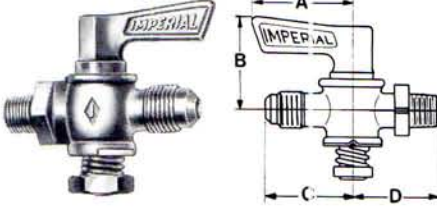
## PLUG TWO-WAY SHUT-OFF

	Catalog Number	Female Pipe Thread	A	B	C	D	E	
<b>FEMALE P.T. TO FEMALE P.T.</b> 	31-E	1/8x1/8	1.000	.842	.750			
	32-E	1/4x1/4	1.000	1.218	1.000			
<b>FEMALE P.T. TO FEMALE P.T.</b> 	39-E	1/4x1/4	1.000	1.218	1.000			
	40-E	3/8x3/8	1.125	1.348	1.062			
	Catalog Number	Female Pipe Thread	Male Pipe Thread	A	B	C	D	E
<b>FEMALE P.T. TO MALE P.T.</b> 	48-E	1/8	1/8	.968	.750	.842		
	49-E	1/4	1/4	1.312	1.062	1.218		

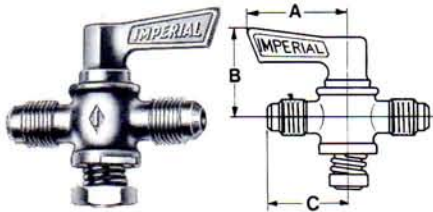
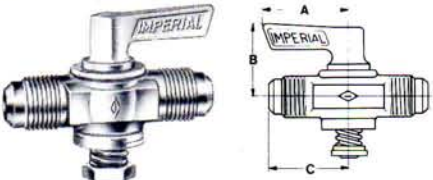
# VALVES

# DIMENSIONAL DATA

## PLUG TWO-WAY SHUT-OFF

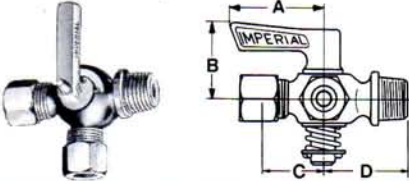
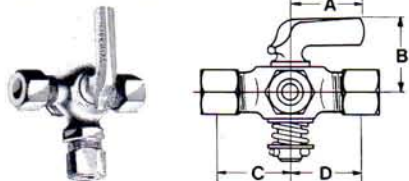
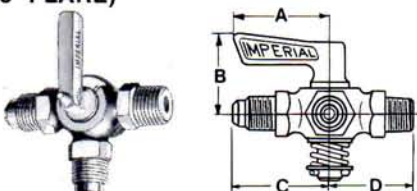
	Catalog Number	Male Pipe Thread	A	B	C	D	E	F	
<b>MALE P.T. TO MALE P.T.</b>	76-E	1/8x1/8	1.000	.842	.968	.968			
	77-E	1/4x1/4	1.000	1.218	1.343	1.343			
									
	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>TUBE (COMPRESSION) TO MALE P.T.</b>	27-EF	1/4	1/8	1.000	1.218	1.215	1.187		
	227-EF	1/4	1/4	1.000	1.218	1.215	1.343		
	29-EF	5/16	1/8	1.000	1.218	1.156	1.187		
	229-EF	5/16	1/4	1.000	1.218	1.156	1.343		
	57-EF	3/8	1/4	1.000	1.218	1.187	1.343		
									
<b>TUBE TO TUBE (COMPRESSION)</b>	28-EF	1/4		1.000	1.218	1.125			
	30-EF	5/16		1.000	1.218	1.156			
	58-EF	3/8		1.000	1.218	1.187			
									
<b>TUBE (COMPRESSION) TO MALE P.T.</b>	89-EF	1/4	1/8	1.093	.875	.750			
									
<b>TUBE (45° FLARE) TO MALE P.T.</b>	27-SAE	1/4	1/8	1.000	1.218	1.250	1.187		
	227-SAE	1/4	1/4	1.000	1.218	1.250	1.343		
	29-SAE	5/16	1/8	1.000	1.218	1.312	1.187		
	229-SAE	5/16	1/4	1.000	1.218	1.312	1.312		
	57-SAE	3/8	1/4	1.000	1.218	1.375	1.375		
									

## PLUG TWO-WAY AND THREE-WAY SHUT-OFF

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>TUBE TO TUBE (45° FLARE)</b> 	28-SAE	1/4		1.000	1.218	1.250			
	30-SAE	5/16		1.000	1.218	1.312			
	58-SAE	3/8		1.000	1.218	1.375			
<b>GAS COCK</b> 	165-SAE	1/2x1/2		1.125	1.343	1.593			

## PLUG THREE-WAY SHUT-OFF

Individually ground plugs. All have stops or indicators. Made of brass or bronze. Flow is from pipe thread connection to either tube connection. Flow with Nos. 116-EF, 120-EF, 121-EF is from branch to either of two line connections.

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>TUBE TO MALE P.T. TO TUBE (COMPRESSION)</b> 	60-EF	1/4	1/8	1.093	1.000	.750	1.000		
	61-EF	5/16	1/8	1.281	1.000	.843	1.093		
<b>TUBE TO TUBE TO TUBE (COMPRESSION)</b> 	120-EF	1/4		1.218	1.015	.906			
	116-EF	5/16		1.218	1.015	.906			
	121-EF	3/8		1.218	1.015	.906	.906		
<b>TUBE TO MALE P.T. TO TUBE (45° FLARE)</b> 	60-SAE	1/4	1/8	1.218	1.015	1.187	1.062		

## NEEDLE SHUT-OFF

Excellent for general service with metering capability.

### MATERIALS:

Brass.

### SIZE RANGE:

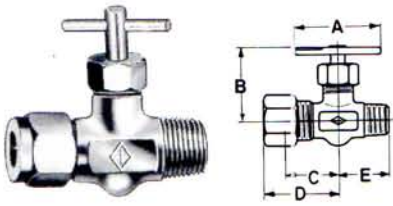
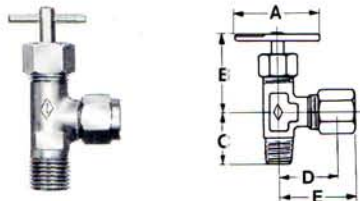
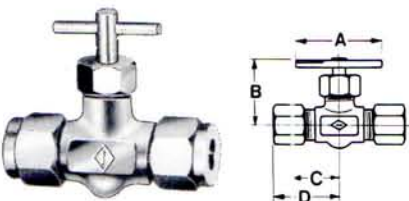
$\frac{3}{16}$ " to  $\frac{3}{8}$ " Tube O.D.  
 $\frac{1}{8}$ " to  $\frac{1}{4}$ " Port NPTF

### RECOMMENDED MAXIMUM WORKING PRESSURE:

300 psi to 200°F.

Ideal for general shut-off service where flow control is also required. Most valves have forged brass bodies. Valves with compression tube connections furnished assembled with nuts and sleeves.

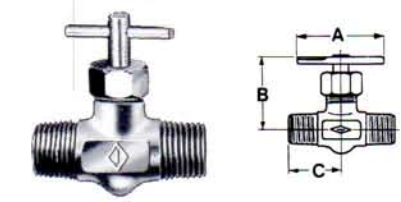
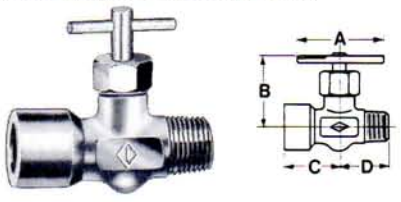
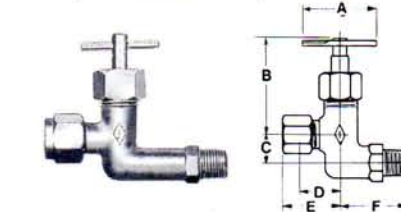

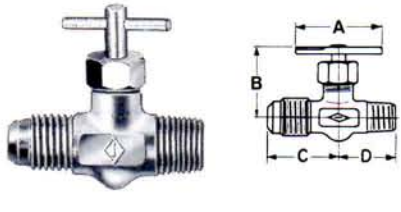
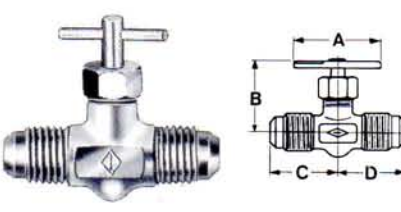
## DIMENSIONAL DATA

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>TUBE (COMPRESSION) TO MALE P.T.</b> 	100-EF	$\frac{3}{16}$	$\frac{1}{8}$	.875	1.250	.593	.843	.625	
	101-EF	$\frac{1}{4}$	$\frac{1}{8}$	.875	1.250	.625	.937	.625	
	141-EF	$\frac{1}{4}$	$\frac{1}{4}$	.875	1.250	.625	.937	.750	
	102-EF	$\frac{5}{16}$	$\frac{1}{8}$	.875	1.250	.656	.968	.812	
	142-EF	$\frac{5}{16}$	$\frac{1}{4}$	.875	1.250	.656	.968	.750	
	143-EF	$\frac{3}{8}$	$\frac{1}{4}$	1.250	1.656	1.000	1.312	1.062	
<b>TUBE (COMPRESSION) TO MALE P.T.</b> 	103-EF	$\frac{1}{4}$	$\frac{1}{8}$	1.250	1.156	.812	.687	1.000	
	153-EF	$\frac{3}{16}$	$\frac{1}{8}$	.875	1.125	.687	.656	.906	
	203-EF	$\frac{3}{16}$	$\frac{1}{8}$	1.250	1.156	.812	.750	1.062	
	204-EF	$\frac{5}{16}$	$\frac{1}{4}$	1.250	1.156	.968	.750	1.062	
	303-EF	$\frac{3}{8}$	$\frac{1}{4}$	1.250	1.437	.968	.781	1.093	
	<b>TUBE TO TUBE (COMPRESSION)</b> 	105-EF	$\frac{3}{16} \times \frac{3}{16}$		.875	1.250	.593	.843	
106-EF		$\frac{1}{4} \times \frac{1}{4}$		.875	1.250	.625	.937		
107-EF		$\frac{5}{16} \times \frac{5}{16}$		.875	1.250	.656	.968		
113-EF		$\frac{3}{8} \times \frac{3}{8}$		1.250	1.656	1.000	1.312		

# DIMENSIONAL DATA

# VALVES

## NEEDLE SHUT-OFF

	Catalog Number	Tube O.D.	Pipe Thread	A	B	C	D	E	F
<b>MALE P.T. TO MALE P.T.</b> 	108-EF		1/8x1/8	.875	1.250	.625			
	110-EF		1/4x1/4	.875	1.125	.750			
<b>MALE P.T. TO FEMALE P.T.</b> 	130-EF		1/8 Male. 1/8 Fem.	.875	1.250	.718	.625		
<b>TUBE (COMPRESSION) TO MALE P.T.</b> 	168-EF	1/4	1/8	1.250	1.156	.343	.718	1.031	1.375
<b>TUBE (45° FLARE) TO MALE P.T.</b> 	103-SAE	1/4	1/8	1.250	1.281	.812	.875		
	203-SAE	5/16	1/8	1.250	1.250	.812	.937		
	204-SAE	5/16	1/4	1.250	1.218	.968	.937		
	303-SAE	3/8	1/4	1.250	1.593	.968	1.031		
	104-SAE	1/4	1/8	.875	1.281	.812	.812		
	105-SAE	1/4	1/4	.875	1.187	.812	.750		
	106-SAE	5/16	1/8	.875	1.312	.875	.812		
	107-SAE	5/16	1/4	.875	1.312	.875	.750		
	108-SAE	3/8	1/4	1.250	1.750	1.062	1.062		
<b>TUBE TO TUBE (45° FLARE)</b> 	110-SAE	1/4x1/4		.875	1.312	.812	.872		
	114-SAE	5/16x5/16		.875	1.312	.875	.875		
	115-SAE	3/8x3/8		1.250	1.750	1.062	1.062		


# VALVES

SPECIAL SERVICE

# DIMENSIONAL DATA

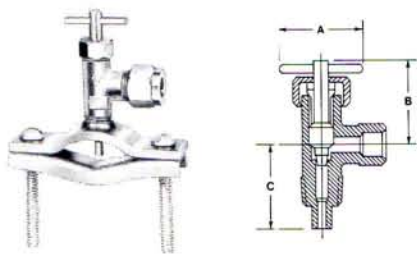
## FUEL VALVES

Comply with Underwriters' Laboratories specification for stuffing box, packing gland. Bronze bodies.

FUEL VALVE		Catalog Number	Female Pipe Thread	A	B	C	D	E	F
 <p>98E 99E</p> <p>189-H 199-H</p>	98-E	1/8	1.375	2.125	.687				
	99-E	1/4	1.375	2.437	.781				
	189-H	1/8	1.375	2.093	.750				
	199-H	1/4	2.500	2.718	.781				

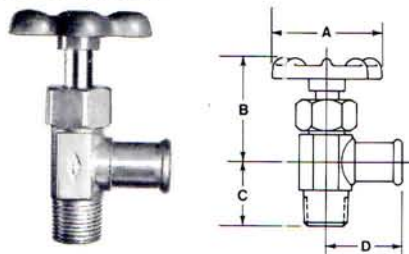
## SADDLE VALVES

For use with humidifiers. Needle shut-off; 1/4" pilot for water pipe. Saddle fits 3/8", 1/2", 3/4" or 1" pipe. Gasket furnished.

SADDLE VALVE		Catalog Number	Tube O.D.	A	B	C	D	E	F
	164-EF	1/4	.875	1.187	.906	.656			


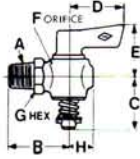

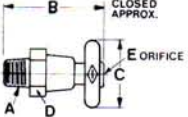

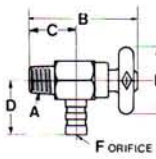

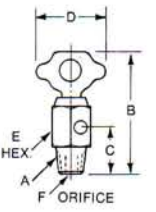
## WATER VALVE

Designed for use with truck hot water heating systems. Barb for hose.

WATER VALVES		Catalog Number	Pipe Thread	Hose I.D.	A	B	C	D
	51-E	3/8	3/8	2.000	2.187	1.000	1.187	
	50-E	3/8	5/8	2.000	2.187	1.000	1.187	

## DRAIN COCKS

Accurate machining and adequate wall thicknesses make these drain cocks highly dependable. Plug types are individually ground to assure perfect seat and smooth operation.


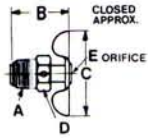

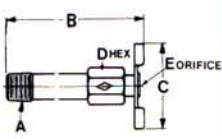

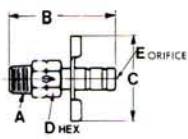

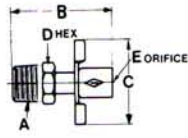
		Catalog Number	A Pipe Thread	B	C	D	E	F	G	H
		41-E	1/8	1.000	.875	1.000	.342	.218	.625	.593
		42-E	1/4	1.000	.875	1.000	.342	.281	.625	.593
		43-E	3/8	1.343	.922	1.000	1.218	.281	.750	.750
		44-E	1/2	1.625	1.078	1.125	1.343	.375	.937	.937
		200-E	1/8	1.562	1.125	.500	.218			
		201-E	1/4	1.625	1.125	.625	.312			
		202-E	3/8	1.562	1.125	.687	.343			
		203-E	1/2	1.812	1.250	.875	.406			
		302-E	1/8	1.562	.703	.812	1.125			
		303-E	1/4	1.562	.703	.812	1.125			
<p>Have extension for attaching 1/4" I.D. rubber hose.</p>										
		305-E	1/8	1.781	.640	1.000	.562	.228		
		306-E	1/4	1.781	.640	1.000	.562	.228		

# VALVES

SPECIAL SERVICE


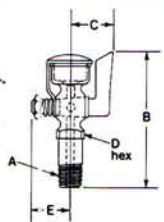
# DIMENSIONAL DATA

## DRAIN COCKS—Continued

		Catalog Number	A Pipe Thread	B	C	D	E	F
		320-E	1/8	.875	1.250	.437	.171	
		321-E	1/4	.937	1.437	.562	.250	
		321-EO	1/4	.968	1.250	.562	.171	
		322-E	3/8	1.250	1.687	.687	.343	
		323-E	1/2	1.562	2.031	.875	.406	
								321-EO Has O-Ring Seal — provides soft seat, positive, shut-off.
		324-E	1/8	1.750	1.250	.406	.218	Length 1 3/4"
		325-E	1/8	1.562	1.250	.406	.218	Has extension for 5/16" I.D. rubber hose.
		326-E	1/4	1.500	1.375	.562	.218	

## PRIMING CUPS

Snug fitting cover opens and closes with handle.

		Catalog Number	Pipe Thread	B	C	D	E
		188-E	1/8	1.968	.781	.500	.718
		195-E	1/8	2.438	.781	.500	.718



### Assures positive one-way flow



#### MATERIALS:

- Body: Brass.
- Disc: Acetal Copolymer.
- O-Ring: Buna-N.

#### SIZE RANGE:

1/8" to 1/2" N.P.T.F.

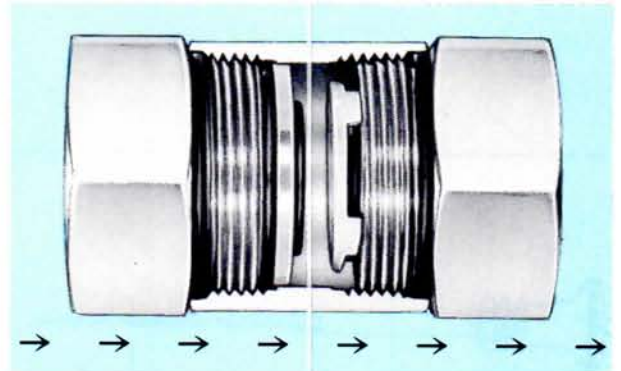
#### MAXIMUM RECOMMENDED WORKING PRESSURE:

500 psi at 200°F.

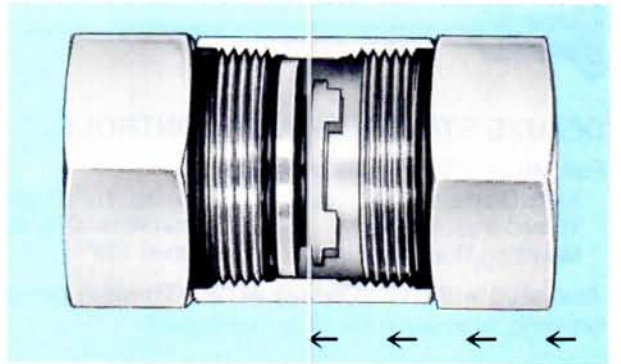
Utilizing a unique, simplified floating disc design, less than 10 milliseconds are required to check fluid media from reversing flow direction. Pressures from a mere puff of air up to 500 psi will assure a bubble-tight closure.

There are no springs, ball or poppets to break or wear out. The valve is operated solely by the flow of media it controls.

It operates through a temperature range of -40°F. to 210°F. with a cracking pressure of 1 inch of water.

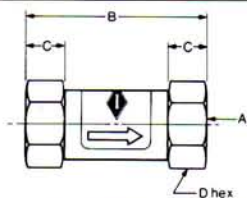


In the forward flow direction, the fluid pushes the valve disc until the lands on the opposite side of the disc contact the end connector. The lands provide a passage for the fluid around the disc.



In the reverse flow direction, the fluid again pushes the disc ahead of it until the face of the disc comes in contact with the sealing O-ring shutting off flow. As the pressure builds up, the O-ring is compressed for a positive, bubble-tight seal.

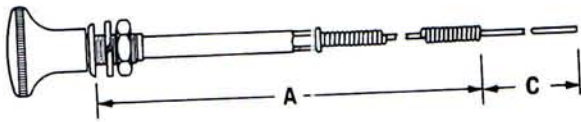
# DIMENSIONAL DATA



Catalog Number	Pipe Thread			
	A	B	C	D
81-C-02	1/8	1.828	.375	.750
81-C-04	1/4	2.343	.625	.812
81-C-06	3/8	2.312	.629	.937
81-C-08	1/2	2.343	.593	1.312

Complete assortment of components, service aids and fitting stock:  
 Push-Pull Controls, Anti-Freeze Testers, Battery Hydrometers,  
 Fuel Strainers and Fitting Stocks.

## PUSH-PULL CONTROLS



Controls for operating throttles, chokes, heater valves, hydraulic valves, shutters, hood releases, power take-offs, water valves, mixing valves, damper controls, remote control electric starter switches and gear changers, speed reducers, etc.



### DELUXE STANDARD-DUTY CONTROLS

Furnished with 4 Types of Knobs.

Knob Diameter: 1 1/8"

Thread Size: 3/8"-24

Mounting Thread: 1/2" long

Casing: 3/16" galvanized wire

Inner Wire: .054" stainless steel

Travel: 2 1/2"

Available with "C" (Choke) or "T" (Throttle) permanently stamped on knob, also plain black or mahogany.

Catalog Number	A	C	Knob Color or Lettering
35-RC	5 ft.	6 in.	"C"
35-RT	5 ft.	6 in.	"T"
39-RB-5	5 ft.	6 in.	Black
39-RB-10	10 ft.	6 in.	Black
39-RM-5	5 ft.	6 in.	Mahogany
39-RM-10	10 ft.	6 in.	Mahogany



### HEAVY-DUTY CONTROLS

For Applications with High Push/Pull Loads

Knob Diameter: 2"

Thread Size: 1/2"-20

Mounting Thread: 1 3/16" long

Casing: Vinyl covered 5/16"

galvanized wire

Inner Wire: .090" high carbon

spring wire

Travel: 4 1/2"

Large knob and heavy 3/8" diameter plunger withstands high working loads. Vinyl covered casing protects against freeze-ups and unnecessary wear due to moisture and abrasive particles penetrating casing.





Available with "P.T.O." (Power Take-Off) permanently stamped on knob.

Catalog Number	A	C	Knob Lettering
57-R-5	5 ft.	6 in.	
57-R-10	10 ft.	6 in.	
57-R-15	15 ft.	6 in.	
57-R-20	20 ft.	6 in.	
57-RP-5	5 ft.	6 in.	P.T.O.
57-RP-10	10 ft.	6 in.	P.T.O.
57-RP-15	15 ft.	6 in.	P.T.O.



# ACCESSORIES

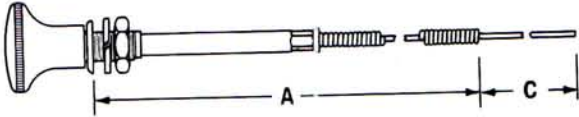
## PUSH-PULL CONTROLS

	Cat. No.	A	C
 <p><b>SELF-LOCKING VERNIER CONTROLS</b> Imperial's Finest Control for Heavy-Duty Service Knob Diameter: 2"                      Casing: Vinyl covered 5/16" wavy Thread Size: 3/4"-16                      spring steel Mounting Thread: 2" long                Inner Wire: .063" stainless steel Travel: 3"</p> <p>Make fine adjustment by screwing knob in or out – fast coarse adjustment by depressing button in knob and moving in or out.</p> <p>Vinyl covered casing protects against freeze-ups and unnecessary wear due to moisture and abrasive particles penetrating casing.</p>	58-R-5	5 ft.	6 in.
	58-R-10	10 ft.	6 in.
	58-R-15	15 ft.	6 in.
	58-R-25	25 ft.	6 in.
 <p><b>FRICITION CONTROLS</b> Holds Setting Under Vibration Knob Diameter: 1 7/16"                      Casing: 3/16" galvanized wire Thread Size: 3/8"-24                      Inner Wire: .054" stainless steel Mounting Thread: 1/2" long                Travel: 2"</p>	59-R-5	5 ft.	6 in.
	59-R-10	10 ft.	6 in.
 <p><b>"T" HANDLE CONTROLS</b> For Hood Releases &amp; Other Applications Handle: 2" Chromium plated                Casing: 3/16" galvanized wire Thread Size: 3/8"-24                      Inner Wire: .054" stainless steel Mounting Thread: 1/2" long                Travel: 2"</p> <p>Well designed control withstands 150 lb. pull.</p>	56-R	8 ft.	6 in.
 <p><b>TURN-TO-LOCK CONTROLS</b> For Locking Throttle Applications Handle: 2" Chromium plated                Casing: 3/16" galvanized wire Thread Size: 7/16"-20                      Inner Wire: .054" stainless steel Mounting Thread: 2" long                Travel: 3"</p> <p>Plunger will lock any place within its travel. Four locking surfaces assure extra strength grip.</p> <p>All working parts made of hardened steel.</p>	54-R-3	3 ft.	6 in.
	54-R-9	9 ft.	6 in.
	54-R-15	15 ft.	6 in.
	54-R-25	25 ft.	6 in.
	54-R-28*	28 ft.	6 in.

\*Mounting Thread: 3/4" long  
Travel: 2 1/2"

# ACCESSORIES

## PUSH-PULL CONTROLS



Controls for operating throttles, chokes, heater valves, hydraulic valves, shutters, hood releases, power take-offs, water valves, mixing valves, damper controls, remote control electric starter switches and gear changers, speed reducers, etc.



### HEAVY-DUTY TURN-TO-LOCK CONTROLS

Rugged Controls for Locking Throttle Applications

Handle: 3" Polished  
Thread Size: 3/4"-16  
Mounting Thread: 3/4" long

Casing: Vinyl covered 5/16" wavy spring steel  
Inner Wire: .063" stainless steel  
Travel: 3 1/2"

A heavy-duty high load control designed for use under even the most adverse conditions. Hefty 3" handle is easy to grab.

Controls built to withstand 150 lb. pull. Plunger will lock any place within its travel.

Vinyl covered casing protects against freeze-ups and unnecessary wear due to moisture and abrasive particles penetrating casing.

Cat. No.	A	C
55-R-9	9 ft. 6 in.	
55-R-15	15 ft. 6 in.	
55-R-25	25 ft. 6 in.	
55-R-28	28 ft. 6 in.	

### WIRE END FITTINGS



61-R



62-R



66-R

No. 61-R Light Duty loads only. Fits all Imperial Controls.

No. 62-R For push-pull loads. Fits all Imperial Controls.

No. 66-R For push-pull loads. Fits all Imperial Controls except No. 57-F. Used with 1/8" or 1/4" thick lever. Washer is removed for use with 1/4" thick lever.

### CASING CLAMP



63-R

No. 63-R For clamping lower end of control casing. Fits all Imperial Controls.

### CASING AND WIRE

No. 64-R 30 ft. Coil, 3/16" O.D. Galvanized Wire Casing.

No. 65-R 32 ft. Coil, .054" Stainless Steel Wire.



# ACCESSORIES

## FUEL STRAINERS

For use on automobiles, tractors, power units, stationary engines, etc. Can be used with gasoline or distillate.

Have clear glass bowls and strong bail assemblies.

All except No. 186-J have double shut-off needle valve. Double seating feature prevents leakage or seepage.

Shallow bowl strainers have brass screens; large bowl strainers have nylon filters with 120 micron capacity.

### LARGE BOWL TYPE

Catalog No.	Inlet Pipe Thread In.	Outlet Pipe Thread In.
154-J*	1/8 Fem.	1/8 Fem.
157-J*	3/8 Male	(2) 1/8 Fem.
159-J*	3/8 Male	1/8 Fem.

### SHALLOW BOWL TYPE

Catalog No.	Inlet Pipe Thread In.	Outlet Pipe Thread In.
186-J	1/8 Fem.	1/8 Fem.
191-J*	3/8 Male	1/8 Fem.
192-J	1/8 Fem.	1/8 Fem.
193-J	3/8 Male & 1/8 Fem.	1/8 Fem.

### PARTS FOR LARGE BOWL STRAINERS

Fit 154-J, 155-J, 157-J, 158-J, 159-J and many others

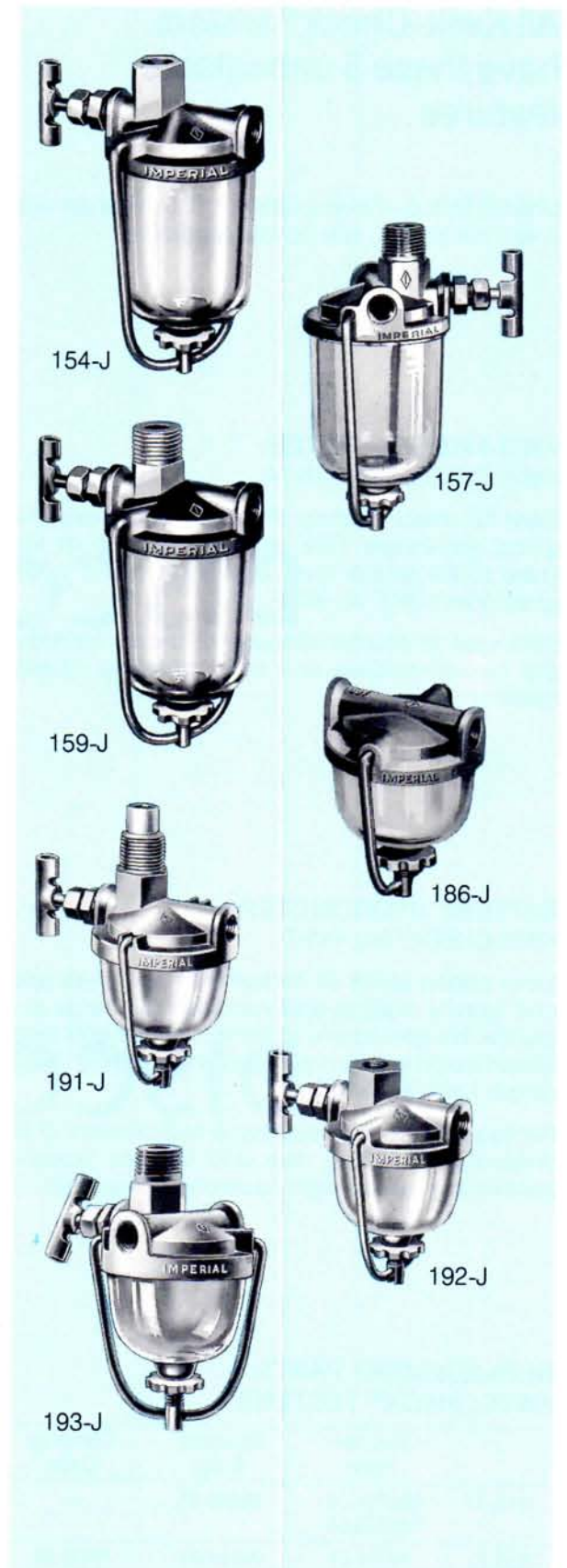
No.	Part
44801-4S	Heat Resistant Glass Bowl
63102S	Corprene Gasket
79064-01S	Nylon Filter
36252S	Metal Bowl
26984S	Bail Assembly
62560S	Bail Nut

### PARTS FOR SHALLOW BOWL STRAINERS

Fit 186-J, 191-J, 192-J, 193-J and many others

No.	Part
32276S	Shallow Glass Bowl
45241-1S	Heat Resistant Glass Bowl
45012-3S	Corprene Gasket
32278S	Brass Screen
43494-2S	Felt Screen
38688S	Shallow Metal Bowl
32279S	Bail Assembly
62560S	Bail Nut

\*Furnished with heat resistant glass bowl.



# ACCESSORIES

KWIK-CHECK® TESTERS

All Kwik-Check® testers have these 5 unbeatable features . . .

**UNBUSTABLE**—Drop it. Step on it. Drive a car over it. Will not break under normal conditions.

**DIRECT READING**—No charts. No computations to make. No confusion. Just fill and read.

**ACCURATE**—Tested to close tolerance. Neither temperature of air or solution will affect accuracy.

**COMPACT**—The size of your hand. Easy to handle.

**LIGHTWEIGHT**—Made of durable, lightweight plastic. Both excess weight and bulk are eliminated.

## ANTI-FREEZE TESTER KWIK-CHECK® No. 438-TA

Ideal for direct reading of all permanent ethylene glycol anti-freeze. One squeeze of the bulb fills tester to the proper level. Shows protection in degrees from +25°F. to -60°F.

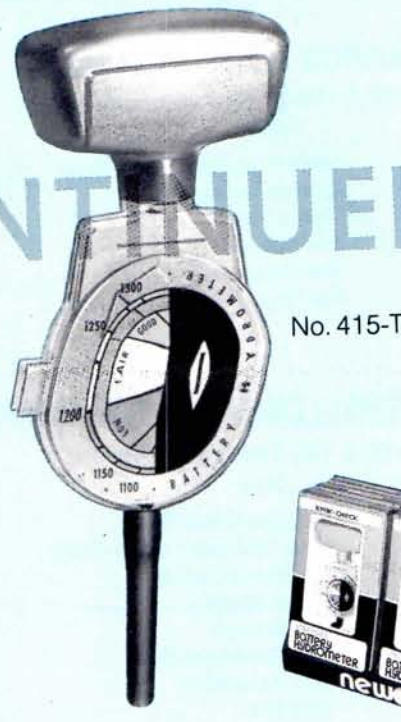
Packaged in counter display. 12 testers individually boxed—packed in a sales boosting counter merchandiser.



## BATTERY HYDROMETER KWIK-CHECK® No. 415-T

Color coded guide on hydrometer face gives specific gravity reading and condition of charge at a glance. No corrections to make. Just fill and read. Made of acid resistant polycarbonate plastic. Scale range: 1.100 to 1.300.

Packaged in counter display. 6 hydrometers in individual, self-selling, see thru window boxes—packed in a sell-on-sight counter merchandiser.



## REPLACEMENT PARTS KWIK-CHECK® TESTERS

	Rubber Hose	Squeeze Bulb	Carrying Case
415-T	082751-01 082750-01	80660-01	—
438-T	79717-01	79714-01	79825-01



# ACCESSORIES

ANTI-FREEZE TESTERS

## UNIVERSAL ANTI-FREEZE TESTER No. 556-TB

For use with all types of anti-freeze solutions—ethylene glycol, alcohol, methanol (Prestone, Zerex, Zerone, etc.)

Color coded protection chart with large easy-to-read figures. Magni-Vision slide calculator takes all the guesswork out of test results. Faster float reaction saves time, increases accuracy.

Important design features include hermetically sealed chart and thermometer to keep out moisture and dirt... stay legible always. Special heat treated glass components resist breakage. Rubber cushioned float and thermometer.

## SINGLE SOLUTION ANTI-FREEZE TESTER

No. 548-TB for Ethylene Glycol ("Prestone," "Zerex," etc.)

Direct Reading

Unmatched accuracy for testing all permanent ethylene glycol anti-freeze, including Prestone, Zerex, Thermo-Royal, etc.

Magnifying calculator provides quick, accurate test results... eliminates guesswork. Larger scale figures on redesigned chart make reading easier, even in poor light.

Beaded float can't stick or lean sideways. Heavy duty glass parts. Hermetically sealed chart and thermometer stay clean at all times. Each unit thoroughly tested for exact performance.



## REPLACEMENT PARTS FOR CURRENT AND OLDER MODEL ANTI-FREEZE TESTERS (GLASS TYPE)

Tester No.	Float	Barrel	Squeeze Bulb	Tip Assembly	Top Rubber Stopper	Bottom Rubber Plug	Slide Calculator	Hose & Connector Only
548-TA		5481-TA	5213-TB	5483-TB	5154-TB			
548-TB	5480-TB	5481-TB†	5213-TB	5483-TB	5154-TB		5155-TB	
550-T		5501-T	5213-TB	5483-TB	5154-TB			
553-T		5531-T	5213-TB	5483-TB	5154-TB			
556-TA			5552-TB	5553-TB	5554-TB	5568-TB	5565-TB	5567-TB
556-TB	5550-TB	5561-TB†	5552-TB	5553-TB††	5554-TB	5568-TB	5565-TB	5567-TB
566-TA			5552-TB	5553-TB††		5568-TB	5565-TB	5567-TB

†Includes barrel, chart, thermometer and slide calculator.

††Includes base, hose and connector.

# ACCESSORIES

## BATTERY HYDROMETERS & FILLERS

### No. 515-TB THERMOMETER TYPE BATTERY HYDROMETER

Quick, precise readings of battery electrolytes with the finest in thermometer type testing instruments.

Color coded chart gives general battery condition instantly. Float calibrated from 1.150 to 1.300.

Sealed chart stays legible always. Magnifying calculator makes readings fast and simple...eliminates mental calculations

Break resistant, fully annealed glass parts. Hard rubber tip.

### No. 521-TB THERMOMETER TYPE BATTERY HYDROMETER

Budget priced hydrometer gives highly accurate readings corrected for temperature of battery electrolyte. Small, lightweight handy. All scales have large legible numbers. Built for rugged use. 3 inch pliable rubber tip.

Float calibration: 1.100-1.300.

### No. 518-TB BATTERY HYDROMETER

Recommended for testing small batteries and batteries low in electrolyte. Ideal for close quarters.

Easy to read, non-sticking float measures accurately with only small amount of electrolyte. Color coded to give general battery condition at a glance.

Large scales. Pliable rubber tip. Float calibration 1.100 to 1.300.

### BATTERY FILLER

#### No. 581-TB Straight Tip

Lightweight and easy to handle. Just 10<sup>3</sup>/<sub>4</sub>" overall. Has red bulb which is exceptionally live, fast acting and durable. Rugged plastic tip. Convenient hanger eye for storage ease.



### REPLACEMENT PARTS FOR CURRENT AND OLDER MODEL BATTERY HYDROMETERS

Tester No.	Float	Barrel	Rubber Bulb	Rubber Tip	Rubber Plug	Slide Calculator
515-T	5150-T		5213-TB	5153-TB	5154-TB	
515-TB	5150-TB	5151-TB†	5213-TB	5153-TB	5154-TB	5155-TB
518-T	5180-TB	5181-TB	5213-TB	5153-TB	5154-TB	
518-TB	5180-TB	5181-TB	5213-TB	5153-TB	5154-TB	
519-T			5213-TB	5153-TB	5154-TB	
521-T	5211-TB	5212-TB	5213-TB	5210-TB	5154-TB	
521-TB		5212-TB	5213-TB	5210-TB	5154-TB	

†Includes barrel, chart, thermometer and slide calculator.

††Includes barrel, thermometer and scale assembly.





# ACCESSORIES

MAKE-UP KIT AND FITTING STOCKS

## POLY-FLO® MAKE-UP KIT

No. 115-P

Emergency jobs and experimental work can be handled quickly with this kit.

Steel cabinet has 4 plastic drawers. All fittings are visible. Each compartment is labeled. Tubing is in top section of cabinet. Diagram in cover gives assembly instructions.

### CONTENTS OF KIT

50 ft.— 44-P	1/4	5—262-PH	1/4	3—272-P	1/4 x 1/8
5—259-P	1/4	3—264-P	1/4	5—282-P	1/4
10—260-P	1/4	5—266-P	1/4 x 1/8	5—282-PH	1/4
5—261-P	1/4	5—268-P	1/4 x 1/8	5—282-PT	1/4
5—262-P	1/4	5—269-P	1/4 x 1/8	2—292-P	1/4 x 1/8
		3—271-P	1/4 x 1/8		

Includes 71 fittings and 50 ft. 1/4" O.D. tubing.



115-P

## CABINET MERCHANDISER

No. 141-MT

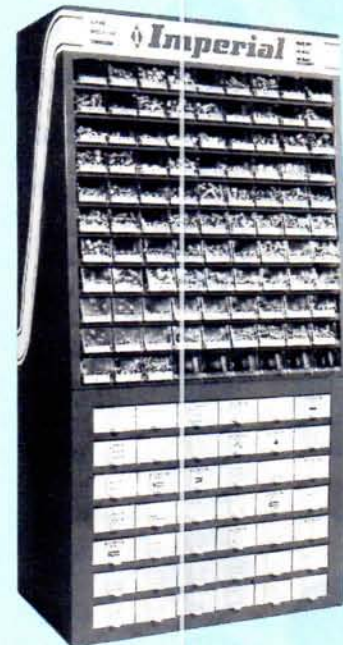
This 141 drawer two section cabinet is designed to offer the best in stock inventory control and merchandising convenience. It is big enough to fulfill your needs, yet compact enough to fit comfortably anywhere on the floor. The 141-MT needs only 4 square feet of floor space. This means with the great profit realized by selling brass products, you get the maximum return on space used.

Rugged metal housing is built around an extra sturdy steel structure. The cabinet is finished in an attractive blue hard enamel. Casters can be attached to the bottom of the 141-MT to give mobility.

141-MT Cabinet Merchandiser. 99 plastic and 42 metal drawers.

142-MT Set of 4 casters.

Cabinet Dimensions: 49"x32"x18".



# REFERENCE DATA

DECIMAL AND METRIC EQUIVALENT OF FRACTIONS

	DECIMAL	METRIC		DECIMAL	METRIC
			$\frac{1}{64}$	.0156	0.397
			$\frac{1}{32}$	.0313	0.794
			$\frac{3}{64}$	.0469	1.191
$\frac{1}{16}$	.0625	1.588	$\frac{5}{64}$	.0781	1.984
			$\frac{3}{32}$	.0938	2.381
			$\frac{7}{64}$	.1094	2.778
$\frac{1}{8}$	.1250	3.175	$\frac{9}{64}$	.1406	3.572
			$\frac{5}{32}$	.1562	3.969
			$\frac{11}{64}$	.1719	4.366
$\frac{3}{16}$	.1875	4.762	$\frac{13}{64}$	.2031	5.159
			$\frac{7}{32}$	.2188	5.556
			$\frac{15}{64}$	.2344	5.953
$\frac{1}{4}$	.2500	6.350	$\frac{17}{64}$	.2656	6.747
			$\frac{9}{32}$	.2812	7.144
			$\frac{19}{64}$	.2969	7.541
$\frac{5}{16}$	.3125	7.938	$\frac{21}{64}$	.3281	8.334
			$\frac{11}{32}$	.3438	8.731
			$\frac{23}{64}$	.3594	9.128
$\frac{3}{8}$	.3750	9.525	$\frac{25}{64}$	.3906	9.922
			$\frac{13}{32}$	.4062	10.319
			$\frac{27}{64}$	.4219	10.716
$\frac{7}{16}$	.4375	11.112	$\frac{29}{64}$	.4531	11.509
			$\frac{15}{32}$	.4688	11.906
			$\frac{31}{64}$	.4844	12.303
$\frac{1}{2}$	.5000	12.700			
			$\frac{17}{32}$	.5313	13.494
			$\frac{33}{64}$	.5156	13.097
			$\frac{19}{64}$	.2938	7.441
$\frac{9}{16}$	.5625	14.288	$\frac{37}{64}$	.5781	14.684
			$\frac{21}{32}$	.6562	16.669
$\frac{5}{8}$	.6250	15.875	$\frac{39}{64}$	.6094	15.479
			$\frac{41}{64}$	.6406	16.272
			$\frac{23}{64}$	.3594	9.128
$\frac{11}{16}$	.6875	17.462	$\frac{43}{64}$	.6719	17.066
			$\frac{25}{32}$	.7812	19.844
			$\frac{45}{64}$	.7031	17.859
$\frac{3}{4}$	.7500	19.050	$\frac{47}{64}$	.7344	18.656
			$\frac{49}{64}$	.7656	19.447
			$\frac{27}{64}$	.4219	10.716
$\frac{13}{16}$	.8125	20.638	$\frac{51}{64}$	.7969	20.241
			$\frac{53}{64}$	.8281	21.034
			$\frac{29}{32}$	.9062	23.019
$\frac{7}{8}$	.8750	22.225	$\frac{55}{64}$	.8594	21.828
			$\frac{57}{64}$	.8906	22.822
			$\frac{31}{64}$	.4844	12.303
$\frac{15}{16}$	.9375	23.812	$\frac{61}{64}$	.9531	24.209
			$\frac{63}{64}$	.9844	25.003
			$\frac{33}{64}$	.5156	13.097
$\frac{1}{1}$	1.0000	25.400			



# TUBING TOOLS



Wide variety of precision engineered tubing tools and service aids designed for years of rugged service.

Tube Cutters  
Flaring Tools  
Reamers  
Swaging Tools  
Tube Benders

Ratchet Wrenches  
Air Nozzles  
Machinery Cleaners  
Drum Faucets

# TUBING TOOL SELECTOR and INDEX

① Heavy duty cutting wheel No. 75046 is recommended for continuous service with steel, stainless steel, monel, titanium and hard temper copper tubing.

② Type M tubing should be torch annealed before flaring.

TYPE OF TOOL	SIZE RANGE TUBE O.D.	TYPES OF TUBING														CONFORMS TO FEDERAL SPEC.	
		COPPER							ANNEALED ALUMINUM	ANNEALED BRASS	STEEL		STAINLESS		TITANIUM		
		ANNEALED GEN. PURPOSE	TYPE K			TYPE L					TYPE M	S.A.E. 1010	BRAZED-BUNDY, GM	ANNEALED			1/8 HARD
			SOFT	BENDING TEMPER-HARD	HARD	SOFT	BENDING TEMPER-HARD	HARD									
<b>TUBE CUTTERS-METAL TUBING</b>																	
127-FB	1/8 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
174-F	3/8 - 1 1/8	•	•	•	①	•	•	•	•	•	•	•	•	•	•	•	•
206-FA	3/8 - 2 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
227-FA	1/8 - 3/4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
274-FC	1/8 - 1 1/8	•	•	•	①	•	•	•	•	•	•	•	•	•	•	•	•
312-FB	1/4 - 1 5/8	•	•	•	①	•	•	•	•	•	•	•	•	•	•	•	•
384-FA	1/8 - 1 1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
406-FA	2 - 4 1/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>TUBE CUTTERS-PLASTIC TUBE &amp; PIPE</b> <span style="float:right">USED WITH PLASTIC TUBE AND PIPE</span>																	
206-FAP	3/8 - 2 3/8																
227-FAP	1/8 - 3/4																
307-FP	1/6 - 1/2																
312-FBP	1/8 - 1																
327-FP	1/8 - 1 3/16																
357-FP	1/8 - 1 5/8																
406-FAP	1 3/4 - 4 1/2																
<b>FLARING TOOLS-PLASTIC TUBE</b> <span style="float:right">USED WITH NYLON AND IMPOLENE TUBING</span>																	
500-FPA	3/16 - 5/8																
<b>45° FLARING TOOLS</b>																	
103-FS	3/4 - 1	•	•	•		•	•		②	•	•						•
195-FC	3/16 - 5/8	•	•	•		•	•		②	•	•						•
203-FA	5/8 - 1 1/8	•	•	•		•	•		②	•	•						•
275-FS (Pg. 17)	1/8 - 3/4	•	•	•		•	•		②	•	•						•
296-FA	3/16 - 5/8	•	•	•		•	•		②	•	•						•
300-FA	3/16 - 5/8	•	•	•		•	•		②	•	•						•
375-FS	1/8 - 3/4	•	•	•		•	•		②	•	•						•
376-FS	1/2 - 3/4	•	•	•		•	•		②	•	•						•
395-FAM	4-16mm	•	•	•		•	•		②	•	•						•
500-FA	3/16 - 5/8	•	•	•		•	•		②	•	•						•
500-FAM	6-16mm	•	•	•		•	•		②	•	•						•
525-F	3/16 - 5/8 (5-16mm)	•	•	•		•	•		②	•	•						•
555-FS	3/16 - 5/8	•	•	•		•	•		②	•	•						•
900-FB	1/8 - 3/4	•	•	•		•	•		②	•	•						•
<b>45° DOUBLE FLARING TOOLS</b>																	
93-FB	3/16 - 1/2	•								•	•						•
195-FB	1/4 - 3/4	•								•	•						•
251-F	3/16 - 1/2	•								•	•						•
<b>37° FLARING TOOLS</b>																	
400-F	3/16 - 5/8	•	•	•		•	•		②	•	•						•
407-FA	1/8 - 1 1/2	•	•	•		•	•		②	•	•						•
437-FA	3/16 - 5/8	•	•	•		•	•		②	•	•						•
447-F	1/8 - 1/2	•	•	•		•	•		②	•	•						•
507-FA	3/16 - 5/8	•	•	•		•	•		②	•	•						•
527-F	3/16 - 5/8 (5-16mm)	•	•	•		•	•		②	•	•						•
555-FS (Pg. 11)	3/16 - 5/8	•	•	•		•	•		②	•	•						•
537-F	3/4 - 1 1/4	•	•	•		•	•		②	•	•						•
637-F	1 1/4 - 2	•	•	•		•	•		②	•	•						•

# TUBING TOOL SELECTOR and INDEX

No. 364-FHA—1" size should be used only with annealed non-ferrous tubing

TYPE OF TOOL	SIZE RANGE TUBE O.D.	TYPES OF TUBING													CONFORMS TO FEDERAL SPEC.	
		ANNEALED GEN. PURPOSE	COPPER						ANNEALED ALUMINUM	ANNEALED BRASS	STEEL		STAINLESS			TITANIUM
			TYPE K			TYPE L					S.A.E. 1010	BRAZED-BUNDY, GM	ANNEALED	1/8 HARD		
			SOFT	BENDING TEMPER-HARD	HARD	SOFT	BENDING TEMPER-HARD	HARD								
<b>37° DOUBLE FLARING TOOLS</b>																
256-F	3/16-1/2	•	•	•	•	•	•	•	•	•						
<b>REAMING and DEBURRING TOOLS</b>																
208-F	3/16-1 1/2	•	•	•	•	•	•	•	•	•	•					
208-FSS	3/16-1 1/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
401-FA	1/4 - 5/8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
<b>TUBE CONSTRICTOR</b>																
374-FC	1/8 - 1 1/8	•	•							•	•					
<b>SWAGING TOOLS</b>																
93-S	3/16-7/8	•	•							•	•					
94-S	1/2, 5/8, 7/8	•	•							•	•					
193-S	1/4 - 5/8	•	•							•	•					
194-S	1/2 - 7/8	•	•							•	•					
195-SA	1/4 - 5/8	•	•							•	•					
275-FS	3/16-3/4	•	•							•	•					
403-S	5/8 - 1 1/8	•	•							•	•					
555-FS	3/16-5/8	•	•							•	•					
<b>BENDING TOOLS</b>																
101-F	1/4 - 5/8	•	•	•						•	•		•		•	
102-F	1/4 - 3/4	•	•	•						•	•		•		•	
112-F	1/4 - 3/8	•	•	•						•	•		•		•	
163-F	1/4 - 5/8	•	•	•						•	•		•		•	
260-FHA	1/4 - 7/8	•	•	•						•	•		•	•	•	
270-F	3/8 - 1 1/8	•	•	•	•					•	•		•	•	•	
350-FHA	1/4 - 3/4	•	•	•						•	•		•	•	•	
360-FHA	3/8 - 3/4	•	•	•						•	•		•	•	•	
361-FHA	5/8, 7/8	•	•	•						•	•		•	•	•	
362-FHA	1/2, 5/8	•	•	•						•	•		•	•	•	
363-FHA	3/4, 7/8	•	•	•						•	•		•	•	•	
364-FHA	1/8 - 3/16	•	•	•						•	•		•	•	•	
364-FHA	1/4 - 1 <sup>Ⓢ</sup>	•	•	•						•	•		•	•	•	
364-FHAM	6-12mm	•	•	•						•	•		•	•	•	
365-FHA	5/8, 3/4	•	•	•						•	•		•	•	•	
367-FH	1/8, 3/16, 1/4	•	•	•						•	•		•	•	•	
600-F	1/4 - 3/4	•	•	•						•	•		•	•	•	
700-F	1/4 - 3/4	•	•	•						•	•		•	•	•	
<b>TOOL KITS</b>																
REFACING TOOL																
METRIC SIZE TOOLS																
MISCELLANEOUS TOOLS																
RATCHET WRENCHES																
AIR NOZZLES																
MACHINERY CLEANERS																
DRUM FAUCETS																
MERCHANDISERS																
TOOL PARTS																
NUMERICAL INDEX																

# TUBE CUTTERS

METAL TUBING

For Hard or Soft Copper, Aluminum, Brass, Thin Wall Steel, Stainless Steel, Monel, Titanium and other tubing.

No. 274-FC · 1/8" to 1 1/8" O.D.

and No. 312-FB 1/4" to 1 5/8" O.D.

## HI-DUTY® TUBE CUTTERS



Makes clean, right-angle cuts with no burrs or chips to clog tubing. Roller type with flare cut-off groove, fold away reamer and spare cutting wheel. Rugged aluminum alloy body designed for handling ease. Has satin finish nickel-chrome plated body.

**No. 274-FC Hi-Duty Tube Cutter for 1/8" to 1 1/8" (4-28mm) O.D. tubing.** (1/8 to 1" nom.) Length 4 1/16". Wt. 6 1/2 oz.

**No. 312-FB Hi-Duty Cutter for 1/4" to 1 5/8" (7-41 mm) O.D. tubing.** (1/8 to 1 1/2" nom.) Length 5 1/2". Wt. 7 oz.

**No. 374-FC Combination Tube Constrictor and Cutter for 1/8" to 1 1/8" (4-28 mm) O.D. tubing.** Includes roller for making brazed connections.

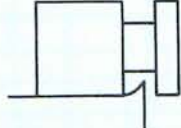
**No. 75046 Cutting Wheel** for stainless steel, monel or hard temper copper tubing.

Conforms to Federal Specification GGG-C-771d, 1-31-64. Type II, Class 1.

Pat. Nos. D-161,438; 2,629,926; 2,784,618; Pat. Can. 1956



**THRUST BEARING FEED**  
Hardened tool steel thrust bearing feed.



**FLARE CUT-OFF GROOVE**  
Groove in rollers reduces tube loss when cracked flare is removed.



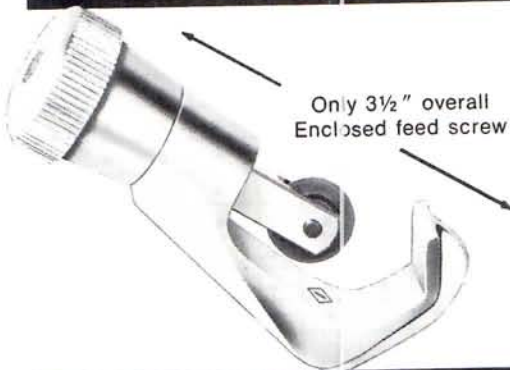
**RETRACTABLE REAMER**  
Fold away, tool steel reamer with turned cutting edge removes inside burrs cleanly. Filing surface removes outside burrs.



**SPARE CUTTING WHEEL**  
Spare cutting wheel carried under retractable, locking reamer.

No. 227-FA · 1/8" to 3/4" O.D.

## JUNIOR TUBE CUTTER



Only 3 1/2" overall  
Enclosed feed screw

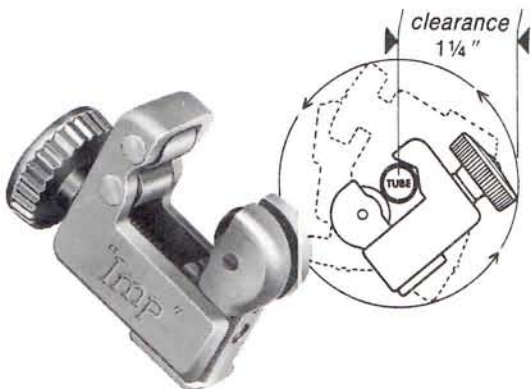
Exceptionally handy in close quarters—only 3 1/2" overall. Makes quick, clean, right-angle cuts without flattening tube. Enclosed feed mechanism. Satin finish

**No. 227-FA Junior Tube Cutter for 1/8" to 3/4" (4-19 mm) O.D. tubing.** (1/8 to 5/8" nom.) Wt. 5 oz.

Conforms to Federal Specification GGG-C-771d, 1-31-64. Type II, Class 1.

No. 127-FB · 1/8" to 5/8" O.D.

## "Imp"® TUBE CUTTER



clearance  
1 1/4"

Designed for use in tight quarters where other cutters won't fit. Requires only 1 1/4" swing radius. Perfect for instrument panels, control cabinets, refrigeration units, cold boxes, freezers, air conditioning, heating units, machine tools, etc. Satin finish

**No. 127-FB "Imp" Tube Cutter for 1/8" to 5/8" (4-15 mm) O.D. tubing.** (1/8 to 1/2" nom.) Size 1 1/16" x 1 1/16" x 7/8". Wt. 2 1/2 oz.

Conforms to Federal Specification GGG-C-771d, 1-31-64. Type II, Class 2, Amendment 1.

Pat. Nos. D-196,936; 3,135,050 \*1 3/8" with 5/8" tube.

For Hard or Soft Copper, Aluminum, Brass,  
Thin Wall Steel, Stainless Steel, Monel,  
Titanium and other tubing.

# TUBE CUTTERS

## METAL TUBING

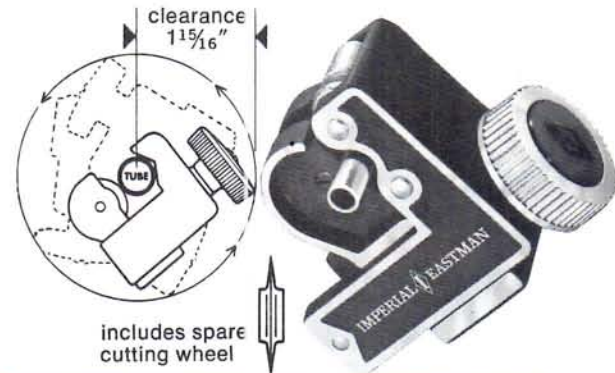
### TUBE CUTTER

No. 174-F •  $\frac{3}{8}$ " to  $1\frac{1}{8}$ " O.D.

Big capacity, small size. Designed for use in tight quarters where other cutters won't fit. Requires only  $1\frac{1}{16}$ "\* swing radius. Perfect for instrument panels, control cabinets, refrigeration units, cold boxes, freezers, air conditioning, heating units, machine tools, etc. Aluminum alloy body, black finish with brushed highlights.

**No. 174-F Tube Cutter** for  $\frac{3}{8}$ " to  $1\frac{1}{8}$ " (10-28 mm) O.D. tubing. ( $\frac{1}{4}$  to 1" nom.) Size  $2\frac{1}{16}$  x  $2\frac{1}{32}$  x  $1\frac{1}{8}$ ". Wt. 5 oz.  
Pat. No. 3,624,682

**No. 75046 Cutting Wheel** for stainless, monel or hard-temper copper tubing. \* $2\frac{1}{4}$ " with  $1\frac{1}{8}$ " tube



### ADJUST-O-MATIC TUBE CUTTER

No. 206-FA •  $\frac{3}{8}$ " to  $2\frac{5}{8}$ " O.D.

Ratchet feed mechanism speeds up cutting operation — opens quickly to insert tubing, slides to cutting position instantly. Extra wide rollers with flare cut-off groove stabilize tubing. Spare cutting wheel included in handle recess. 206-FA has fold away reamer. Enclosed screw-type feed mechanism; light weight aluminum alloy body.

**No. 206-FA Adjust-O-Matic Tube Cutter** for tubing from  $\frac{3}{8}$ " to  $2\frac{5}{8}$ " (10-66 mm) O.D. ( $\frac{1}{4}$  to  $2\frac{1}{2}$ " nom.) Length closed  $7\frac{3}{4}$ ". Wt. 2 lbs.

**No. 406-FA Hi-Duty 2-to-4 Cutter** for 2 to  $4\frac{1}{8}$ " (51-104 mm) O.D. tubing. (2 to 4" nom.) Length closed  $11\frac{1}{4}$ ". Wt.  $3\frac{1}{2}$  lbs.  
*Conforms to Federal Specification GGG-C-771d, 1-31-64. Type II, Class 1.*

Pat. Nos. D-161,438; 2,787,054; Other patents pending.

No. 406-FA • 2 to  $4\frac{1}{8}$ " O.D.

No. 406-FA



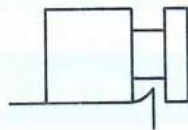
No. 206-FA



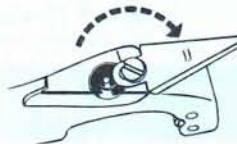
**RATCHET FEED**  
Ratchet release opens cutter instantly to maximum size.



Push on handle to slide cutting wheel to tubing.



**FLARE CUT-OFF GROOVE**  
Wide flare cut-off groove in rollers to accommodate flares on large size tubing.



**RETRACTABLE REAMER**  
Fold away, tool steel reamer with turned cutting edge removes burrs cleanly.



**SPARE CUTTING WHEEL**  
Spare cutting wheel carried in handle.

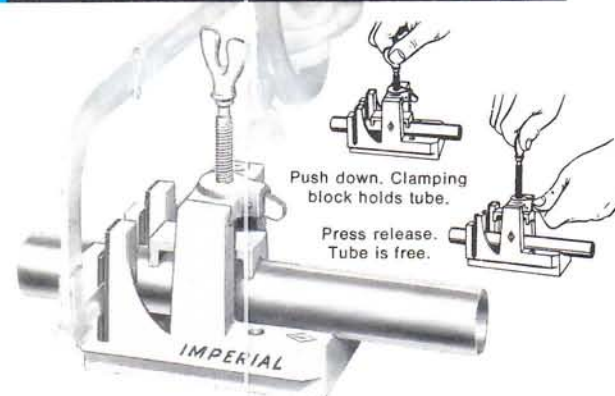
### SAWING VISE

No. 384-FA •  $\frac{1}{8}$ " to  $1\frac{1}{2}$ " O.D.

Grips tube or hose securely for perfect right-angle cuts. Excellent for holding wire braid hose when cutting with hacksaw. Quick clamp adjustment to tube size. Instant tube release. Removable hardened steel hacksaw guides. No loose parts. Fastens on bench or clamps in vise.

**No. 384-FA Sawing Vise** for  $\frac{1}{8}$ " to  $1\frac{1}{2}$ " (4-38 mm) O.D. tube or hose. ( $\frac{1}{8}$  to  $1\frac{1}{4}$ " nom.) Size:  $5 \times 3\frac{3}{8} \times 5\frac{1}{8}$ ". Wt.  $2\frac{1}{2}$  lbs.

*Conforms to Federal Specification GGG-V-436d, 8-10-61.*  
Pat. No. 2,759,385



Push down. Clamping block holds tube.

Press release. Tube is free.

# TUBE CUTTERS

## PLASTIC TUBE & PIPE

For Cutting Plastic Tubing and Pipe,  
Hytron Hose and Rubber Hose  
Without Wire Reinforcing.

No. 312-FBP •  $\frac{1}{8}$  to 1" O.D.

### HOSE & PLASTIC TUBE CUTTER

Makes clean, right-angle cuts. Leaves Hytron or rubber hose and plastic tubing round, ready for use. Over-size fixed position cutting wheel is super sharp for perfect cuts. For new cutting surface, just loosen retaining screw, rotate cutting wheel slightly and tighten in new position. Satin finish nickel-chrome plated body, polished handle.

**No. 312-FBP Cutter for Hytron hose and plastic tubing in sizes from  $\frac{1}{8}$  to 1" (4-25 mm) O.D. Wt. 7 oz.**

Pat. No. D-161,438; 3,013,335. Other patents pending.

#### BALL BEARING FEED.



Ball bearing, enclosed feed mechanism provides easy operation; reduces friction and wear.

No. 227-FAP •  $\frac{1}{8}$  to  $\frac{3}{4}$ " O.D.

### JUNIOR TUBE CUTTER

Cuts nylon, polypropylene and other plastic tubing. Exceptionally handy in close quarters—only  $3\frac{1}{2}$ " overall length. Enclosed feed mechanism. Has super sharp, fixed position cutting wheel. Rotate cutting wheel for new cutting surface.

**No. 227-FAP Junior Tube Cutter for  $\frac{1}{8}$  to  $\frac{3}{4}$ " (4-19 mm) O.D. tubing. Wt. 5 oz.**

No. 307-FP •  $\frac{1}{16}$  to  $\frac{1}{2}$ " O.D.

### "Snimp"™ PLASTIC TUBING SHEAR

Here's the most compact shear available—only  $2\frac{7}{8}$ " overall. "Snimp" easily cuts nylon, Poly-Flo, polypropylene and other plastic tubing. Also, cuts Hytron and other types of non-wire reinforced hose.

Shear is spring-loaded for safety—closes automatically, completely covering cutting edge of blade. Replaceable hardened steel blade produces clean, right-angle cuts. "Snimp" can be bench or wall mounted.

**No. 307-FP "Snimp" Plastic Tube and Hose Shear for  $\frac{1}{16}$  to  $\frac{1}{2}$ " (1-13 mm) O.D. hose or tubing. Wt. 1 oz.**

Pat. No. 3,807,046.

No. 327-FP •  $\frac{1}{8}$  to  $1\frac{13}{16}$ " O.D.

### PLASTIC TUBING & HOSE SHEAR

Excellent for cutting plastic tubing, Hytron hose and other types of hose which do not have wire reinforcing.

Shearing action produces a clean cut. Hardened steel cutting blade is replaceable. Tool can be bench or wall mounted or carried in tool kit.

**No. 327-FP Plastic Tube and Hose Shear for  $\frac{1}{8}$  to  $1\frac{13}{16}$ " (4-20 mm) O.D. hose or tubing. Wt. 1 lb.**

No. 357-FP •  $\frac{1}{8}$  to  $1\frac{5}{8}$ " O.D.

### PLASTIC TUBING & HOSE SHEAR

Large capacity shear for cutting plastic tubing, Hytron hose and other types of hose which do not have wire reinforcing.

Produces a clean, right-angle cut. Hardened steel cutting blade is replaceable. Tool can be hand held, bench or wall mounted. Positive non-slip grips on handles.

**No. 357-FP Plastic Tube and Hose Shear for  $\frac{1}{8}$  to  $1\frac{5}{8}$ " (4-41 mm) O.D. hose or tubing. Wt.  $2\frac{3}{4}$  lbs.**

Pat. No. 3,726,171.



For Cutting Rigid Plastic Tube and Pipe

# TUBE CUTTERS

## PLASTIC TUBE & PIPE

### ADJUST-O-MATIC TUBE CUTTER

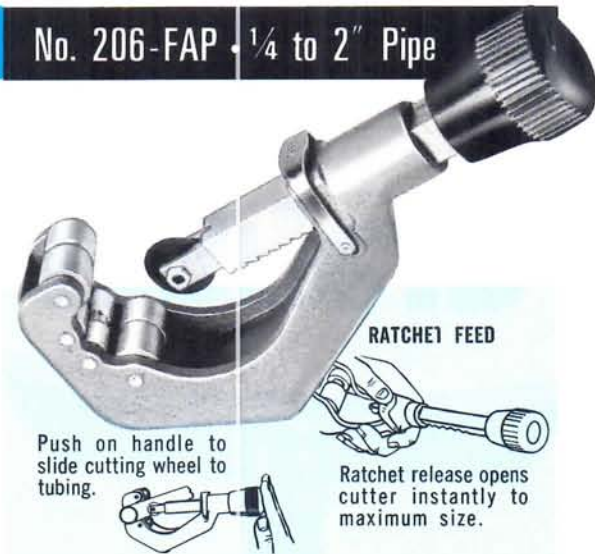
No. 206-FAP • 1/4 to 2" Pipe

A tool designed especially to provide a superior method of cutting rigid plastic pipe and tubing—PVC (polyvinyl chloride), ABS (acrylonitrile butadiene styrene) and others. Cuts pipe sizes of 1/4 to 2" (3/8 to 2 3/8" O.D.) Handles wall thicknesses through 1/4".

Specially designed thin, sharp, rotating cutting wheel is made of hardened steel. Four rollers provide good support for pipe or tubing. Groove in rollers at point of cut minimizes friction and provides space for raised bead. This cutter employs Imperial-Eastman Adjust-O-Matic ratchet feed mechanism to provide fast operation. Opens quickly to insert tubing — feed rack slides to cutting position.

**No. 206-FAP Adjust-O-Matic Tube Cutter for Plastic Pipe and Tubing—pipe sizes 1/4 to 2" (3/8 to 2 3/8"—10-60 mm—O.D.) Overall length closed 8". Wt. 2 1/2 lbs.**

Pat. Nos. D-161,438; 2,787,054



### ADJUST-O-MATIC TUBE CUTTER

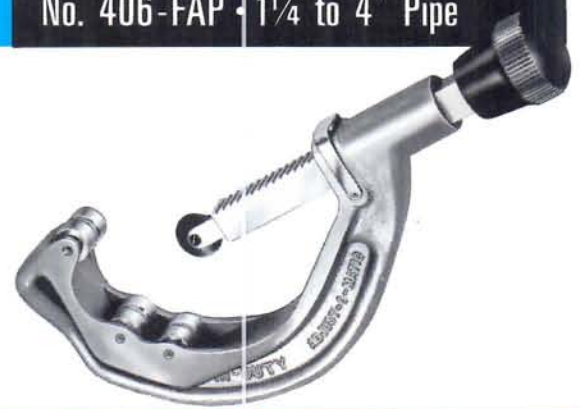
No. 406-FAP • 1 1/4 to 4" Pipe

A tool designed especially for cutting large sizes of rigid plastic pipe and tubing. Used for DWV, water lines and industrial process lines. Cuts PVC, ABS and other types of plastic pipe in sizes of 1 1/4 to 4" (1 3/4 to 4 1/2" O.D.)—wall thicknesses through 1/4".

Has specially designed thin, sharp rotating cutting wheel and three rollers. Offers all the advantages of No. 206-FAP described above.

**No. 406-FAP Adjust-O-Matic Tube Cutter for Plastic Pipe and Tubing—pipe sizes 1 1/4 to 4" (1 3/4 to 4 1/2"—45-114 mm—O.D.) Overall length closed 12 3/8". Wt. 3 1/2 lbs.**

Pat. Nos. D-161,438; 2,787,054



## FLARING TOOL 45° & 37°

For Nylo-Seal and Impolene Plastic Tubing

No. 500-FPA • 3/16 to 5/8" O.D.

Flares Nylon or Impolene (Imperial's polypropylene) tubing for use with either 45° or 37° flare fittings. Fast acting. Makes flare to extra-wide angle, then elastic quality of plastic springs flare to correct angle. New slip-on yoke and new feed screw design make operation easier. Sliding die blocks lock in place by lever clamping action. Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 500-FPA Flaring Tool for Plastic Tubing, sizes 3/16, 1/4, 3/16, 3/8, 1/2 and 5/8" O.D. Wt. 1 3/8 lbs.**

Pat. Nos. 2,505,666; 2,534,510; 2,505,665  
Pat. Can. 1951 and 1955. Other patents pending.



Slip-on yoke with self centering feature.

Sliding die blocks with lever clamping action.



# FLARING TOOLS

(45°)

For Soft Copper, Aluminum, Brass Tubing

No. 525-F •  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.

**"Grabber" ROL-AIR® (45°)**

# the "Grabber"

**UNIVERSAL APPLICATION —ONE OPENING HOLDS ALL SIZES  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.—(5 to 16 MM O.D.)**

Unique, self-adjusting, tube holding mechanism permits flaring any size tubing within the range of  $\frac{3}{16}$  thru  $\frac{5}{8}$ " O.D.

Innovative, single opening design is more compact and easier to use than conventional multi-opening flaring bars.

Faceted, hard chrome finished cone rolls out and burnishes perfect 45° flare above the tube holding mechanism. Original wall thickness is maintained at base of flare.

Slip-on self centering yoke permits use in tight quarters. Large handle, with better leverage, and precision threads on feed screw make flaring effortless.

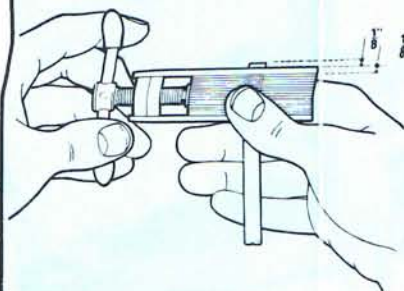
Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 525-F 45° "Grabber" Rol-Air Flaring Tool.** Flares and burnishes  $\frac{3}{16}$  to  $\frac{5}{8}$ " (5-16 mm) O.D. tubing. Wt. 1 $\frac{3}{4}$  lbs.

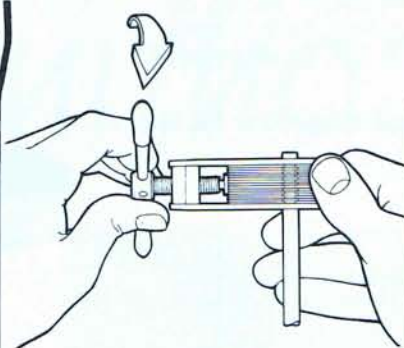
Pat. No. 3,829,077.



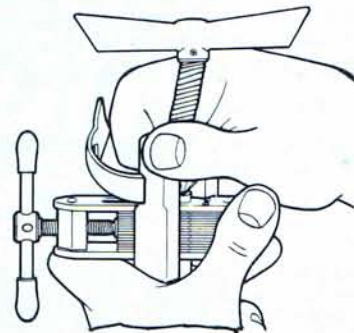
## GREATEST ADVANCE IN FLARING TOOL DESIGN IN 60 YEARS



Insert tubing into adjustable opening of tube holding assembly. Position end of tubing approximately  $\frac{1}{8}$ " above tip surface of holder. (Cover plates of holder are  $\frac{1}{8}$ " thick and can be used as a comparison gauge for positioning tubing.)



Tighten clamp screw approximately  $\frac{1}{2}$  to  $\frac{3}{4}$  of a turn beyond free travel position to secure tubing.



Be certain flaring cone surface is oiled. Slip yoke over tube holding assembly centering on tubing. Twist yoke clockwise to lock in position. Turn yoke handle clockwise to flare.

For Soft Copper, Aluminum, Brass Tubing

# FLARING TOOLS (45°)

## ROL-AIR® FLARING TOOL (45°)

No. 500-FA • 3/16 to 5/8" O.D.

Faceted, hard chrome finished cone rolls out perfect 45° flares above die block—then automatically burnishes flare face. Original wall thickness is maintained at base of flare. New slip-on yoke permits use in tight quarters, lets you flare where there is little space between nut and tube end. Larger handle, with better leverage, and precision threads on feed screw make flaring effortless. Heat treated dies grip tubing without scoring. Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 500-FA 45° Rol-Air Flaring Tool. Flares and burnishes 3/16, 1/4, 5/16, 3/8, 1/2 and 5/8" O.D. tubing. (1/8, 1/4, 3/8, 1/2" nom.) Wt. 1 1/2 lbs.**

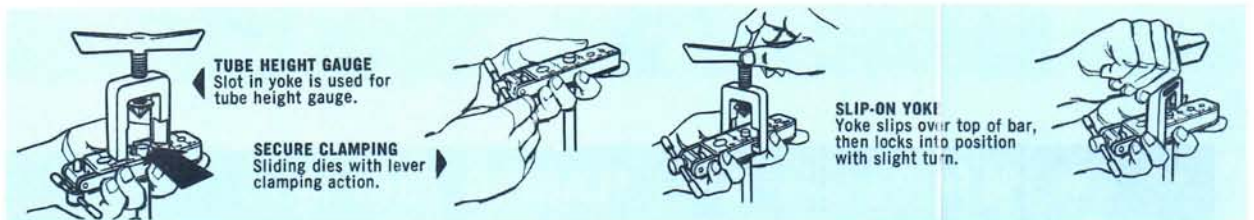
### METRIC SIZE FLARING TOOL

**No. 500-FAM Metric 45° Rol-Air Flaring Tool. Same as 500-FA except for metric size tubing 6, 8, 10, 12, 15, 16 mm O.D.**

Pat. Nos. 2,505,665; 2,505,666; 2,534,510; 2,893,463  
Pat. Can. 1951 and 1956. Other patents pending.



Flares rolled out above die bar by super-smooth faceted cone. Makes stronger flares.



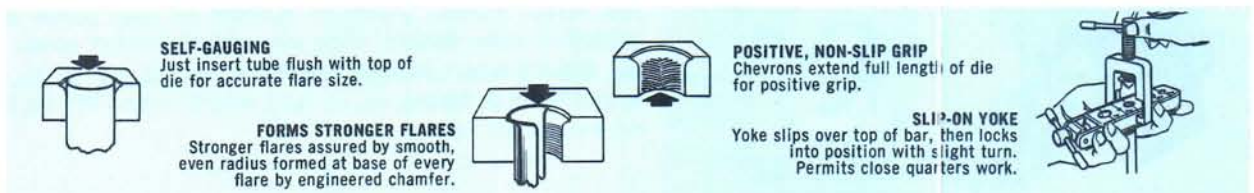
## HI-DUTY® FLARING TOOL (45°)

No. 300-FA • 3/16 to 5/8" O.D.

Hard chrome finished cone makes exceptionally smooth, high strength flares with a radius at base of flare—instead of the sharp angle formed by ordinary tools. New slip-on yoke permits use in tight quarters, lets you flare where there is little space between nut and tube end. New feed screw provides smoother, easier operation. Positive gripping and self-gaging of tube for exact flare size. Sliding die blocks lock in place by lever clamp action. Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 300-FA Hi-Duty Flaring Tool for 3/16, 1/4, 5/16, 3/8, 1/2 and 5/8" O.D. tubing. (1/8, 1/4, 3/8, 1/2" nom.) Wt. 1 5/8 lbs.**

Pat. Nos. 2,072,359; 2,505,665; 2,505,666; 2,534,510  
Pat. Can. 1951 and 1956. Other patents pending.





Flares 7 sizes of tubing. Rugged forged steel slip-on yoke and hardened flaring bar. Positive clamping action of bars prevents tube slippage. Self centering yoke with swivel-type, hard chrome-finished flaring cone forms better flares with less effort. Design of yoke permits flaring where there is little space between nut and tube end. Satin finish nickel-chrome plated.

**\*No. 195-FC Flaring Tool for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{7}{16}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " O.D. tubing. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ " nom.) Wt. 2 lbs.**

### METRIC SIZE FLARING TOOL

**No. 395-FAM Metric Flaring Tool.** Same as 195-FC except for metric size tubing 4, 6, 8, 10, 12, 15, 16mm O.D.

*\*Conforms to Federal Specification GGG-F-451a, 4-5-61. Type I, Class 2, Style A.*

Pat. Nos. 2,553,813; 3,027,931. Pat. Can. 1953

**Nos. 195-FC, 296-FA, 395-FAM Have Imperial's Exclusive Slip-On Yoke**

Yoke slips over top of bar.



Self centering yoke locks into position with a slight turn.



**No. 296-FA -  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.**

### FLARING TOOL (45°)



Economical, fast operating tool. Quick slip-on, die cast yoke. Easy operating swivel-type, hard chrome-finished cone assures smooth flares. Bar is lighter than No. 195-FC and is not hardened.

**No. 296-FA Flaring Tool for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{7}{16}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " O.D. tubing. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ " nom.) Wt. 1 $\frac{3}{4}$  lbs.**

Pat. Nos. 2,553,813; 3,027,931. Pat. Can. 1953

**No. 900-FB -  $\frac{1}{8}$  to  $\frac{3}{4}$ " O.D.**

### 9-IN-1 FLARING TOOL (45°)



Rotate die bar for correct tube size.

Flares rolled out above die bar by super-smooth faceted cone. Makes stronger flares.

*Combines wide range with compactness. Faceted hard chrome finished cone rolls out flares above dies—then automatically burnishes flare face. Also forms over-size flares. Single unit construction—no separate parts. Split bar revolves to permit use of two sets of hardened steel clamping dies (9 sizes). Flaring is made effortless with new larger handle, precision threads on feed screw and exclusive cone design. High strength aluminum yoke.*

**No. 900-FB 9-in-1 Flaring Tool for  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{7}{16}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$  and  $\frac{3}{4}$ " O.D. tubing. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " nom.) Wt. 1 $\frac{1}{2}$  lbs.**

Pat. Nos. 2,892,480; 2,893,463

For Soft Copper, Aluminum, Brass Tubing

# FLARING TOOLS (45°)

## WIDE-RANGE FLARING KIT

Compact kit holds 2 flaring bars and one yoke for flaring 9 tube sizes. Self-centering forged steel yoke has latest slip-on feature. Hard chrome-finished, swivel-type flaring cone reduces effort required. Positive clamping action of flaring bars eliminates tube movement. Satin finish nickel-chrome plated.

**No. 375-FS Flaring Kit for  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{7}{16}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$  and  $\frac{3}{4}$ " O.D. tubing.** ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ " nom.) In plastic kit. Wt. 4 $\frac{3}{4}$  lbs.

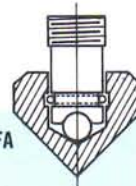
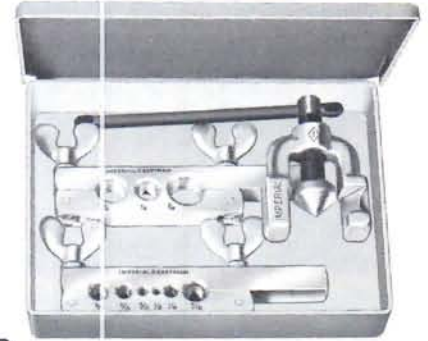
**No. 376-FS — For  $\frac{1}{2}$ ,  $\frac{5}{8}$  and  $\frac{3}{4}$ " O.D. tubing.** ( $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ " nom.) Wt. 2 lbs.

Conforms to Federal Specification GGG-F-451a, 4-5-61. Type I, Class 2, Style A.

Pat. Nos. 2,553,813; 3,027,931. Pat. Can. 1953.

No. 375-FS ·  $\frac{1}{8}$  to  $\frac{3}{4}$ " O.D.

No. 376-FS ·  $\frac{1}{2}$  to  $\frac{3}{4}$ " O.D.



**SWIVEL TYPE, BALL BEARING CONES WITH Nos. 375-FS, 376-FS, 103-FS, 203-FA**  
Ball thrust bearing in flaring cone minimizes friction, makes operation easier.

## FLARING TOOLS (45°)

Flares larger tube sizes. Quick slip-on yoke. Hard chrome finished, swivel flaring cone reduces effort required. Positive clamping action of flaring bar eliminates tube movement. Satin finish nickel-chrome plated.

**No. 103-FS Flaring Tool for sizes  $\frac{3}{4}$ ,  $\frac{7}{8}$  and 1" O.D. tubing.** ( $\frac{5}{8}$ ,  $\frac{3}{4}$ " nom.) Wt. 3 $\frac{3}{4}$  lbs.

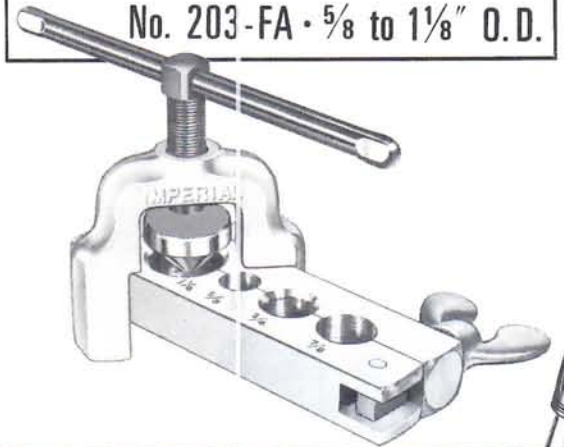
**No. 203-FA Flaring Tool for sizes  $\frac{5}{8}$ ,  $\frac{3}{4}$ ,  $\frac{7}{8}$  and 1 $\frac{1}{8}$ " O.D. tubing.** ( $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$  and 1" nom.) Wt. 3 $\frac{3}{4}$  lbs.

Conforms to Federal Specification GGG-F-451a, 4-5-61. Type I, Class 2, Style A.

Pat. No. 2,553,813. Pat. Can. 1953.

No. 103-FS ·  $\frac{3}{4}$  to 1" O.D.

No. 203-FA ·  $\frac{5}{8}$  to 1 $\frac{1}{8}$ " O.D.



## PRODUCTION FLARING (45° & 37°) and SWAGING TOOL

Flares and swages 6 sizes of soft copper, aluminum or brass tubing. Makes both 45° and 37° flares. Fast cam-lever operation. Makes flares or swages in less than 4 seconds. Portable—can be used anywhere there is a vise or bench. Change sizes quickly. Self-gaging for accurate flare size or swage depth. Positive non-slip grip on tubing.

**No. 555-FS Combination Production Flaring and Swaging Tool for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " O.D. tubing.** Wt. 6 $\frac{1}{2}$  lbs. Furnished with 45° and 37° flaring cones and 6 swaging adapters for sizes shown above.

No. 555-FS ·  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.



Makes 45° and 37° Flares



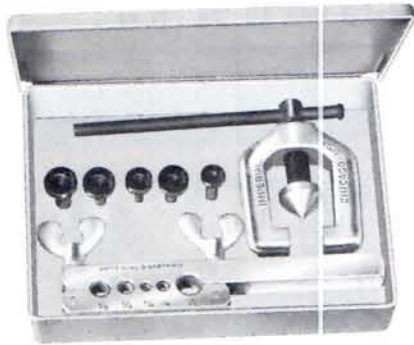
Swages 6 sizes

# DOUBLE FLARING TOOLS (45°)

For Soft Steel, Copper, Aluminum Tubing

No. 93-FB •  $\frac{3}{16}$  to  $\frac{1}{2}$ " O.D.

## DOUBLE FLARING TOOL (45°)



Recommended for Bundy, GM, Avon and other brazed or welded soft steel tubing (wall thickness to .035"). Also makes single or double flares in soft copper or aluminum tubing. Small, light weight, easy to handle. Forged steel yoke; swivel-type hard chrome-finished flaring cone. Bar provides positive grip of tubing.

**No. 93-FB Double Flaring Tool for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$  and  $\frac{1}{2}$ " O.D. tubing.** In plastic kit. Wt. 3 lbs.

Conforms to Federal Specification GGG-F-451a, 4-5-61. Type I, Class 2, Style A.

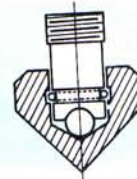
Pat. Nos. 2,370,089; 2,553,813. Pat. Can. 1953. Other patents pending.



Screw down flaring cone with proper size adapter in tube. Retract cone, remove adapter, complete flare.

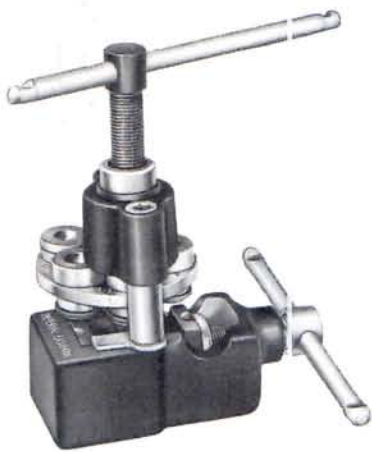


**SWIVEL TYPE, BALL BEARING CONE**  
Ball thrust bearing in flaring cone minimizes friction, makes operation easier.



No. 251-F •  $\frac{3}{16}$  to  $\frac{1}{2}$ " O.D.

## DOUBLE FLARING TOOL (45°)



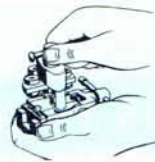
Bells tube then folds end down to make accurate 45° flare with double-thick walls on soft steel tubing such as Bundy, GM and Avon (wall thickness to .040"). Also makes single 45° S.A.E. standard and over-size flares in soft copper or aluminum tubing. Adapters revolve for quick size change and act as positioning gauge for tube. Small 2-piece die block handles all 5 sizes. Body fits snugly into palm of hand for comfortable grip; sliding handle gives maximum leverage.

**No. 251-F Double Flaring Tool for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$  and  $\frac{1}{2}$ " O.D. tubing.** Wt. 1 lb. 13 oz.

Pat. Nos. 2,774,408; RE-24,325

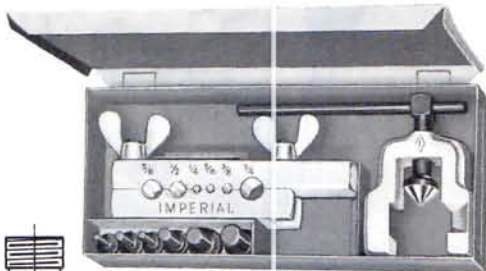


Integral adapter bells tube end. Flaring cone finishes double flare.



No. 195-FB •  $\frac{1}{4}$  to  $\frac{3}{4}$ " O.D.

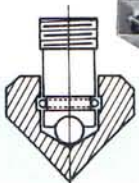
## DOUBLE FLARING TOOL (45°)



Designed for automotive air conditioning service. Makes double flares in soft copper or aluminum tubing (wall thickness to .035"). Easy operating ball bearing swivel-type hard chrome-finished flaring cone. Quick slip-on yoke. Flaring bar offers positive grip of tubing. Makes flare with double-thick, double-strength walls. (See illustrations above). Also makes single flares and oversize flares.

**No. 195-FB Double Flaring Tool for  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$  and  $\frac{3}{4}$ " O.D. tubing.** Wt. 5½ lbs.

Pat. Nos. 2,370,089; 2,553,813. Pat. Can. 1953.



**SWIVEL TYPE, BALL BEARING CONE**  
Ball thrust bearing in flaring cone minimizes friction, makes operation easier.

For Soft Copper, Aluminum, Brass Tubing

# FLARING TOOLS (37°)

## 'Grabber' ROL-AIR® (37°)

No. 527-F •  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.

**UNIVERSAL APPLICATION—ONE OPENING HOLDS ALL SIZES  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.—(5 to 16 MM O.D.)**

Unique, self-adjusting, tube holding mechanism permits flaring any size tubing within the range of  $\frac{3}{16}$  thru  $\frac{5}{8}$ " O.D.

Innovative, single opening design is more compact and easier to use than conventional multi-opening flaring bars.

Faceted, hard chrome finished cone rolls out and burnishes perfect 37° flare above the tube holding mechanism. Original wall thickness is maintained at base of flare.

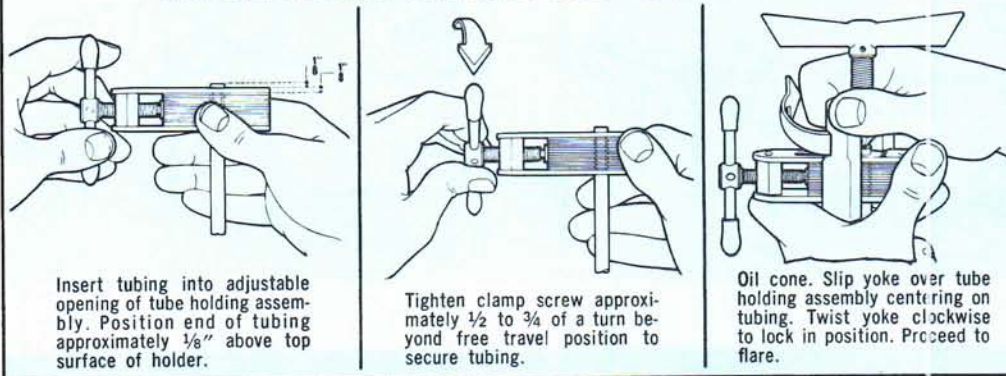
Slip-on self centering yoke permits use in tight quarters. Large handle, with better leverage, and precision threads on feed screw make flaring effortless.

Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 527-F 37° "Grabber" Rol-Air Flaring Tool.** Flares and burnishes  $\frac{3}{16}$  to  $\frac{5}{8}$ " (5-16 mm) O.D. tubing. Wt. 1  $\frac{1}{4}$  lbs. Pat. No. 3,829,077.



### GREATEST ADVANCE IN FLARING TOOL DESIGN IN 60 YEARS



Insert tubing into adjustable opening of tube holding assembly. Position end of tubing approximately  $\frac{1}{8}$ " above top surface of holder.

Tighten clamp screw approximately  $\frac{1}{2}$  to  $\frac{3}{4}$  of a turn beyond free travel position to secure tubing.

Oil cone. Slip yoke over tube holding assembly centering on tubing. Twist yoke clockwise to lock in position. Proceed to flare.

## HI-DUTY® FLARING TOOL (37°)

No. 437-FA •  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.

Hard chrome finished cone makes exceptionally smooth, high strength flares with a radius at base of flare—instead of the sharp angle formed by ordinary tools. New slip-on yoke permits use in tight quarters, lets you flare where there is little space between nut and tube end. New feed screw design provides smoother, easier operation. Positive gripping and self-gaging of tube for exact flare size. Sliding die blocks lock in place by lever clamp action. Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 437-FA Hi-Duty 37° Flaring Tool for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " O.D. tubing.** Wt. 1 lb., 11 oz.

Pat. Nos. 2,072,359; 2,505,665; 2,505,666; 2,534,510. Pat. Can. 1951. Other patents pending.



**SELF-GAUGING**  
Just insert tube flush with top of die for accurate flare size.

**FORMS STRONGER FLARES**  
Stronger flares assured by smooth, even radius formed at base of every flare by engineered chamfer.



**POSITIVE, NON-SLIP GRIP**  
Chevrons extend full length of die for positive grip.

**SLIP-ON YOKE**  
Yoke slips over top of bar, then locks into position with slight turn. Permits close quarters work.



# FLARING TOOLS

(37°)

For Soft Copper, Aluminum, Brass Tubing

No. 507-FA ·  $\frac{3}{16}$  to  $\frac{5}{8}$ " O.D.

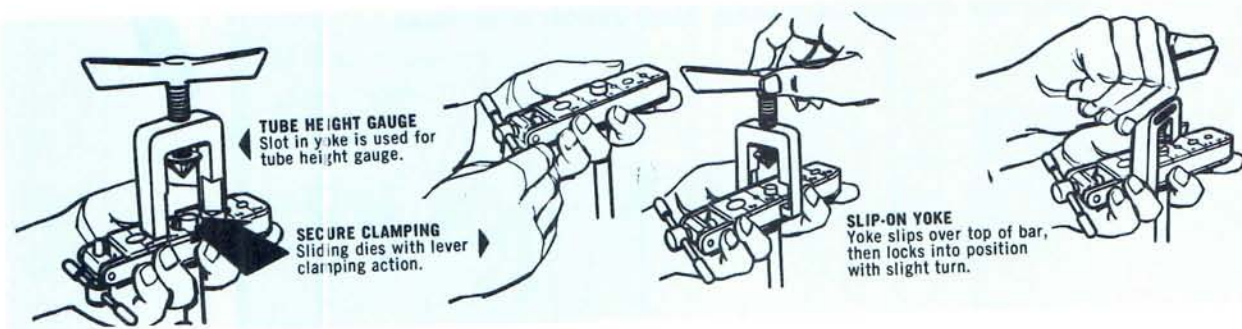
**ROL-AIR® FLARING TOOL (37°)**



Flares rolled out above die bar by super-smooth faceted cone. Makes stronger flares.

Faceted, hard chrome finished cone rolls out perfect 37° flares above die block—then automatically burnishes flare face. Original wall thickness is maintained at base of flare. New slip-on yoke permits use in tight quarters, lets you flare where there is little space between nut and tube end. Larger handle, with better leverage, and precision threads on feed screw make flaring effortless. Heat treated dies grip tubing without scoring. Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 507-FA Rol-Air Flaring Tool. Flares and burnishes  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " O.D. tubing. Wt. 1½ lbs.**  
Pat. Nos. 2,505,665; 2,893,463; 2,707,511. Pat. Can. 1953 and 1956. Other pat. pend.



**TUBE HEIGHT GAUGE**  
Slot in yoke is used for tube height gauge.

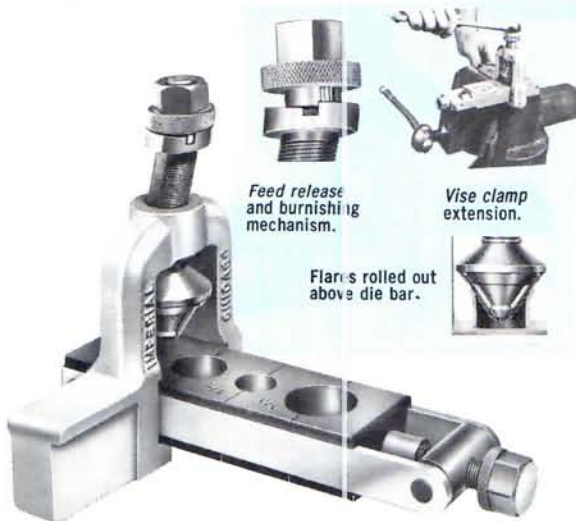
**SECURE CLAMPING**  
Sliding dies with lever clamping action.

**SLIP-ON YOKE**  
Yoke slips over top of bar, then locks into position with slight turn.

No. 537-F ·  $\frac{3}{4}$  to 1¼" O.D.

**FLARING TOOLS (37°)**

No. 637-F · 1¼ to 2" O.D.



Feed release and burnishing mechanism.

Vise clamp extension.

Flares rolled out above die bar.

For Soft Steel, Copper, Aluminum, Annealed Stainless Steel Tubing

3 cylinders in flaring cone roll out 37° flare above die block. Flares soft steel, copper, aluminum and fully annealed stainless steel tubing. Roller action cuts effort required; maintains original wall thickness; eliminates stress concentration. Automatic burnishing action. Vise clamp extension on yoke. Heat treated dies clamp tubing without marking it. Satin chrome and black nickel finish. Furnished in steel kit.

**No. 537-F\* Flares and burnishes  $\frac{3}{4}$ ,  $\frac{7}{8}$ , 1 and 1¼" O.D. tubing. Wt. 5 lbs.**

**No. 637-F Flares and burnishes 1¼, 1½ and 2" tubing. Wt. 13 lbs.**

\*Conforms to Federal Specification GGG-F-451a, 4-5-61. Type I, Class 1, Style B.

Pat. Nos. 2,505,665; 2,505,666; 2,534,510; 2,707,511.  
Pat. Can. 1951 and 1956. Other patents pending.



For Steel, Stainless Steel, Copper, Aluminum Tubing

# FLARING TOOLS (37°)

## FLARING TOOL (37°)

No. 400-F · 3/16 to 5/8" O.D.

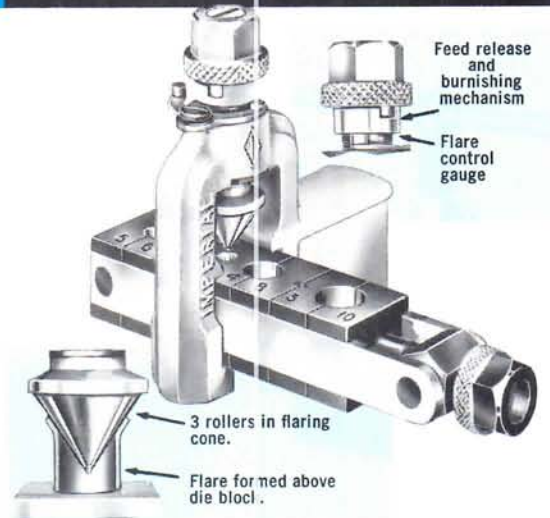
Forms 37° flares to AN Standards in steel, stainless steel (including MIL-T-6845), titanium and other metal tubing. Positive stop gauge assures correct size of flare. Special burnishing action polishes flare face. 3 rollers in flaring cone roll out 37° flare above die block. Roller action cuts effort required; maintains original wall thickness; eliminates stress concentration. Extension on yoke for clamping in vise. Satin chrome and black nickel finish. Furnished in plastic kit.

**No. 400-F Flaring Tool** for 3/16, 1/4, 5/16, 3/8, 1/2 and 5/8" O.D. tubing. In plastic kit. Wt. 2 lbs., 9 oz.

**No. 402-FA Flaring and Reaming Kit.** Contains No. 400-F Flaring Tool and No. 401-FA Reaming Yoke for 1/4 to 5/8" O.D. tubing. In plastic kit. Wt. 3 1/8 lbs.

Conforms to Federal Specification GGG-F-451a, 4-5-61. Type I, Class 1, Style A.

Pat. Nos. 2,505,665; 2,505,666; 2,604,139; 2,707,511; 2,709,474; 2,727,559; 3,078,907. Pat. Can. 1951, 1953, 1956. Other patents pending.

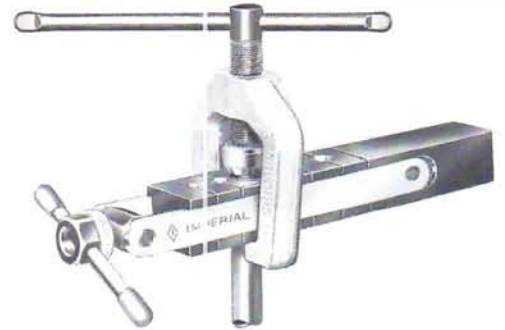


## HEAVY DUTY FLARING TOOL (37°)

No. 447-F · 1/8 to 1/2" O.D.

Forms 37° flares in annealed stainless steel (MIL-T-6845 or AMS5566), cold drawn stainless steel and annealed copper or aluminum tubing. Ideal for use where considerable number of 37° flares in stainless steel tubing must be made every day. Built to withstand continuous rugged service. Ball thrust bearing flaring cone mechanism reduces effort required. Hardened tool steel die features non-slip grip of tubing, even after repetitive flaring. Bar has vise extension.

**No. 447-F Heavy Duty Flaring Tool** for 1/8, 3/16, 1/4, 5/16, 3/8 and 1/2" O.D. tubing. Wt. 3 1/4 lbs.



## FLARING TOOL (37°)

No. 407-FA · 1/8 to 1 1/2" O.D.

Precision tool flares (37°) 1/8 hard stainless steel and other tubing to extremely close tolerances. Swivel-head clamp locks tubing in smooth bore die blocks. Lathe type tube feed. Flares rolled out by ball-bearing mounted flaring cone. Tool must be clamped in vise.

**No. 407-FA Flaring Tool** for 1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 1, 1 1/4 and 1 1/2" O.D. tubing. In carrying case. Wt. 50 lbs.

No. 407-FA will flare 1/8 hard stainless steel tubing in the sizes and wall thicknesses listed below. In some cases these wall thicknesses can be exceeded when flaring aluminum, copper or soft steel tubing.

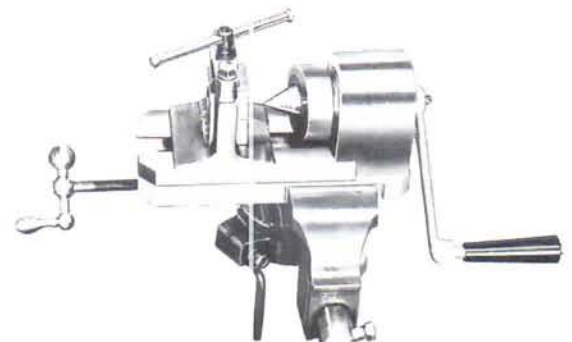
O.D. Size Inches	Wall Thickness Inches	O.D. Size Inches	Wall Thickness Inches
1/8	.020, .028	3/8	.035, .049
3/16	.010, .028	1/2	.028, .035, .049
1/4	.016, .028, .035	1	.028, .035
5/16	.035	1 1/4	.035, .049
3/8	.028, .035	1 1/2	.035, .049, .065
1/2	.035, .049		

**Squaring and Deburring Attachments**  
(Not included with 407-FA)

- No. 74460 Internal Deburring Tool for 1/8 to 1/2" O.D.
- No. 74455 Internal Deburring Tool for 3/8 to 1 1/2" O.D.
- No. 74447 External Deburring Tool
- No. 74462 Facing Tool

### Accessories

- No. 74472 Flare O.D. Gage



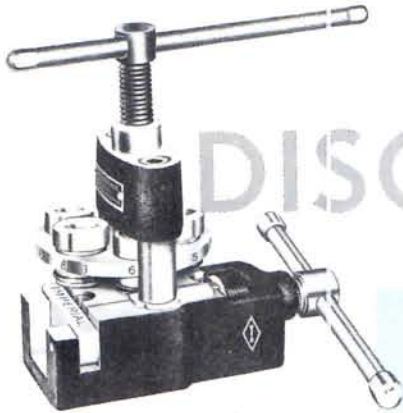
Flares 1/8 hard stainless steel (MIL-T-6845) and all other tubing to Military Standard MS 33584.

# DOUBLE FLARING TOOL (37°)

Makes Flares to AN Standards in  
Soft Copper and Aluminum Tubing

No. 256-F •  $\frac{3}{16}$  to  $\frac{1}{2}$ " O.D.

## DOUBLE FLARING TOOL (37°)



Forms 37° double flap flares to AN Standard AND10078 in soft copper and aluminum tubing (wall thickness to .040"). Also makes single 37° S.A.E. standard and over-size flares. Adapters revolve for quick size change and act as positioning gauge for tube. Small 2-piece die block handles all 5 sizes. Body fits snugly into palm of hand for comfortable grip; sliding handle gives maximum leverage.

**No. 256-F Double Flaring Tool for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$  and  $\frac{1}{2}$ " O.D. tubing. Wt. 1 lb. 13 oz.**

Pat. Nos. 2,774,408; RE-24,325.



Integral  
adapter bells  
tube end.



# REAMING and DEBURRING TOOLS

For Copper, Aluminum, Stainless Steel,  
Brass, Steel Tubing

Nos. 208-F & 208-FSS

## INNER-OUTER REAMERS



Reaming capacity —  $\frac{3}{16}$   
to  $1\frac{1}{2}$ " O.D. ( $\frac{1}{8}$  to  $1\frac{1}{4}$ "  
nom.)

Reams both inside and outside edges of tube with 3 hollow ground tool steel cutters. Fluted body is shaped to fit comfortably in palm. No. 208-FSS has high speed steel cutters.

**No. 208-F Reamer for copper, aluminum and brass tubing. Wt. 10 oz.**

**No. 208-FSS Reamer for aircraft grade stainless steel tubing; hard or soft copper, aluminum, brass and steel tubing. Wt. 10 oz.**

Pat. No. 2,242,821

# TUBE CONSTRICTOR & CUTTER

No. 374-FC •  $\frac{1}{8}$  to  $1\frac{1}{8}$ " O.D.



A modified No. 274-FC Tube Cutter, converted into a tube constrictor. Handy for making braze- or sweat-type connections. Roller is used in place of cutting wheel. Insert smaller tube into larger tube and constrict larger tube as shown.

**No. 374-FC Hi-Duty Combination Tube Constrictor and Cutter for  $\frac{1}{8}$  to  $1\frac{1}{8}$ " O.D. tubing. Length  $4\frac{7}{8}$ ". Wt.  $6\frac{1}{2}$  oz.**

Pat. Nos. 2,629,926; D-161,438; 2,784,618; Pat. Can. 1956; Other patents pending.

FILL WITH  
SOLDER



Joint is ready for  
sweating when  
constricted tube  
contacts smaller  
tube.



Cutting wheel in  
recess under  
reamer.

# SWAGING TOOLS

## PUNCH-TYPE SWAGING TOOLS

Nos. 193-S, 195-SA, 93-S, 94-S

Use these tools for making tubing connections without fittings. Enlarge end of tube, insert another tube of original O.D. size and solder together like a sweat fitting.

**No. 193-S—Vinyl case contains 4 Swaging Punches—** $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " O.D. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ " nom.) Wt. 1 lb.

**No. 195-SA—Flaring Bar and 4 Swaging Punches—** $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " O.D. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ " nom.) In steel kit. Wt. 2 lbs.

**No. 75531—Flaring Bar only.** Wt. 1 lb.

### INDIVIDUAL AND COMBINATION SWAGING TOOLS Order by Catalog Number and O.D. Size

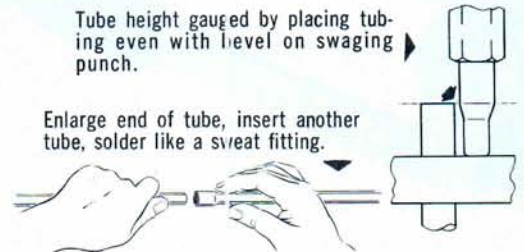
Cat. No.	O.D. Size	Nom. Size	Weight
93-S	$\frac{3}{16}$	—	3 oz.
93-S	$\frac{1}{4}$	$\frac{1}{8}$	3 oz.
93-S	$\frac{5}{16}$	—	$\frac{1}{4}$ lb.
93-S	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$ lb.
93-S	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$ lb.
93-S	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{2}$ lb.
93-S	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{4}$ lb.
93-S	$\frac{7}{8}$	$\frac{3}{4}$	1 lb.
94-S	$\frac{1}{2}$ , $\frac{5}{8}$ , $\frac{7}{8}$	$\frac{3}{8}$ , $\frac{1}{2}$ , $\frac{3}{4}$	1 lb.

Pat. No. 2,553,813. Pat. Can. 1953



Tube height gauged by placing tubing even with level on swaging punch.

Enlarge end of tube, insert another tube, solder like a sweat fitting.



## FLARING (45°) & SWAGING TOOL

No. 275-FS ·  $\frac{1}{8}$  to  $\frac{3}{4}$ " O.D.

Flares or swages. Converts quickly. Screw-type feed. Ideal close quarters tool. Two bars included cover 9 sizes. Swivel-type swaging adapters and spreader cone are hard chrome-finished for easy operation. Self-centering, slip-on forged steel yoke.

**No. 275-FS Flaring and Swaging Tool.** Flares  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$  and  $\frac{3}{4}$ " O.D. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ " nom.) Includes 5 swage adapters for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ " O.D. ( $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ " nom.) In plastic kit. Wt.  $3\frac{1}{2}$  lbs.

Pat. No. 2,553,813

### EXTRA PARTS

**No. 278-FS  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{3}{8}$ " Adapter**

**No. 278-FS  $\frac{5}{16}$ " Adapter**

**No. 278-FS  $\frac{1}{2}$ " Adapter**

**No. 278-FS  $\frac{5}{8}$ " Adapter**

**No. 278-FS  $\frac{3}{4}$ " Adapter**

**No. 38600 Flaring Cone**



Operates in close quarters where punch type tool cannot be used.

## SWAGING TOOLS

No. 194-S ·  $\frac{1}{2}$  to  $\frac{7}{8}$ " O.D.

No. 403-S ·  $\frac{5}{8}$  to  $1\frac{1}{8}$ " O.D.

Screw-type swaging tool. Far easier to work with in close quarters than hammer type tools. No punch to drop, no chance of doing a poor job. Perfect swage alignment of tube every time. Adapters change quickly.

**No. 194-S Swaging Tool** for  $\frac{1}{2}$ ,  $\frac{5}{8}$  and  $\frac{7}{8}$ " O.D. ( $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ " nom.) In plastic kit. Wt.  $2\frac{1}{2}$  lbs.

**No. 403-S Swaging Tool** for  $\frac{5}{8}$ ,  $\frac{3}{4}$ ,  $\frac{7}{8}$ ,  $1\frac{1}{8}$ " O.D. ( $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ ,  $1$ " nom.) Wt.  $5\frac{1}{2}$  lbs.

**No. 38600 Flaring Cone** for No. 194-S. Makes combination flaring and swaging tool.

Pat. Nos. 2,493,127; 2,553,813.  
Pat. Can. 1953. Other patents pending.



# TUBE BENDERS

## (LEVER-TYPE)

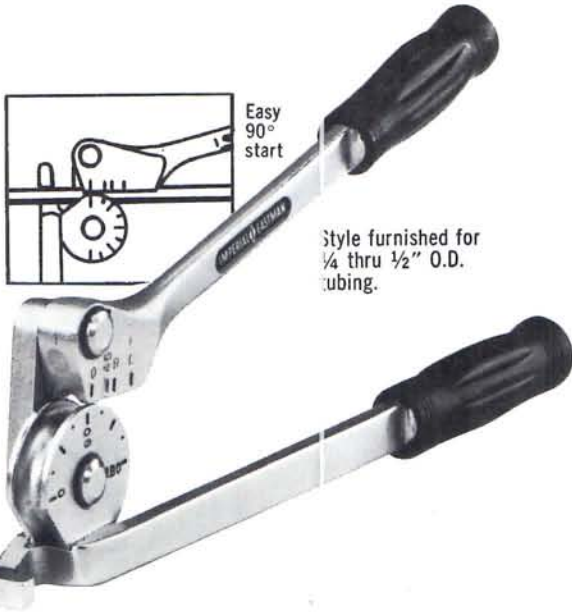
For Bending Annealed Copper, Aluminum, Steel, Stainless Steel and Hard Copper Tubing† of Bending Temper (Including Types K, L and ACR).

No. 364-FH · 1/8 to 1" O.D.

### LEVER-TYPE TUBE BENDERS

Each tool bends one size. Open side type which slips over tube at any point. Makes smooth short radius bends up to 180° with minimum effort. No marking, scraping or flattening of tubing. Calibrated to show angle of bend. Wide hook grips tubing securely.

New fixed hook tube benders furnished for 1/4 to 1/2" O.D. sizes have easy 90° start—require much less effort to make fast, accurate bends. Wide fixed hook simplifies operation, holds tubing securely.



Style furnished for 1/4 thru 1/2" O.D. tubing.

#### ORDER BY CATALOG NUMBER

Each tool bends only one size.

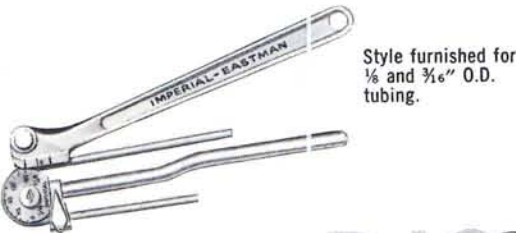
Catalog Number	Outside Diameter of Tubing	Nominal Size	Radius to Center of Tube	Weight Each
364-FH-02	1/8	—	3/8	1/2 lb.
364-FH-03	3/16	—	7/16	9 oz.
364-FHA-04	1/4	1/8	7/16	1 lb.
364-FHA-05	5/16	—	1 1/16	1 1/4 lbs.
364-FHA-06	3/8	1/4	1 5/16	1 3/4 lbs.
364-FHA-07	7/16	—	1 1/2	3 1/2 lbs.
364-FHA-08	1/2	3/8	1 1/2	3 1/2 lbs.
364-FHA-10	5/8	1/2	2 1/4	5 1/2 lbs.
364-FHA-12	3/4	5/8	3	7 lbs.
364-FHA-14	7/8	3/4	3	10 1/2 lbs.
364-FHA-16	1"	—	3 1/2	10 1/2 lbs.

Conforms to Federal Specification GGG-B-191a, 3-1-63. Type III, Class 2.

Pat. Nos. 2,887,917; 3,685,335.

Patents pending.

#### Bench Mounting Attachment for Fixed Hook Tube Benders



Style furnished for 1/8 and 3/16" O.D. tubing.

Catalog Number	Bender Size
264-F-04	1/4"
264-F-05	5/16"
264-F-06	3/8"
264-F-08	7/16" & 1/2"

Remove only one screw to substitute base for lever handle

#### METRIC SIZE BENDING TOOLS

Catalog Number	Outside Diameter of Tubing mm	Radius to Center of Tube	
		mm	Inches
364-FHAM-06	6	14.2	9/16
364-FHAM-08	8	17.5	1 1/16
364-FHAM-10	10	24.0	1 5/16
364-FHAM-12	12	38.1	1 1/2

† Type M tubing is not recommended for bending.  
\* For bending annealed copper and aluminum tubing only.

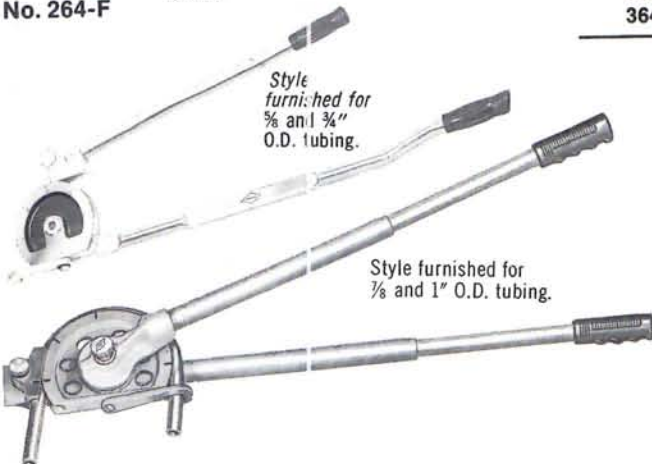


No. 264-F

To attach bench mounting adapter remove screw from handle.



Substitute base for lever handle and replace screw. Bender is now ready to be bench mounted or held in vise for easy repetitive bends.



Style furnished for 5/8 and 3/4" O.D. tubing.

Style furnished for 7/8 and 1" O.D. tubing.

For Bending Annealed Copper,  
Aluminum, Brass, Steel, Stainless  
Steel and Other Metals.

# TUBE BENDERS

(LEVER-TYPE)

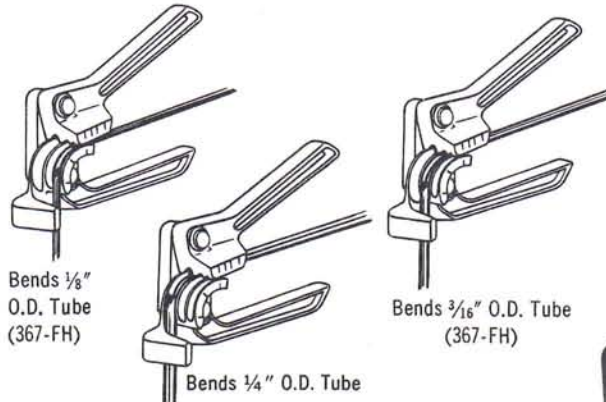
## "Imp"® TRIPLE HEADER BENDER No. 367-FH

Innovative multi-tube-size design does the work of three conventional lever-type benders. Calibrated markings for making accurate left-hand, right-hand, and offset bends. 90° start requires less effort — makes bending fast and easy. Wide, fixed hook simplifies operation, holds tubing securely. Open side—slips on tubing at any point. Attractive black and chrome finish.

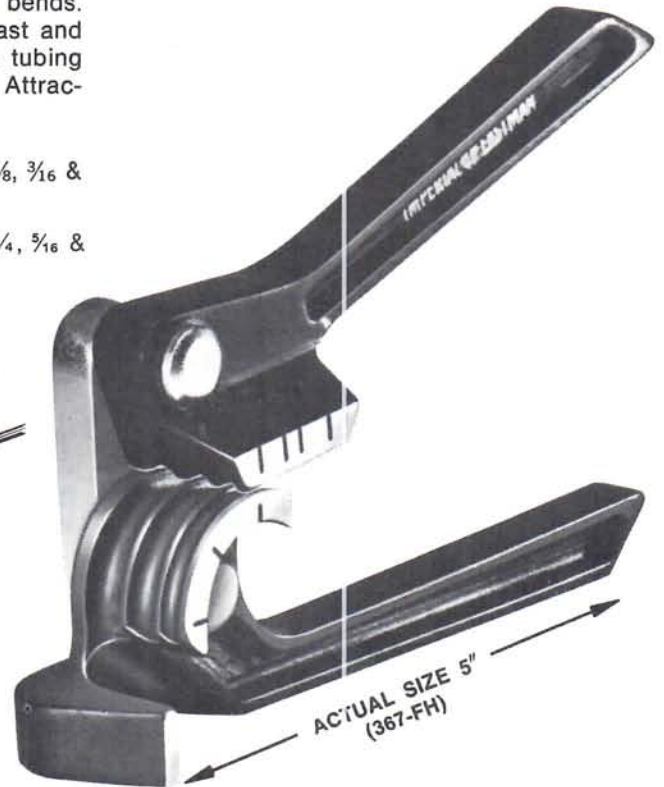
**No. 367-FH "Imp" Triple Header Tube Bender** for 1/8, 3/16 & 1/4" O.D. tubing. (3, 4, 6 MM O.D.) Wt. 5 oz.

**No. 368-FH "Imp" Triple Header Tube Bender** for 1/4, 5/16 & 3/8" O.D. tubing. (6, 8 MM O.D.)

Pat. Nos. 2,887,917; 3,685,335; 3,750,447.  
Other patents pending.



**Universal Application—**  
bends three tube sizes



For Soft Copper and Aluminum Tubing

# TUBE BENDERS

(SPRING-TYPE)

## SPRING-TYPE TUBE BENDER No. 102-F · 1/4 to 3/4" O.D.

Budget priced tools for hand bending soft tubing to any shape without collapsing walls. Special spring steel, nickel finished. End belled for quick tube removal.

**No. 102-F INDIVIDUAL BENDERS**  
Order by Catalog Number

Catalog No.	Size	Length	Weight	Catalog No.	Size	Length	Weight
102-F-04	1/4	10	3 oz.	102-F-08	1/2	12	6 1/2 oz.
102-F-05	3/16	10	3 oz.	102-F-10	5/8	12	8 oz.
102-F-06	3/8	10	4 oz.	102-F-12	3/4	12	10 oz.
102-F-07	7/16	12	6 1/4 oz.				

**No. 101-F—Set of 6 Benders.**(1/4, 3/16, 3/8, 7/16, 1/2 and 5/8" O.D.)

**No. 163-F—Set of 4 Benders** (1/4, 3/8, 1/2, and 3/8" O.D.)

**No. 112-F—Set of 3 Benders** (1/4, 3/16, and 3/8" O.D.)

Conforms to Federal Specification GGG-B-191a, 3-1-63 and Interim Amendment No. 2, 9-16-64. Type IV.



# TUBE BENDERS

## (LEVER-TYPE)

For Bending Annealed Copper, Aluminum, Steel, Stainless Steel and Hard Copper Tubing† of Bending Temper (Including Types K, L and ACR).

Nos. 260-FHA, 350-FHA, 360-FHA

## Wide Range TUBE BENDERS



Each tool quickly adapts to all sizes in its range by changing forming wheel and block. Long handles reposition during bend for best leverage. Calibrations show precise bend angle. One piece benders furnished for 1/4 and 5/16" O.D. sizes. Furnished in steel tool kit with space for other tools needed on the job.

### WIDE RANGE BENDERS

**No. 260-FHA** for 7 sizes shown below. Wt. 23 lbs.

O.D. Size	Nom. Size	Radius to Cen. of Tube
1/4	1/8	1/16
3/16	—	1 1/16
3/8	1/4	1 5/8
1/2	3/8	1 5/8
5/8	1/2	2 1/4
3/4	5/8	3
7/8	3/4	3

**No. 350-FHA** for 6 sizes below. Wt. 20 lbs.

O.D. Size	Nom. Size	Radius to Cen. of Tube
1/4	1/8	1/16
5/16	—	1 1/16
3/8	1/4	1 5/8
1/2	3/8	1 5/8
5/8	1/2	2 1/4
3/4	5/8	3

**No. 360-FHA** for 4 sizes below. Wt. 20 lbs.

O.D. Size	Nom. Size	Radius to Cen. of Tube
3/8	1/4	1 5/8
1/2	3/8	1 5/8
5/8	1/2	2 1/4
3/4	5/8	3



All wide range benders furnished in steel tool kit with space for other tools.

Conforms to Federal Specification GGG-B-191a, 3-1-63. Type III, Class 1.

Pat. Nos. 2,887,917; 3,685,335.

No. 361-FHA, No. 362-FHA,

No. 363-FHA, No. 365-FHA

## TWO-IN-ONE TUBE BENDERS

Each tool adapts swiftly to two sizes by changing forming wheel and block. Bends any angle to 180°. Long handles reposition during bend for best leverage. Calibrations show precise bend angle.

Each Bender Handles Two Tube Sizes as shown.

**No. 361-FHA.** Wt. 10 lbs.

O.D. Size	Nom. Size	Radius to Cen. of Tube
5/8	1/2	2 1/4
7/8	3/4	3

**No. 363-FHA.** Wt. 11 lbs.

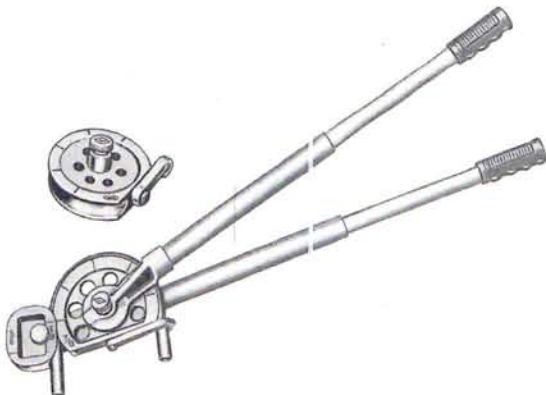
O.D. Size	Nom. Size	Radius to Cen. of Tube
3/4	5/8	3
7/8	3/4	3

**No. 362-FHA.** Wt. 9 1/4 lbs.

O.D. Size	Nom. Size	Radius to Cen. of Tube
1/2	3/8	1 5/8
5/8	1/2	2 1/4

**No. 365-FHA.** Wt. 10 lbs.

O.D. Size	Nom. Size	Radius to Cen. of Tube
5/8	1/2	2 1/4
3/4	5/8	3



Conforms to Federal Specification GGG-B-191a, 3-1-63. Type III, Class 1.

Pat. Nos. 2,887,917.

† Type M tubing is not recommended for bending.

For Aircraft Grade Stainless Steel  
(MIL-T-6845) and All Other Metal Tubing

# TUBE BENDERS

(GEAR-TYPE)

## WORM-GEAR TUBE BENDER

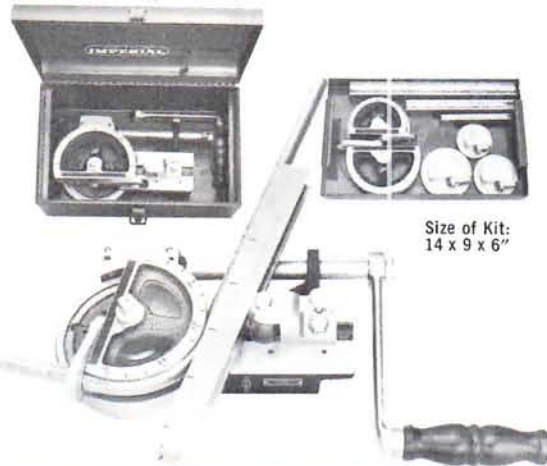
No. 600-F • 1/4 to 3/4" O.D.

Precision tool for highest quality work. Worm-gear type with 50-to-1 ratio and crank with revolving hand grip. Keeps effort at a minimum. Follow bar eliminates drawing action and keeps tube in virtually perfect round. Adjustable pressure roller positions quickly in index holes. Enclosed gears. Pull out center pin and wheel to change sizes. Furnished in steel carrying case.

**No. 600-F Worm Gear Bender for 1/4, 5/16, 3/8, 1/2, 5/8 and 3/4" O.D. tubing.** Wt. (in case) 35 lbs.

Radii of Bends	O.D. of Tube	Radius to Cen. of Tube	O.D. of Tube	Radius to Cen. of Tube
	1/4	3/4	1/2	2
	5/16	1	5/8	2 1/2
	3/8	1 1/4	3/4	3

Conforms to Federal Specification GGG-B-191a, 3-1-63 and Interim Amendment No. 2, 9-16-64. Type I, Class 2.



Size of Kit:  
14 x 9 x 6"

## GEAR-TYPE TUBE BENDER

No. 700-F • 1/4 to 3/4" O.D.

Makes bends up to 180° in stainless steel tubing, conforming to Specification MIL-T-6845. Precision construction maintains original diameter of tube within 5% at bend. Also bends copper, aluminum and other types of tubing.

Calibrated dial indicates angle of bend.

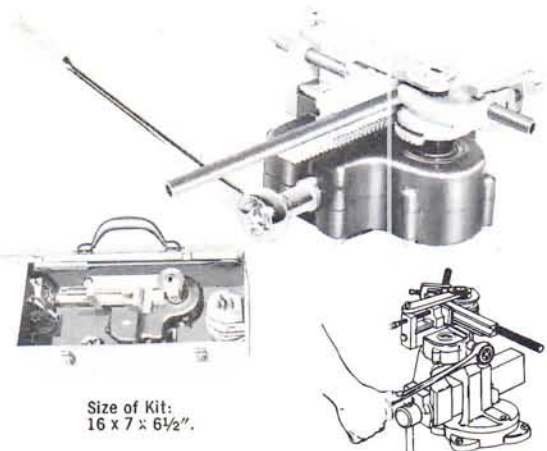
**No. 700-F Gear-Type Tube Bender for 1/4, 5/16, 3/8, 1/2, 5/8 and 3/4" O.D. tubing.** Wt. (in steel case) 32 lbs.

**Tubing Wall Thickness and Bend Radii for Stainless Steel (MIL-T-6845) Tubing**

(In some cases these wall thicknesses can be exceeded for copper and aluminum tubing. Experimentation is suggested to determine what thicknesses can be bent successfully.)	O.D. Tube in.	Wall Thickness in.	Bend Radius to Center of Tube in.
	1/4	.016 to .049	5/16
	5/16	.020 to .065	1 1/16
	3/8	.028 to .083	1 5/16
	1/2	.035 to .083	1 1/4
	5/8	.042 to .083	1 1/2
	3/4	.049 to .083	1 3/4

Conforms to Federal Specification GGG-B-191a, 3-1-63 and Interim Amendment No. 2, 9-16-64. Type II, Class 2.

Pat. No. 2,986,195.



Size of Kit:  
16 x 7 x 6 1/2"

Tool is designed to be clamped in vise.

## GEAR-TYPE TUBE BENDER

No. 270-F • 3/8" to 1 1/8" O.D.

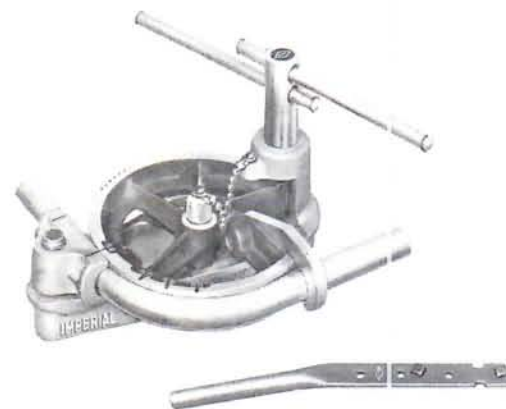
For all bending work. Spur-gear type with 10-to-1 ratio for easy bending of all tubing.† Floating shoe aligns tube perfectly on calibrated forming wheel. Pull-pin on wheel speeds repositioning for bends over 90°. Portable. Can be hand held, clamped in vise or bolted to bench. Adapts to pipe vise with handle No. 271-F.

ORDER BY CATALOG NUMBER AND O.D. SIZE	Catalog No.	O.D. Size	Nom. Size	Bending Radius to Cen. of Tube	Min. Return from Cen. of Tubing	Weight Each in Lbs.
270-F-06	270-F-06	3/8	1/4	1 3/4	4 1/2	3
270-F-08	270-F-08	1/2	3/8	2 1/2	6	4 3/4
270-F-10	270-F-10	5/8	1/2	3	7 1/2	8 1/2
270-F-12	270-F-12	3/4	5/8	4	9 1/2	15
270-F-14	270-F-14	7/8	3/4	4	9 1/2	14 3/4
270-F-16	270-F-16	1	—	4	9 1/2	14 3/4
270-F-18	270-F-18	1 1/8	1	4	9 1/2	14 1/4

**No. 271-F Extension Handle. Fits all No. 270-F Benders.** For use when clamping bender in pipe vise. Wt. 1 3/4 lbs.

Conforms to Federal Specification GGG-B-191a, 3-1-63 and Interim Amendment No. 2, 9-16-64, Type I, Class 1.

† Type L tubing in 1 and 1 1/8" sizes should be stress relieved before bending. Heat to approximately 800°F. Type M tubing is not recommended for bending.



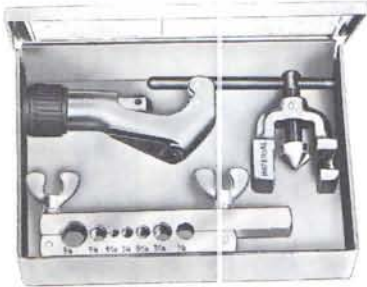
271-F Extension Handle.

# TUBING TOOL KITS

For Flaring, Cutting, Bending Soft Copper, Aluminum, Brass Tubing.

No. 1226-FA

## FLARING & CUTTING (45°)



No. 1226-FA

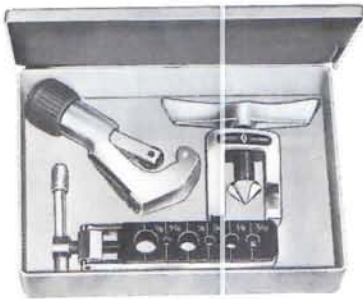
Kit contains No. 274-FC Tube Cutter for 1/8 to 1 1/8" O.D. tubing and No. 195-FC Flaring Tool. In plastic case. Wt. of kit 3 lbs.

Catalog No.	Tube Cutter	Flaring Tool	Range of Flaring Tool
1226-FA	274-FC	195-FC	3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8" O.D. (1/8, 1/4, 3/8, 1/2" nom.)

Conforms to Federal Specification GGG-C-744, Type I.

Nos. 123-FA & 124-FA

## FLARING & CUTTING KITS (45°)

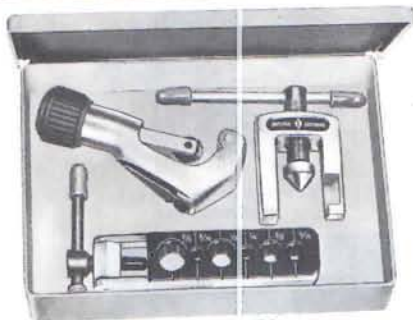


No. 124-FA

Catalog No.	Tube Cutter	Flaring Tool	Range of Flaring Tool
123-FA	274-FC	300-FA	3/16, 1/4, 5/16, 3/8, 1/2, 5/8" O.D. (1/8, 1/4, 3/8, 1/2" nom.)
124-FA	274-FC	500-FA	Same as above

No. 122-FA

## FLARING & CUTTING KIT (37°)



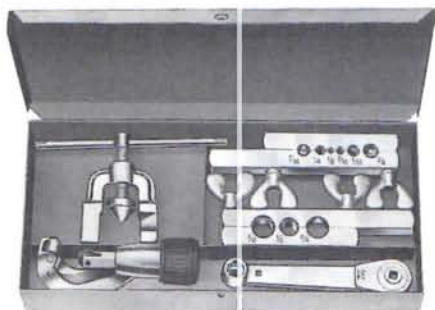
No. 122-FA

Kit contains No. 437-FA Flaring Tool and the No. 274-FC Tube Cutter with fold-away reamer and spare wheel. In plastic case.

No. 122-FA Flaring and Cutting Kit. Wt. 2 3/4 lbs.

Nos. 120-F & 121-F

## TOOL KITS



No. 121-F

### No. 120-F WIDE RANGE FLARING AND CUTTING KIT (45°)

Contains: No. 274-FC Cutting Tool, and No. 375-FS Wide Range Flaring Tool for tube sizes 1/8, 3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8 and 3/4" O.D. (1/8, 1/4, 3/8, 1/2 and 5/8" nom.) In plastic carrying case.

### No. 121-F ALL PURPOSE TUBING TOOL KIT

Contains tools listed above plus three No. 102-F Bending Springs for 1/4, 3/8 and 1/2" O.D. tubing; and the No. 123-C Ratchet Wrench with 1/4" ratchet, 3/16 and 1/4" square opening and 1/2" hex in handle. In steel carrying case.

No. 120-F Wide Range Flaring and Cutting Kit. Wt. 5 1/4 lbs.

No. 121-F\* All Purpose Tubing Tool Kit. Wt. 5 3/4 lbs.

\* Conforms to Federal Specification GGG-C-744, Type II.



For Flaring, Cutting, Bending Soft Copper,  
Aluminum, Brass Tubing.

# TUBING TOOL KITS

## FLARING (37°) & REAMING KIT

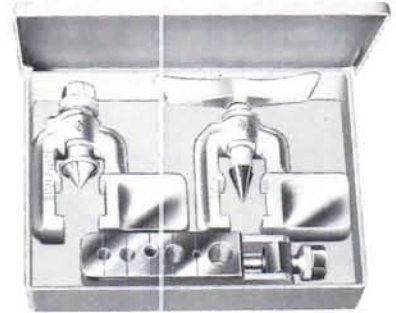
No. 402-FA

Kit contains No. 400-F Flaring Tool and No. 401-FA Deburring and Reaming Tool. Makes 37° flares to AN standards in steel, stainless steel (including MIL-T-6845), and other metal tubing. In plastic case.

**No. 402-FA Flaring and Reaming Kit.** Wt. 3 $\frac{3}{8}$  lbs.

**No. 401-FA Deburring Tool for all metal tubing, including steel and stainless steel—Sizes  $\frac{1}{4}$  to  $\frac{5}{8}$ " O.D.** (Use with No. 400-F Die Holder Assembly, No. 79249-01.) Wt. 14 oz.

**No. 79249-01 Die Holder Assembly for  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ " O.D.** Wt. 1 lb., 6 oz.



## (45°) REFACING TOOL

### REFACING TOOL °

No. 345-FA ·  $\frac{1}{4}$ " to  $\frac{5}{8}$ " O.D.

Makes nicked or marred seats on brass and other non-ferrous fittings and valves as good as new. Precision feed. Replaceable cutter. Kit furnished in steel case.

**No. 345-FA 45° Refacing Tool (with cutter and adapters for  $\frac{1}{4}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{5}{8}$ " fittings).** In steel case. Wt. 2 lbs.



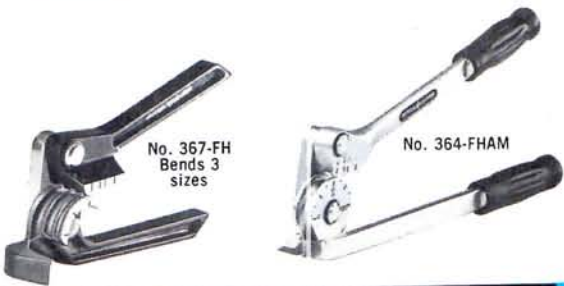
# METRIC SIZE TOOLS FOR BENDING & FLARING

For bending annealed copper, aluminum, steel, stainless steel and hard copper tubing of bending temper.

**No. 364-FHAM • 6 to 12mm O.D.**  
**No. 367-FH • 3, 4 & 6mm O.D.**

## LEVER-TYPE TUBE BENDERS

Open side design slips over tube at any point. Makes short radius bends with minimum effort. Calibrated to show angle of bend.



Catalog Number	Outside Diameter of Tubing mm	Radius to Center of Tube	
		mm	inches
364-FHAM-06	6	14.2	5/8
364-FHAM-08	8	17.5	11/16
364-FHAM-10	10	24.0	13/16
364-FHAM-12	12	38.1	1 1/2
367-FH	3, 4 & 6	14.2	5/8
368-FH	6 & 8	17.5	1 1/16

**No. 525-F 45° • 5 to 16mm O.D.**  
**No. 527-F 37° • 5 to 16mm O.D.**

## "Grabber" ROL-AIR® (45° & 37°)



Flares and burnishes soft copper, aluminum and brass tubing.

Unique self-adjusting tube holding mechanism permits flaring any size tubing within the range of 5 to 16 mm O.D. Innovative, single opening design is compact and easy to use. Faceted, hard chrome finished cone rolls out and burnishes perfect flares above tube holding mechanism. Slip-on self-centering yoke. Smart professional appearance.

**No. 525-F 45° "Grabber" Rol-Air Flaring Tool.** Flares and burnishes 5 to 16 MM O.D. tubing. Wt. 1 3/4 lbs.

**No. 527-F 37° "Grabber" Rol-Air Flaring Tool.** Flares and burnishes 5 to 16 MM O.D. tubing. Wt. 1 3/4 lbs.

Patents pending.

**No. 500-FAM 45° • 6 to 16mm O.D.**

## ROL-AIR® FLARING TOOLS (45° & 37°)



Flares rolled out above die bar by super-smooth faceted cone. Makes stronger flares.

Faceted, hard chrome finished cone rolls out perfect flares above die block — then automatically burnishes flare face. Original wall thickness is maintained at base of flare. Slip-on yoke permits use in tight quarters, lets you flare where there is little space between nut and tube end. Heat treated dies grip tubing without scoring. Satin chrome and black nickel finish add to tool life and smart professional appearance.

**No. 500-FAM 45° Rol-Air Flaring Tool.** Flares and burnishes 6, 8, 10, 12, 15 and 16 mm O.D. tubing. Wt. 1 1/2 lbs.

Pat. Nos. 2,505,665; 2,893,463 Pat. Can. 1951

**No. 395-FAM • 4 to 16mm O.D.**

## METRIC SIZE FLARING TOOL (45°)



Yoke slips over top of bar then locks into position with a slight turn.

Flares 7 sizes of tubing. Rugged forged steel slip-on yoke and hardened flaring bar. Positive clamping action of bar prevents tube slippage. Self centering yoke with swivel-type, hard chrome-finished flaring cone forms better flares with less effort. Satin finish nickel-chrome plated.

**No. 395-FAM Flaring Tool for 4, 6, 8, 10, 12, 15, 16mm O.D. tubing.** Wt. 2 lbs.

Pat. Nos. 2,553,813; 3,027,931. Pat. Can. 1953.

Forms 45° flares in soft copper, aluminum and brass tubing.

# TESTING AND SERVICE TOOLS

## TUBING TEST CAPS

No. 240-F · ¼ to ½" O.D.

For shutting off tube ends temporarily without pinching off or installing a valve. Used for working pressures to 100 psi. No need to deburr tubing. Can be used even when tube surface is rough. Also, wall thickness of tube is unimportant. Place cap over tube end and tighten wing nut. Synthetic rubber seal of cap grips outside of tube.

### Order by Catalog Number

Catalog No.	O.D. of Tube	Nominal Size	Weight Each
240-F-04	¼	⅜	1 oz.
240-F-05	⅝	—	1 oz.
240-F-06	¾	¼	1½ oz.
240-F-08	½	⅜	3 oz.



## TUBING TEST PLUGS

No. 140-F · ¼ to 1½" O.D.

For temporary shut-off of tubing without pinching it off or installing a valve. Especially handy for plumbing, heating, refrigeration and instrumentation when trouble shooting for leaks. Light weight, fast acting, dependable. Insert plug in tube end and tighten wing nut. Synthetic rubber expander seals tube and holds pressures to 100 psi.

### Order by Catalog Number

Catalog No.	O.D. Size	Nom. Size	Weight Each	Catalog No.	O.D. Size	Nom. Size	Weight Each
140-F-04	¼	⅝	½ oz.	140-F-14	⅞	¾	3 oz.
140-F-06	⅝	¼	¾ oz.	140-F-18	1 ⅛	1	4 oz.
140-F-08	½	⅜	1 oz.	140-F-22	1 ⅜	1 ¼	4 oz.
140-F-10	⅝	½	1 ½ oz.	140-F-26	1 ⅝	1 ½	5 oz.
140-F-12	¾	⅝	2 oz.				



## TEST PLUG KIT

No. 142-F · ½ to ⅞" O.D.

Handy transparent plastic case contains the three most popular test plug sizes for plumbing, heating and other applications.

**No. 142-F Test Plug Kit for sizes ½, ⅝ and ⅞" O.D.** (⅜, ½, ¾" nom.) In plastic case. Wt. 9 oz.



## PINCH-OFF TOOL

No. 105-FF · ¼ to ½" O.D.

Temporarily closes soft copper, aluminum or steel tubing so no liquid or gas passes sealed part. Lets you disconnect line while making repairs without loss of liquid or gas. Also opens tubing and rounds it back to shape.

**No. 105-FF Pinch-Off Tool for ¼, ⅜ and ½" O.D.** Wt. ¾ lbs.

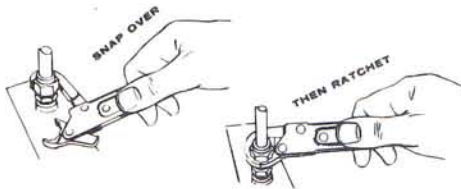


# KWIK-TITE® RATCHET WRENCHES

For Tube Fittings, Valves, Nuts, Bolts

Nos. 199-F, 499-F

## KWIK-TITE® RATCHET WRENCHES



### TORQUE CORRECTION FORMULA

Adapter extends lever arm of torque wrench. To compensate for this, use the following formula:

$$T_w = \frac{T_a \times L}{1 + A}$$

where  $T_a$  = Specified torque applied to fastener (desired torque)  
 $T_w$  = Torque indicated on torque wrench scale  
 $L$  = Lever length of torque wrench  
 $A$  = Lever length of adapter

The Imperial-Eastman Kwik-Tite Ratchet Wrench speeds installation of tube fittings and valves, hex nuts, bolts and fasteners. This unusual wrench, with its open jaw design, makes it easy to slip onto fittings and fasteners—even in tight quarters. Flips quickly into tightening position with a sure grip on all hex surfaces.

12 point contact distributes torque pressures evenly on the flats of the hex—not at the corners. Eliminates warping and distorting of fittings and fasteners. Because of the Kwik-Tite ratchet action, tightening jobs are easier and faster.

Kwik-Tite Wrenches are made with long life, rugged construction. Jaws are forged steel, handles are made of heavy gauge spring steel and chromium plated. Furnished as complete wrenches or torque wrench adapters as listed below.

### WRENCH SIZES FOR FITTINGS

Type Fitting	Tube O.D. of Fitting									
	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	7/8"	1"
Hi-Seal	1/2"	5/16"	3/8"	11/16"	3/4"	7/8"	1 1/8"	1 1/4"	1 1/2"	1 3/4"
Hi-Duty	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Inverted Flare	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Comp. Standard and Mini-Flex	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Comp. Long Nut	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Flare	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"	1 3/4"
Flare (45°)	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
H. D. 45° Flare	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Flare (37°)	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Series 1900	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Poly-Flo	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"
Nylo-Seal	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"

### NO. 199-F KWIK-TITE RATCHET WRENCH

Catalog No.	Nut Hex of Wrench	Overall Length	Catalog No.	Nut Hex of Wrench	Overall Length
199-F-06	3/8"	5 3/8"	199-F-12	3/4"	7 3/16"
199-F-07	7/16"	5 7/16"	199-F-13	13/16"	9 1/8"
199-F-08	1/2"	5 3/8"	199-F-14	7/8"	9 3/32"
199-F-09	9/16"	5 3/8"	199-F-15	15/16"	9 1/4"
199-F-10	5/8"	7 1/32"	199-F-16	1"	9 9/32"
199-F-11	11/16"	7 1/8"			

### NO. 499-F KWIK-TITE TORQUE WRENCH ADAPTERS

Catalog No.	Nut Hex.	Square Drive	Lever Length	Catalog No.	Nut Hex.	Square Drive	Lever Length
499-F-06	3/8"	3/8"	2"	499-F-13	13/16"	1/2"	3"
499-F-07	7/16"	3/8"	2"	499-F-14	7/8"	1/2"	3"
499-F-08	1/2"	3/8"	2"	499-F-15	15/16"	1/2"	3"
499-F-09	9/16"	3/8"	2"	499-F-16	1"	1/2"	3"
499-F-10	5/8"	3/8"	2"	499-F-18	1 1/8"	1/2"	3"
499-F-11	11/16"	3/8"	2"	499-F-20	1 1/4"	1/2"	3"
499-F-12	3/4"	3/8"	2"				

### KWIK-TITE® RATCHET WRENCH KITS

Furnished in roll-up type vinyl kit.

No. 299-F Contains No. 199-F 3/8", 1/2", 5/8", 3/4", 7/8", 1" wrenches.

No. 399-F Contains No. 199-F 1/2", 5/8", 3/4" wrenches.

Pat. No. 2,814,225  
 Pat. Canada 1963



299-F



399-F

**PLUMBER'S FINISHING KIT**

No. 489-F

A service kit containing the most used tubing tools for plumbing installation and replacement. Handy vinyl carrying pouch contains the following time saving tools:

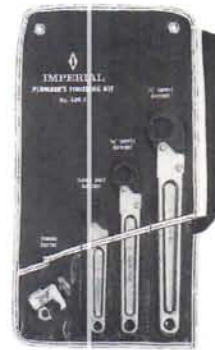
No. 127-FB "Imp" Tube Cutter for tubing from 1/8 to 5/8" O.D. Requires only 1 1/4" clearance. Cuts hard or soft copper, aluminum, thin-wall steel tubing.

No. 199-F-09 Kwik-Tite Ratchet Wrench for closet bolts.

No. 199-F-10 Kwik-Tite Ratchet Wrench for 3/8" supply lines.

No. 199-F-13 Kwik-Tite Ratchet Wrench for 1/2" supply lines.

**No. 489-F Plumber's Finishing Kit furnished in vinyl carrying pouch.**



For Air Conditioning and Refrigeration Service

**RATCHET WRENCHES**

**RATCHET WRENCH**

No. 123-C

A steel forged ratchet wrench for use on small refrigerant cylinders, shut-off valves, packing gland wrenches, etc. Ratchet has 1/4" square drive and raised face. Handle has 3/16" and 1/4" square drives and 1/2" hex.

**No. 123-C Ratchet Wrench.**



**RATCHET WRENCH**

No. 124-C

This is a combination wrench with the four sizes most needed for servicing automotive air conditioning: 3/16" hex for dust cap on Schrader type valves and plug for oil check on York compressor; 1/2" hex for mounting bolts on compressor service valves and head bolts on Tecumseh, York and Airtemp compressors; 1/4" square for valve stem on York and Tecumseh service valves and old style compressor valves; 3/16" square for valve on old style refrigerant charging tanks.

**No. 124-C Ratchet Wrench.**



**RATCHET WRENCH**

No. 125-C

By far our best ratchet wrench. This is a rugged steel forged wrench with five sizes covering almost any application. 1/4" square ratchet for valve stem on York and Tecumseh service valves and old style compressor valves. Other end has 3/16", 1/4", 5/16" square openings plus 3/16" hex opening for dust cap on Schrader type valves and plug for oil check on York compressor.

**No. 125-C Ratchet Wrench**



**RATCHET WRENCH**

No. 127-C

Compressor Access Valve Wrench—Compact, rugged steel forged ratchet wrench covers the sizes most needed by the refrigeration serviceman. Chrome plated wrench has 1/4", 3/8", 3/16" and 5/16" square drive ratchets and is specially designed for use on compressors with access valves in hard to reach places. Reversible ratchets.

**No. 127-C Ratchet Wrench**



# AIR NOZZLES

Nozzles with 30 psi maximum delivery.  
Meet OSHA Requirements.

Nos. 30-A, 32-A, 33-A, 35-A, 36-A & 37-A

**SAFETY AIR NOZZLES**

## Safety Air Nozzles

### MAXIMUM DELIVERY 30 PSI

All safety air nozzles have these advantages:

30 psi maximum delivery. Conform to Walsh-Healy and Williams-Steiger Occupational Safety and Health Acts. They meet requirements for maximum 30 psi delivery when used with air supply lines up to 100 psi. Also conform to noise level requirements and have vented tips to prevent pressure build-up in dead-end service.

No. 30-A



### No. 30-A BUTTON CONTROL AIR NOZZLE

Compact spring loaded button-control nozzle. Oil proof synthetic rubber washer. 1/4" female pipe thread connection.

**No. 30-A Air Nozzle. Wt. 6 Oz.**

OSHA 1910.95 and 1910.242 (b)

No. 32-A

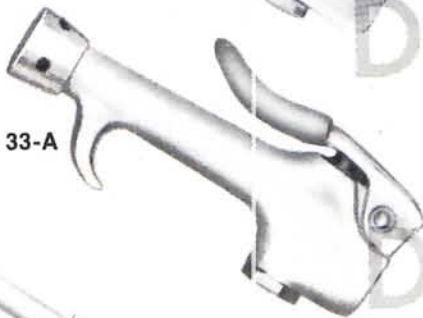


### No. 32-A LEVER CONTROL AIR NOZZLE

Tamper-proof, vented tip. Comfortable, rugged design with hang-up hook. Chrome plated for lasting durability.

**No. 32-A Lever Air Nozzle.**

No. 33-A

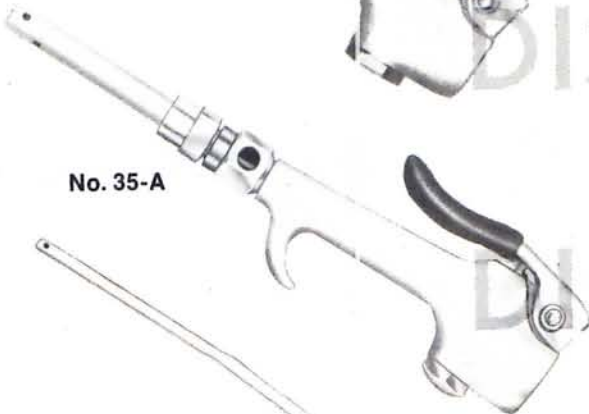


### No. 33-A SHIELDED TIP LEVER AIR NOZZLE

New shielded tip offers the extra protection of an air shield around main air stream for added protection from flying chips. Tamper-proof vented tip. Chrome plated.

**No. 33-A Shielded Tip Lever Air Nozzle.**

No. 35-A



### No. 35-A LEVER AIR NOZZLE WITH 3" EXTENDED TIP

New extended tip offers a wide range of special applications. Chrome plated air nozzle with tamper-proof vented tip. Comfortable, rugged design with convenient hang-up hook.

**No. 35-A Lever Air Nozzle with 3" Extended Tip.**

Nos. 36-A & 37-A



### Nos. 36-A and 37-A LEVER AIR NOZZLES WITH EXTRA LONG TIPS

These durable chrome plated air nozzles with extra long tips meet the need when an extension is called for. Tamper-proof vented tips.

**No. 36-A Lever Air Nozzle with 12" Extended Tip.**

**No. 37-A Lever Air Nozzle with 18" Extended Tip.**

### Merchandising Aid Nos. 30-A, 32-A, 33-A

Safety Air Nozzles are individually packaged in plastic for display on pegboard merchandisers.

Nozzles with 30 psi maximum delivery.  
Meet OSHA Requirements.

# AIR NOZZLES

## EXTRA VOLUME AIR NOZZLES

Nos. 34-A and 137-A

### Safety Air Nozzles

**MAXIMUM DELIVERY 30 PSI**

#### Nos. 34-A and 137-A EXTRA VOLUME AIR NOZZLES

These new air nozzles provide an extra volume of air, yet meet OSHA requirements. Added ports in tip provide more CFM while maintaining pressure under 30 psi.

**No. 34-A Chrome Plated Extra Volume Air Nozzle.**  
**No. 137-A Heavy Duty Extra Volume Air Nozzle.**



## HEAVY DUTY AIR NOZZLES

Nos. 134-A, 135-A and 136A

### Safety Air Nozzles

**MAXIMUM DELIVERY 30 PSI**

#### No. 134-A HEAVY DUTY AIR NOZZLE

Light-weight, rugged aluminum body. Vented tip. Oil proof washer, 1/4" female pipe thread connection. Meets OSHA requirements.

**No. 134-A Heavy Duty Air Nozzle.**

#### No. 135-A EXTENDED TIP HEAVY DUTY AIR NOZZLE

Heavy duty air nozzle with lever action for better control. Extended tip (10 5/8") for special applications. Light-weight, rugged aluminum body. 30 psi delivery and vented tip meet OSHA requirement. 1/4" female pipe thread connection.

**No. 135-A Extended Tip Heavy Duty Air Nozzle.**

#### No. 136-A HEAVY DUTY AIR NOZZLE WITH EXTENDED & STANDARD TIPS

This heavy duty air nozzle is furnished with interchangeable tips. Standard tip for normal uses and extended (10 5/8") tip for special applications. Meets OSHA requirements. 1/4" female pipe thread connection.

**No. 136-A Heavy Duty Air Nozzle with Interchangeable Tips.**



# ENGINE CLEANER

No. 37-CB

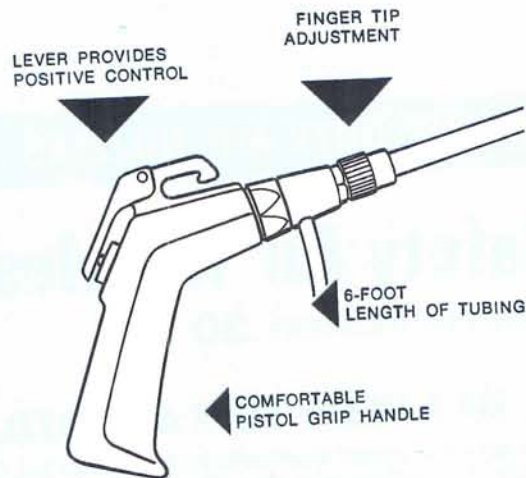
## ENGINE & MACHINERY CLEANER



No. 37-CB

Balanced design; comfortable grip. Body weighs less than your telephone receiver. Lever action for added convenience. Aluminum alloy construction. Finger tip adjustment for solvent. Light-weight, pliable PVC tubing carries solvent.

No. 37-CB Machinery Cleaner including 6 ft. length of PVC tubing.



No. 48-A

## INFLATER



No. 48-A

*Compact, button control nozzle with spring loaded packing. Ordinary air chuck just can't deliver the same big volume. Inflates tires, tubes, valve equipment. Synthetic oil proof gasket. Positive shut-off. 1/4" female P.T. connection.*

No. 48-A Inflater. Wt. 6 oz. Pat. No. 2,949,244.



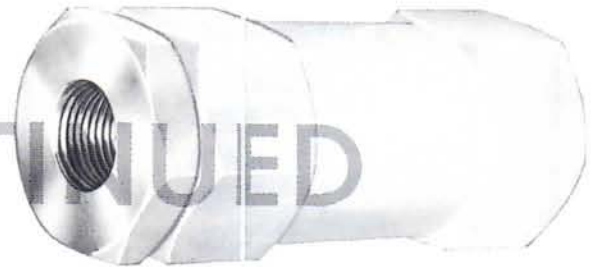
# AIR CHECK VALVE and QUICK CONNECTS

## EXCESS FLOW CHECK VALVE

Nos. 51-C $\frac{1}{4}$ " ,  $\frac{3}{8}$ " ,  $\frac{1}{2}$ " ,  $\frac{3}{4}$ " & 1"

## Safety Air EXCESS FLOW CHECK VALVE

This new safety air excess flow check valve meets the OSHA requirements for air line safety. Tamperproof valve automatically shuts off air flow in the case of sudden air line break and automatically resets itself after repair is made. This corrosion free unit protects personnel and property from whipping air hoses. Allows full, unrestricted flow in open position.



Catalog No.	Female Pipe Thread	Length	Width
51-C-04	$\frac{1}{4}$ "	$3\frac{3}{16}$ "	$1\frac{3}{8}$ "
51-C-06	$\frac{3}{8}$ "	$3\frac{3}{16}$ "	$1\frac{3}{8}$ "
51-C-08	$\frac{1}{2}$ "	$3\frac{3}{16}$ "	$1\frac{3}{8}$ "
51-C-12	$\frac{3}{4}$ "	$4\frac{3}{4}$ "	$2\frac{1}{4}$ "
51-C-16	1"	$4\frac{3}{4}$ "	$2\frac{1}{4}$ "

## KWIK-TITE® AIR QUICK DISCONNECTS

Nos. 71-04, 71-06, 72-04 & 72-06

Full flow, extra quick connections where system flexibility is the primary requirement. Made of solid steel bar stock, cadmium plated for long lasting durability, 360° swivel and precision rubber seal insures leak-proof operation.

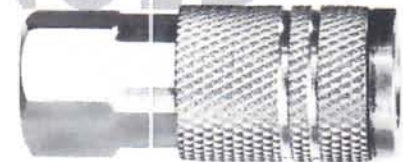
Body Assembly		
Cat. No.	End Style	Pipe Size
71-04M	Male pipe	$\frac{1}{4}$ "
71-04F	Female pipe	$\frac{1}{4}$ "
71-06M	Male pipe	$\frac{3}{8}$ "
71-06F	Female pipe	$\frac{3}{8}$ "

Nose Insert		
Cat. No.	End Style	Pipe Size
72-04M	Male pipe	$\frac{1}{4}$ "
72-04F	Female pipe	$\frac{1}{4}$ "
72-06M	Male pipe	$\frac{3}{8}$ "
72-06F	Female pipe	$\frac{3}{8}$ "



No. 71-04M



No. 71-04F



No. 72-04M



No. 72-04F

# SELF-STORING NYLON TUBING

**SELF-STORING NYLON TUBING**

**Nos. 244-CN, 264-CN, 266-CN & 288-CN**



Self-Storing Tubing (Nylon 11) is used wherever shop air is conducted from the main line to portable air operated tools, air blow guns, air nozzles, etc. Can also be used for low pressure hydraulics and other applications where the advantages of a self-retrieving tubing are desired.

This is a new hose which has greater flexibility, extra strength and smoother recoil action. It is much lighter than ordinary air hose.

Tubing is furnished in coils of 12, 25 or 50 linear feet with fittings assembled or bulk coils of 100 linear feet without fittings. Furnished in tan color. 12, 25 and 50 foot coils have male pipe thread fittings on both ends. Also available in 3/8" tubing with 1/4" MPT on both ends in 12 and 25 foot lengths.

## SELF-STORING TUBING ASSEMBLIES

(12 and 25 foot coils furnished with fittings noted above. Specify number of coils, example: 48 No. 244-CN-25)

Catalog Number	Tube I.D. In.	Male P.T. In.	Linear Feet	Coil O.D. In.	Coil Overall Length In.	Burst Pressure PSI
244-CN-12	1/4	1/4	12	3 1/2	4 1/4	700
264-CN-12	3/8	1/4	12	6	4 1/4	700
266-CN-12	3/8	3/8	12	6	4 1/4	700
288-CN-12	1/2	1/2	12	8	4 1/4	700
244-CN-25	1/4	1/4	25	3 1/2	8 1/2	700
264-CN-25	3/8	1/4	25	6	8 1/2	700
266-CN-25	3/8	3/8	25	6	8 1/2	700
288-CN-25	1/2	1/2	25	8	8	700
244-CN-50	1/4	1/4	50	3 1/2	20	700
266-CN-50	3/8	3/8	50	6	17	700
288-CN-50	1/2	1/2	50	8	17	700

## SELF-STORING TUBING

(100 foot coils without fittings. Specify number of feet desired, example: 400 feet No. 44-CN-100)

44-CN-100	1/4	100	3 1/2	34	700
66-CN-100	3/8	100	6	34	700
88-CN-100	1/2	100	8	32	700

160-N Sleeve	Catalog Number	Tube I.D.
	160-N-04	1/4
160-N-06	3/8	
160-N-08	1/2	

## FITTINGS FOR SELF-STORING TUBING

These fittings are made of brass and nickel plated. Sleeves are made of a special thermoplastic material. Furnished with spring guard.

168-N Male Pipe Connector	Catalog Number	Tube I.D. In.	Male NPTF
	168-N-04X04	1/4	1/4
168-N-06X06	3/8	3/8	
168-N-08X08	1/2	1/2	

176-N Female NPSM Swivel	Catalog Number	Tube I.D. In.	Female NPSM
	176-N-04X04	1/4	1/4
176-N-06X06	3/8	3/8	
176-N-08X08	1/2	1/2	

178-N Male Pipe Swivel	Catalog Number	Tube I.D. In.	Male NPTF
	178-N-04X04	1/4	1/4

169-N Male Pipe Elbow	Catalog Number	Tube I.D. In.	Male NPTF
	169-N-04X04	1/4	1/4
169-N-06X06	3/8	3/8	
169-N-08X08	1/2	1/2	

# DRUM FAUCETS

## SELF-CLOSING DRUM FAUCET

No. 261-G

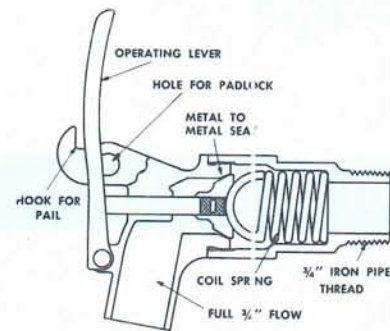
Millions in use. Durable metal-to-metal seat. No washers to wear or deteriorate and cause leakage. Fast flowing. Operates well in heat or cold. Locks closed. Can not be held open mechanically. Special spring stands up longer, retains original strength. Hook for pail. No. 261-G not suitable for methanol antifreeze.

**No. 261-G Self-Closing Drum Faucet.**  $\frac{3}{4}$ " pipe thread shank fits standard 1" opening in drums and barrels. Wt. 10 oz.

**No. 361-G** Same as above with polyethylene seat which resists most solvents and chemicals, including methanol antifreeze. Wt. 10 oz.



Fits all standard drums and barrels. For oil, gasoline, kerosene, alcohol, light varnishes, lacquers, thinners, solvents and most other liquids. (Except acids and highly alkaline solutions.)



## FLAME-ARREST DRUM FAUCETS

Nos. 270-G & 269-G

Self-closing. Equipped with flame arrestor. Heavy cast bronze construction. Polyethylene seat resists most solvents and chemicals including methanol. Fast flowing. Can't be held open mechanically. Locks closed.

**No. 270-G Self-Closing Drum Faucet with Flame Arrestor.**  $\frac{3}{4}$ " pipe thread shank fits standard drums. Wt. 17 oz.

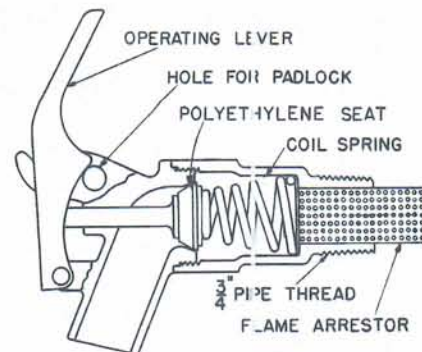
**No. 269-G** Same as above but without flame arrestor. Approved by Factory Mutual Laboratories for dispensing viscous flammable liquids from 55-gallon drums horizontally racked.

Cannot be used with commercial lacquer thinners.



### FOR FLAMMABLE LIQUIDS

Approved by Factory Mutual Laboratories for dispensing free-flowing volatile flammable liquids from 55-gallon drums racked horizontally.



## "Imp"® MERCHANDISER

No. 20-FD

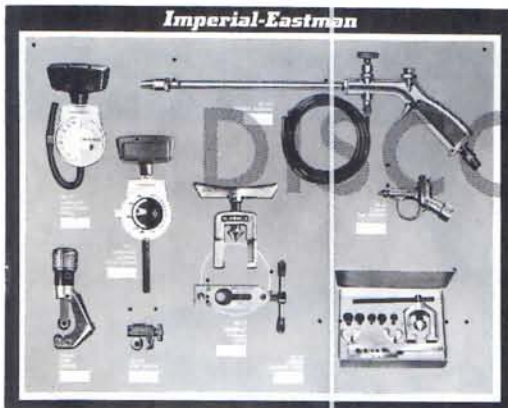


Sales boosting merchandiser contains 12 fast selling "Imp" Cutters individually boxed. Has easel for counter display, or can be hung on wall, pegboard, etc.

**No. 20-FD Merchandiser**, includes 12 No. 127-FB Tube Cutters. Size: 11 x 14". Wt. 2½ lbs.

## AUTOMOTIVE TOOL BOARD

No. 10-FD



### No. 10-FD Automotive Tool Merchandiser

Boost your automotive tool sales with this hard-working wall merchandiser. Includes eight of the most popular Imperial automotive service items. Each item is pictured against a bright blue background for easy replacement. Merchandiser and hooks are furnished free with the purchase of tool assortment.

#### Contents

- |           |  |
|-----------|--|
| 438-T     | Kwik-Check® anti-freeze tester                               |
| 415-T     | Kwik-Check® battery hydrometer                               |
| 37-CB     | Engine and machinery cleaner                                 |
| 30-A      | Safety air nozzle  |
| 274-FC    | Hi-Duty® tube cutter   |
| 127-FB    | Imp® tube cutter   |
| 525-F     | "Grabber" flaring tool                                       |
| 93-FB     | Double flaring tool  |
| No. 10-FD | Automotive tool merchandiser with tool assortment and hooks. |

Replacement Parts For IMPERIAL TOOLS  
Listed By Tool Number

# PARTS LIST

CATALOG NUMBER OF TOOL	PART NUMBER	DESCRIPTION OF PART	CATALOG NUMBER OF TOOL	PART NUMBER	DESCRIPTION OF PART		
30-A	81778-01	Body	195-FB (con't)	64253	Ear Assembly		
	81103-01	Nozzle		68012	1/4" Adapter		
	80461-01	Valve Assembly		68013	5/16" Adapter		
37-C	24604	Outer Pipe		68014	3/8" Adapter		
	24605	Inner Pipe		68015	1/2" Adapter		
	24606	Nozzle	68016	5/8" Adapter			
	24607	Tube Guide	68017	3/4" Adapter			
	27174	Flexible Metal Tube Assembly	195-FC	32644	Flivet (2 required)		
73611	Hose Connection	82031-01		Wing Nut (2 required)			
37-CA	24604	Outer Pipe		64462	Compressor Cone		
	24605	Inner Pipe		73938	Eolt (2 required)		
	24606	Nozzle		75531	Ear Assembly		
	24607	Tube Guide	75534	Yoke Assembly			
	80246-01	Valve Assembly	203-FA	28357	Eolt for open end of bar		
	64201	Tube Assembly		28358	Flivet		
	68528	Nozzle Assembly		28359	Wing Nut		
68558	Handle	38586		Eolt for pivot end of bar			
68559	Stem Assembly	38903		Yoke Assembly			
37-CB	82008-01	Outer Pipe	38904	Compressor Cone			
	24605	Inner Pipe	70603	Ear Assembly			
	82007-01	Nozzle	203-FS	28357	Eolt for Open End of Bar		
	81993-01	Body		38586	Eolt for Pivot End of Bar		
	82126-01	Lever		28359	Wing Nut (2 required)		
83378-01	Rivet for Lever	38903		Yoke Assembly			
64204	Hose Connection	38904		Compressor Cone Only			
48-A	36922	Body	70603	Ear Assembly			
	80460-01	Valve Assembly	206-FA	79318-01	Feamer Blade		
	39035	Neoprene Washer		82015-01	Screw for Reamer Blade		
	69067	Nozzle Assembly		74197	Spring Washer for Reamer Blade		
93-FB	32638	Yoke Assembly		74761	Cutting Wheel		
	32640	Compressor Cone		77511	Screw for Cutting Wheel		
	73938	Bolt for Pivot End of Bar	77507	Lock Nut for Wheel Screw			
	38381	Bar Assembly	206-FAP	77857-01	Cutting Wheel		
	38388	3/16" Adapter		77511	Screw for Cutting Wheel		
	82031-01	Wing Nut (2 required)		77507	Lock Nut for Wheel Screw		
	68012	1/4" Adapter	227-F, 227-FA	26883	Screw for Cutting Wheel		
	68013	3/8" Adapter		32633	Cutting Wheel		
	68014	3/8" Adapter		227-FP, 227-FAP	68257	Cutting Wheel	
	68015	1/2" Adapter	68258		Screw for Cutting Wheel		
	103-FS	28357	Bolt for Open End of Bar	251-F	63587	Fair of Die Blocks in Base	
		38586	Bolt for Pivot End of Bar		256-F	68019	Fair of Die Blocks in Base
		28359	Wing Nut (2 required)	260-FHA		68478	V/heel Assembly for 3/8" O.D.
		38903	Yoke Assembly			68480	Hook for 3/8" O.D. Wheel Asbly
		38904	Compressor Cone Only			66914	Hook Screw for 3/8"
38905		Bar Assembly	68492		V/heel Assembly for 1/2" O.D.		
127-F, 127-FA	32633	Cutting Wheel	62156		Hook for 1/2" O.D. Wheel Asbly		
	127-FB	26883	Screw for Cutting Wheel		66914	Hook Screw for 1/2"	
134-A	81993-01	Body	68496		V/heel Assembly for 5/8" O.D.		
135-A	82010-01	Nozzle	80588-01		Hook for 5/8" O.D. Wheel Asbly		
136-A	82141-01	Lever	66914		Hook Screw for 5/8"		
	83378-01	Rivet for Lever	84870-01		V/heel Assembly for 3/4" O.D.		
	82138-01	Extended Nozzle	80589-01		Hook for 3/4" O.D. Wheel Asbly		
141-A	141-A	Body	66914		Hook Screw for 3/4"		
	142-A	39022	Intermediate Length Nozzle		84852-01	V/heel Assembly for 7/8" O.D.	
		39023	Extra Length Nozzle		68502	Hook for 7/8" O.D. Wheel Asbly	
143-A	39026	Adjustable Nozzle	66914		Hook Screw for 7/8"		
	39029	Flat Nozzle	84266-01	Form Shoe for 7/8" O.D.			
	80460-01	Valve Assembly	68481	Spring Washer for All Above Sizes			
174-F	39035	Neoprene Washer	84265-01	Form Shoe for 3/8", 1/2", 5/8", 3/4" O.D.			
	75015	Cutting Wheel	84263-01	Form Shoe for 5/8", 7/8" O.D.			
	74762	Screw for Cutting Wheel	84374-01	Form Shoe for 1/2", 5/8" O.D.			
194-S	75046	Heavy Duty Cutting Wheel	84902-01	Form Shoe for 3/4", 7/8" O.D.			
	195-FB	278-FS	Individual Swaging Adapters Specify Size: 1/2", 3/4" or 5/8" O.D.	84373-01	Form Shoe for 5/8", 3/4" O.D.		
		32644	Rivet	74754	Thumb Screw		
82031-01		Wing Nut	68483	V/reinch Assembly			
78858-01		Yoke Assembly	68484	V/reinch			
69947		Bar Assembly	68485	Stud			
195-FB	28357	Bolt	68486	Ease			
	28359	Wing Nut (2 required)	84253-01	Handle Assembly			
	38586	Bolt	270-F	See Part List on Page 204			
	64250	Yoke Assembly					
	32640	Compressor Cone					

# PARTS LIST

## Replacement Parts For IMPERIAL TOOLS Listed By Tool Number

CATALOG NUMBER OF TOOL	PART NUMBER	DESCRIPTION OF PART	CATALOG NUMBER OF TOOL	PART NUMBER	DESCRIPTION OF PART
274-FB	79318-01	Reamer Blade	364-FHA	84266-01	Shoe for 7/8" O.D.
274-FC	82015-01	Screw for Reamer Blade		75052	Shoe for 1" O.D.
	74197	Spring Washer for Reamer Blade		66914	Hook retaining Screw for 7/16" 1/2", 3/8", 3/4" and 7/8" O.D.
	74762	Screw for Cutting Wheel		84253-01	Handle Assembly for 7/8" and 1" O.D.
	75015	Cutting Wheel		80588-01	Hook for 3/8" O.D.
	75046	Cutting Wheel for Stainless Steel and Hard Temper Tubing		80589-01	Hook for 3/4" O.D.
				68502	Hook for 7/8" O.D.
				80809-01	Allen Screw for 1/4" and 5/16" O.D.
				81221-01	Allen Screw for 3/8" O.D.
				81791-01	Allen Screw for 7/16" and 1/2" O.D.
275-FS	278-FS	3/16", 1/4", 3/8" O.D. (1 Adapter)	80811-01	Handle for 1/4" O.D. (Includes hook)	
	278-FS	1/2" O.D. (Adapter)	80816-01	Handle for 3/16" O.D. (Includes hook)	
	278-FS	5/8" O.D. (Adapter)	81217-01	Handle for 3/8" O.D. (Includes hook)	
	278-FS	3/4" O.D. (Adapter)	83479-01	Handle for 7/16" and 1/2" O.D.	
	82031-01	Wing Nut (2 required)	81784-01	Hook for 7/16" and 1/2" O.D.	
	78858-01	Yoke Assembly without cone or adapters	84425-01	Wheel for 364-FHB-12	
	38600	Compressor Cone	84694-01	Lever Assembly for 364-FHB-12	
	38766	Bar for 1/8", 3/16", 1/4", 5/16", 3/8" and 7/16" O.D. Tubing			
	38767	Bar for 1/2", 5/8" and 3/4" O.D. Tubing			
296-FA	30009	Rivet	365-FHA	See 260-FHA	
	73938	Bolt for pivot end of bar (4-sided)	374-FC	79318-01 Reamer Blade	
	82031-01	Wing Nut		82015-01 Screw for Reamer Blade	
	64464	Bar Assembly		74197 Spring Washer for Reamer Blade	
	71470	Yoke Assembly		74762 Screw for Cutting Wheel	
				75015 Cutting Wheel	
				75046 Cutting Wheel for Stainless Steel and Hard Temper Tubing	
300-FA	79134-01	Yoke Assembly	375-FS	32640 Compressor Cone	
	64462	Compressor Cone	376-FS	73938 Bolt for Pivot End of Bar	
	79133-01	Die Holder Assembly		82031-01 Wing Nut (4 required)	
				38766 Flaring Bar for 1/8", 3/16", 1/4", 5/16", 3/8" and 7/16" O.D.	
				38767 Flaring Bar for 1/2", 5/8" and 3/4" O.D.	
				38769 Yoke Assembly	
307-FP	81156-01	Cutting Blade	384-FA	62094 Locking Assembly Complete	
				74050 Locking Assembly Pivot Screw	
312-FB	79318-01	Reamer Blade		62105 Saw Guide Face Plate, Large (2 required)	
	82015-01	Screw for Reamer Blade		62106 Saw Guide Face Plate, Small (2 required)	
	74197	Spring Washer for Reamer Blade		62107 Saw Guide Face Plate Retaining Screw with recessed head (4 required)	
	74762	Screw for Cutting Wheel		62108 Saw Guide Face Plate Retaining Screw with round head (4 required)	
	75015	Cutting Wheel			
	75046	Cutting Wheel for Stainless Steel and Hard Temper Tubing			
.312-FP, 312-FBP	7247-1	Cutting Wheel	395-FAM	64462 Compressor Cone	
	7247-5	Screw for Cutting Wheel		75534 Yoke Assembly	
				75567 Bar Assembly	
327-FP	7761-5	Cutting Blade	400-F	60232 Gauge Retaining Screw Spring	
337-F	338-F	Adapter only (specify size)		82015-01 Gauge Retaining Screw	
	340-F	Cutter Blade for 3/16", 1/4" and 5/16" fittings		61818 Gauge	
	341-F	Cutter Blade for 3/8", 1/2" and 5/8" fittings		61825 Drive Nut Retaining Screw	
				79249-01 Die Holder Assembly Complete	
357-FP	80549-01	Cutting Blade		68050 Drive Nut Retaining Spring	
				68146 Flaring Cone Roller Retaining Cap	
350-FHA				69063 Yoke Assembly Complete	
360-FHA				69064 Flaring Cone	
361-FHA				69065 Flaring Cone Rollers (3 required)	
362-FHA					
363-FHA					
364-FH	75198	Hook for 1" O.D.			
	84253-01	Handle Assembly			
	68547	Hook for 1/4" O.D. Wheel Assembly			
	68548	Hook for 5/16" O.D. Wheel Assembly			

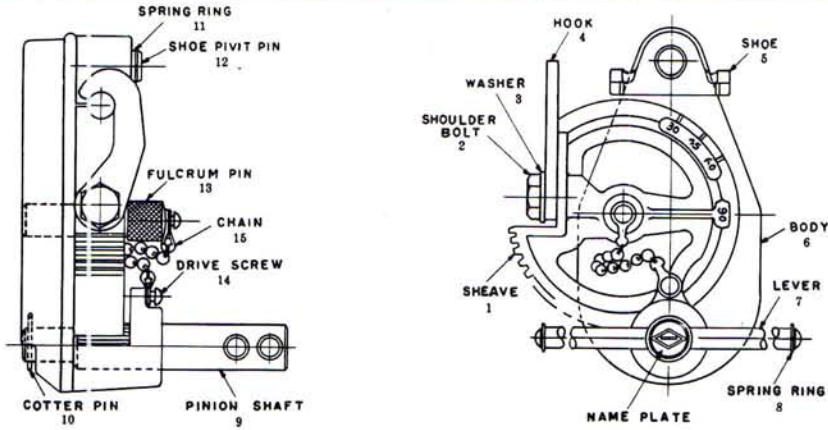
Replacement Parts For IMPERIAL TOOLS  
Listed By Tool Number

# PARTS LIST

CATALOG NUMBER OF TOOL	PART NUMBER	DESCRIPTION OF PART	CATALOG NUMBER OF TOOL	PART NUMBER	DESCRIPTION OF PART	
403-S	28357	Bolt for Open End of Bar	525-F	80851-01	Yoke Assembly	
	38586	Bolt for Pivot End of Bar		80867-01	Cone	
	70965	Bar Assembly		80852-01	Tube Holding Assembly	
	406-F	70966	Yoke Assembly	527-F	80868-01	Yoke Assembly
		70973	5/8" O.D. Adapter		80869-01	Cone
		70974	3/4" O.D. Adapter		80852-01	Tube Holding Assembly
		70975	7/8" O.D. Adapter	537-F	79234-01	Die Holder Assembly Complete
70976		1 1/8" O.D. Adapter	61948		Yoke Assembly Complete	
406-FA	69966	Cutting Wheel	61952	Rollers for Flaring Cone (3 required)		
	69967	Screw for Cutting Wheel	555-F } 555-FS } 557-F } 559-S }	79174-01	Set of Dies Only	
406-FAP	74833	Cutting Wheel		All Parts Inter- changeable	70348	45° Flaring Cone Only
	74834	Screw for Cutting Wheel			70349	37° Flaring Cone Only
437-FA	79284-01	Cutting Wheel			560-S	Swaging Adaptors Only Specify Size Required: 3/16", 1/4", 5/16", 3/8", 1/2" or 5/8" O.D.
	74834	Screw for Cutting Wheel	70469		Guide	
447-F	79146-01	Yoke Assembly	600-F	36185	Crank Retaining Hex Nut	
	68128	Compressor Cone		62144	Mandrel for 3/4" O.D.	
	79147-01	Die Holder Assembly		62149	Mandrel for 5/8" O.D.	
500-FA	78992-01	Yoke Assembly		62153	Mandrel for 1/2" O.D.	
	67863	Compressor Cone		62159	Mandrel for 3/8" O.D.	
	78987-01	Die Holder Assembly		62163	Mandrel for 5/16" O.D.	
500-FAM	78992-01	Yoke Assembly		62167	Mandrel for 1/4" O.D.	
	67863	Compressor Cone		62182	Mandrel Retaining Stud	
	79761-01	Die Holder Assembly		62184	Following Bar for 5/8" and 3/4" O.D.	
500-FPA	79009-01	Yoke Assembly		62185	Following Bar for 3/8" and 1/2" O.D.	
	68417	Compressor Cone		62186	Following Bar for 1/4" and 5/16" O.D.	
	79010-01	Die Holder Assembly Complete		62187	Crank Assembly Less Retaining Nut	
507-FA	79150-01	Yoke Assembly	637-F	64219	Yoke Assembly Complete	
	68009	Compressor Cone		64227	Rollers for Flaring Cone (3 required)	
	79151-01	Die Holder Assembly		79268-01	Die Holder Assembly Complete	

# REPAIR PARTS

## FOR IMPERIAL NO. 270-F GEAR TYPE TUBE BENDERS



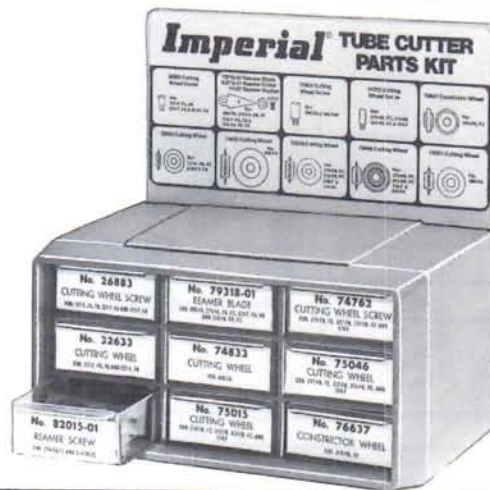
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Size	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.
3/8"	62244	62245	62246	62247	62250	62251	62252	62253	62254	62255	62257	62258	62838	62836	62839
1/2"	62261	62264	62246	62263	62262	62260	62269	62253	62268	62255	62266	62265	62840	62836	62839
5/8"	62275	62280	62279	62278	62277	62276	62284	62285	62283	62255	62281	62282	62841	62836	62842
3/4"	62305	62294	62298	62307	62306	62288	62292	62297	62291	62255	62296	62295	62835	62836	62837
7/8"	62302	62294	62298	62304	62303	62288	62292	62297	62291	62255	62296	62295	62835	62836	62837
1"	62299	62294	62298	62301	62300	62288	62292	62297	62291	62255	62296	62295	62835	62836	62837
1 1/8"	62287	62294	62298	62290	62289	62288	62292	62297	62291	62255	62296	62295	62835	62836	62837



# REPAIR PARTS

No. 143-F

## TUBE CUTTER PARTS KIT



No need to hunt the shelves for those replacement parts. Attractive 9 drawer cabinet contains all the most frequently needed parts for Imperial tube cutters—cutting wheels, screws for cutting wheels, reamer blades, screws and washers for reamers—12 different replacement parts in all. Can be used as counter top or wall hanging merchandiser. Ideal for shop or maintenance area.

Easy to use chart clearly identifies each part and tool on which it is used. Shows part number for pricing and ordering replacement. Comes complete with labels and dividers. Kit has enough space to permit adding other items to meet your particular requirements.

**No. 143-F Tube Cutter Parts Kit**  
**Size of Kit: 9 $\frac{3}{4}$ " x 9 $\frac{3}{4}$ " x 6 $\frac{5}{8}$ "**

### CONTENTS OF 143-F TUBE CUTTER PARTS KIT

QUANTITY	PART No.	TOOLS ON WHICH PART IS USED	QUANTITY	PART No.	TOOLS ON WHICH PART IS USED
<b>Cutting Wheels</b>			<b>Constrictor Wheel</b>		
10	32633	127-F, FA, FB & 227-F, FA	2	76637	374-FB, FC
3	74833	406-FA	<b>Reamer Blade</b>		
10	75015	274-FB, FC, 312-FB, FC, 174F & 374-FC	5	79318-01	206-FA, 274-FA, FB, FC, 312-F, FA, FB & 374-FA, FB, FC
10	75046	274-FB, FC, 312-FB, FC, 174-F & 374-FC For Stainless Steel & Hard Temper Tubing.	<b>Reamer Screw</b>		
5	74761	206-FA	5	82015-01	206-FA, 274-FA, FB, FC, 312-F, FA, FB & 374-FA, FB, FC
<b>Cutting Wheel Screws</b>			<b>Reamer Washer</b>		
10	26883	127-F, FA, FB, 227-F, FA & 312-F, FA	5	74197	206-FA, 274-FA, FB, FC, 312-F, FA, FB & 374-FA, FB, FC
3	74834	406-FA, 406-FAP			
10	74762	274-FB, FC, 312-FB, 374-FB, FC, 174-F			

No. 144-F

## TUBE CUTTER PARTS KIT



This kit contains all of the most frequently needed parts for Imperial tube cutters—cutting wheels, screws for cutting wheels, reamer blades, screws and washers for reamers—20 different replacement parts.

Chart on inside of cover for kit clearly identifies each part and tool on which it is used. Shows part number for pricing and ordering replacements.

**No. 144-F Tool Parts Kit in steel case.**  
**Size of Kit: 7 $\frac{1}{2}$  x 10 x 1". Wt. 3 $\frac{1}{2}$  lbs.**

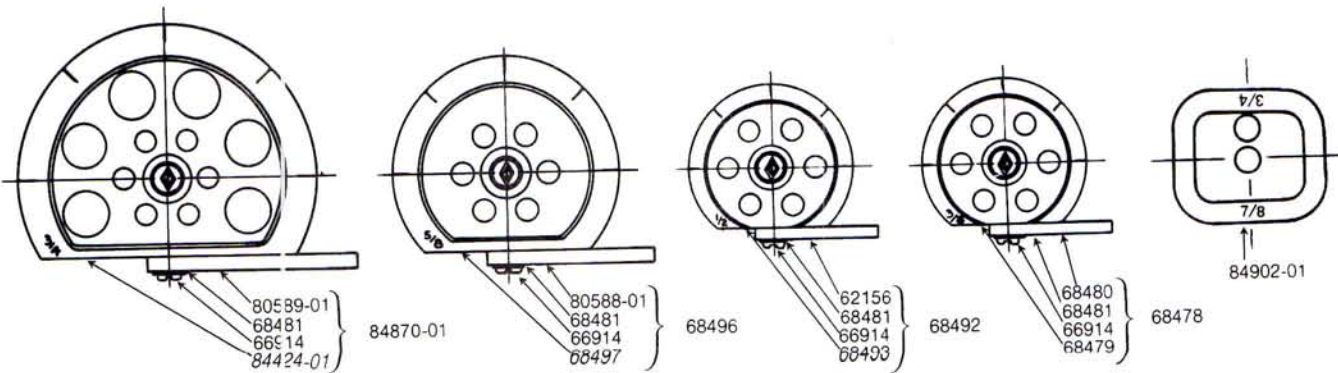
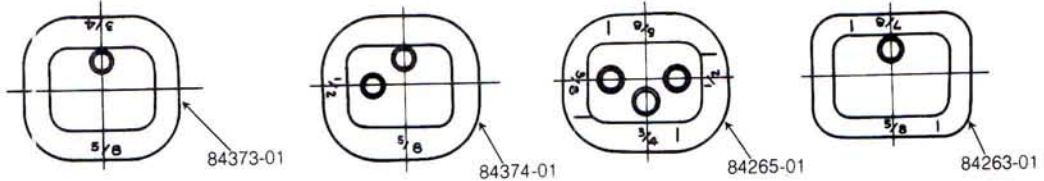
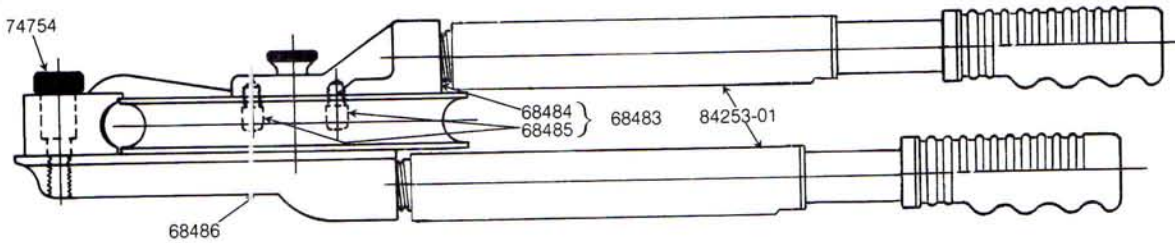
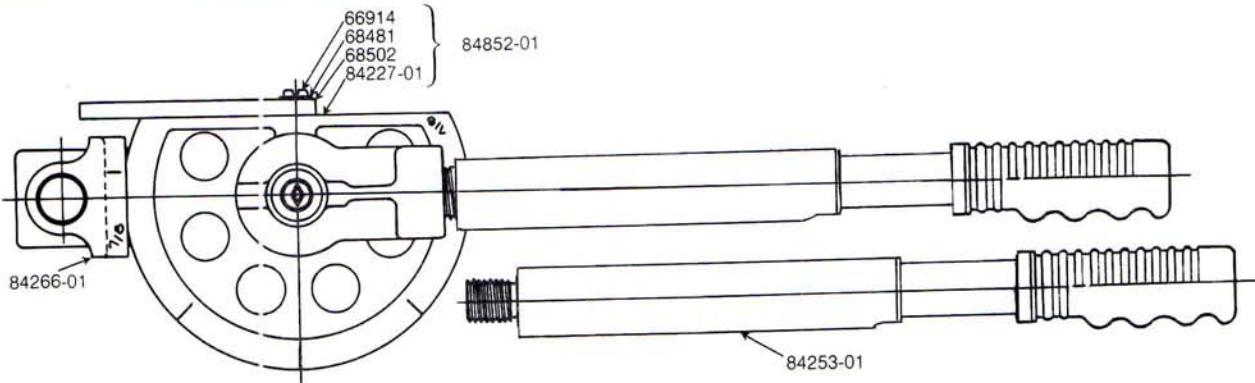
### CONTENTS OF NO. 144-F TUBE CUTTER PARTS KIT

QUANTITY	PART NO.	TOOLS ON WHICH PART IS USED	QUANTITY	PART NO.	TOOLS ON WHICH PART IS USED
<b>Cutting Wheels</b>			<b>Screws for Cutting Wheels</b>		
10	32633	127-F, 127-FA, 127-FB, 227-F, 227-FA, 274-F, 374-F	10	26883	127-F, 127-FA, 127-FB, 227-F, 227-FA, 274-F, 312-F
10	60769	274-FA, 312-F, 312-FA, 374-FA	10	69516	274-FA, 374-FA 312-FA
10	75015	274-FB, 274-FC, 312-FB, 374-FB, 374-FC	10	74762	206-FA, 274-FB 274-FC, 312-FB, 374-FB, 374-FC
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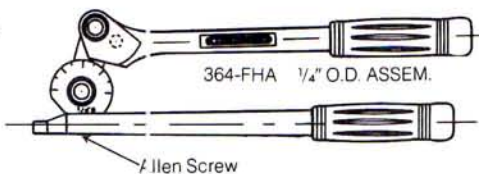
# REPLACEMENT PARTS

For Imperial Combination Lever-Type Tube Benders

Nos. 260-FHA, 350-FHA, 360-FHA, 361-FHA, 362-FHA, 363-FHA, 364-FHA, 365-FHA



## No. 364-FHA



364-FHA Size	Allen Screw	Handle	Hook Only
1/4"	80809-01	80811-01*	
5/16"	80809-01	80816-01*	
3/8"	81221-01	81217-01*	
7/16"	81791-01	81786-01	81784-01
1/2"	81791-01	81786-01	81784-01

\*One piece, includes hook.



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