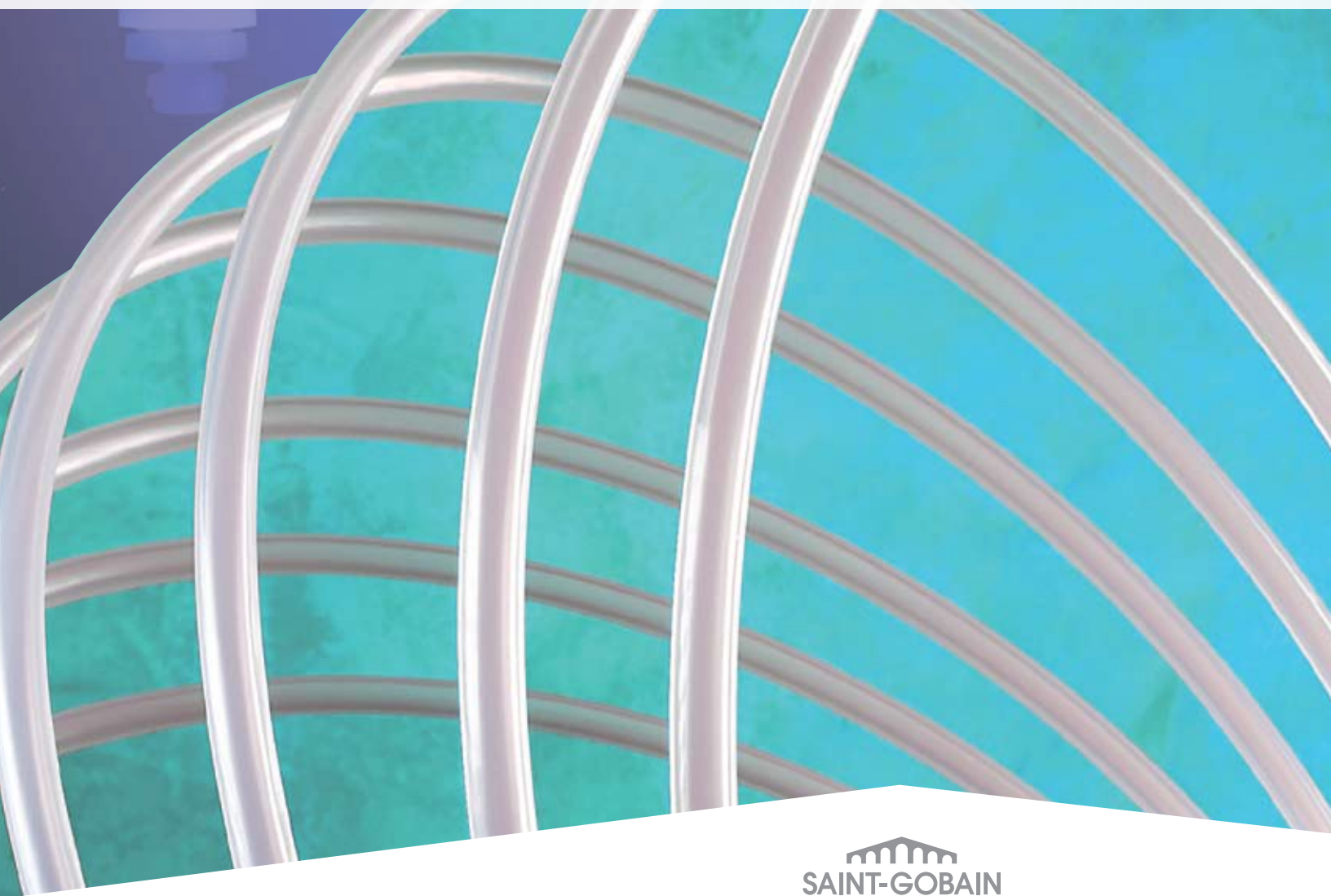


Pharma Fluor™

Tubing & Fittings Brochure



Pharma Fluor™

PharmaFluor™ FEP Tubing

PharmaFluor™ FEP is a fluoropolymer tubing that meets the demands of biopharmaceutical, medical and laboratory applications. PharmaFluor™ tubing has outstanding chemical and physical characteristics because processing occurs under stringently controlled conditions. In addition to being chemically inert, PharmaFluor™ tubing can be used in a broad range of temperatures, from -100°F to 400°F.

PharmaFluor™ Characteristics

Fluid integrity is an obvious area of concern in biopharmaceutical, medical and lab applications. PharmaFluor™ FEP will resist the absorption/adsorption of aqueous fluids, which minimizes the risk of fluid alteration in single or repeat use applications. PharmaFluor™ tubing is also virtually unaffected by chemical sanitizers and cleaners and can be cleaned repeatedly without decreasing its service life.

Biocompatibility

PharmaFluor™ FEP complies fully with the requirements of USP Class VI and all current ISO standards, and is entirely non-cytotoxic, non-pyrogenic and non-hemolytic. To ensure the superior characteristics of PharmaFluor™ FEP, the following tests were also performed: Genotoxicity Tests, Bacteriostasis-Fungistasis Tests, Physicochemical Testing for Elastomeric Closures (USP <381>) and Physicochemical Testing for Plastics (USP <661>). PharmaFluor™ FEP has a Master File with the U.S. Food and Drug Administration.



Features/Benefits

- Chemically inert
- Ultra-pure
- Documented biocompatibility
- Fully characterized to all current standards
- Non-cytotoxic, non-pyrogenic and non-hemolytic
- Extremely low sorption characteristics compared to other flexible tubings
- Fully autoclavable and sterilizable
- Excellent barrier with very low permeability

Typical Applications

- Sterile filling and dispensing systems
- Diagnostic equipment
- General laboratory use
- Cell and tissue culture transport
- Analytical and process equipment in biotechnology, biopharmaceutical and environmental fields

Connections

- PharmaFluor® fluoropolymer fittings

PharmaFluor™ FEP Tubing Sizes

Part Number*	Diameter (inches)		Approximate Min. Bend Radius (inches)	Maximum Working Pressure (psi)**		
	ID	OD		73°F (23°C)	212°F (100°C)	400°F (204°C)
				FEP	FEP	FEP
PHFE6-0125-031-50	1/16	1/8	1/2	412	148	N/A
PHFE6-0250-062-50	1/8	1/4	1/2	417	150	N/A
PHFE6-0250-047-50	5/32	1/4	3/4	289	104	N/A
PHFE6-0250-031-50	3/16	1/4	1	177	64	N/A
PHFE6-0312-062-50	3/16	5/16	1-1/2	312	112	N/A
PHFE6-0375-062-50	1/4	3/8	1	250	90	N/A
PHFE6-0375-031-50	5/16	3/8	2-1/2	113	41	N/A
PHFE6-0500-062-50	3/8	1/2	2	97	35	N/A

* Part numbers shown are for 50-foot lengths. Additional lengths available upon request.

** Safety factor of 4 to 1 ratio burst pressure to working pressure. ASTM D1599.

Typical Physical Properties

Property	ASTM Method	Value or Rating
Color	–	Transparent
Durometer Hardness Shore D	D2240	55
Elongation @ 73°F	D638	275%
Maximum Service Temperature, °F (°C)	–	400 (204)
Melting Point, °F (°C)	D4591	500-530 (302-310)
Low Temperature Embrittlement, °F (°C)	D746	-100 (-73)
Specific Gravity	D792	2.17
Odor and Taste	–	none
Toxicity	–	none
Flammability	–	UL 94 rated V-0 (self-extinguishing)
Chemical Resistance	D471	
- strong or weak acids		excellent
- strong or weak alkalies		excellent
- solvents or fuels		excellent
Moisture Absorption, %	D570	<0.01%
Effect of Weathering and UV Exposure	–	none

The values listed for working and burst pressures are derived from tests conducted under controlled laboratory conditions. Many factors will reduce the tubing's ability to withstand pressures including temperature, chemical attack, stress, pulsation and the attachment to fittings. It is imperative that the user conduct tests simulating the conditions of the application prior to specifying the tubing for use.

Sterilization Methods

Autoclavable	Yes
Gas (Ethylene Oxide)	Yes
Radiation (Up to 50kGy)	Yes

PHARMAFLUOR™ TUBING IS NOT INTENDED FOR USE AS AN IMPLANT MATERIAL

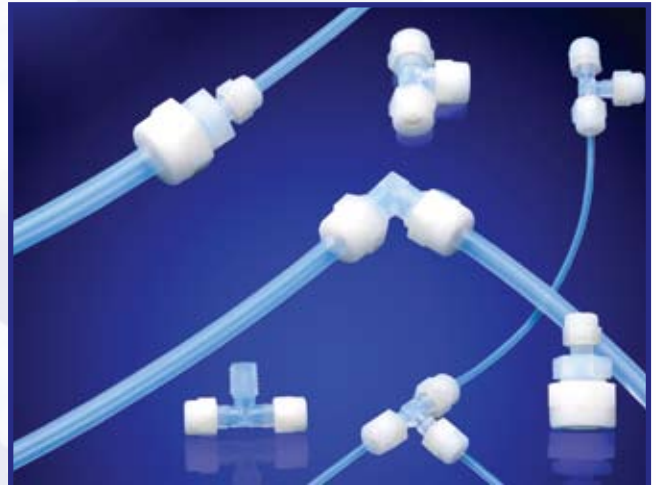
Pharma Fluor™

PharmaFluor™ PFA Compression Fittings

Saint-Gobain manufactures PFA fittings for handling corrosive or ultra-pure fluids under contamination-free conditions. The PharmaFluor™ compression fitting line offers PFA purity combined with the robust performance of compression style fittings. These fittings are ideal for gas or pneumatic connections in applications that do not require flared connections. Once tubing has been cut to the desired length, PharmaFluor™ fittings require no tools for installation. The fittings are available in 1/8," 1/4," 3/8," 1/2," 3/4" and 1" sizes.

We use 100% virgin HP PFA to give you the ultimate in purity and the minimum in contamination. Each PharmaFluor™ PFA fitting is carefully inspected to ensure quality and reliability in your application and throughout the life of the product. Fluid handling applications in the biomedical, chemical, petrochemical, food processing and semiconductor industries benefit greatly from the use of these fittings.

Whether it be a simple fluid handling system or a complex laboratory layout, PharmaFluor™ PFA fittings save precious time and money, and provide all the reliability needed to facilitate successful outcomes.

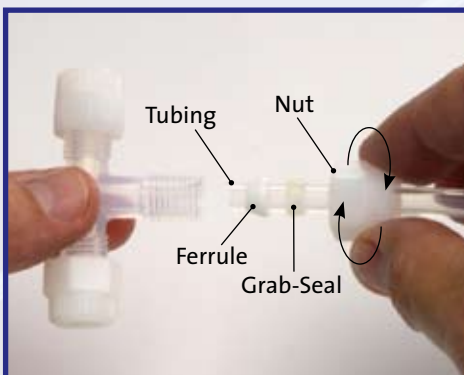


Features/Benefits

- Simple design for ease of installation
- No special tools required
- Accommodates temperatures up to 212°F (100°C)

Materials of Construction

- Body: high purity PFA
- Gripper: PVDF
- Ferrule: PTFE
- Nut: ETFE

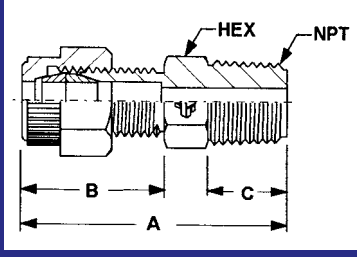


Fitting Installation

1. Cut tubing to desired length.
2. Loosen nut, insert tube.
(your pre-assembled fitting should be ready for use)
3. Tighten nut finger-tight.
4. Your fitting is now ready for use.

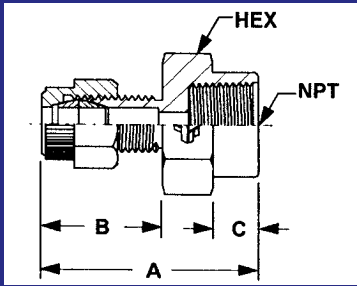
No tools are required, but if you decide to use a mechanical device to tighten it, rotate the nut no more than one turn past finger-tight.

Union Adapter Male Male NPT Threads



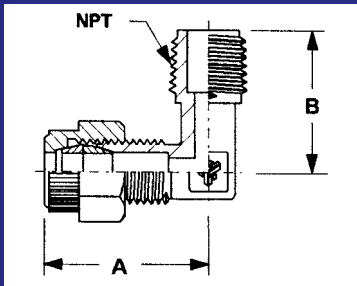
Part Number	O.D.	Male	Orifice	A	B	C	Hex Flat
	Tube Size	NPT Size					
	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)
G1077067	1/8 (3.17)	1/8 (3.17)	0.09 (2.29)	1.40 (35.56)	0.73 (18.54)	0.40 (10.16)	0.45 (11.43)
G1077054	1/8 (3.17)	1/4 (6.35)	0.09 (2.29)	1.50 (38.10)	0.73 (18.54)	0.50 (12.71)	0.50 (12.70)
G1077053	1/4 (6.35)	1/8 (3.17)	0.19 (4.83)	1.47 (37.34)	0.80 (20.32)	0.40 (10.16)	0.44 (11.18)
G1077002	1/4 (6.35)	1/4 (6.35)	0.19 (4.83)	1.58 (40.13)	0.81 (20.57)	0.50 (12.70)	0.50 (12.70)
G1077080	1/4 (6.35)	3/8 (9.52)	0.19 (4.83)	1.67 (42.42)	0.80 (20.32)	0.50 (12.70)	0.68 (17.27)
G1077081	1/4 (6.35)	1/2 (12.70)	0.19 (4.83)	1.80 (45.72)	0.80 (20.32)	0.63 (16.00)	0.87 (22.10)
G1077382	3/8 (9.52)	1/8 (3.17)	0.19 (4.83)	1.61 (40.89)	0.84 (21.34)	0.40 (10.16)	0.68 (17.27)
G1077003	3/8 (9.52)	1/4 (6.35)	0.31 (7.87)	1.71 (43.43)	0.84 (21.34)	0.50 (12.71)	0.68 (17.27)
G1077004	3/8 (9.52)	3/8 (9.52)	0.31 (7.87)	1.71 (43.43)	0.84 (21.34)	0.50 (12.71)	0.68 (17.27)
G1077051	3/8 (9.52)	1/2 (12.70)	0.31 (7.87)	1.84 (46.74)	0.84 (21.34)	0.63 (16.00)	0.87 (22.10)
G1077050	1/2 (12.70)	1/4 (6.35)	0.29 (7.37)	1.81 (45.97)	0.94 (23.88)	0.50 (12.71)	0.87 (22.10)
G1077005	1/2 (12.70)	3/8 (9.52)	0.42 (10.67)	1.81 (45.97)	0.94 (23.88)	0.50 (12.71)	0.87 (22.10)
G1077001	1/2 (12.70)	1/2 (12.70)	0.46 (11.68)	1.95 (49.53)	0.94 (23.88)	0.64 (16.26)	0.87 (22.10)
G1077104	1/2 (12.70)	3/4 (19.05)	0.46 (11.68)	2.18 (55.37)	0.88 (22.35)	0.80 (20.32)	1.12 (28.45)

Union Adapter Female Female NPT Threads



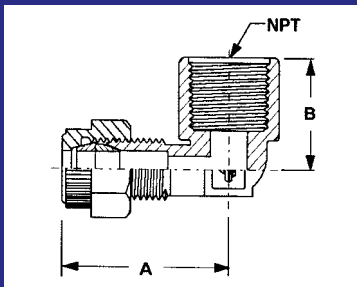
Part Number	O.D.	Female	Orifice	A	B	C	Hex Flat
	Tube Size	NPT Size					
	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)
G1077084	1/4 (6.35)	1/8 (3.17)	0.19 (4.83)	1.38 (35.05)	0.80 (20.32)	0.31 (7.87)	0.56 (14.22)
G1077055	1/4 (6.35)	1/4 (6.35)	0.19 (4.83)	1.52 (38.61)	0.80 (20.32)	0.34 (8.64)	0.94 (23.88)
G1077085	1/4 (6.35)	3/8 (9.52)	0.19 (4.83)	1.48 (37.59)	0.80 (20.32)	0.31 (7.87)	1.00 (25.40)
G1077086	1/4 (6.35)	1/2 (12.70)	0.19 (4.83)	1.57 (39.88)	0.80 (20.32)	0.40 (10.16)	1.13 (28.70)
G1077377	3/8 (9.52)	1/8 (3.17)	0.25 (6.35)	1.52 (38.61)	0.84 (21.34)	0.31 (7.87)	0.69 (17.53)
G1077056	3/8 (9.52)	1/4 (6.35)	0.31 (7.87)	1.53 (38.86)	0.84 (21.34)	0.32 (8.13)	0.94 (23.88)
G1077057	3/8 (9.52)	3/8 (9.52)	0.31 (7.87)	1.52 (38.61)	0.84 (21.34)	0.31 (7.87)	1.00 (25.40)
G1077087	3/8 (9.52)	1/2 (12.70)	0.31 (7.87)	1.61 (40.89)	0.84 (21.34)	0.40 (10.16)	1.13 (28.70)
G1077088	1/2 (12.70)	1/4 (6.35)	0.31 (7.87)	1.61 (40.89)	0.94 (23.88)	0.30 (7.62)	0.88 (22.35)
G1077089	1/2 (12.70)	3/8 (9.52)	0.45 (11.43)	1.63 (41.40)	0.94 (23.88)	0.32 (8.13)	1.13 (28.70)
G1077090	1/2 (12.70)	1/2 (12.70)	0.46 (11.68)	1.73 (43.94)	0.94 (23.88)	0.42 (10.67)	1.13 (28.70)
G1077373	1/2 (12.70)	3/4 (19.05)	0.46 (11.68)	1.82 (46.23)	0.94 (23.88)	0.38 (9.63)	1.38 (35.05)

Elbow Adapter Male Male NPT Threads



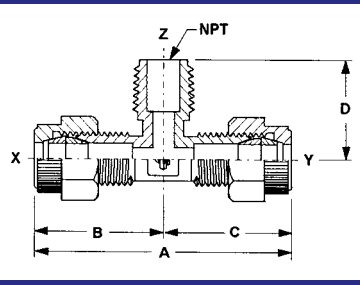
Part Number	O.D.	Male	Orifice	A	B
	Tube Size	NPT Size			
	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)
G1077072	1/8 (3.17)	1/8 (3.17)	0.09 (2.29)	0.73 (18.54)	0.72 (18.29)
G1077091	1/8 (3.17)	1/4 (6.35)	0.09 (2.29)	0.99 (25.15)	0.78 (19.81)
G1077059	1/4 (6.35)	1/8 (3.17)	0.19 (4.83)	1.05 (26.67)	0.71 (18.03)
G1077007	1/4 (6.35)	1/4 (6.35)	0.19 (4.83)	1.05 (26.67)	0.97 (24.64)
G1077321	1/4 (6.35)	3/8 (9.52)	0.19 (4.83)	1.16 (29.46)	0.85 (21.59)
G1077323	3/8 (9.52)	1/8 (3.17)	0.19 (4.83)	1.19 (30.23)	0.85 (21.59)
G1077008	3/8 (9.52)	1/4 (6.35)	0.31 (7.87)	1.19 (30.23)	0.95 (24.13)
G1077009	3/8 (9.52)	3/8 (9.52)	0.31 (7.87)	1.18 (29.97)	1.05 (26.67)
G1077094	3/8 (9.52)	1/2 (12.70)	0.31 (7.87)	1.28 (32.51)	1.13 (28.70)
G1077058	1/2 (12.70)	1/4 (6.35)	0.31 (7.87)	1.28 (32.51)	1.13 (28.70)
G1077010	1/2 (12.70)	3/8 (9.52)	0.42 (10.67)	1.28 (32.51)	1.13 (28.70)
G1077012	1/2 (12.70)	1/2 (12.70)	0.46 (11.68)	1.36 (34.54)	1.13 (28.70)
G1077105	1/2 (12.70)	3/4 (19.05)	0.46 (11.68)	1.57 (39.88)	1.50 (38.10)

Elbow Adapter Female Female NPT Threads



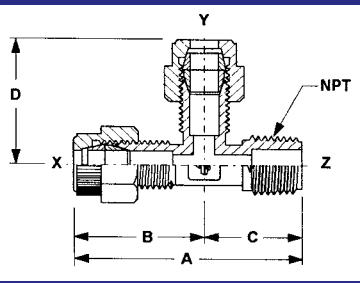
Part Number	O.D.	Female	Orifice	A	B
	Tube Size	NPT Size			
	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)	Inches (mm)
G1077317	1/4 (6.35)	1/4 (6.35)	0.09 (2.29)	1.27 (32.26)	0.80 (20.32)
G1077318	3/8 (9.52)	1/4 (6.35)	0.31 (7.87)	1.32 (33.53)	1.00 (25.40)
G1077095	3/8 (9.52)	3/8 (9.52)	0.31 (7.87)	1.40 (35.56)	1.00 (25.40)
G1077316	3/8 (9.52)	1/2 (12.70)	0.31 (7.87)	1.59 (40.39)	1.12 (28.45)
G1077322	1/2 (12.70)	3/8 (9.52)	0.44 (11.18)	1.50 (38.10)	1.12 (28.45)
G1077096	1/2 (12.70)	1/2 (12.70)	0.40 (10.16)	1.63 (41.40)	1.25 (31.75)

Male Branch Tee Male NPT Threads



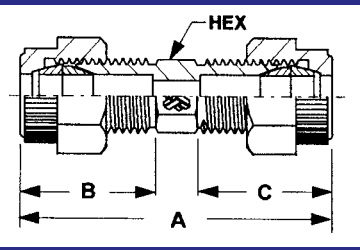
Part Number	O.D. Tube Size (X) Inches (mm)	O.D. Tube Size (Y) Inches (mm)	Male NPT Size (Z) Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
G1077097	1/8 (3.17)	1/8 (3.17)	1/8 (3.17)	0.09 (2.29)	1.86 (47.24)	0.93 (23.62)	0.93 (23.62)	0.78 (19.81)
G1077047	1/4 (6.35)	1/4 (6.35)	1/4 (6.35)	0.19 (4.83)	2.10 (53.34)	1.05 (26.67)	1.05 (26.67)	0.93 (23.62)
G1077049	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)	0.31 (7.78)	2.38 (60.45)	1.19 (30.23)	1.19 (30.23)	0.94 (23.88)
G1077100	1/2 (12.70)	1/2 (12.70)	1/2 (12.70)	0.44 (11.18)	2.78 (70.61)	1.39 (35.31)	1.39 (35.31)	1.23 (31.24)

Male Run Tee Male NPT Threads



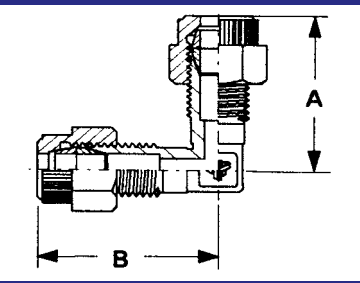
Part Number	O.D. Tube Size (X) Inches (mm)	O.D. Tube Size (Y) Inches (mm)	Male NPT Size (Z) Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
G1077101	1/8 (3.17)	1/8 (3.17)	1/8 (3.17)	0.09 (2.29)	1.70 (43.18)	0.92 (23.37)	0.78 (19.81)	0.92 (23.37)
G1077039	1/4 (6.35)	1/4 (6.35)	1/4 (6.35)	0.19 (4.83)	1.90 (48.26)	1.05 (26.67)	0.85 (21.59)	1.05 (26.67)
G1077041	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)	0.31 (7.87)	2.13 (54.10)	1.19 (30.23)	0.94 (23.88)	1.19 (30.23)
G1077338	1/2 (12.70)	1/2 (12.70)	1/2 (12.70)	0.44 (11.18)	2.62 (66.55)	1.39 (35.31)	1.23 (31.24)	1.39 (35.31)

Straight Union



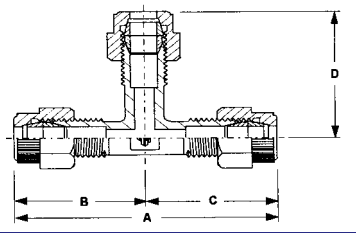
Part Number	O.D. Tube Size Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)	C Inches (mm)	Hex Flat Inches (mm)
G1077070	1/8 (3.17)	0.09 (2.29)	1.84 (46.74)	0.73 (18.54)	0.73 (18.54)	0.38 (9.65)
G1077019	1/4 (6.35)	0.19 (4.83)	1.87 (47.50)	0.80 (20.32)	0.80 (20.32)	0.38 (9.65)
G1077020	3/8 (9.52)	0.31 (7.87)	2.05 (52.07)	0.84 (21.34)	0.84 (21.34)	0.68 (17.27)
G1077021	1/2 (12.70)	0.44 (11.18)	2.23 (56.64)	0.93 (23.62)	0.93 (23.62)	0.87 (22.10)

Union Elbow



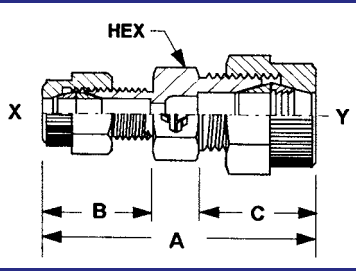
Part Number	O.D. Tube Size Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)
G1077071	1/8 (3.17)	0.09 (2.29)	0.94 (23.88)	0.94 (23.88)
G1077023	1/4 (6.35)	0.19 (4.83)	1.19 (30.23)	1.19 (30.23)
G1077024	3/8 (9.52)	0.31 (7.87)	1.31 (33.27)	1.31 (33.27)
G1077025	1/2 (12.70)	0.44 (11.18)	1.47 (37.34)	1.47 (37.34)

Union Tee



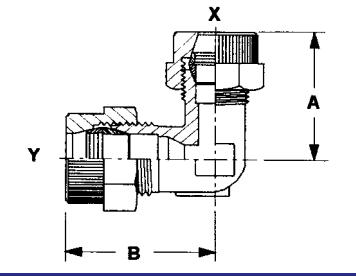
Part Number	O.D Tube Size Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
G1077066	1/8 (3.17)	0.09 (2.29)	1.86 (47.24)	0.93 (23.62)	0.93 (23.62)	0.93 (23.62)
G1077027	1/4 (6.35)	0.19 (4.83)	2.28 (57.91)	1.14 (28.96)	1.14 (28.96)	1.35 (34.29)
G1077028	3/8 (9.52)	0.31 (7.87)	2.38 (60.45)	1.19 (30.23)	1.19 (30.23)	1.19 (30.23)
G1077029	1/2 (12.70)	0.44 (11.18)	3.16 (80.26)	1.58 (40.13)	1.58 (40.13)	1.58 (40.13)

Straight Union Reducer



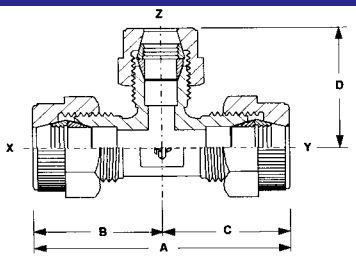
Part Number	O.D Tube Size (X) Inches (mm)	O.D Tube Size (Y) Inches (mm)	Male NPT Size (Z) Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
G1077334	1/4 (6.35)	1/8 (3.17)	1/4 (6.35)	0.09 (2.29)	2.03 (51.56)	1.05 (26.67)	0.98 (24.89)	0.87 (22.10)
G1077336	3/8 (9.52)	1/4 (6.35)	3/8 (9.52)	0.19 (4.83)	2.40 (60.96)	1.22 (30.99)	1.18 (29.97)	0.88 (22.35)
G1077332	1/2 (12.70)	1/4 (6.35)	1/2 (12.70)	0.19 (4.83)	2.68 (68.07)	1.38 (35.05)	1.30 (33.02)	1.31 (33.27)
G1077333	1/2 (12.70)	3/8 (9.52)	3/8 (9.52)	0.31 (7.87)	2.75 (69.85)	1.38 (35.05)	1.37 (34.80)	1.31 (33.27)

Union Elbow Reducer



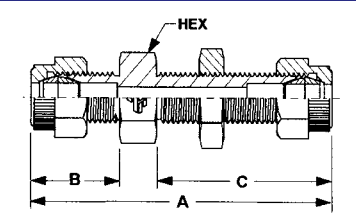
Part Number	O.D Tube Size (X) Inches (mm)	O.D Tube Size (Y) Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)
G1077388	1/8 (3.17)	1/4 (6.35)	0.09 (2.29)	1.00 (25.40)	1.08 (27.43)
G1077387	1/4 (6.35)	3/8 (9.52)	0.19 (4.83)	1.16 (29.46)	1.25 (31.75)
G1077390	3/8 (9.52)	1/2 (12.70)	0.31 (7.87)	1.36 (34.54)	1.44 (36.58)
G1077386	1/4 (6.35)	1/2 (12.70)	0.25 (6.35)	1.30 (33.02)	1.44 (36.58)
G1077384	1/2 (12.70)	3/4 (19.05)	0.44 (11.18)	1.74 (44.20)	1.81 (45.97)

Union Tee Reducer



Part Number	O.D. Tube Size (X) Inches (mm)	O.D. Tube Size (Y) Inches (mm)	O.D. Tube Size (Z) Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
G1077395	3/8 (9.52)	3/8 (9.52)	1/4 (6.35)	0.19 (4.83)	2.40 (60.96)	1.20 (30.48)	1.20 (30.48)	1.16 (29.46)
G1077392	1/2 (12.70)	1/2 (12.70)	1/4 (6.35)	0.19 (4.83)	2.80 (71.12)	1.40 (35.56)	1.40 (35.56)	1.32 (33.53)
G1077393	1/2 (12.70)	1/2 (12.70)	3/8 (9.52)	0.31 (7.87)	2.80 (71.12)	1.40 (35.56)	1.40 (35.56)	1.36 (34.54)

Straight Union Panel



Part Number	O.D Tube Size Inches (mm)	Orifice Inches (mm)	A Inches (mm)	B Inches (mm)	C Inches (mm)	Hex Flat Inches (mm)
G1077068	1/8 (3.17)	0.09 (2.29)	2.80 (71.12)	0.73 (18.54)	1.69 (42.93)	0.58 (14.73)
G1077013	1/4 (6.35)	0.19 (4.83)	2.92 (74.17)	0.80 (20.32)	1.75 (44.45)	0.68 (17.27)
G1077014	3/8 (9.52)	0.31 (7.87)	3.04 (77.22)	0.84 (21.34)	1.83 (46.48)	0.94 (23.88)
G1077015	1/2 (12.70)	0.44 (11.18)	3.16 (80.26)	0.93 (23.62)	1.86 (47.24)	1.12 (28.45)

PharmaFluor™ is a trademark.

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