Fittings - Chromatography

GC & HPLC Fittings

- VICI Valco/Cheminert

GC Fittings -

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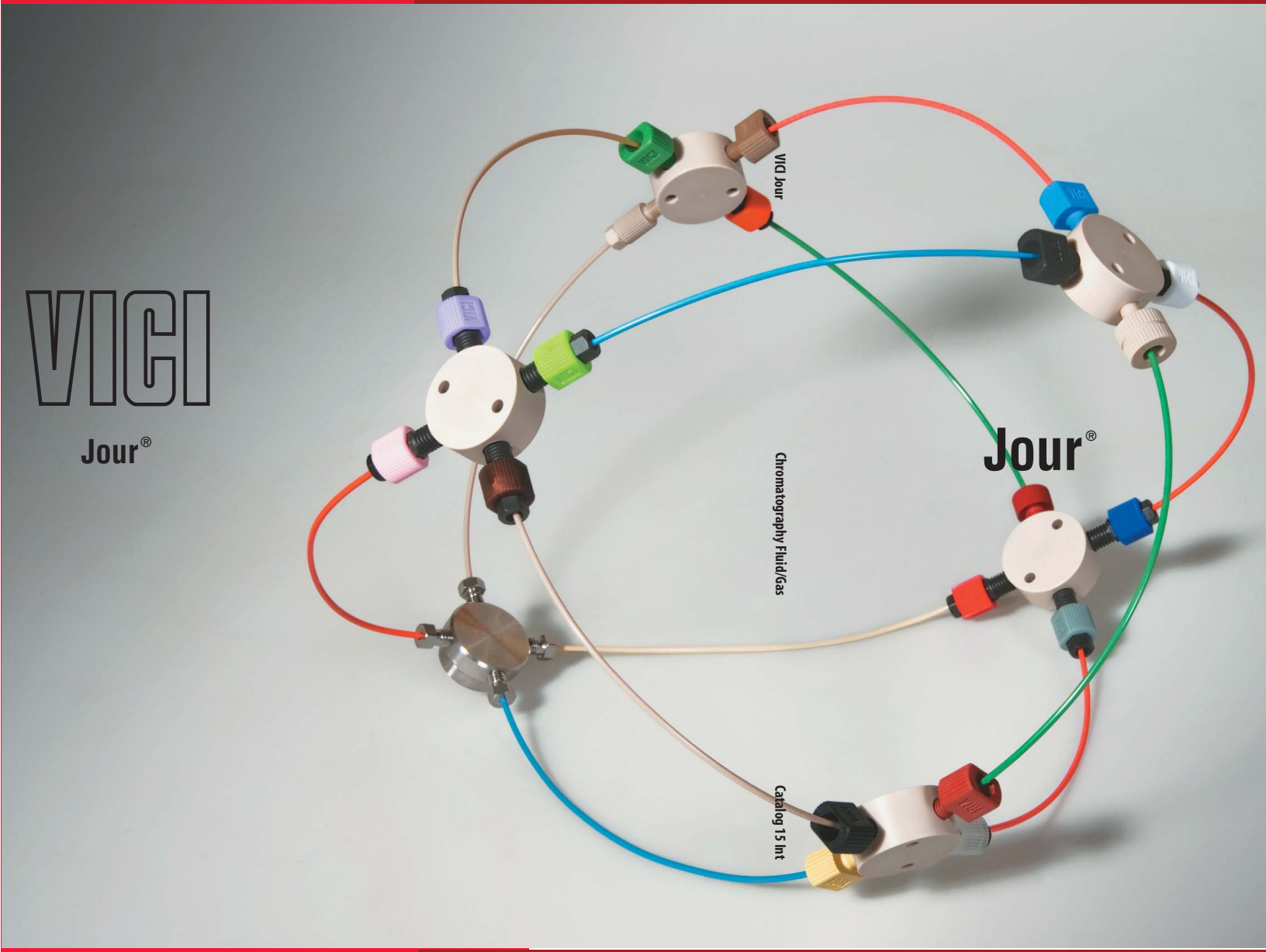
Chromatography Fluid/Gas Transfer

CATALOG 15 INT



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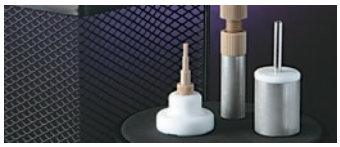
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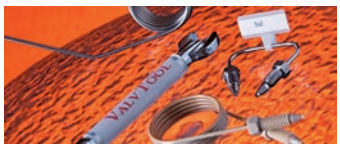
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NOTE
Our products could also be available from your local disributor. Please contact VICI AG International for other countries.

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VICI AG International

VICI Jour has been a part of VICI AG International in Switzerland since 2004. The complete Jour line of accessories and consumables for fluid transfer in GC and LC is available from VICI AG International, VICI Valco Canada, VICI Precision Sampling, and through our international distributor network.

VICI AG International, in Schenkon, Switzerland, is an independent site for the manufacturing of Valco and Cheminert valves and the handling of all VICI product lines in Europe, Africa, the Middle East, and the Far East.

VICI AG International has obtained the ISO certificate to the standard of 9001:2008, and is the first ISO-certified manufacturer of high pressure and low pressure valves for scientific equipment.

VICI Jour product line

Jour products include a complete line of tubing and capillaries in a wide variety of diameters and materials, high and low pressure fingertight fittings and connection accessories, column hardware, high and low pressure filters, cutters and other tools, backpressure regulators, and much more.

We offer accessories and consumables for fluid transfer in GC and LC, including:

- Fittings - high pressure polymeric and stainless, Nanovolume® PEEK and stainless, and low pressure
- Tubing and sample loops
- Safety products and mobile phase handling systems
- Filters and frits
- PEEK columns and guard columns

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VICI Jour now offers high quality, high pressure fittings, filters, and tubing for use in Ultra-High Performance Liquid Chromatography (UHPLC).

Page 15 **Stainless steel tubing – premium grade** ***UHPLC***

- Seamless Type 316 stainless steel
- Variety of sizes for UHPLC, HPLC, and GC applications
- Smooth internal surface
- Soft annealed OD for easy ferrule connections
- Available in 3 m and 10 m lengths

Page 19 **PEEK one-piece hex-head fittings** ***NEW*** ***UHPLC***

- Made of special PEEK HT™ for better pressure resistance
- One-piece – no ferrule required
- Biocompatible

Page 22 **PEEK ferrules** ***NEW*** ***UHPLC***

- Biocompatible 1/16" ferrule for ultra-high pressures
- Alternative to titanium ferrules in applications with titanium valves
- Excellent in combination with stainless nuts

Pages 38-39 **Nanovolume® 360 micron fittings** ***UHPLC***

- For direct connection of 360 µm tubing
- Work with metal, fused silica, or PEEK
- Up to 20,000 psi with metal tubing
- Snap-in rotating ferrule for "one-piece" fitting with no tubing twist

Our high pressure fittings permit direct connection of 360 micron OD fused silica, PEEK, stainless, or electroformed nickel tubing without the use of liners.

Pages 31, 32 **Valco® stainless steel nuts and ferrules** ***UHPLC***

- Excellent fit to Valco fitting details
- Different lengths available

These fittings are for use with all standard Valco internal fittings and most valves. They may be used with fittings from other manufacturers as well. Valco metal ferrules cut a ring near the end of the tube, preventing tube release at high pressures without significantly deforming and restricting the tube interior.

Page 32 **Stainless steel plugs and caps** ***UHPLC***

- For 1/32", 1/16", and 1/8" OD tubing

Plugs close off an usused port in a valve, manifold, or HPLC column. Caps close off a tube with a ferrule and internal nut already made up.

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Page 34 **Stainless steel unions** ***UHPLC***

- Choice of four bores: 0.15 mm, 0.25 mm, 0.50 mm, or 0.75 mm
- For 1/16" OD tubing

Page 34 **Stainless steel reducing unions, imperial** ***UHPLC***

These reducing unions join 1/16" OD to 1/8" OD tubing.

Page 35 **Stainless steel reducing unions, imperial to metric** ***NEW*** ***UHPLC***

- For 1 mm, 2 mm, and 3 mm OD tubing

With these new reducing unions, metric tubing can be connected to imperial fittings, valves, and chromatographic systems.

Page 33 **Stainless steel tees and crosses** ***UHPLC***

- For 1/16" OD tubing
- 0.25 mm, 0.50 mm, and 0.75 mm bores

Page 56 **Stainless steel precolumn filter** **NEW** ***UHPLC***

- Fewer connections compared to in-line filters
- Works with 1/16" column connections from all manufacturers
- Three porosity options: 0.5 µm, 2 µm, and 5 µm

The design of this precolumn filter reduces the number of connections compared to a standard in-line filter, increasing the stability and reducing the potential of leakage.

Page 57 **Stainless steel in-line filter** ***UHPLC***

- Minimized hold-up volume
- Two bores for analytical and semi-prep flow rates
- Three porosity options: 0.5 µm, 2 µm, and 5 µm

The stainless steel in-line filter has virtually no hold-up volume and can be used in various applications without significant band broadening or loss of efficiency.

Page 90 **Stainless steel starter kit** ***UHPLC***

The kit consists of stainless fittings, ferrules, tubing, and solvent filters, as well as a union, our cutting-wheel type metal tubing cutter, and other useful items like our ValvTool. All boxed together for a very competitive price.

Tubing

METAL AND POLYMERIC

We offer chromatography grade tubing in a variety of polymers as well as stainless steel. Outside diameters are 360 µm, 1/32", 1/16", 1/8", and 1/4".

Tubing index

PEEK tubing

Natural PEEK . . . . . page 5

Available in ODs from 360 micron to 1/4", in custom lengths (priced per meter) and packages of 3 and 10 meters.

Striped color-coded PEEK 6

A stripe is added to the outside of the tubing, so dye never contacts the fluid stream.

Dual-layer PEEK 7

With an inner layer of natural PEEK and an outer layer of color-coded PEEK, there is no possibility of stream contents coming in contact with coloring agents.

Solid color-coded PEEK. 8

Color coding identifies the ID or your PEEK tubing. Each ID is coded with a different color.

Other polymeric tubing

ETFE 9

FEP

Solid color-coded 10

Natural 11

PFA 9

PTFE

Solid color-coded 12

Natural 12

Thermo-formed polymeric tubing 13

Impermeable tubing 13

FEP coated with PVDF combines the chemical resistance of FEP with the tight, impermeable structure of PVDF.

Stainless steel tubing

Pre-cut SS tubing

Pre-cut tubing 14

Flexible pre-cut tubing 14

1/32" tubing with 1/16" ends.

Bulk SS tubing

Premium grade, seamless 15

Standard grade, welded seam 15

DISCLAIMER

The maximum holding pressure for any type of connections involving tubing and a ferrule varies considerably with the tubing material, the ferrule material, the clearance between tubing OD and ferrule ID, and the shape of the fitting detail.

RELATED PRODUCTS

SolviFlex coiled tubing 70

Tubing tools and accessories

Easy-Flange kit 85

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PEEK tubing elbows . . . 86

Tubing cutters for polymeric tubing

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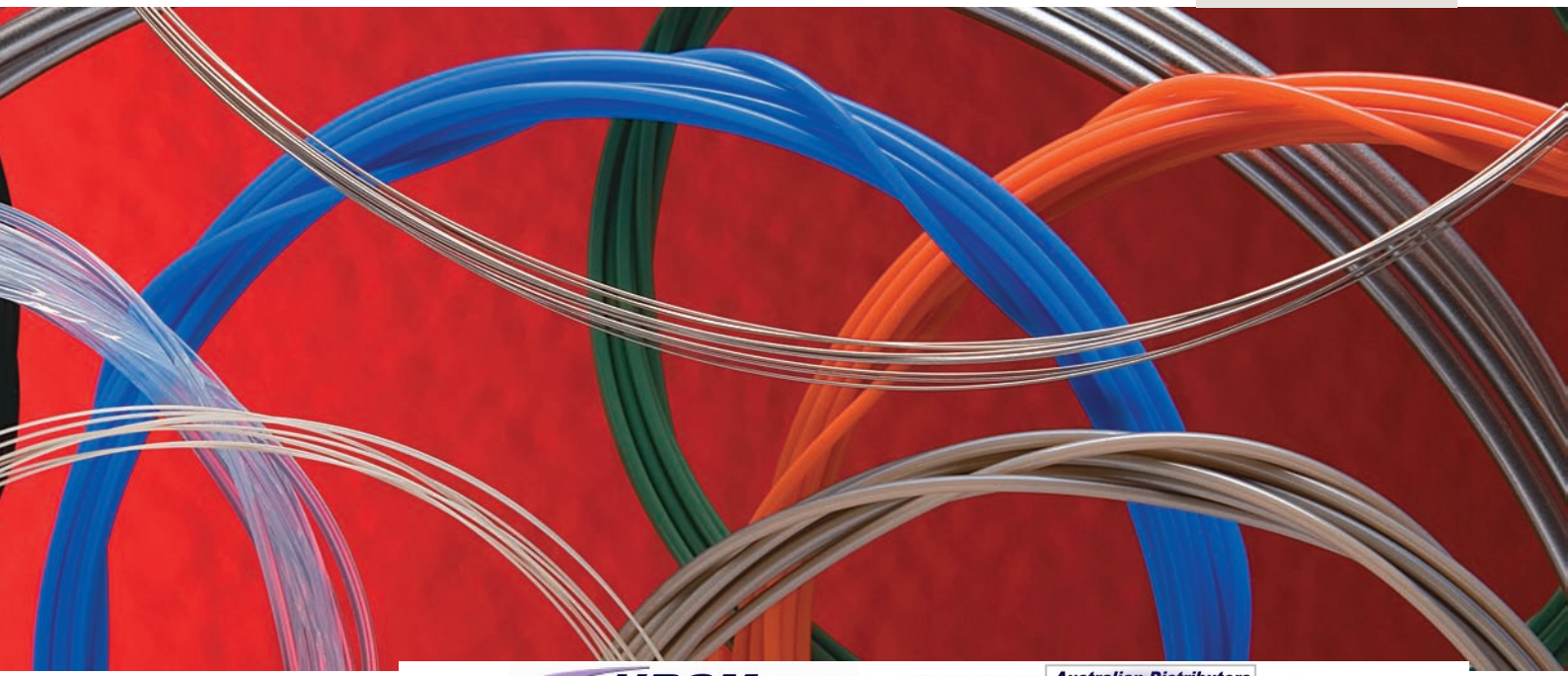

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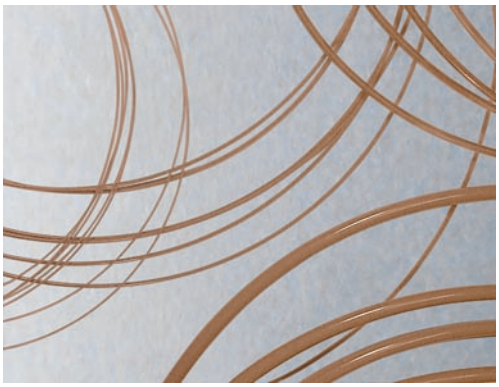
VICI offers natural and color-coded PEEK® tubing. PEEK tubing has the strength required to withstand continuous use at HPLC pressure without swelling or bursting, and is not affected by halide salts, high strength buffers, or other aggressive mobile phases that corrode stainless steel. The polymer surface will not leach metal ions into the eluent or extract metal-sensitive components from the sample. Note however that dichloromethane, THF, and DMSO may cause swelling in PEEK, and concentrated nitric and sulphuric acid will attack PEEK.

PEEK tubing – natural

Qty/pkg:		3 m	10 m	per meter
OD	*ID*	*Product No.*	*Product No.*	*Product No.*
360 µm	75 µm	JR-T-6060-M3	JR-T-6060-M10	—
1/32"	0.13 mm	JR-T-5993-M3	JR-T-5993-M10	—
1/16"	0.064 mm	JR-T-5998-M3	JR-T-5998-M10	—
1/8"	0.75 mm	JR-T-6004-M3	JR-T-6004-M10	—
	1.59 mm	JR-T-60041-M3	JR-T-60041-M10	—
	2.00 mm	JR-T-60042-M3	JR-T-60042-M10	—
1/4"	3.17 mm	—	—	JR-T-6006

SPECS

- Maximum recommended working temp: 100°C (continuous) for 1/16" OD tubing with ID up to 0.75 mm
- Max working pressures: see page 94
- Tubing tolerances: see page 95



Natural PEEK tubing
shown with ODs of 1/8", 1/16", 1/32", and 360 µm

PEEK TUBING TOLERANCES

Due to tighter tolerances, VICI Jour PEEK tubing is the best choice for chromatography applications in which exact flow rates or tube volume are of importance. The tighter tolerance ensures a more consistent internal volume of transfer lines.

Tubing OD	OD (±) (mm)	ID (±) (mm)
360 µm	0.025	0.013
1/32"	0.025	0.013
1/16" *	0.025	0.013
1/16" **	0.025	0.025
1/8"	0.05	0.05

* For ID up to 0.25 mm
** For ID over 0.25 mm

OPTIONS

Contact your distributor for more information about:

- Longer bulk tubing lengths
- Customized ODs and IDs (30 m minimum quantity)

TECH TIP

- A clean burr-free perpendicular cut can be achieved with our Clean-Cut tubing cutter 86
- To bend PEEK tubing at the optimal radius, use our tubing elbows. . . 86

MORE INFORMATION

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Easy-Flange kit 85
PEEK fittings
High pressure 19-29
Low pressure . 42, 44-47
PEEK tubing elbows . . . 86

WHICH PEEK TUBING FOR WHICH APPLICATION?

Application	*Tubing*
Standard HPLC*	1/16" OD x 0.25 mm ID
High pressure semi-prep LC*	1/8" OD
Agilent 1100 LC systems**	1/32"
Most capillary systems	360 µm

* Smaller ID for low flow rates/higher ID for high flow rates. Note that a low linear flow rate (cm/min) causes peak broadening.
** For some 1100 LC systems with high pressure flow paths

TECH TIP: STRAIGHTENING PEEK TUBING

1. Start with stainless steel tubing:
   ID slightly larger than OD of PEEK
   Length = 2 cm shorter than PEEK
2. Slide PEEK tubing into stainless tubing, extending 1 cm out each end of the stainless
3. Place sleeved PEEK tubing into oven:
   220°C for 30 minutes, or
   180°C for 60 minutes
4. Allow sleeved tubing to cool in oven to ambient temperature
5. Once tubing is cooled, remove PEEK tubing from the SS sleeve
6. Check for straightness
7. Repeat if necessary

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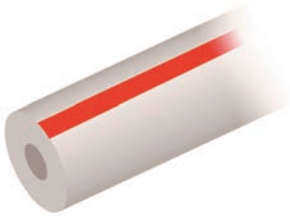
Striped color-coded PEEK tubing

SPECS

- Maximum recommended working temp: 100°C (continuous) for 1/16" OD tubing with ID up to 0.75 mm
- Max working pressures: see page 94
- Tubing tolerances: see page 95

We recommend striped PEEK tubing for easy color-coded identification of tubing ID, with maximum chemical resistance and biocompatibility. The stripe is added to the outside, so dye never contacts the fluid stream.

All colorants used in the manufacture of this tubing are RoHS-compliant. (Restriction of Hazardous Substances)



Qty/pkg:			**1 m**	**3 m**
Tubing OD	*Color*	*ID (µm)*	*Product No.*	*Product No.*
360 µm	Orange	50	JR-T-3650-M1	JR-T-3650-M3
	Green	75	JR-T-3675-M1	JR-T-3675-M3
	Grey	100	JR-T-36100-M1	JR-T-36100-M3
	Red	125	JR-T-36125-M1	JR-T-36125-M3
	Black	150	JR-T-36150-M1	JR-T-36150-M3

			1 m	**3 m**
	Color	*ID (mm)*	*Product No.*	*Product No.*
1/32"	Orange	0.050	JR-T-5702-M1	JR-T-5702-M3
	Pink	0.064	JR-T-5764-M1	JR-T-5764-M3
	Green	0.075	JR-T-5703-M1	JR-T-5703-M3
	Black	0.100	JR-T-5704-M1	JR-T-5704-M3
	Red	0.13	JR-T-5705-M1	JR-T-5705-M3
	Yellow	0.18	JR-T-5707-M1	JR-T-5707-M3
	Orange	0.20	JR-T-5608-M1	JR-T-5608-M3
	Blue	0.25	JR-T-5710-M1	JR-T-5710-M3
	Orange	0.50	JR-T-5720-M1	JR-T-5720-M3

			3 m	**5m**
	Color	*ID (mm)*	*Product No.*	*Product No.*
1/16"	Orange	0.050	JR-T-5802-M3	JR-T-5802-M5
	Pink	0.064	JR-T-5998C-M3	JR-T-5998C-M5
	Green	0.075	JR-T-5803-M3	JR-T-5803-M5
	Black	0.10	JR-T-5804-M3	JR-T-5804-M5
	Red	0.13	JR-T-5999-M3	JR-T-5999-M5
	Yellow	0.18	JR-T-6000-M3	JR-T-6000-M5
	Blue	0.25	JR-T-6001-M3	JR-T-6001-M5
	Orange	0.50	JR-T-6002-M3	JR-T-6002-M5
	Green	0.75	JR-T-6003-M3	JR-T-6003-M5
	Grey	1.00	JR-T-60031-M3	JR-T-60031-M5
	Black	1.40	JR-T-60032-M3	JR-T-60032-M5

			10 m	**25m**
	Color	*ID (mm)*	*Product No.*	*Product No.*
	Orange	0.050	JR-T-5802-M10	JR-T-5802-M25
	Pink	0.064	JR-T-5998C-M10	JR-T-5998C-M25
	Green	0.075	JR-T-5803-M10	JR-T-5803-M25
	Black	0.100	JR-T-5804-M10	JR-T-5804-M25
	Red	0.13	JR-T-5999-M10	JR-T-5999-M25
	Yellow	0.18	JR-T-6000-M10	JR-T-6000-M25
	Blue	0.25	JR-T-6001-M10	JR-T-6001-M25
	Orange	0.50	JR-T-6002-M10	JR-T-6002-M25
	Green	0.75	JR-T-6003-M10	JR-T-6003-M25
	Grey	1.00	JR-T-60031-M10	JR-T-60031-M25
	Black	1.40	JR-T-60032-M10	JR-T-60032-M25

TECH TIP

VICI Jour sample loops for analytical applications are made of PEEK striped color-coded tubing.

PEEK loops 81

OPTIONS

Contact your distributor or VICI about:

- Longer bulk tubing lengths
- Customized ODs and IDs (30 m minimum quantity)

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Dual layer color-coded PEEK tubing

- Inner layer of natural PEEK, outer layer of color-coded PEEK
- No possibility of stream coming in contact with coloring agents
- Pressure performance equivalent to single layer tubing
- 1/16" OD, IDs from 0.10 to 0.75 mm

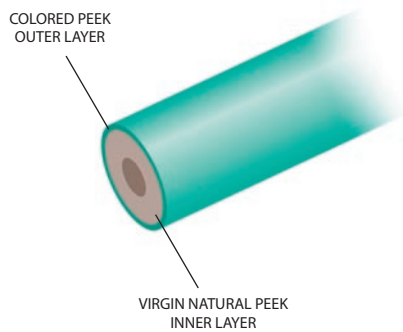
Our dual layer PEEK tubing eliminates any concern that a critical sample stream could be contaminated by pigments used to color code the tubing. It looks like any other color-coded tubing at first glance, but a closer look reveals that the pigmented layer* surrounds a separate but integrally-bonded inner layer of natural PEEK. Only natural PEEK is in contact with the fluid stream.

The ID tolerance of ±0.025 mm (.001") is equivalent to or better than that of tubing typically sold as premium grade.

*All colorants used in the manufacture of this tubing are RoHS-compliant. (Restriction of Hazardous Substances)

SPECS
- Maximum recommended working temp: 100°C (continuous)
- Max working pressures: see page 94
- Tubing tolerances: see page 95

Qty/pkg:					**3 m**	**10 m**	**25 m**
Tubing OD	*Color*	*ID (mm)*	*bar*	*psi*	*Product No.*	*Product No.*	*Product No.*
1/16"	Black	0.10	460	6700	JR-TD-5804-M3	JR-TD-5804-M10	JR-TD-5804-M25
	Red	0.13	420	6100	JR-TD-6007-M3	JR-TD-6007-M10	JR-TD-6007-M25
	Yellow	0.18	400	5800	JR-TD-6008-M3	JR-TD-6008-M10	JR-TD-6008-M25
	Blue	0.25	386	5600	JR-TD-6009-M3	JR-TD-6009-M10	JR-TD-6009-M25
	Orange	0.50	350	4500	JR-TD-6010-M3	JR-TD-6010-M10	JR-TD-6010-M25
	Green	0.75	240	3500	JR-TD-6011-M3	JR-TD-6011-M10	JR-TD-6011-M25



OPTIONS AND MORE INFORMATION
See facing page.

RELATED PRODUCTS
Solid color-coded PEEK tubing 8

Solid color-coded PEEK tubing

SPECS

- Maximum recommended working temp: 100°C (continuous) for 1/16" OD tubing with ID up to 0.75 mm
- Max working pressures: see page 94
- Tubing tolerances: see page 95

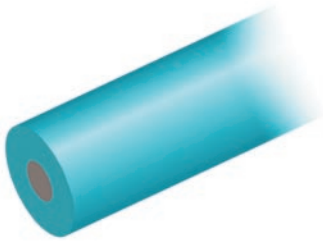
Color-coding identifies the ID of your PEEK tubing – each ID is coded with a different color. Solid colored tubing is made of pre-dyed raw material.

All colorants used in the manufacture of this tubing are RoHS-compliant. (Restriction of Hazardous Substances)

Qty/pkg:			**1 m**	**3 m**	**10 m**
Tubing OD	*Color*	*ID (µm)*	*Product No.*	*Product No.*	*Product No.*
360 µm	Orange	50	JR-T-3750-M1	JR-T-3750-M3	—
	Natural	75	—	JR-T-6060-M3	JR-T-6060-M10
	Green	75	JR-T-3775-M1	JR-T-3775-M3	—
	Grey	100	JR-T-37100-M1	JR-T-37100-M3	—
	Red	125	JR-T-37125-M1	JR-T-37125-M3	—
	Black	150	JR-T-37150-M1	JR-T-37150-M3	—

			1 m	**3 m**	**10 m**
	Color	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*
1/32"	Orange	0.050	JR-T-5602-M1	JR-T-5602-M3	—
	Pink	0.064	JR-T-5664-M1	JR-T-5664-M3	—
	Green	0.075	JR-T-5603-M1	JR-T-5603-M3	—
	Black	0.100	JR-T-5604-M1	JR-T-5604-M3	—
	Natural	0.13	—	JR-T-5993-M3	JR-T-5993-M10
	Red	0.13	JR-T-5605-M1	JR-T-5605-M3	—
	Purple	0.15	JR-T-5606-M1	JR-T-5606-M3	—
	Natural	0.18	—	JR-T-5994-M3	JR-T-5994-M10
	Yellow	0.18	JR-T-5607-M1	JR-T-5607-M3	—
	Orange	0.20	JR-T-5608-M1	JR-T-5608-M3	—
	Natural	0.25	—	JR-T-5995-M3	JR-T-5995-M10
	Blue	0.25	JR-T-5610-M1	JR-T-5610-M3	—
	Natural	0.38	—	JR-T-5715-M3	JR-T-5715-M10
	Orange	0.50	JR-T-5620-M1	JR-T-5620-M3	—

			3 m	**10 m**	**25 m**
	Color	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*
1/16"	Natural	0.064	JR-T-5998-M3	JR-T-5998-M10	JR-T-5998-M25
	Black	0.10	JR-T-6020-M3	JR-T-6020-M10	JR-T-6020-M25
	Red	0.13	JR-T-6007-M3	JR-T-6007-M10	JR-T-6007-M25
	Purple	0.15	JR-T-6030-M3	JR-T-6030-M10	JR-T-6030-M25
	Yellow	0.18	JR-T-6008-M3	JR-T-6008-M10	JR-T-6008-M25
	Blue	0.25	JR-T-6009-M3	JR-T-6009-M10	JR-T-6009-M25
	Grey	0.38	JR-T-6040-M3	JR-T-6040-M10	JR-T-6040-M25
	Orange	0.50	JR-T-6010-M3	JR-T-6010-M10	JR-T-6010-M25
	Green	0.75	JR-T-6011-M3	JR-T-6011-M10	JR-T-6011-M25



TECH TIP

See our dual layer PEEK tubing for solid colored PEEK tubing with no possibility of stream coming into contact with coloring agents. 7

OPTIONS

Contact your distributor or VICI about:

- Longer bulk tubing lengths
- Customized ODs and IDs (30 m minimum quantity)

MORE INFORMATION

About PEEK® 99
Chemical resistance
PEEK 96-98
PEEK at higher temperatures 96
Maximum working pressure 94
Tubing ID chart: volume per length . . . 93
Tubing tolerances 95

RELATED PRODUCTS

Clean-cut tubing cutter 86
Easy-Flange kit 85
PEEK fittings
High pressure 19-29
Low pressure . 42, 44-47
PEEK tubing elbows . . . 86

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ETFE tubing

ETFE (ethyltrifluoroethylene) tubing is particularly suitable for HPLC, since it has a higher burst pressure as compared to PTFE. 1/16" OD x 0.25 mm ID tubing will withstand up to 186 bar (2700 psi) with water as mobile phase. However, it is important to note that when used with organic solvents, ETFE tubing may swell, reducing that maximum pressure to 70 bar (1000 psi).

This is the ideal polymer for applications with chloride salts, which typically corrode stainless steel.

SPECS
- Max working pressures: see page 94
- Tubing tolerances: see page 95

Qty/pkg:		**3 m**	**10 m**	**25 m**
Tubing OD	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*
1/32"	0.25	JR-T-084-M3	JR-T-084-M10	JR-T-084-M25
1/16"	0.18	JR-T-078-M3	JR-T-078-M10	JR-T-078-M25
	0.25	JR-T-080-M3	JR-T-080-M10	JR-T-080-M25
	0.50	JR-T-082-M3	JR-T-082-M10	JR-T-082-M25
	0.75	JR-T-083-M3	JR-T-083-M10	JR-T-083-M25
	1.00	JR-T-085-M3	JR-T-085-M10	JR-T-085-M25
1/8"	1.59	JR-T-086-M3	JR-T-086-M10	JR-T-086-M25

		1 m	**3 m**
	ID (mm)	*Product No.*	*Product No.*
3.0 mm	1.0	JR-T-087-M1	JR-T-087-M3
6.0 mm	4.0	JR-T-088-M1	JR-T-088-M3

PFA tubing

PFA (perfluoroalkoxy) tubing from VICI Jour has excellent chemical stability and mechanical strength. 1/16" OD high purity tubing has a maximum pressure rating of up to 100 bar (1450 psi), while 1/8" OD tubing can be used at up to 72 bar (1050 psi).

Always use PFA instead of PTFE if gas permeability is an issue.

SPECS
- Max working pressures: see page 94
- Tubing tolerances: see page 95

Qty/pkg:		**1 m**	**3 m**
Tubing OD	*ID (mm)*	*Product No.*	*Product No.*
360 µm	50 µm	JR-T-43650-M1	JR-T-43650-M3
	75 µm	JR-T-43675-M1	JR-T-43675-M3
	100 µm	JR-T-436100-M1	JR-T-436100-M3

		3 m	**10 m**	**25 m**
	ID (mm)	*Product No.*	*Product No.*	*Product No.*
1/16"	0.50 mm	JR-T-4001-M3	JR-T-4001-M10	JR-T-4001-M25
	0.75 mm	JR-T-4002-M3	JR-T-4002-M10	JR-T-4002-M25
	1.00 mm	JR-T-4007-M3	JR-T-4007-M10	JR-T-4007-M25
1/8"	1.59 mm	JR-T-4003-M3	JR-T-4003-M10	JR-T-4003-M25

		per meter
	ID (mm)	*Product No.*
1/8"	1.70 mm	JR-T-4005
3/16"	3.20 mm	JR-T-4009
1/4"	4.35 mm	JR-T-4004

TECH TIP
- When selecting tubing for low pressure applications, give careful consideration to gas permeability characteristics.
- Use PFA instead of PTFE if gas permeability is an issue.

OPTIONS
Contact your distributor or VICI about:
- Longer tubing lengths at competitive bulk prices
- Customized ODs and IDs (30 m minimum quantity)

MORE INFORMATION
About ETFE. 99
Chemical resistance 96-98
Maximum working pressure 94
Tubing ID chart: volume per length . . . 93
Tubing tolerances 95

RELATED PRODUCTS
Clean-cut tubing cutter 86
Easy-Flange kit 85
Low pressure fittings 40-47
SolviFlex coiled PFA tubing 70

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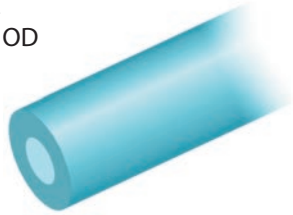
FEP tubing, solid color-coded

SPECS

- Maximum recommended working temp: 80°C (continuous)
- Max working pressures: see page 94
- Tubing tolerances: see page 95

FEP (FluorinatedEthylenePropylene) tubing is chemically inert to most HPLC solvents, and is recommended for low pressure applications. Typically 1/16" OD tubing holds up to 117 bar (1700 psi), and 1/8" OD holds up to 70 bar (1000 psi).



Solid colors identify the tubing ID.

We recommend FEP for ion chromatography applications.

Qty/pkg:			**3 m**	**10 m**	**25 m**
Tubing OD	*Color*	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*
1/32"	Black	0.10	JR-T-6604C-M3	JR-T-6604C-M10	JR-T-6604C-M25
	Red	0.13	JR-T-6605C-M3	JR-T-6605C-M10	JR-T-6605C-M25
	Purple	0.15	JR-T-6606C-M3	JR-T-6606C-M10	JR-T-6606C-M25
	Yellow	0.18	JR-T-6607C-M3	JR-T-6607C-M10	JR-T-6607C-M25
	Blue	0.25	JR-T-6610C-M3	JR-T-6610C-M10	JR-T-6610C-M25
	Orange	0.50	JR-T-6620C-M3	JR-T-6620C-M10	JR-T-6620C-M25

			3 m	**10 m**	**25 m**
	Color	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*
1/16"	Black	0.10	JR-T-6704C-M3	JR-T-6704C-M10	JR-T-6704C-M25
	Red	0.13	JR-T-6705C-M3	JR-T-6705C-M10	JR-T-6705C-M25
	Purple	0.15	JR-T-6706C-M3	JR-T-6706C-M10	JR-T-6706C-M25
	Yellow	0.18	JR-T-6707C-M3	JR-T-6707C-M10	JR-T-6707C-M25
	Blue	0.25	JR-T-6812C-M3	JR-T-6812C-M10	JR-T-6812C-M25
	Orange	0.50	JR-T-6802C-M3	JR-T-6802C-M10	JR-T-6802C-M25
	Green	0.75	JR-T-6803C-M3	JR-T-6803C-M10	JR-T-6803C-M25
	Black	1.00	JR-T-6806C-M3	JR-T-6806C-M10	JR-T-6806C-M25

TECH TIP

When selecting tubing for low pressure applications, give careful consideration to gas permeability characteristics.

OPTIONS

Contact your distributor or VICI about:

- Longer tubing lengths at competitive bulk prices
- Customized ODs and IDs (30 m minimum quantity)

MORE INFORMATION

About FEP 99
Chemical resistance 96-98
Maximum working pressure 94
Tubing ID chart: volume per length . . . 93
Tubing tolerances 95

RELATED PRODUCTS

Clean-cut tubing cutter 86
Easy-Flange kit 85
Low pressure fittings 40-47

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FEP tubing, natural color

FEP (FluorinatedEthylenePropylene) tubing is chemically inert to most HPLC solvents, and is recommended for low pressure applications. Typically 1/16" OD tubing holds up to 117 bar (1700 psi), and 1/8" OD holds up to 70 bar (1000 psi).

We recommend FEP for ion chromatography applications.

SPECS
- Maximum recommended working temp: 80°C (continuous)
- Max working pressures: see page 94
- Tubing tolerances: see page 95

Qty/pkg:		**1 m**	**3 m**	**10 m**
Tubing OD	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*
1/32"	0.10	JR-T-6794-M1	JR-T-6794-M3	JR-T-6794-M10
	0.13	JR-T-6605-M1	JR-T-6605-M3	JR-T-6605-M10
	0.15	JR-T-6606-M1	JR-T-6606-M3	JR-T-6606-M10
	0.18	JR-T-6607-M1	JR-T-6607-M3	JR-T-6607-M10
	0.25	JR-T-6610-M1	JR-T-6610-M3	JR-T-6610-M10
	0.38	JR-T-6615-M1	JR-T-6615-M3	JR-T-6615-M10
	0.50	JR-T-6620-M1	JR-T-6620-M3	JR-T-6620-M10

		3 m	**10 m**	**25 m**
	ID (mm)	*Product No.*	*Product No.*	*Product No.*
1/16"	0.10	JR-T-6704-M3	JR-T-6704-M10	JR-T-6704-M25
	0.13	JR-T-6705-M3	JR-T-6705-M10	JR-T-6705-M25
	0.15	JR-T-6706-M3	JR-T-6706-M10	JR-T-6706-M25
	0.18	JR-T-6707-M3	JR-T-6707-M10	JR-T-6707-M25
	0.20	JR-T-6708-M3	JR-T-6708-M10	JR-T-6708-M25
	0.25	JR-T-6812-M3	JR-T-6812-M10	JR-T-6812-M25
	0.30	JR-T-6702-M3	JR-T-6702-M10	JR-T-6702-M25
	0.50	JR-T-6802-M3	JR-T-6802-M10	JR-T-6802-M25
	0.75	JR-T-6803-M3	JR-T-6803-M10	JR-T-6803-M25
	1.00	JR-T-6806-M3	JR-T-6806-M10	JR-T-6806-M25
1/8"	1.59	JR-T-6804-M3	JR-T-6804-M10	JR-T-6804-M25
	2.10	JR-T-6813-M3	JR-T-6813-M10	JR-T-6813-M25
3/16"	3.18	JR-T-6835-M3	JR-T-6835-M10	JR-T-6835-M25
1 mm	0.50	JR-T-6105-M3	JR-T-6105-M10	JR-T-6105-M25
2 mm	1.00	JR-T-6210-M3	JR-T-6210-M10	JR-T-6210-M25
3 mm	1.00	JR-T-6310-M3	JR-T-6310-M10	JR-T-6310-M25
	2.00	JR-T-6320-M3	JR-T-6320-M10	JR-T-6320-M25

Qty/pkg:		**per meter**
Tubing OD	*ID (mm)*	*Product No.*
1/4"	4.35	JR-T-6809

OPTIONS AND MORE INFORMATION
See facing page.

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PTFE tubing, solid color-coded

SPECS
- Maximum recommended working temp: 100°C (continuous)
- Maximum working pressures: see page 94
- Tubing tolerances: see page 95

PTFE (polytetrafluoroethylene) tubing is chemically inert and suitable for lower pressure applications. Typically 1/16" OD tubing holds up to 62 bar (900 psi) and 1/8" up to 35 bar (500 psi). Maximum continuous operating temperature is 100°C.

Black PTFE, available in two IDs, is recommended for light sensitive applications such as enzymatic reactions, luminescent reactions, connecting to a flow cell, and radioactive HPLC.

Solid colors identify the tubing ID.

Qty/pkg:			3 m	10 m	25 m
OD	*Color*	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*
1/16"	Blue	0.25	JR-T-4011C-M3	JR-T-4011C-M10	JR-T-4011C-M25
	Black	0.25	JR-T-6808-M3	JR-T-6808-M10	JR-T-6808-M25
		0.50	JR-T-6811-M3	JR-T-6811-M10	JR-T-6811-M25
	Orange	0.50	JR-T-4183C-M3	JR-T-4183C-M10	JR-T-4183C-M25
	Green	0.75	JR-T-4136C-M3	JR-T-4136C-M10	JR-T-4136C-M25

PTFE tubing, natural color

SPECS
- Maximum recommended working temp: 100°C (continuous)
- Max working pressures: see page 94
- Tubing tolerances: see page 95

PTFE tubing is chemically inert and suitable for lower pressure applications. Typically 1/16" OD tubing holds up to 62 bar (900 psi) and 1/8" up to 35 bar (500 psi). Maximum continuous operating temperature is 100°C.

Qty/pkg:		3 m	5 m	10 m	25 m
Tubing OD	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*	*Product No.*
1/16"	0.18	JR-T-6805-M3	JR-T-6805-M5	JR-T-6805-M10	JR-T-6805-M25
	0.25	JR-T-4011-M3	JR-T-4011-M5	JR-T-4011-M10	JR-T-4011-M25
	0.50	JR-T-4183-M3	JR-T-4183-M5	JR-T-4183-M10	JR-T-4183-M25
	0.75	JR-T-4036-M3	JR-T-4036-M5	JR-T-4036-M10	JR-T-4036-M25
	1.00	JR-T-6807-M3	JR-T-6807-M5	JR-T-6807-M10	JR-T-6807-M25
1/8"	1.59	JR-T-6800-M3	JR-T-6800-M5	JR-T-6800-M10	JR-T-6800-M25
	2.40	JR-T-4037-M3	JR-T-4037-M5	JR-T-4037-M10	JR-T-4037-M25

		3 m	10 m	25 m
	ID (mm)	*Product No.*	*Product No.*	*Product No.*
2 mm	1.70	JR-T-6801-M3	JR-T-6801-M10	JR-T-6801-M25
4 mm	3.00	JR-T-4039-M3	JR-T-4039-M10	—

Qty/pkg:			per meter
Tubing OD in.	*mm*	*ID (mm)*	*Product No.*
3/16"	4.76	3.76	JR-T-4041
1/4"	6.35	4.35	JR-T-6810

TECH TIP
Use PFA instead of PTFE if gas permeability is an issue.

TECH TIP
Use black PTFE for for light sensitive applications such as enzymatic reactions, luminescent reactions, connectioning to a flow cell, and radioactive HPLC.

OPTIONS
Contact your distributor or VICI about:
- Longer tubing lengths at competitive bulk prices
- Customized ODs and IDs (30 m minimum quantity)

MORE INFORMATION
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Tubing ID chart: volume per length . . . 91
Tubing tolerances 95

RELATED PRODUCTS
Clean-cut tubing cutter 86
Easy-Flange kit 85
Flanged fittings. 40, 43
Flangeless fittings . . 41-42

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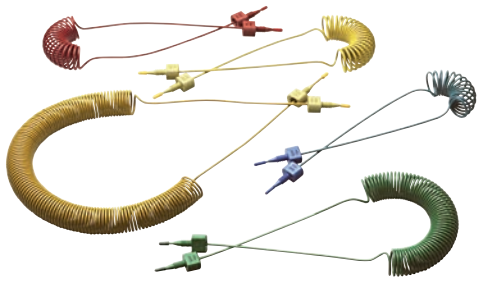


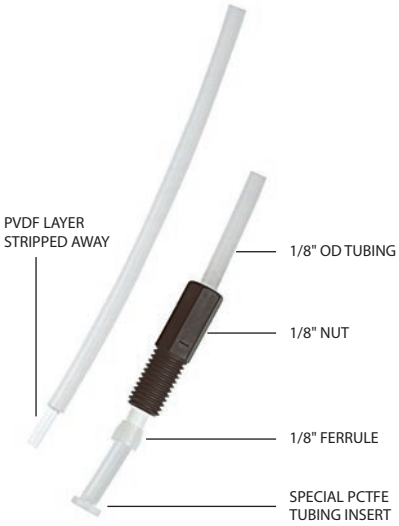
Thermo-formed polymeric tubing

- Available in a variety of polymers
- Provides axial flexibility
- Telephone cables or customer-specified shapes

VICI Jour offers thermo-formed tubing in various geometric shapes and polymers. The form will maintain its shape so long as the temperature does not exceed 100°C.

Straight tubing, spirals, or even more complex forms – just define your form and material on a drawing for us.

FOR PRICING
Contact VICI or your local distributor for more information or a quotation.



Impermeable polymeric tubing

- FEP coated with PVDF
- Prevents "re-gassing"
- Excellent chemical resistance

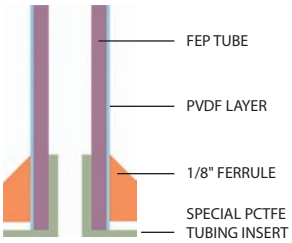
PTFE and FEP have very good chemical resistance, but are too permeable to be suitable for mobile phase transfer lines. PVDF, on the other hand, lacks chemical resistance but is a very tight polymer with no observable micropores. Our impermeable tubing is produced by co-extruding PVDF over FEP to combine the best features of both polymers, ensuring that degassed solvent will stay degassed until it reaches the HPLC pump.

The PVDF layer can easily be stripped away with our Clean-Cut tubing cutter or a razor blade, leaving a length of exposed FEP to extend into the solvent reservoir.

When making connections, a special PCTFE tubing insert fits into the ID of the tubing and seals against the bottom of the port, preventing the solvent from contacting the PVDF layer at the end of the tube.

SPECS
- Low pressure only
- 1/8" OD, 1.65 mm ID
- OD and ID tolerances: ±0.05 mm (.002")
- Materials
  Tubing: FEP coated with PVDF
  Insert: PCTFE
  Ferrule: ETFE
  Fitting: PPS

Qty/pkg:		**3 m** *Product No.*	**10 m** *Product No.*
Impermeable tubing, 1/8" OD x 1.65 mm ID		JR-T-6130-M3	JR-T-6130-M10
	Qty/pkg	*Product No.*	
Additional spare parts			
PCTFE tubing inserts	10	JR-6141-10	
1/8" PPS nuts	10	JR-55071-10	
1/8" ETFE ferrules	10	JR-051-10	
Fitting kit		JR-6140	
contains:			
PCTFE tubing inserts	2		
1/8" PPS nuts	2		
1/8" ETFE ferrules	2		



TECH TIP
Use FEP or PFA tubing inside the solvent reservoir, since PVDF has limited chemical resistance.

TECH TIP
Always use the specially-designed tubing insert to prevent solvent contact with the PVDF layer.

OPTIONS
Contact us for more info about longer tubing lengths at competitive bulk prices.

MORE INFORMATION
About FEP 99
About PVDF 100
Chemical resistance 96-98
Tubing ID chart:
volume per length . . . 93
Tubing tolerances 95

RELATED PRODUCTS
Clean-cut
tubing cutter 86
Color-sleeve
fingertight adapters . 17

Pre-cut stainless steel tubing

UHPLC

SPECS
- Pressure rating varies with ID; minimum is 365 bar (5300 psi) (see page 93)
- Tolerances
  OD ±0.05mm (.002")
  ID ±0.025mm (.001")

- For zero dead volume connections
- Steam-cleaned and ready to use
- Soft annealed OD for easy ferrule connections
- Color bands for quick identification of tubing ID

VICI Jour offers pre-cut 1/16" stainless steel tubing in lengths most commonly required in UHPLC and HPLC systems. The tubes are cut to square, burr-free ends for zero dead volume connections. Colored bands allow quick ID identification.

VICI pre-cut tubing is specially cleaned with steam from micro-filtered deionized water, which removes both organic and inorganic contaminants. Longer tubes are cleaned with liquid hexane. Softener-free polyethylene caps are used to prevent any contamination during shipment and storage.

Length):			**50 mm**	**100 mm**	**200 mm**	**300 mm**
OD	*Color*	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*	*Product No.*
1/16"	Red	0.13	JR-T-97005	JR-T-97010	JR-T-97015	JR-T-97020
	Yellow	0.18	JR-T-97025	JR-T-97030	JR-T-97035	JR-T-97040
	Blue	0.25	JR-T-97045	JR-T-97055	JR-T-97060	JR-T-97065
	Orange	0.50	JR-T-97075	JR-T-97080	JR-T-97085	JR-T-97090
	Green	0.75	JR-T-97095	JR-T-97100	JR-T-97105	JR-T-97110

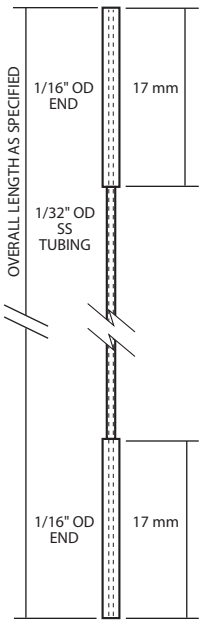
Pre-cut flexible stainless steel tubing

UHPLC

SPECS
- Pressure rating varies with ID; minimum is 365 bar (5300 psi) (see page 93)
- Tolerances
  OD ±0.05mm (.002")
  ID ±0.025mm (.001")

- Seamless 1/32" tubing with 1/16" laser-welded ends
- For zero dead volume connections
- Steam-cleaned and ready to use
- Soft annealed OD for easy ferrule connections
- Color bands for quick identification

Our flexible pre-cut stainless steel tubing is made of 1/32" premium grade 316 stainless steel tubing with ends laser-welded into 1/16" tubing of the same premium grade. Available in lengths most commonly required in UHPLC and HPLC systems.



The tubes are cut to square, burr-free ends for zero dead volume connections. Colored bands allow quick ID identification.

VICI pre-cut tubing is specially cleaned with steam from micro-filtered deionized water, which removes both organic and inorganic contaminants. Longer tubes that cannot be steam-cleaned are cleaned with liquid hexane. Softener-free polyethylene caps are used to prevent any contamination during shipment and storage.

Length:			**105 mm**	**150 mm**	**200 mm**	**280 mm**	**400 mm**
OD	*Color*	*ID (mm)*	*Product No.*	*Product No.*	*Product No.*	*Product No.*	*Product No.*
1/16"	Red	0.13	JR-T-96005	JR-T-96010	JR-T-96015	JR-T-96020	JR-T-96025
	Yellow	0.18	JR-T-96105	JR-T-96110	JR-T-96115	JR-T-96120	JR-T-96125
	Blue	0.25	JR-T-96205	JR-T-96210	JR-T-96215	JR-T-96220	JR-T-96225
	Orange	0.50	JR-T-96305	JR-T-96310	JR-T-96315	JR-T-96320	JR-T-96325

			600 mm	**700 mm**	**800 mm**	**900 mm**
			Product No.	*Product No.*	*Product No.*	*Product No.*
	Red	0.13	JR-T-96030	JR-T-96035	JR-T-96040	—
	Yellow	0.18	JR-T-96130	JR-T-96135	JR-T-96140	JR-T-96145
	Blue	0.25	JR-T-96230	JR-T-96235	JR-T-96240	—
	Orange	0.50	JR-T-96330	JR-T-96335	JR-T-96340	—

TECH TIP
Contact your local distributor or VICI for custom lengths.

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Stainless steel tubing – premium grade

UHPLC

- Seamless Type 316 stainless steel
- Variety of sizes for UHPLC, HPLC, and GC applications
- Smooth internal surface
- Soft annealed OD for easy ferrule connections

Our premium grade seamless stainless steel tubing is the base for all high pressure and ultra-high pressure lines in your equipment.

Note that this tubing is roughly cut with tubing pliers so the ends must be properly cut before use.

Qty/pkg:		**3 m**	**10 m**
Tubing OD	*ID (mm)*	*Product No.*	*Product No.*
1/32"	0.13	JR-TSS.505-M3	JR-TSS.505-M10
	0.18	JR-TSS.507-M3	JR-TSS.507-M10
	0.25	JR-TSS.510-M3	JR-TSS.510-M10
	0.50	JR-TSS.520-M3	JR-TSS.520-M10
1/16"	0.13	JR-TSS105-M3	JR-TSS105-M10
	0.25	JR-TSS110-M3	JR-TSS110-M10
	0.38	JR-TSS115-M3	JR-TSS115-M10
	0.50	JR-TSS120-M3	JR-TSS120-M10
	0.75	JR-TSS130-M3	JR-TSS130-M10
	1.00	JR-TSS140-M3	JR-TSS140-M10
1/8"	0.75	JR-TSS230-M3	JR-TSS230-M10
	1.00	JR-TSS240-M3	JR-TSS240-M10
	1.52	JR-TSS260-M3	JR-TSS260-M10
	1.70	JR-TSS267-M3	JR-TSS267-M10
	2.16	JR-TSS285-M3	JR-TSS285-M10

SPECS

- Pressure rating (values shown are minimum; rating varies with ID; (see page 93)

OD	bar	psi
1/32"	400	5800
1/16"	365	5300
1/8"	315	4600

- Tolerances
  OD ±0.05mm (.002")
  ID ±0.025mm (.001")

Stainless steel tubing – standard grade

UHPLC

- Type 316 stainless steel, welded under inert gas
- Variety of sizes for HPLC and GC applications
- Smooth internal surface
- Soft annealed OD for easy ferrule connections

Qty/pkg:		**3 m**	**10 m**
Tubing OD	*ID (mm)*	*Product No.*	*Product No.*
1/16"	0.13	JR-T-625-04-M3	JR-T-625-04-M10
	0.18	JR-T-625-05-M3	JR-T-625-05-M10
	0.25	JR-T-625-10-M3	JR-T-625-10-M10
	0.50	JR-T-625-20-M3	JR-T-625-20-M10
	0.75	JR-T-625-30-M3	JR-T-625-30-M10
	1.00	JR-T-625-40-M3	JR-T-625-40-M10
1/8"	2.1	JR-T-626-00-M3	JR-T-626-00-M10

Qty/pkg:		**per meter**
Tubing OD	*ID (mm)*	*Product No.*
1/4"	4.65	JR-T-628-00

SPECS

- Pressure rating (values shown are minimum; rating varies with ID; (see page 93)

OD	bar	psi
1/16"	315	4600
1/8"	315	4600

- Tolerances
  OD ±0.05mm (.002")
  ID ±0.05mm (.002")

TECH TIP

For zero dead volume connections, we strongly recommend pre-cut stainless steel tubing . . 14

NOTE

ID dimensions in mm are converted from nominal inch dimensions.

OPTIONS

Contact us for more info about longer tubing lengths at competitive bulk prices.

MORE INFORMATION

About Type 316 stainless steel. 100
Maximum working pressure 93
Tubing ID chart: volume per length . . . 93

RELATED PRODUCTS

Stainless steel tubing cutter 87
Stainless fittings 30-35

Fittings

HIGH AND LOW PRESSURE

High pressure polymeric fittings... page 18

High pressure polymeric fittings are useful in applications involving proteins, peptides, and other samples of biological origin where metal systems may interact with samples.

High pressure stainless fittings.... page 30

Our stainless steel fittings are typically compression fittings, in which a ferrule is compressed onto the tube as a nut is tightened. They offer the best reliability in high pressure situations.

Nanovolume® HPLC fittings ..... page 36

With bore sizes of 100 and 150 microns, (.004" -.006"), the minimal transfer volume contributed by Nanovolume® components makes them especially beneficial in applications with flow rates in the µl/min range, when the transfer volume can be critical.

Low pressure fittings ..... page 40

Low pressure fittings are ideally suited for flow injection analysis, low pressure liquid chromatography, and stream sampling devices. They may be safely used at pressures up to 500 psi and temperatures to 50°C.

MORE INFORMATION

Tools for fittings

Ferrule removal kit..... 89
Tweezer..... 89
ValvTool..... 88
Wrench 89

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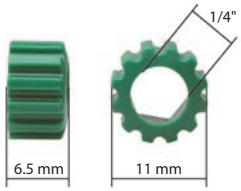
Color-It fingertight adapters

- For high and low pressure
- Fit all hex-head PEEK and SS fittings for 1/16" tubing
- Available in six colors for easy solvent line identification

SPECS
- For 1/4" hex-head nuts
- Material: Polypropylene

Color-It snap-on fingertight adapters are used with for our 1/4" PEEK and stainless hex-head nuts, converting them into color-coded fingertight fittings in an instant. Available in six colors.

Color	*Qty/pkg*	*Product No.*
Blue	5	JR-55010-5
Yellow	5	JR-55011-5
Green	5	JR-55012-5
Black	5	JR-55013-5
White	5	JR-55014-5
Red	5	JR-55015-5
Assorted	2 each	JR-55016-12



Color-Sleeve fingertight adapters

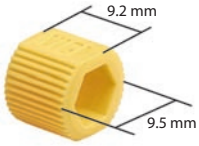
- For high and low pressure
- Designed for our PPS fittings for 1/16" tubing
- Available in twelve colors for easy solvent line identification

SPECS
- For 1/4" hex-head nuts
- Material: Polypropylene

This adapter is useful for color coding different solvent lines, and turns VICI Jour PPS nuts into fingertight fittings in an instant.

Color	*Qty/pkg*	*Product No.*
Natural	5	JR-55080-5
	10	JR-55080-10
White	5	JR-55081-5
	10	JR-55081-10
Dark grey	5	JR-55082-5
	10	JR-55082-10
Black	5	JR-55083-5
	10	JR-55083-10
Lavender	5	JR-55084-5
	10	JR-55084-10
Red	5	JR-55085-5
	10	JR-55085-10
Yellow	5	JR-55086-5
	10	JR-55086-10
Orange	5	JR-55087-5
	10	JR-55087-10

Color	*Qty/pkg*	*Product No.*
Brown	5	JR-55088-5
	10	JR-55088-10
Green	5	JR-55089-5
	10	JR-55089-10
Blue	5	JR-55090-5
	10	JR-55090-10
Purple	5	JR-55091-5
	10	JR-55091-10
Assorted		
All 12 colors	2 each	JR-5508X-24
Blue, red, green, yellow, black, white	2 each	JR-5508X-12



MORE INFORMATION
Hex head nuts
PEEK 19-23
Stainless. 31
PPS
High pressure. . . 19, 25
Low pressure 41

High pressure fittings

POLYMERIC

Our high pressure fittings are rated up to 350 bar (5000 psi) with fingertight nuts, well beyond the burst strength of most PEEK tubing. These fittings are manufactured from high quality inert polymers to exacting tolerances.

High pressure polymeric fittings index

One-piece fittings
PEEK hex-head
Over 5,000 psi ..... *NEW*.... page 19
5,000 psi.....19
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Plugs and caps
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Reducing unions.....27

PEEK tees and crosses
Standard tees and crosses.....28
Biocompatible mixing tee 28

PEEK adapters
PEEK port and Luer adapters 29

DISCLAIMER
The maximum holding pressure for any type of connections involving tubing and a ferrule varies considerably with the tubing material, the ferrule material, the clearance between tubing OD and ferrule ID, and the shape of the fitting detail.

RELATED PRODUCTS

ChromBox kit..... 91
HPLC parts kit with PEEK and stainless fittings and tubing
Fingertight adapters
Color-It 17
Color-Sleeve..... 17
Nanovolume® high pressure fittings..36-39
PEEK starter kits 90
Tools for fittings 88-89

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PEEK one-piece hex-head fittings *NEW* *UHPLC*

- Made of special PEEK™ HT for better pressure resistance
- One-piece – no ferrule required
- Biocompatible
- Handy tightening tool included

These fittings are machined from special PEEK material to reach a higher pressure rating than standard PEEK fittings.

Sold in packages of 10.

Includes a tightening tool (*page 89*) for easy installation.

Tubing ID	*Thread*	*Product No.*
1/32"	6-40	JR-5525-10
1/16"	10-32	JR-5520-10

SPECS
- Material: PEEK, special black
- Threads:
  1/32" 6-40
  1/16" 10-32
- Pressure ratings, fingertight, on SS tubing:
  1/32" 625 bar (9,000 psi)
  1/16" 700 bar (10,000 psi)

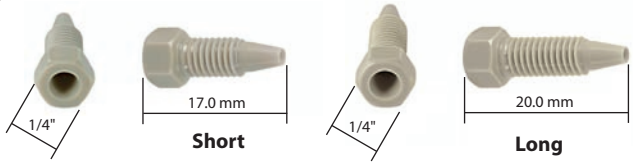
PEEK one-piece hex-head fittings *10-32*

- Fingertight up to 350 bar (5000 psi)
- Excellent chemical and mechanical properties
- One-piece – no ferrule required
- Biocompatible
- For any 10-32 high pressure fitting

PEEK one-piece hex-head fittings are easy to use with the ValvTool or with the Color-It color-coded fingertight adapters. The 10-32 thread will fit virtually all standard high pressure female connections, and will withstand pressures of up to 350 bar (5000 psi). Available in short and long versions.

Sold in packages of 5.

Description	*Product No.*
Short	JR-55100-5
Long	JR-55110-5



SPECS
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Tolerance: ±0.05 mm (.002")
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

TECH TIP
Coloration pigments are carefully chosen so as to contain no heavy metals or hazardous chemicals.

MORE INFORMATION
About PEEK 99
About PPS. 99
Chemical resistance 96-98

RELATED PRODUCTS
1/16" OD tubing for high pressure applications 5-8
PEEK starter kit 90
Color-Sleeve adapters . 17

1/32" and 1/16" tightening tools for PEEK fittings. 89

PPS one-piece hex-head fittings *10-32*

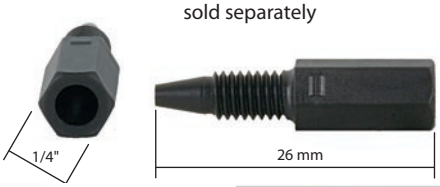
- Economically-priced alternative to PEEK
- Excellent chemical and mechanical properties
- One-piece – no ferrule required
- Slim design – finger-tight with Color-Sleeve adapter

The VICI Jour PPS one-piece hex-head (fingertight with adapter) fitting offers excellent chemical and pressure resistance.

Sold in packages of 5.

Product No.
JR-58000-5

Shown with Color-Sleeve adapter, sold separately



SPECS
- For 1/16" OD tubing
- Material: Black PPS (Polyphenylene sulfide)
- 10-32 threads
- Tolerance: ±0.05 mm (.002")
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

PEEK one-piece fingertight fittings – color-coded *10-32*

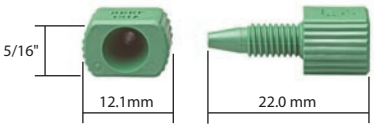
SPECS
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Tolerance: ±0.05 mm (.002")
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

- Fingertight up to 350 bar (5000 psi)
- Excellent chemical and mechanical properties
- One-piece – no ferrule required
- Biocompatible

Our PEEK fingertight fittings are available in six colors, for easy identification of tubing lines. They are rated to 350 bar (5000 psi) and can be used in virtually any type of 10-32 thread HPLC fitting detail on the market.

Sold in packages of 5.

Color	*Product No.*
Natural	JR-55020-5
Black	JR-55021-5
Red	JR-55022-5
Yellow	JR-55023-5
Blue	JR-55024-5
Green	JR-55025-5



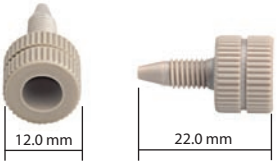
PEEK one-piece fingertight fittings *10-32*

SPECS
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Tolerance: ±0.05 mm (.002")
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

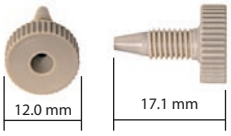
- Natural PEEK versions fingertight up to 350 bar (5000 psi)
- One-piece – no ferrule required
- Biocompatible
- Four styles, machined for extra precision

Sold in packages of 5.

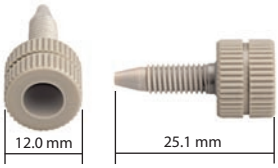
Description	*Product No.*
Standard	JR-5502-5
Short	JR-5504-5
Long	JR-5507-5
Narrow hex-head/fingertight	JR-5508-5



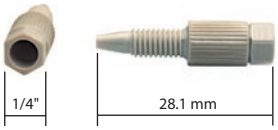
Standard



Short



Long



Narrow hex-head/fingertight

TECH TIP
Coloration pigments are carefully chosen so as to contain no heavy metals or hazardous chemicals.

MORE INFORMATION
About PEEK 99
About CTFE 99
Chemical resistance 96-98

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PEEK no-twist "one-piece" fittings

10-32

- Snap-in ferrule rotates freely
- Choice of ferrule materials
- Choice of fitting lengths

No-twist fittings offer the convenience of a one-piece fitting while solving a problem inherent to such designs. In other one-piece designs, the ferrule rotates against the fitting detail, creating particulates. The no twist design has a separate ferrule that snaps into the nut, so it's attached but still free to avoid rotation during tightening.

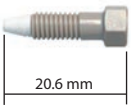
Since the ferrule is not machined onto the nut, it can be made from a different material. We offer several PEEK nuts, with ferrules of PEEK, CTFE, or glass-filled PEEK.

Sold in packages of 5.

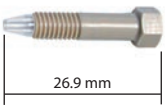
Ferrule material:	**PEEK**	**Glass-filled PEEK**	**CTFE**
Description	*Product No.*	*Product No.*	*Product No.*
Fingertight	JR-ZNF1FPK-5	JR-ZNF1FPKG-5	JR-ZNF1FKF-5
Hex, short	JR-ZNF1PK-5	JR-ZNF1PKG-5	JR-ZNF1KF-5
Hex, medium	JR-MZNF1PK-5	JR-MZNF1PKG-5	JR-MZNF1KF-5
Hex, long	JR-LZNF1PK-5	JR-LZNF1PKG-5	JR-LZNF1KF-5
Replacement ferrules	JR-ZNF1PK-F-5	JR-ZNF1PKG-F-5	JR-ZNF1KF-F-5

Fingertight

Hex, short



Hex, medium



Hex, long

SPECS

- For 1/16" OD tubing
- Materials:
  Nut: PEEK
  Ferrule: PEEK, glass-filled PEEK, or CTFE
- 10-32 threads
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

OPTIONS

- Optional ferrule materials available: FEP, PFA, PTFE, and glass-filled PTFE. Contact us for availability.
- Some 1/32" versions are available. Call for details.

RELATED PRODUCTS

1/16" OD tubing for high pressure applications 5-8
PEEK starter kit 90
ValvTool for tightening hex-head fittings 88
Color-It fingertight adapters. 17

PEEK ferrules *NEW* *UHPLC*

SPECS
- For 1/16" OD tubing
- Material: PEEK, special black
- Pressure rating on SS tubing and with SS nut: (preliminary) 1170 bar (17,000 psi)

- Biocompatible 1/16" ferrule for ultra-high pressures
- Alternative to titanium ferrules in applications with titanium valves
- Excellent in combination with stainless nuts

Sold in packages of 5.

Product No.	
JR-5010-5	

PEEK nuts with single ferrules *10-32*

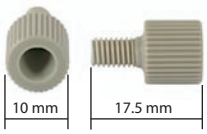
SPECS
- Material: PEEK
- Pressure rating: <280 bar (4000 psi) *(Varies with tubing material and ID)*

- Reuseable nut, replaceable ferrule
- For 1/32", 1/16", and 1/8" tubing
- Suitable for pressures to 280 bar (4000 psi)

Fingertight nuts have a knurled surface designed to allow sufficient sealing force to be applied to the ferrule without wrenches. Hex style nuts allow wrench tightening; however, since they are polyeric, they can break, and are recommended for use only when space is limited and fingers will not fit.

Sold in packages of 5.

	Tubing OD	*Description*	*Thread*	*Product No.*
Nuts	1/32"	Fingertight	6-40	JR-ZN.5FPK-5
	1/16"	Fingertight	10-32	JR-5570-5
	1/8"	Hex-head	5/16-24	JR-ZN2PK-5
Single ferrules	1/32"			JR-ZF.5PK-5
	1/16"			JR-5003-5
	1/8"			JR-ZF2PK-5



1/16" fingertight

1/8" hex-head

MORE INFORMATION

About PEEK 99
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RELATED PRODUCTS

1/16″ OD tubing for high pressure applications 5-8
PEEK starter kit 90
PEEK tubing 5-8
Stainless steel nuts 31
ValvTool for tightening hex-head fittings 88
Color-It fingertight adapters. 17

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PEEK nuts with double ferrules

10-32

- High pressure rating - up to 420 bar (6000 psi)
- Ideal for 1/16" PEEK tubing
- Fit any 10-32 fitting

These nuts are for use with VICI Jour double ferrules, which grip the tubing twice for added stability. The fingertight version may be hand-tightened for operation at up to 420 bar (6000 psi). The hex-head version can be used for connections that are difficult to reach, or are closely spaced. The fittings work in virtually any female 1/16" fitting.

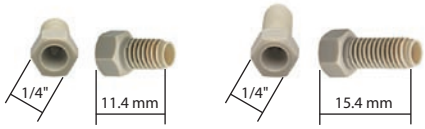
Sold in packages of 5.

SPECS

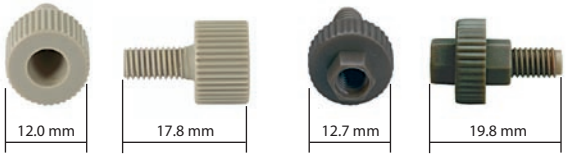
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Pressure rating: <420 bar (6000 psi) *(Varies with tubing material and ID)*

Description		*Product No.*
1/16" nuts	Hex-head, short	JR-5511-5
	Hex-head, long	JR-5510-5
	Fingertight	JR-5580-5
	Universal fingertight*	JR-5503-5*
1/16" ferrule	Double	JR-5004-5

*Limited to existing stock.



Hex-head, short **Hex-head, long**



Fingertight **Universal fingertight**

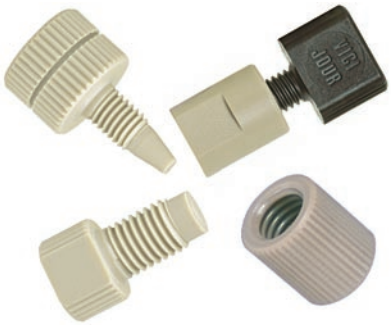
PEEK plugs and caps

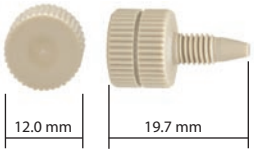
SPECS
- Material: PEEK
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

- For plugging ports and capping solvent lines
- Available in all common thread sizes

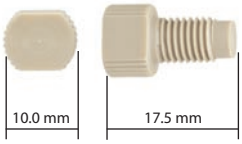
Sold individually.

	Threads		*Product No.*
Plugs	6-40		JR-ZP.5FPK
	10-32		JR-408
		fingertight	JR-ZP1FPK
		hex	JR-MZP1PK
		long hex	JR-LZP1PK
	1/4-28		JR-409
	M6		JR-410
Caps	6-40		JR-ZC.5FPK
	10-32		JR-ZC1PK
	1/4-28		JR-CCPK-1

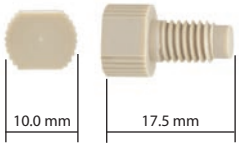




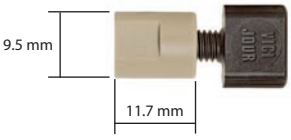
10-32 plug
(JR-408)



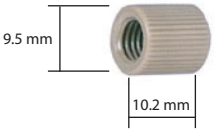
1/4-28 plug



M6 plug



10-32 cap



1/4-28 cap

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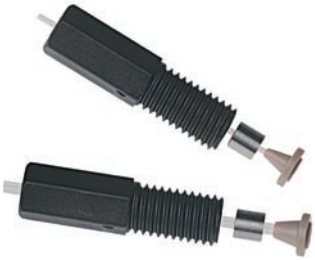


Nut, ferrule, and bushing

1/4-28

- High pressure rating – up to 480 bar (7000 psi) with 1/16" tubing
- For 1/4-28 connections
- Available for 1/32" and 1/16" tubing

This combination of PPS nut, PEEK ferrule, and stainless steel bushing allows a high pressure connection in a 1/4-28 flat-bottomed fitting detail.

Sold in packages of 10.

Order nuts and bushing/ferrules separately.

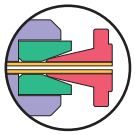
Description	*Tubing OD*	*Product No.*
PPS hex-head nut	1/32" or 1/16"	JR-55050-10
Bushing and ferrule	1/32"	JR-FPKBSS.5-10
	1/16"	JR-FPKBSS1-10

SPECS

- For 1/32" and 1/16" OD tubing
- Materials
  Nut: PPS
  Ferrule: PEEK
  Bushing: SS
- 1/4-28 connection
- Pressure rating

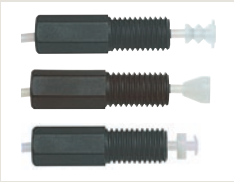
OD	bar	psi
1/32"	175	2500
1/16"	480	7000

(Varies with tubing material and ID)



LOW PRESSURE 1/4-28 NUTS AND FERRULES

1/4-28 PPS hex-head nuts are available with three different sealing designs for flangeless and flanged fittings 41



TECH TIP

To make up high pressure connection with nut, ferrule, and bushing, first slide the nut on the tubing, then the bushing, and then the PEEK ferrule as shown in the product photo.

PEEK unions

10-32

SPECS
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

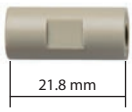
- Easy connection of transfer/solvent lines
- Low dead volume
- Completely inert and biocompatible

VICI Jour PEEK unions are usable with most common organic and inorganic HPLC solvents without risking corrosion, metal contamination, or protein degradation that might occur with stainless steel.

Small diameter bores are used to ensure low dead volume connections. These unions have the standardized Valco fitting details with smooth transition of the taper into the threaded part. Connections to these PEEK unions can be made with any 10-32 fitting that uses polymeric ferrules.

PEEK unions are available in body-only versions as well as complete with our PEEK one-piece fingertight fittings ready to connect to any 1/16" OD tubing.

	Bore (mm)	*Qty/pkg*	*Product No.*
Union with fittings	0.25	1	JR-1061
	0.50	1	JR-1066
	0.75	1	JR-1067
Body only	0.25	1	JR-061
	0.50	1	JR-066
	0.75	1	JR-067



Replacement fittings	*Qty/pkg*	*Product No.*
PEEK 1/16" one-piece fingertight fittings, 10-32, black	5	JR-55021-5

PEEK bulkhead unions

10-32

SPECS
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

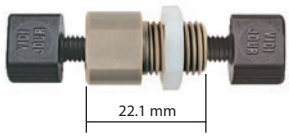
- Designed for panel mounting
- Easy connection of transfer/solvent lines
- Low dead volume
- Completely inert and biocompatible

Bulkhead unions are designed to be mounted through an instrument panel or on a bracket. Typically the mounting nut goes inside the instrument, so that the long threaded portion will be out of sight.

Bulkhead unions require a minimum 10 mm panel hole, 9 mm maximum thickness.

Includes fittings.

Bore (mm)	*Qty/pkg*	*Product No.*
0.25	1	JR-ZBU1CFPK
0.50	1	JR-ZBU1MFPK
0.75	1	JR-ZBU1FPK



Replacement fittings	*Qty/pkg*	*Product No.*
PEEK 1/16" one-piece fingertight fittings, 10-32, black	5	JR-55021-5
JAM-Nut replacement mounting nut for bulkhead fittings	1	JR-CBN

RELATED PRODUCTS
Low pressure PEEK 1/4-28 unions. 44
PEEK one-piece fingertight fittings 19-21

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PEEK reducing unions

- Connects 1/16" to 1/32" tubing, or 1/8" to 1/16" tubing
- Easy connection of transfer/solvent lines
- Completely inert and biocompatible

VICI Jour PEEK reducing unions are usable with most common organic and inorganic HPLC solvents without risking corrosion, metal contamination, or protein degradation that might occur with stainless steel. These reducing unions have the standardized Valco fitting details with smooth transition of the taper into the threaded part.

Includes fittings.

SPECS

- Material: PEEK
- Threads: 1/32": 6-40 1/16": 10-32 1/8": 5/16-24
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

Tubing OD	*Bore (mm)*	*Qty/pkg*	*Product No.*
1/16" to 1/32"	0.25	1	JR-ZRU1.5FPK
1/8" to 1/16"	0.75	1	JR-ZRU21FPK

PEEK replacement fittings		*Qty/pkg*	*Product No.*
For 1/16" to 1/32" reducing unions			
1/16"	One-piece fitting, black	5	JR-55021-5
1/32"	Fingertight nut	1	JR-ZN.5FPK
1/32"	Ferrule	1	JR-ZF.5PK
For 1/8" to 1/16" reducing unions			
1/8"	Hex-head PEEK nut	5	JR-ZN2PK-5
1/8"	PEEK ferrule	5	JR-ZF2PK-5
1/16"	One-piece fitting, black	5	JR-55021-5

RELATED PRODUCTS

Low pressure PEEK 1/4-28 reducing unions 45

PEEK tees and crosses

10-32

SPECS
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Body size: 25.0 mm OD 12.0 mm thick
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

- Easy connection of transfer/solvent lines
- Low dead volume
- Completely inert and biocompatible

The 100% PEEK flowpath makes VICI Jour PEEK tees and crosses usable with most common organic and inorganic HPLC solvents without risking corrosion, metal contamination, or protein degradation that might occur with stainless steel.

Small diameter through-holes are used to ensure low dead volume connections. These unions have the standardized Valco fitting details with smooth transition of the taper into the threaded part. Connections to these PEEK tees and crosses can be made with any 10-32 fitting that uses polymeric ferrules.

PEEK tees and crosses are available in body-only versions as well as complete with our PEEK one-piece fingertight fittings ready to connect to any 1/16" OD tubing.

	Bore (mm)	*Qty/pkg*	**With fittings** *Product No.*	**Body only** *Product No.*
Tee	0.25	1	JR-1030	JR-2030
	0.50	1	JR-1032	JR-2032
	0.75	1	JR-1033	JR-2033
Cross	0.25	1	JR-1040	JR-2040
	0.50	1	JR-1042	JR-2042
	0.75	1	JR-1043	JR-2043

Replacement fittings	*Qty/pkg*	*Product No.*
PEEK 1/16" one-piece fingertight fittings, 10-32, black	5	JR-55021-5

Biocompatible mixing tee

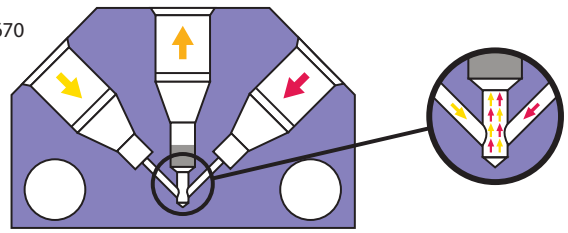
10-32

SPECS
- For 1/16" OD tubing
- Material: PEEK
- 10-32 threads
- Pressure rating: <350 bar (5000 psi) *(Varies with tubing material and ID)*

- High pressure gradient mixing
- Post column reactions
- Completely biocompatible
- Built-in protein-friendly titanium filter, 10 µm

A unique, more thorough mixing results from the turbulence generated by the introduction angle of the solvents as well as by the flow through our titanium filter element. The biocompatible tee can be used for high pressure gradient mixing as well as for post column reactions.

	Product No.
Mixing tee with fittings	JR-9000-0670



The two solvent streams are well-mixed in the vortex mixing chamber

TECH TIP
Use our color-coded one-piece fingertight fittings for easy solvent line identification. 20

MORE INFORMATION
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Chemical resistance 96-98

RELATED PRODUCTS
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Low pressure 1/4-28 mixing tees 47

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PEEK adapters

- Connect various combinations of thread types, male and female
- Includes male and female Luer adapters
- Low dead volume
- For any 10-32 high pressure fitting

We offer male and female Luer adapters as well as adapters to connect standard LC fittings to standard LC ports.

The 100% PEEK flowpath makes VICI Jour PEEK adapters usable with most common organic and inorganic HPLC solvents without risking corrosion, metal contamination, or protein degradation that might occur with stainless steel.

Sold individually.

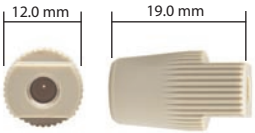
SPECS

- Material: PEEK
- Bore: 0.40 mm
- Pressure ratings:
  M6, 1/4-28 <70 bar (1000 psi)
  Luer <35 bar (502 psi)
  (Varies with tubing material and ID)

Description		*Product No.*
1/4-28 female to	10-32 male	JR-0612
	10-32 female	JR-062
	M6 male	JR-0622
	Luer female	JR-0625
	Luer male	JR-0626
10-32 female to	1/4-28 male	JR-0617
	M6 female (Pharmacia*)	JR-5595
	Luer female	JR-0623
Waters female to	10-32 male	JR-0611
M6 female to	10-32 male	JR-5505
Female Luer to	1/4-28	JR-CFLAPK
	10-32	JR-ZUFLPK
Male Luer to	1/4-28	JR-CMLAPK

1/4-28 female to:

10-32 male



10-32 female

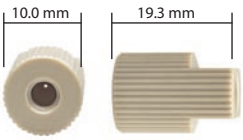
M6 male

Luer female

Luer male

10-32 female to:

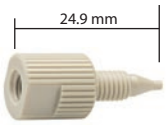
1/4-28 male



M6 female (Pharmacia)

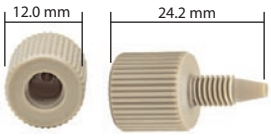
Luer female

Waters female to:



10-32 male

M6 female to:



10-32 male

* Pharmacia is a division of GE Healthcare.

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High pressure fittings

STAINLESS STEEL

Our stainless steel fittings are typically compression fittings, in which a ferrule is compressed onto the tube as a nut is tightened. They offer the best reliability in high pressure situations.

High pressure stainless fittings index

Nuts

Valco nuts ..... page 31
Valco nuts are available for 1/32", 1/16", and 1/8" tubing, in several lengths.

Rheodyne® compatible nuts 31
These nuts are sized for 1/16" tubing, and come in three lengths.

Ferrules

Valco 32
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Crosses 33

Unions and reducing unions

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Reducing unions
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DISCLAIMER

The maximum holding pressure for any type of connections involving tubing and a ferrule varies considerably with the tubing material, the ferrule material, the clearance between tubing OD and ferrule ID, and the shape of the fitting detail.

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Valco® stainless nuts

UHPLC

- Excellent fit to Valco fitting details
- Different lengths available
- For 1/32", 1/16", and 1/8" OD tubing

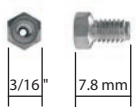
These nuts are for use with all standard Valco internal fittings and most valves. They may be used with fittings from other manufacturers as well. The medium and long types are ideal for metal Valco and Cheminert valves with more than 8 ports, or where the fitting head may be otherwise inaccessible.

Sold in packages of 5.

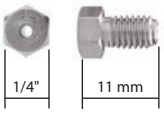
Tubing OD	*Length*	*Product No.*
1/32"	Standard	JR-ZN.5-5
1/16"	Standard	JR-ZN1-5
	Medium	JR-MZN1-5
	Long	JR-LZN1-5
1/8"	Standard	JR-ZN2-5

SPECS

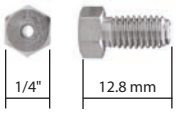
- For 1/32", 1/16", and 1/8" OD tubing
- Material: Type 303 SS
- Threads:
  1/32": 6-40
  1/16": 10-32
  1/8": 5/16-24
- Pressure rating with premium SS tubing and ZF1S6 ferrule: 1375 bar (20,000 psi)



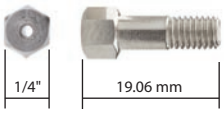
1/32" standard



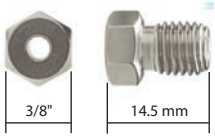
1/16" standard



1/16" medium



1/16" long



1/8" standard

Rheodyne® compatible stainless nuts

- Excellent fit to Rheodyne fitting details
- Different lengths available
- For 1/16" OD tubing

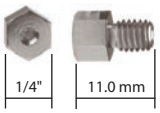
These nuts are for use with metal Rheodyne valves. Three different length nuts are available, in order to accommodate any possible connecting situation. The standard nut is suitable for easily accessible connections (couplers, detectors, columns, etc.) For very tight and difficult to reach areas, we recommend the long and extra long nut.

Sold in packages of 5.

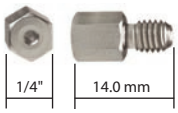
Tubing OD	*Length*	*Product No.*
1/16"	Short	JR-56-5
	Long head	JR-57-5
	Extra long	JR-58-5

SPECS

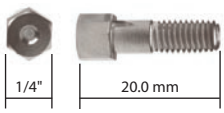
- For 1/16" OD tubing
- Material: Type 316 SS
- Threads: 10-32
- Pressure rating: <500 bar (7,250 psi) *(Varies with tubing material and ID)*



Short



Long head



Extra long

TECH TIP
Using nuts with different lengths will create more space, for better wrench access.

MORE INFORMATION
About stainless steel . . 100

RELATED PRODUCTS
Ferrules
Rheodyne 32
Valco 32
Stainless steel
starter kit 90
Stainless tubing 14-15
ValvTool for tightening
hex-head fittings 88
Color-It fingertight
adapters. 17

Valco® stainless ferrules

UHPLC

SPECS
- For 1/32", 1/16", and 1/8" OD tubing
- Material: Type 316 SS
- Pressure rating: 1375 bar (20,000 psi) *(Varies with tubing material and ID)*

- Excellent fit to Valco fitting details
- For 1/32", 1/16", and 1/8" OD tubing

These ferrules are for use with all standard Valco internal fittings and most valves, and with those of most other manufacturers as well. Valco metal ferrules cut a ring near the end of the tube, preventing tube release at high pressures without significantly deforming and restricting the tube interior. (However, if the hardness of the tubing is equal to or greater than that of the ferrule, deformation of the tube rather than a cut ring is likely.)

Sold in packages of 5.

Size		*Product No.*
1/32"		JR-ZF.5-5
1/16"		JR-ZF1-5
1/8"		JR-ZF2-5

Rheodyne® compatible stainless ferrules

SPECS
- For 1/16" OD tubing
- Material: Type 316 SS
- Pressure rating: <500 bar (7,250 psi) *(Varies with tubing material and ID)*

- Excellent fit to Rheodyne fitting details
- For 1/16" OD tubing

These ferrules are for use with metal Rheodyne valves.

Sold in packages of 5.

Description		*Product No.*
Standard ferrule		JR-59-5
2-step Rheodyne-type ferrule		JR-60-5

Stainless steel plugs

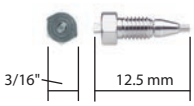
UHPLC

SPECS
- For 1/16", and 1/8" OD tubing
- Material:
  1/16": SS 316
  1/8": SS 313
- Threads:
  1/16": 10-32
  1/8": 5/16-24

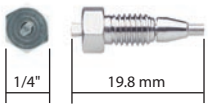
Use a plug to close off an usused port in a valve, manifold, or HPLC column. The standard stainless plug consists of a zero volume nut with a ferrule made up on a piece of solid rod.

Sold individually.

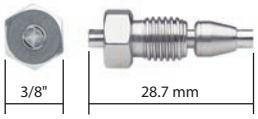
Tubing OD	*Product No.*
1/32"	JR-ZP.5
1/16"	JR-ZP1
1/8"	JR-ZP2



1/32" plug



1/16" plug



1/8" plug

Stainless steel caps

UHPLC

SPECS
- For 1/16", and 1/8" OD tubing
- Material: Type 303 SS
- Threads:
  1/16": 10-32
  1/8": 5/16-24

Use a cap to close off a tube with a ferrule and internal nut already made up. A cap is essentially a piece of hex stock with a zero volume fitting detail machined into it, but with no through-hole.

Sold individually.

Tubing OD	*Product No.*
1/32"	JR-ZC.5
1/16"	JR-ZC1
1/8"	JR-ZC2

14.0 mm
3/16" hex (body)
1/32" cap

19.6 mm
1/4" hex (body)
1/16" cap

25.7 mm
11.1 mm hex (body)
1/8" cap

RELATED PRODUCTS
UHPLC PEEK ferrules . . . 22

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- Easy connection of solvent lines
- Low dead volume
- For 1/16" OD tubing

VICI stainless steel tees and crosses are for joining solvent lines. They are precision machined with a focus on the concentricity of the bore as well as on the finish of the surfaces to gave an absolute leak-free connection.

These tees and crosses have internal threads, which we recommend for most applications. Internal threads make stronger connections and internal fitting details provide the lowest dead volume for high performance instrumentation.

Stainless tees

UHPLC

VICI stainless steel tees join three solvent lines.

Three nuts and ferrules ship with each tee.

Description	*Bore (mm)*	*Qty/pkg*	*Product No.*
1/16" tee	0.25	1	JR-ZT1C
	0.50	1	JR-ZT1M
	0.75	1	JR-ZT1
Replacement nut		5	JR-ZN1-5
Replacement ferrule		5	JR-ZF1S6-5

SPECS
- For 1/16" OD tubing
- Material:
  Body Type 316 SS
  Nuts Type 303 SS
  Ferrules 316 SS
- Pressure rating: 1375 bar (20,000 psi) *(Varies with tubing material and ID)*

Stainless crosses

UHPLC

VICI stainless steel crosses join four solvent lines.

Four nuts and ferrules ship with each tee.

Description	*Bore (mm)*	*Qty/pkg*	*Product No.*
1/16" cross	0.25	1	JR-ZX1C
	0.50	1	JR-ZX1M
	0.75	1	JR-ZX1
Replacement nut		5	JR-ZN1-5
Replacement ferrule		5	JR-ZF1S6-5

SPECS
- For 1/16" OD tubing
- Material:
  Body Type 316 SS
  Nuts Type 303 SS
  Ferrules 316 SS
- Pressure rating: 1375 bar (20,000 psi) *(Varies with tubing material and ID)*

MORE INFORMATION

About stainless steel . . 100

RELATED PRODUCTS

Open end wrench 89
Stainless steel starter kit 90
ValvTool for tightening hex-head fittings 88

HIGH PRESSURE FITTINGS ■ STAINLESS STEEL

- Easy connection of solvent lines
- Low dead volume

VICI stainless steel unions and reducing unions are precision machined with a focus on the concentricity of the bore as well as on the finish of the surfaces to gave an absolute leak-free connection.

These unions have internal threads, which we recommend for most applications. Internal threads make stronger connections and internal fitting details provide the lowest dead volume for high performance instrumentation.

Stainless unions

UHPLC

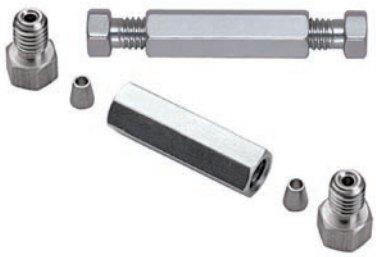
SPECS
- For 1/16" OD tubing
- Material:
  Body Type 316 SS
  Nuts Type 303 SS
  Ferrules 316 SS
- Pressure rating: 1375 bar (20,000 psi) *(Varies with tubing material and ID)*

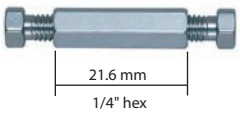
- Choice of four bores
- For 1/16" OD tubing

VICI stainless steel unions join two pieces of 1/16" OD metal tubing.

Two nuts and ferrules ship with each union.

Description	*Bore (mm)*	*Qty/pkg*	*Product No.*
1/16" union	0.15	1	JR-ZU1XC
	0.25	1	JR-ZU1CS6
	0.50	1	JR-ZU1MS6
	0.75	1	JR-ZU1S6
Replacement nut		5	JR-ZN1-5
Replacement ferrule		5	JR-ZF1S6-5





Stainless reducing unions *Imperial*

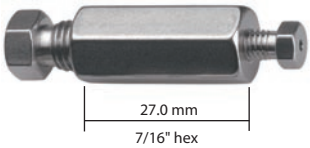
UHPLC

SPECS
- For joining 1/8" to 1/16" OD tubing
- Material:
  Body Type 316 SS
  Nuts Type 303 SS
  Ferrules 316 SS
- Pressure rating: 1375 bar (20,000 psi) *(Varies with tubing material and ID)*

These reducing unions join 1/16" OD to 1/8" OD tubing.

Two nuts and ferrules ship with each union.

Description	*Size*	*Qty/pkg*	*Product No.*
Reducing union	1/8" to 1/16"	1	JR-ZRU21
Replacement nut	1/8"	5	JR-ZN2-5
	1/16"	5	JR-ZN1-5
Replacement ferrule	1/8"	5	JR-ZF2S6-5
	1/16"	5	JR-ZF1S6-5



RELATED PRODUCTS
Nanovolume® high pressure fittings . . 36-39
Stainless starter kit 90
HPLC parts kit with stainless fittings and tubing
ChromBox kit. 91
HPLC parts kit with PEEK and stainless fittings and tubing

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Stainless reducing unions *NEW* *Imperial to metric* *UHPLC*

- Ultra-high pressure
- For 1 mm, 2 mm, and 3 mm OD tubing

With these new reducing unions, metric tubing can be connected to imperial fittings, valves, and chromatographic systems. The unions are manufactured from Type 303 stainless steel.

For easy identification, the metric end is marked by a groove.

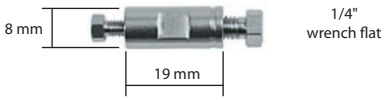
Two nuts and ferrules ship with each reducing union.

SPECS

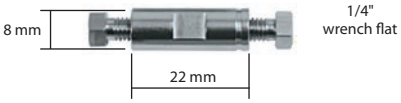
- Material:
  Body Type 303 SS
  Nuts Type 303 SS
  Ferrules 316 SS
- Tube reducing OD
  1/32" to 1.0 mm
  1/16" to 2.0 mm
  1/8" to 3.0 mm
- Pressure rating: 1375 bar (20,000 psi) *(Varies with tubing material and ID)*

Description	*Bore (mm)*	*Threads*	*Qty/pkg*	*Product No.*
Reducing union				
1/32" to 1.0 mm	0.25	6-40 to 10-32	1	JR-096
1/16" to 2.0 mm	0.75	10-32	1	JR-082
1/8" to 3.0 mm	0.75	5/16-24	1	JR-086

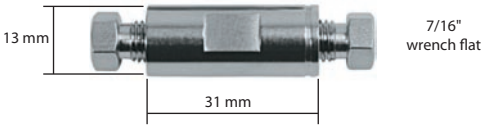
Description	*Size*	*Threads*	*Qty/pkg*	*Product No.*
Replacement nut	1/32"	6-40	5	JR-ZN.5-5
	1/16"	10-32	5	JR-ZN1-5
	1/8"	5/16-24	5	JR-ZN2-5
	for 1.0 mm	10-32	5	JR-ZN1-5
	for 2.0 mm	10-32	5	JR-80-5
	for 3.0 mm	5/16-24	5	JR-ZN2-5
Replacement ferrule	1/32"		5	JR-ZF.5S6-5
	1/16"		5	JR-ZF1S6-5
	1/8"		5	JR-ZF2S6-5
	1.0 mm	*NEW*	5	JR-097-5
	2.0 mm	*NEW*	5	JR-083-5
	3.0 mm	*NEW*	5	JR-087-5



1/32" to 1.0 mm



1/16" to 2.0 mm



1/8" to 3.0 mm

WRENCH SIZE FOR BODY FLAT

Wrench size	*Reducing union*	*P/N*
1/4"	1/32" to 1.0 mm	JR-096
1/4"	1/16" to 2.0 mm	JR-082
7/16"	1/8" to 3.0 mm	JR-086

Metric ferrules

High pressure fittings

NANOVOLUME® FITTINGS ■ FOR 360 MICRON AND 1/32" TUBING

VICI Nanovolume® fittings generally have bore sizes of 100-150 µm (.004" - .006"), with some as small as 50 µm (.002"). The minimal transfer volume contributed by Nanovolume® components makes them especially beneficial in applications with flow rates in the µl/min range, when the transfer volume can be critical.

High pressure Nanovolume® fittings index

1/32" Nanovolume® Fittings

Nuts, ferrules, unions, reducing unions 37

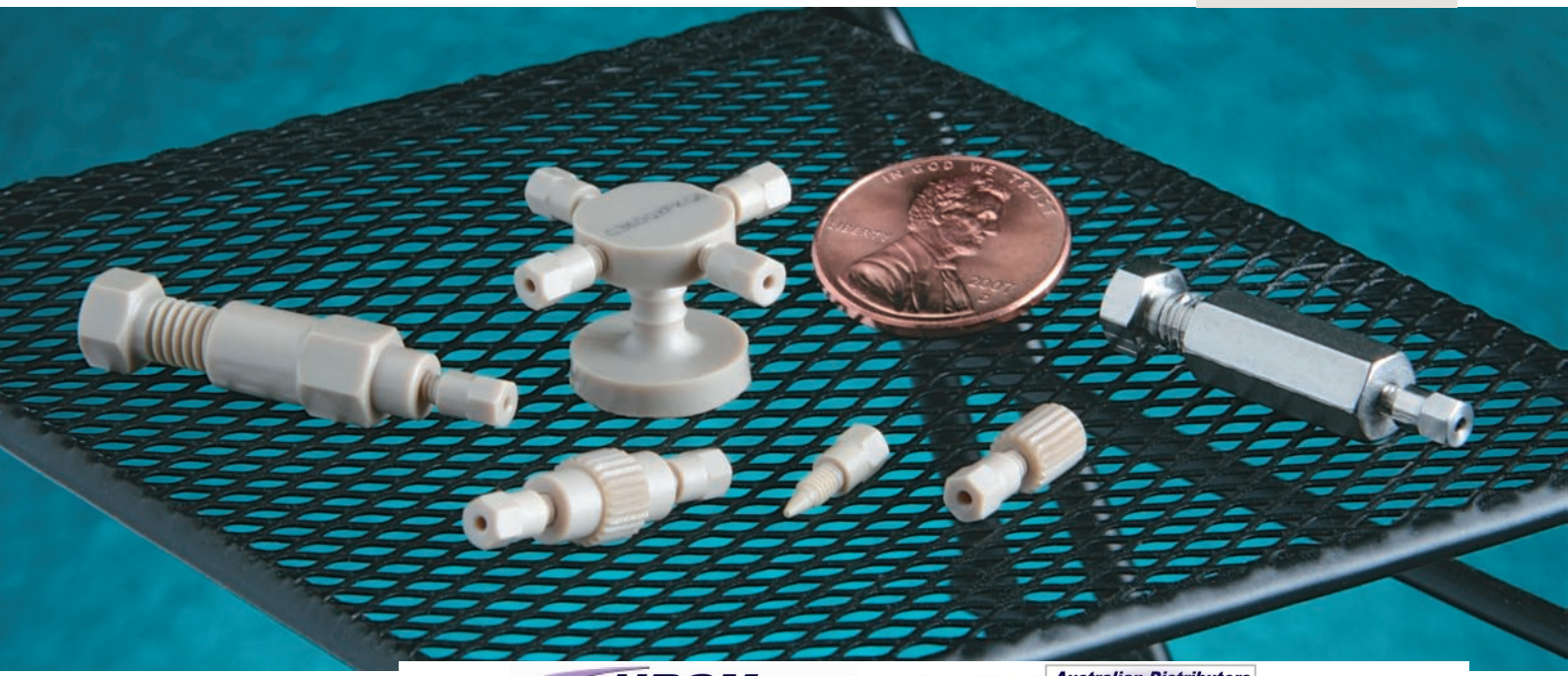
1/32" fittings, with 100 µm or 150 µm bore, are ideal for high resolution capillary chromatography. Rated at 5,000 psi with fingertight nuts, they will remain leak-tight well beyond the burst strength of most PEEK tubing. These fittings are machined from high quality inert polymers to the same exacting tolerances as our popular Valco zero dead volume fittings, and the taper angle and detail design conform to the industry standard established by the Valco line.

360 Micron Nanovolume® Fittings

For PEEK or FS tubing, <10K psi 38
For fused silica tubing, 10K psi 39
For metal tubing, <20K psi. 39

Our newest high pressure fittings permit direct connection of 360 micron OD fused silica, PEEK, stainless, or electroformed nickel tubing without the use of liners. The ferrule snaps into the nut so that the fitting is "one-piece", but the ferrule remains free to rotate as the nut is tightened so that the tube doesn't twist. Because of the compact size and fine 2-56 threads, a leak-free connection that seals at pressures in excess of 20,000 psi can be easily formed with the available manual tool.

DISCLAIMER
The maximum holding pressure for any type of connections involving tubing and a ferrule varies considerably with the tubing material, the ferrule material, the clearance between tubing OD and ferrule ID, and the shape of the fitting detail.



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- 100 and 150 µm bores available
- Nuts, ferrules, and unions
- For PEEK tubing

VICI Nanovolume® fittings are designed for capillary LC, used in HTS techniques, proteomics, genomics, and other newer developments in industrial research requiring small sample size for reduction of analysis time.

VICI Nanovolume connectors include our one-piece fingertight fittings for 1/32" OD tubing, featuring our patented* collapsible ferrule. PEEK ferrules for use with our external nuts also feature the collapsible, grooved design. To avoid potential confusion, all fittings utilizing the Cheminert collapsible ferrule are made of black PEEK; fittings with a standard Valco ZDV fitting detail are natural PEEK.

VICI Nanovolume fittings are as easy to handle as our standard analytical fittings and unions. The only difference is their size.

*U.S. patent no. 6,575,501.

Nanovolume® fittings

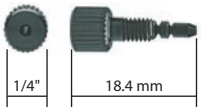
1/32"

The internal nut includes a collapsible ferrule as an integral part of the fitting; the external nut must be used with the separate ferrule listed below.

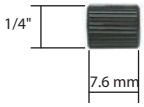
Description	*Tubing OD*	*Product No.*	
One-piece nut/ferrule	1/32"	JR-C-NNFFPK	
External nut	1/32" 1/16"	JR-C-EN.5FPKB JR-C-EN1FPKB	
Ferrule, collapsible	1/32" 1/16"	JR-ZGF.5PK JR-ZGF1PK	
Bore size:	*Tubing OD*	**100 micron** *Product No.*	**150 micron** *Product No.*
Union (external to internal)	1/32"	JR-C-NEU.5XFPK	JR-C-NEU.5FPK
Reducing union	1/16" to 1/32"	—	JR-C-NERU1FPK

SPECS

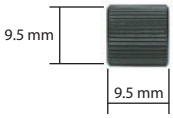
- For 1/32" OD PEEK
- Material: PEEK
- Threads:
  Nut/ferrule 6-40
  External nut
  1/32" 8-36
  1/16" 10-32
- Pressure rating: <350 bar (5,000 psi) *(Varies with tubing material and ID)*
- Tolerances: ±0.05mm (.002")



Nut/ferrule



1/32" external nut



1/16" external nut

1/32" union

1/16" to 1/32" reducing union

Liners for 1/32" connectors

for use with fused silica tubing

Use these natural PEEK liners to adapt 1/32" connectors to the most common sizes of fused silica tubing. The 27 mm liners are for internal nuts with collapsible ferrules. 10 mm liners are for use with external nuts. Sold in packages of 5.

27 mm liners
Use with internal nuts JR-C-NNFFPK or JR-C-NNFLFPK

For tubing OD	*Prod No*
125 - 175 µm	JR-C-NL.15L-5
175 - 225 µm	JR-C-NL.20L-5
225 - 275 µm	JR-C-NL.25L-5
275 - 325 µm	JR-C-NL.30L-5
325 - 375 µm	JR-C-NL.35L-5

10 mm liners
Use with external nut JR-C-EN.5FPKB

For tubing OD	*Prod No*
125 - 175 µm	JR-C-NL.15S-5
175 - 225 µm	JR-C-NL.20S-5
225 - 275 µm	JR-C-NL.25S-5
275 - 325 µm	JR-C-NL.30S-5
325 - 375 µm	JR-C-NL.35S-5

MORE INFORMATION

360 µm Nanovolume® fittings 38-39

CONVERSIONS

50 µm	=	.002"
100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"

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- For direct connection of 360 µm tubing
- Work with metal, fused silica, or PEEK
- Up to 20,000 psi with metal tubing
- Snap-in rotating ferrule for "one-piece" fitting with no tubing twist
- Eliminate use of troublesome liners

Our high pressure fittings permit direct connection of 360 micron OD fused silica, PEEK, stainless, or electroformed nickel tubing without the use of liners. The ferrule snaps into the nut so that the fitting is "one-piece", but the ferrule remains free to rotate as the nut is tightened so that the tube doesn't twist. Because of the compact size and fine 2-56 threads, a leak-free connection that seals at pressures in excess of 20,000 psi can be easily formed with the available manual tool.

VICI Nanovolume® 360 µm fittings are dedicated for use with either fused silica, metal, or PEEK tubing; components cannot be mixed or used with a different tubing material.

Tees and crosses offer a choice of three bore sizes, and feature a "quick-mount" base with adhesive backing to make sure that the fitting is stable and fragile tubing doesn't get broken. There is also a quick-mount PEEK union.

For PEEK or fused silica tubing — up to 10,000 psi

360 µm

SPECS
- For PEEK or FS tubing, 360 µm
- Material: PEEK
- Threads: 2-56
- Pressure rating: <689.5 bar (10,000 psi) *(Varies with tubing material and ID)*

These fittings are constructed from premium grade natural PEEK material. They are intended for use with PEEK or fused silica tubing at pressures up to 10,000 psi, or the maximum pressure for which the tubing is rated, whichever is lower. Quick-mount versions have integral base with double stick tape to secure fittings to a surface.

		Product No.
Nut/ferrule		JR-C360NFPK
Cap		JR-C360CPK
Plug		JR-C360PPK
Tightening tool		JR-C360ET

Bore size:	**50 micron** *Product No.*	**100 micron** *Product No.*	**150 micron** *Product No.*
Union	JR-C360UPK2	JR-C360UPK4	JR-C360UPK6
Reducing union, 1/16" to 360 µm	—	—	JR-C360RU1PK6
Union, quick mount	JR-C360QUPK2	JR-C360QUPK4	JR-C360QUPK6
Tee, quick mount	JR-C360QTPK2	JR-C360QTPK4	JR-C360QTPK6
Cross, quick mount	JR-C360QXPK2	JR-C360QXPK4	JR-C360QXPK6

360 µm union

1/16" to 360 µm reducing union

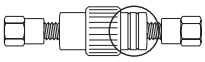
Union, quick mount

Tee, quick mount

Cross, quick mount

TECH TIP
360 micron fittings are dedicated for use with either fused silica, metal, or PEEK tubing. Components cannot be mixed or used with a different tubing material.

TECH TIP
Grooves on the fitting body indicate the bore size:



Grooves indicate bore size
1 groove: 50 µm
2 grooves: 100 µm
no grooves: 150 µm

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For fused silica tubing — 10,000 psi and above

360 µm

These fittings are constructed from HPLC grade stainless steel, with stainless steel nut and a special ferrule which is precision machined from electroformed nickel. For optimal sealing characteristics, the ferrule is gold plated.

	Product No.
Nut/ferrule	JR-C360NFFS
Cap	JR-C360CFS

Bore size:	**50 micron** *Product No.*	**100 micron** *Product No.*	**150 micron** *Product No.*
Union	JR-C360UFS2	JR-C360UFS4	JR-C360UFS6
Reducing union, 1/32" to 360 µm	JR-C360RU.5FS2	JR-C360RU.5FS4	JR-C360RU.5FS6
Reducing union, 1/16" to 360 µm	—	—	JR-C360RU1FS6

360 µm union

1/32" to 360 µm reducing union

1/16" to 360 µm reducing union

SPECS

- For FS tubing, 360 µm
- Materials
  Body and nut: HPLC grade SS
  Ferrule: Gold-plated nickel
- Threads: 2-56
- Pressure rating: ≥ 689.5 bar (10,000 psi) *(Varies with tubing material and ID)*

For metal tubing — up to 20,000 psi

360 µm

Our highest pressure Nanovolume® fittings are constructed of HPLC grade stainless steel, including stainless steel nut and ferrule. These fittings are optimized for use with stainless or electroformed nickel tubing.

	Product No.
Nut/ferrule	JR-C360NFS6
Cap	JR-C360C

Bore size:	**50 micron** *Product No.*	**100 micron** *Product No.*	**150 micron** *Product No.*
Union	JR-C360US62	JR-C360US64	JR-C360US66
Reducing union, 1/32" to 360 µm	JR-C360RU.5S62	JR-C360RU.5S64	JR-C360RU.5S66
Reducing union, 1/16" to 360 µm	—	—	JR-C360RU1S66

360 µm union

1/32" to 360 µm reducing union

1/16" to 360 µm reducing union

SPECS

- For metal tubing, 360 µm
- Materials
  HPLC grade SS
- Threads: 2-56
- Pressure rating: <1375 bar (20,000 psi) *(Varies with tubing material and ID)*

MORE INFORMATION

1/32" Nanovolume® fittings 37

CONVERSIONS

50 µm	=	.002"
100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"

Low pressure fittings

POLYMERIC

Our low pressure fittings are ideally suited for flow injection analysis, low pressure liquid chromatography, and stream sampling devices. They may be safely used at pressures up to 500 psi and temperatures to 50°C.

Low pressure polymeric fittings index

Nuts, ferrules, and washers for 1/4-28 flat-bottom fitting details

PPS hex head nuts
- Flangeless ..... page 41
- Flanged 41

Flangeless ferrules
- Collapsible 41
- Inverted 41

Flangeless nuts
- PPS hex-head 41
- PEEK fingertight nuts 42
- Color-coded polyacetal fingertight nuts ... 42

Flanged color-coded polypropylene fingertight nuts 43

Unions and reducing unions

Union body, polyamide 43
PEEK unions 44
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Tees, crosses, and manifolds

Tees 46
Biocompatible mixing tee 47
Crosses 46
Manifolds with 5 and 9 ports 46

Plugs

10-32 and 1/4-28 polypropylene plugs 48

Adapters, polypropylene 48

A wide offering of adapters, including male and female Luer to barbed, 10-32, and 1/4-28 male and female, plus many other combinations.

Micro valves for LC and GC 49

Simplify your liquid or gas handling application. The unique design of the fitting detail allows a leak-free seal with no potential for rotor damage from overtightening.

Peristaltic tubing adapter set 49

Connect soft tubing to PTFE and PTFE-like tubing with this biocompatible adapter set, which works with peristaltic tubing up to 4.50 mm OD.

FITTING DESIGNS

VICI Jour offers two types of low pressure fittings for 1/4-28 flat-bottomed fitting details:

- **Flangeless** connections utilize several ferrule designs. The ferrule grips the tubing as the fitting is tightened, without significantly reducing the tubing ID.
- **Flanged** tube end fittings are retained on polymeric tubing by a flange formed around a polypropylene washer. The washer never comes in contact with the mobile phase.

DISCLAIMER

The maximum holding pressure for any type of connections involving tubing and a ferrule varies considerably with the tubing material the ferrule material, the clearance between tubing OD and ferrule ID, and the shape of the fitting detail.

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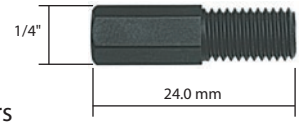
- Economically priced alternative to PEEK
- Excellent chemical resistance
- For 1/16" or 1/8" OD tubing
- Fingertight when used with Color-Sleeve adapters

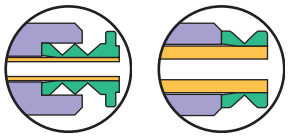


Our PPS 1/4-28 fitting series offers excellent chemical and pressure resistance. Three different sealing options are available.

PPS hex-head nuts and collapsible ferrules (flangeless) *1/4-28*

Patented* collapsible ferrules are not included. Order separately.

* Patent No. 6,575,501



Description	*Material*	*Tubing OD*	*Qty/pkg*	*Product No.*
Nut for use with collapsible ferrule	PPS	1/16"	10	JR-55050-10
		1/8"	10	JR-55051-10
Collapsible ferrules	CTFE	1/16"	10	JR-CFL-CB1KF
		1/8"	10	JR-CFL-CB2KF
	PEEK	1/16"	10	JR-CFL-CB1PK

SPECS

- For 1/16" and 1/8" OD tubing
- Threads: 1/4-28
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

(Varies with tubing material and ID)

- * Patent No. 6,575,501

PPS hex-head nuts and inverted ferrules (flangeless) *1/4-28*

Ferrules are not included. Order separately.

Description	*Material*	*Tubing OD*	*Qty/pkg*	*Product No.*
Nut for use with inverted ferrule	PPS	1/32"	10	JR-55073-10
		1/16"	10	JR-55070-10
		1/8"	10	JR-55071-10
		1.0 mm	10	JR-55073-10
		2.0 mm	10	JR-55072-10
Inverted ferrules	ETFE	1/32" ***NEW***	10	JR-032-10
		1/16"	10	JR-041-10
		1/8"	10	JR-051-10
		1.0 mm ***NEW***	10	JR-031-10
		2.0 mm ***NEW***	10	JR-042-10
		3.0 mm ***NEW***	10	JR-049-10

SPECS

- For 1/32"–1/8"OD tubing
- Threads: 1/4-28
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

(Varies with tubing material and ID)

PPS hex-head nuts and washers (flanged connections) *1/4-28*

Washers are not included. Order separately.

Description	*Material*	*Tubing OD*	*Qty/pkg*	*Product No.*
Nut for flange/ washer connection	PPS	1/16"	10	JR-55060-10
		1/8"	10	JR-55061-10
Washer	PP	1/16"	10	JR-201926-10
		1/8"	10	JR-201928-10
Easy-Flange kit *(see page 85)*				JR-201540

SPECS

- For 1/16" and 1/8" OD tubing
- Threads: 1/4-28
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

(Varies with tubing material and ID)

HIGH PRESSURE 1/4-28 NUTS AND FERRULES

A PPS nut, PEEK ferrule, and stainless steel bushing allow a high pressure connection in a 1/4-28 flat-bottomed fitting detail. 25

TECH TIP

Color-Sleeve adapters turn PPS nuts into fingertight fittings and color-code different solvent lines. 17

CHEMICAL RESISTANCE OF PPS

A = suitable
B = marginal
C = not recommended

Chemical class	Resistance
Acids, organic	A
Acids, inorganic	B/C*
Aldehydes	A
Alcohols	A
Bases	B
Esters	A
Halogenated org.	A/B
Hydrocarbons	A
Ketones	A

* Concentrated halogen acids

See detailed chemical resistance chart 96-98

MORE INFORMATION

About polymers . . . 99-100

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PEEK fingertight nuts (flangeless) *1/4-28*

SPECS
- For 1/16" and 1/8" OD tubing
- Materials
  Nut: PPS
  Ferrules: ETFE
- 1/4-28 threads
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

(Varies with tubing material and ID)

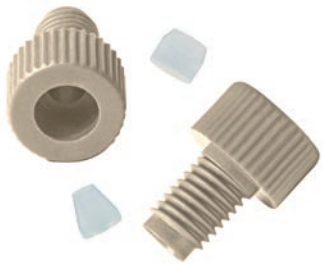
- Compatible with all 1/4-28 flat-bottom ports
- Excellent chemical resistance
- For 1/16" or 1/8" OD tubing
- True fingertight – no tools required

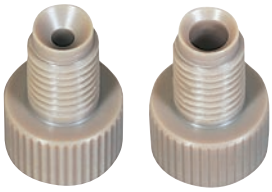
PEEK flangeless nuts in combination with our inverted ferrule do not a require flanging tool. A hand-tightening procedure makes leak-free seals.

With this fitting system, the inert ETFE ferrule is the only part besides the tubing which comes into contact with the fluid stream – the nut is never in contact.

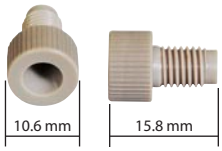
Ferrules are not included. Order separately.

Tubing OD: *Description*	*Material*	*Qty/pkg*	**1/16"** *Product No.*	**1/8"** *Product No.*
Nut for use with inverted ferrule	PEEK	10	JR-20124-10	JR-20116-10
Inverted ferrules	ETFE	10	JR-041-10	JR-051-10





1/16" **1/8"**



Color-coded fingertight nuts (flangeless) *1/4-28*

SPECS
- For 1/16" and 1/8" OD tubing
- Materials
  Nut: Polyacetal
  Ferrules: ETFE
- 1/4-28 threads
- Pressure rating:

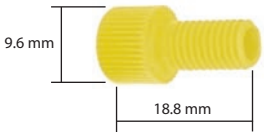
OD	Bar	Psi
1/16"	70	1000
1/8"	35	500

(Varies with tubing material and ID)

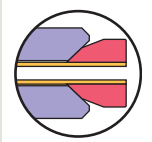
- Polyacetal – economical alternative to PEEK
- Compatible with all 1/4-28 flat-bottom ports
- For 1/16" or 1/8" OD tubing
- True fingertight – no tools required

Polyacetal flangeless nuts in combination with the inverted ferrule do not require a flanging tool. A hand-tightening procedure makes leak-free seals. With this fitting system, the inert ETFE ferrule is the only part besides the tubing which comes into contact with the fluid stream – the nut is never in contact. Six colors are available.

Tubing OD: *Description*	*Color*	*Qty/pkg*	**1/16"** *Product No.*	**1/8"** *Product No.*
Nuts	Green	10	JR-040GR-10	JR-050GR-10
	Blue	10	JR-040BL-10	JR-050BL-10
	Yellow	10	JR-040YL-10	JR-050YL-10
	Red	10	JR-040RE-10	JR-050RE-10
	White	10	JR-040WH-10	JR-050WH-10
	Black	10	JR-040BK-10	JR-050BK-10
1" long nuts	White	10	JR-040WL-10	JR-050WL-10
Inverted ETFE ferrules		10	JR-041-10	JR-051-10



TECH TIP
The inert ETFE ferrule used with these nuts is the only part besides the tubing which is in contact with the fluid stream.



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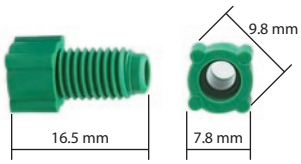
Color-coded fingertight nuts (flanged connections) *1/4-28*

- For flanged connections
- Compatible with all 1/4-28 flat-bottom ports
- For 1/16" or 1/8" OD tubing
- Fiberglass-reinforced PP with PP washers

For those systems requiring or preferring flanged connections, use these fiberglass-reinforced fittings with our Easy-Flange flanging tool and polypropylene washers to make a clean connection. The flange on the tubing ensures that the washer never comes in contact with the mobile phase.

Six colors are available.

SPECS
- For 1/16" and 1/8" OD tubing
- Material: Fiberglass-reinforced polypropylene
- 1/4-28 threads
- Pressure rating: <30 bar (435 psi) *(Varies with tubing material and ID)*



Tubing OD:			**1/16"**	**1/8"**
Description	*Color*	*Qty/pkg*	*Product No.*	*Product No.*
Nuts	Green	10	JR-202123-10	JR-202143-10
	Blue	10	JR-202122-10	JR-202142-10
	Yellow	10	JR-202124-10	JR-202144-10
	Red	10	JR-202125-10	JR-202145-10
	White	10	JR-201094WH-10	JR-201580WH-10
	Black	10	JR-201094BK-10	JR-201580BK-10
1" long nuts	White	10	JR-202120-10	JR-202119-10
	Black	10	JR-202118-10	JR-202121-10
Polypropylene washer		10	JR-201926-10	JR-201928-10

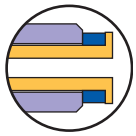
Union body for flanged connections *1/4-28*

- Through bore low pressure union
- For flanged 1/4-28 flat-bottom connections
- For 1/16" or 1/8" OD tubing
- Completely inert and biocompatible

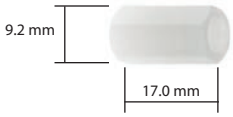
Flanged fittings are not included.

Order PPS hex-head flanged nuts or color-coded fingertight flanged nuts separately.

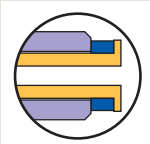
SPECS
- For 1/16" and 1/8" OD tubing
- Material: Polyamide
- 1/4-28 threads



Description	*Qty/pkg*	*Product No.*
Union body, polyamide	5	JR-060-5



TECH TIP
Use our Easy-Flange kit for forming flanges on tubing 85



PEEK unions

1/4-28

SPECS

- For 1/16" and 1/8" OD tubing
- Materials
  Body: PEEK
  Nut: PPS
  Ferrules: ETFE
- 1/4-28 threads
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

(Varies with tubing material and ID)

- For easy connection of low pressure solvent lines
- Low dead volume
- For 1/16" or 1/8" OD tubing
- Flat-bottomed 1/4-28 fitting details
- Completely inert and biocompatible

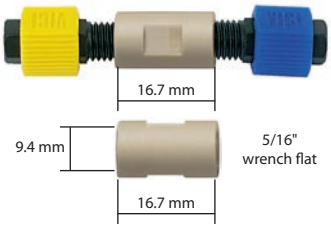
These unions facilitate the quick and reliable connection of two pieces of 1/16" or 1/8" OD tubing. Use with color-coded adapters for easy solvent line identification.

These are available as the body only, or complete with fittings.

A union with fittings includes:

- PEEK low pressure union
- 2 PPS flangeless hex-head nuts
- ETFE inverted ferrules
- Color-Sleeve adapters

	Bore (mm)	Tubing OD	Qty/pkg	Product No.
Union, with fittings	0.50	1/16"	1	JR-1064
	0.75	1/8"	1	JR-1068
	1.30	1/8"	1	JR-1065
Body only	0.50	1/16"	1	JR-064
	0.75	1/8"	1	JR-068
	1.30	1/8"	1	JR-065



Spare parts	Tubing OD	Qty/pkg	Product No.
PPS flangeless nuts	1/16"	10	JR-55070-10
	1/8"	10	JR-55071-10
Inverted ETFE ferrules	1/16"	10	JR-041-10
	1/8"	10	JR-051-10

TECH TIP

While our PEEK unions are typically used with inverted ferrules, collapsible ferrules or flanged connections can also be used.

Standard: Inverted ferrule

Collapsible ferrule

Flanged

PEEK bulkhead unions

1/4-28

SPECS

- For 1/16" and 1/8" OD tubing
- Materials
  Body: PEEK
  Nut: PPS
  Ferrules: ETFE
- 1/4-28 threads
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

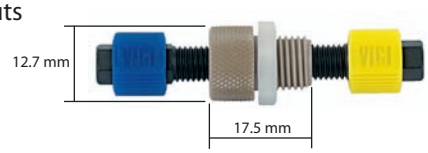
(Varies with tubing material and ID)

- Panel mounting (10 mm hole required, max 9 mm thick)
- For easy connection of low pressure solvent lines
- Low dead volume
- For 1/16" or 1/8" OD tubing
- Completely inert and biocompatible

Bulkhead unions are designed to be mounted through an instrument panel or on a bracket.

They are sold complete with fittings, and include:

- 2 PPS flangeless hex-head nuts
- 2 ETFE inverted ferrules
- 2 Color-Sleeve adapters



	Bore (mm)	Tubing OD	Qty/pkg	Product No.
Bulkhead union, with fittings	0.75	1/16"	1	JR-CBUMPK
	1.50	1/8"	1	JR-CBULPK

Spare parts	Tubing OD	Qty/pkg	Product No.
PPS flangeless nuts	1/16"	10	JR-55070-10
	1/8"	10	JR-55071-10
Inverted ETFE ferrules	1/16"	10	JR-041-10
	1/8"	10	JR-051-10

TECH TIP

Use our impermeable tubing to avoid gas diffusion in the solvent lines 13

RELATED PRODUCTS

Color-coded fingertight flanged nuts. 43
Color-Sleeve adapters, in 12 colors 17
High pressure PEEK unions 26
PPS hex-head flanged nuts. 41

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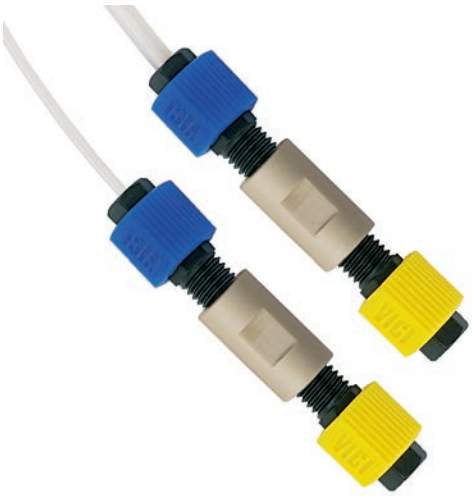


PEEK reducing unions *NEW* *Imperial to metric, 1/4-28*

- Connects 1/16", 1/8", 1 mm, 2 mm, and 3 mm OD polymeric tubing
- Completely inert and biocompatible

With these new reducing unions, metric tubing can be connected to imperial fittings on valves and LC systems.

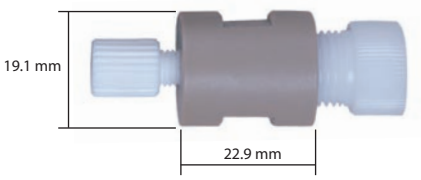
A reducing union with fittings includes:
- PEEK low pressure reducing union
- 1 PPS flangeless hex-head nut, imperial size noted
- 1 PPS flangeless hex-head nut, metric size noted
- ETFE inverted ferrules
- Color-Sleeve adapters

Tubing OD	*Bore (mm)*	*Qty/pkg*	*Product No.*
Reducing union, with fittings			
1/32" to 1 mm	0.50	1	JR-0640
1/16" to 2 mm	0.75	1	JR-0680
1/8" to 3 mm	1.30	1	JR-0650

Spare parts	*Tubing OD*	*Qty/pkg*	*Product No.*
PPS flangeless nuts	1/16"	10	JR-55070-10
	1/8"	10	JR-55071-10
	1.0 mm/ 1/32"	10	JR-55073-10
	2.0 mm	10	JR-55072-10
Inverted ETFE ferrules	1/32"	10	JR-032-10
	1/16"	10	JR-041-10
	1/8"	10	JR-051-10
	1.0 mm	10	JR-031-10
	2.0 mm	10	JR-042-10
	3.0 mm	10	JR-049-10

Metric ferrules

SPECS
- For 1/32"–1/8"OD tubing, flangeless connections
- Materials
  Body: PEEK
  Nuts: PPS
  Ferrules: ETFE
- 1/4-28 threads
- Pressure rating: ≤48 bar (700 psi) *(Varies with tubing material and ID)*



PEEK reducing unions *Imperial, 1/2-20 to 1/4-28*

- Connects 1/4" and 1/8" OD tubing
- Low dead volume
- Completely inert and biocompatible

PEEK reducing unions are sold complete with fittings, and include:
- One 1/8" flangeless nut, white polypropylene
- One 1/8" ferrule, CTFE
- One 1/4" flangeless nut, polyacetal
- One 1/4" ferrule, CTFE

	Bore (mm)	*Tubing OD*	*Qty/pkg*	*Product No.*
Reducing union with fittings	1.5	1/4" to 1/8"	1	JR-CU4LPK

Spare parts

Tubing OD	*Description*	*Qty/pkg*	*Product No.*
1/8″	Flangeless nut, white propylene	1	JR-CFL-2W-S
	Ferrule, CTFE	1	JR-CFL-CB2KF-S
1/4″	Flangeless nut, polyacetal	1	JR-CFL-4D
	Ferrule, CTFE	1	JR-CFL-CB4KF-S

SPECS
- For 1/4" to 1/8" OD tubing, flangeless connections
- Materials
  Body: PEEK
  Nuts:
  1/8" PP
  1/4" Polyacetal
  Ferrules: CTFE
- Threads: 1/2-20 to 1/4-28
- Pressure rating: <35 bar (500 psi) *(Varies with tubing material and ID)*

TECH TIP
While our PEEK bulkhead unions are typically used with inverted ferrules, collapsible ferrules or flanged connections can also be used.

RELATED PRODUCTS
Color-Sleeve adapters, in 12 colors 17

PEEK tees, crosses, and manifolds

1/4-28

SPECS

- For 1/16" and 1/8" OD tubing
- Materials
  Body: PEEK
  Nut: PPS
  Ferrules: ETFE
- 1/4-28 threads
- Body sizes: see chart below
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

(Varies with tubing material and ID)

- For 1/16" or 1/8" OD tubing
- Flat-bottomed 1/4-28 fitting details
- Completely inert and biocompatible

These VICI Jour connectors for low pressure applications are machined from PEEK. The bodies have 1/4-28 female ports which accept any flanged or flangeless fittings for 1/8" or 1/16" OD tubing.

Choose smaller through-holes for applications where low flowrate or low dead volume is required. Fittings with 1.50 mm through-holes are preferred for high flowrate applications.

These are available as the body only, or complete with fittings.

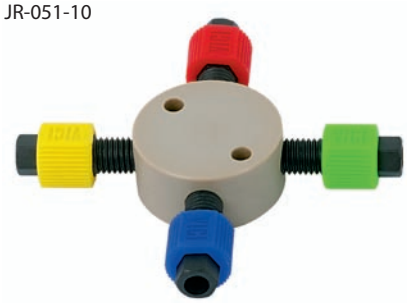
The appropriate number of the following are included when fittings are ordered:

- PPS flangeless hex-head nuts
- ETFE inverted ferrules
- Color-Sleeve adapters

Sold individually.

		Tubing OD	Bore (mm)	With fittings Product No.	Body only Product No.
Tees		1/16"	0.50	JR-6029	JR-6034
			0.80	JR-6030	JR-6032
		1/8"	1.50	JR-6031	JR-6033
Crosses		1/16"	0.50	JR-6039	JR-6044
			0.80	JR-6040	JR-6042
		1/8"	1.50	JR-6041	JR-6043
Manifolds	5 ports	1/16"	0.75	JR-C5M1PK	JR-B-C5M1PK
		1/8"	1.50	JR-C5M2PK	JR-B-C5M2PK
	9 ports	1/16"	0.75	JR-C9M1PK	JR-B-C9M1PK
		1/8"	1.50	JR-C9M2PK	JR-B-C9M2PK

Spare parts	*Tubing OD*	*Qty/pkg*	*Product No..*
PPS flangeless nuts	1/16"	10	JR-55070-10
	1/8"	10	JR-55071-10
Inverted ETFE ferrules	1/16"	10	JR-041-10
	1/8"	10	JR-051-10



BODY SIZES

	Diameter	*Thickness*
Tees	25.0 mm	17.1 mm
Crosses	25.0 mm	17.1 mm
Manifolds		
5 ports	25.0 mm	17.1 mm
9 ports	25.0 mm	28.6 mm

TECH TIP

While our PEEK tees and crosses are typically used with inverted ferrules, collapsible ferrules or flanged connections can also be used.

Standard: Inverted ferrule

Collapsible ferrule

Flanged

TECH TIP

Use our impermeable tubing to avoid gas diffusion in the solvent lines 13

RELATED PRODUCTS

Color-Sleeve adapters, in 12 colors 17
High pressure PEEK tees 28
PPS hex-head flanged nuts 41

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PEEK mixing tees

1/4-28

- For 1/16" or 1/8" OD tubing
- Mountable
- Completely inert and biocompatible

A unique mixing results from the the turbulence created by the introduction angle of the solvents. The mixing is much more thorough than with a conventional tee.

Typically our inverted ferrules are used in these fittings, but the 1/4-28 flat-bottomed details will also accept collapsible ferrule or flanged fittings.

These are available as the body only, or complete with fittings. A mixing tee with fittings includes:

- 3 PPS flangeless hex-head nuts
- 3 ETFE inverted ferrules
- 3 Color-Sleeve adapters

Sold individually.

	Tubing OD	*Bore (mm)*	*Product No..*
Mixing tee, with fittings	1/16"	0.75	JR-CM1XPK
	1/8"	1.50	JR-CM2XPK
Body only	1/16"	0.75	JR-B-CM1XPK
	1/8"	1.50	JR-B-CM2XPK
Spare parts	*Tubing OD*	*Qty/pkg*	*Product No..*
PPS flangeless nuts	1/16"	10	JR-55070-10
	1/8"	10	JR-55071-10
Inverted ETFE ferrules	1/16"	10	JR-041-10
	1/8"	10	JR-051-10

SPECS

- For 1/16" and 1/8" OD tubing
- Materials
  Body: PEEK
  Nut: PPS
  Ferrules: ETFE
- 1/4-28 threads
- Pressure rating:

OD	Bar	Psi
1/16"	105	1500
1/8"	35	500

(Varies with tubing material and ID)

- Mixing volume

Bore	*Volume*
0.75 mm	25 µl
1.50 mm	100 µl

RELATED PRODUCTS

Color-Sleeve adapters, in 12 colors 17

Polypropylene plugs

1/4-28 or 10-32

SPECS
- Material: Polypropylene
- 10-32 or 1/4-28 threads

Sold in packages of 10.

Description		*Product No.*
10-32 male		JR-072450-10
1/4-28 male		JR-072350-10
1/4-28 male, flat bottom		JR-201999-10

Polypropylene adapters

SPECS
- Material: Polypropylene

Sold in packages of 10.

Inlet		*Outlet*			*Product No.*
Male	Luer	Barbed	1/16"		JR-070211-10
			3/32"		JR-070212-10
			1/8"		JR-070213-10
		Male	10-32		JR-070224-10
			1/4-28		JR-070225-10
Male	1/4-28	Barbed	1/16"		JR-071123-10
			1/8"		JR-071323-10
Male	10-32	Barbed	1/16"		JR-071124-10
			1/8"		JR-071324-10
Female	Luer	Barbed	1/16"		JR-070111-10
			3/32"		JR-070112-10
			1/8"		JR-070113-10
		Female	Luer		JR-070101-10
		Male	10-32		JR-070124-10
			1/4-28		JR-070123-10

Sold individually.

Flat bottom	1/4-28	Barbed	1/8" ID		JR-075013

RELATED PRODUCTS

High pressure
PEEK adapters 29
High pressure plugs . . . 24

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Micro valves for GC and LC

1/4-28

- Compact 1" design
- Convenient panel mount, hole diameter 8 mm (0.3125"), 6 mm maximum thickness
- Biocompatible and inert
- Variety of configurations

Simplify your liquid or gas handling application with a VICI Jour sampling micro valve. The unique design of the fitting detail allows a leak-free seal with no potential for rotor damage from overtightening. Internal parts are PEEK and PTFE.

SPECS

- For 1/16" and 1/8" OD tubing
- Materials
  - *Wetted parts:* PEEK, PTFE
  - *Body:* POM
  - *Nuts:* PPS
  - *Ferrules:* CTFE
- 1/4-28 threads
- 1.50 mm bore
- Pressure rating: see notes at left

Includes flangeless PPS fittings and CTFE collapsible ferrules for 1/8" OD tubing. Sold individually.

		Product No.
"T" flow path	3 ports	JR-660100
	4 ports	JR-660110
180° flow path	2 ports	JR-660200
	4 ports	JR-660210
90° flow path	2 ports	JR-660300
	3 ports	JR-660310
	4 ports	JR-660320

"T" flow path

180° flow path

90° flow path

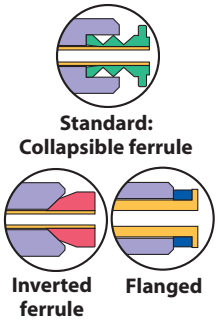
Spare parts	*Material*	*Tubing OD*	*Qty/pkg*	*Product No.*
Nuts	PPS	1/16"	10	JR-55050-10
		1/8"	10	JR-55051-10
Collapsible ferrules	PEEK	1/16"	10	JR-CFL-CB1PK
	CTFE	1/8"	10	JR-CFL-CB2KF

MICRO VALVE PRESSURE RATINGS

- 200 psi gas
  Tested with helium using 1/16" OD x 0.84 mm ID PTFE tubing with PEEK collapsible ferrules
- 500 psi liquid
  Tested with isopropanol using 1/8" OD x 0.75 mm ID PTFE tubing with CTFE collapsible ferrules

TECH TIP

While micro valves are typically used with collapsible ferrules, inverted ferrules or flanged connections can also be used.



TECH TIP

Use our impermeable tubing to avoid gas diffusion in the solvent lines 13

RELATED PRODUCTS

Color-Sleeve adapters, in 12 colors 17

High pressure PEEK tees. 28
PPS hex-head flanged nuts. 41

Peristaltic tubing adapter set

1/4-28

- For connecting soft tubing to PTFE and PTFE-like tubing
- Works with peristaltic tubing up to 4.50 mm OD
- For 1/16" and 1/8" PTFE and PTFE-like tubing
- Biocompatible
- Low dead volume

This "one-fits-all" set consists of everything needed to connect 1/16" or 1/8" OD PTFE and PTFE-like tubing to soft tubing (such as silicone), up to 4.5 mm in OD, minimum 0.5 mm ID.

The adapter includes:

- 3 different bushings (for the different soft tubing ODs)
- 2 PPS nuts (one each for 1/16" and 1/8" OD tubing)
- 2 ETFE inverted ferrules (one each for 1/16" and 1/8" OD tubing)
- 2 Color-Sleeve adapters

Sold individually.

SPECS

- For 1/16" and 1/8" OD tubing
- Materials
  - *Body:* PEEK
  - *Bushings:* PPS
  - *Nut:* PPS
  - *Ferrules:* ETFE
- 1/4-28 threads
- 1.50 mm bore
- Body size: 28 mm long 12 mm diameter.

	Product No.
PEEK adapter for peristaltic to PTFE tubing connection	JR-PTAS

Filters

AND MOBILE PHASE FILTERS

Filters trap foreign particulates from sample and mobile phase streams before they can damage valuable columns and instruments.

Filters index

Low pressure filters

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Filter/spargers
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High pressure filters

PEEK high pressure filters
- In-line filter kit 54
- Precolumn filter kit 55
- Sure-Guard 54

Stainless UHPLC filters 56
Stainless inline filter 57

In-line filter cartridges

Low pressure

SPECS
- Materials
  Cartridge: PTFE/CTFE
  Filter screen: 316 stainless
- 1/4-28 detail
- Dimensions
  OD 5.20 mm
  Thickness 2.03 mm
  Bore 0.8 mm
  Filter surface diameter 2 mm
- Tolerances
  ±0.05 mm (.002")

- Easy to replace
- Compact design
- Fit all 1/4-28 fitting details
- Three porosity options

These convenient-to-use filters can be simply dropped into any 1/4-28 fitting detail, such as in a union. The filters are constructed of PTFE and CTFE, with a Type 316 stainless low-pressure-drop screen. The inner design of the cartridge ensures the equal distribution of the solvent to the screen.

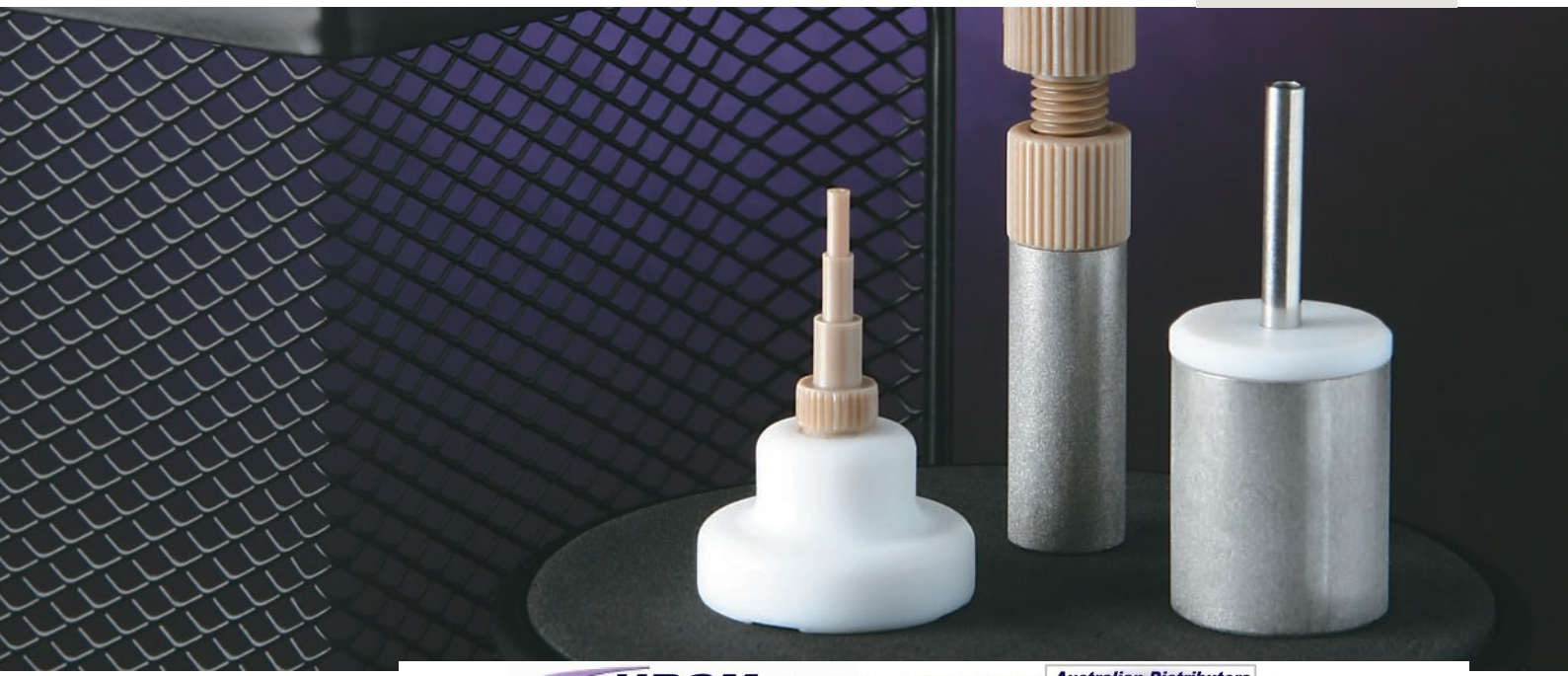
Pore size	*Maximum flow rate **	*Qty/pkg*	*Product No.*
2 µm	30 ml/min	5	JR-CFE-S2-5
10 µm	30 ml/min	5	JR-CFE-S10-5
75 µm	30 ml/min	5	JR-CFE-S75-5

NOTES
* Flowrate measured with methanol/water (1:1), ultrasonic degassed, helium sparging to prevent regassing.

TECH TIP
We recommend using these in-line filter cartridges in combination with our low pressure fittings:

PEEK unions 44
Tees and crosses 46
Manifolds 46
Micro valves 49

DISCLAIMER
The maximum holding pressure for any type of connections involving tubing and a ferrule varies considerably with the tubing material, the ferrule material, the clearance between tubing OD and ferrule ID, and the shape of the fitting detail.



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Last Drop mobile phase filters

Low pressure

- No loss of mobile phase
- Biocompatible PTFE frits or stainless steel frits
- Three porosity options
- Two connector types: stepped tubing and 1/4-28 fitting

The Last Drop mobile phase filter allows more analyses per batch of mobile phase and helps reduce hazardous waste. The flat filter element sits parallel to the bottom of the reservoir, allowing the Last Drop to filter all but the last 2% of the mobile phase from the reservoir without drawing air into the system. Compare this with conventional cylindrical filters that can begin to draw air into the system when nearly 10% of the solvent remains in the reservoir.

The Last Drop mobile phase filter consists of a 316 stainless steel, PTFE 2.5 µm, or a hydrophobic PE filter element pressed into an inert PTFE housing. The top of the housing has a 1/4-28 nut and ferrule or a stepped PEEK fitting connector which slips into 1.5, 2.2, or 3.5 mm ID pump inlet lines.

SPECS

- Materials
  Body: PTFE
  Frits: PTFE/ 316 SS/PE
- Stepped tubing version is for 1.5, 2.2, and 3.5 mm ID tubing
- Fitting version (for 1/8" OD tubing) includes PEEK 1/4-28 nut with ETFE ferrule

Connector type:			**Stepped tubing connector**	**Fitting connector**
Filter material	*Pore size*	*Maximum flow rate **	*Product No.*	*Product No.*
PTFE	2.5 µm	1.2 ml/min	JR-9000-0520	JR-9000-0520F
	5 µm	2.6 ml/min	JR-9000-0521	JR-9000-0521F
	10 µm	3.5 ml/min	JR-9000-0522	JR-9000-0522F
Polyethylene	10 µm	11 ml/min	JR-9000-0522H	JR-9000-0522HF
Stainless	2 µm	28 ml/min	JR-9000-0530	JR-9000-0530F
	5 µm	30 ml/min	JR-9000-0531	JR-9000-0531F
	10 µm	30 ml/min	JR-9000-0532	JR-9000-0532F

NOTES

* Flowrate measured with methanol/water (1:1), ultrasonic degassed, helium sparging to prevent regassing.

TECH TIPS

- Economy Last Drop mobile phase filters are easy to replace - easy to clean. Use ultrasound or replace with a new filter.
- Connect the Economy Last Drop filter with 1/8" OD/ 1.59 mm OD tubing:
  PFA tubing 9
  PTFE tubing 12
- We recommend metal-free PTFE or glass filters for sensitive biochromatography applications where metal surfaces may corrode or interact with samples.

RELATED PRODUCTS

Last Drop mobile phase filter/spargers 53

Economy Last Drop mobile phase filters

Low pressure

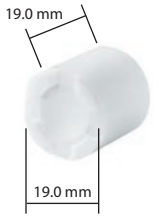
- Very competitively priced
- Biocompatible PTFE frits or stainless steel frits
- Three porosity options
- Two diameters

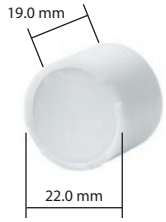
SPECS

- Materials
  Body: PTFE
  Frits: PTFE/ 316 SS
- For 1/8" OD tubing

Economy mobile phase filters come in two body diameters, for various dimensions of bottle necks. The filter body is made of PTFE, which is resistant to virtually all common mobile phases.

Frit material	*Body OD*	*Pore size*	*Maximum flow rate **	*Product No.*
PTFE	19 mm	2.5 µm	1.2 ml/min	JR-4676-2.5TF
		5 µm	2.6 ml/min	JR-4676-5TF
		10 µm	3.5 ml/min	JR-4676-10TF
	22 mm	2.5 µm	1.2 ml/min	JR-4677-2.5TF
		5 µm	2.6 ml/min	JR-4677-5TF
		10 µm	3.5 ml/min	JR-4677-10TF
Stainless steel	19 mm	2 µm	30 ml/min	JR-4676-2
		10 µm	30 ml/min	JR-4676-10
	22 mm	2 µm	30 ml/min	JR-4677-2
		10 µm	30 ml/min	JR-4677-10





Last Drop biocompatible glass mobile phase filters *Low pressure*

SPECS
- Materials
  Body: Glass
  Frit: Glass
- For use with 1/8" tubing

- The solution for biocompatibility and high flowrates
- Easy-push tubing connection

Because it has a glass frit, the flowrate can be much higher with this filter than with PTFE mobile phase filters. The glass foot allows withdrawal of nearly all of the mobile phase – less than 2% is left in the bottle.

Includes 1/8" tubing connector.

Frit material	*Pore size*	*Maximum flow rate **	*Product No.*
Glass	1.0 - 1.6 µm	30 ml/min	JR-9000-0520B
	10-16 µm	50 ml/min	JR-9000-0526G
	40-100 µm	200 ml/min	JR-9000-0528G

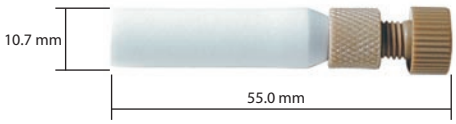
Replacement connectors

For tubing	Size	Qty/pkg	Product No.
1/8" OD	6.8 mm	1	JR-9000-0525GC

No-Met biocompatible mobile phase filters *Low pressure*

SPECS
- Materials
  Body: PTFE/ Polyethylene
  Adapter: PEEK
  Fitting: PEEK
  Ferrule: ETFE
- For use with 1/8" tubing

- Very competitively priced
- Inert and biocompatible
- Replacement filters
- Also recommended for IC



Stainless steel in the flowpath is not acceptable in a growing number of applications involving the separation of biomolecules. High salt buffers can corrode stainless steel, and the metal ions released from metallic filters may contaminate or otherwise react with the biomolecules of interest.

The No-Met polyethylene filter is designed for these applications, with inert polymeric fittings for 1/8" tubing and a 20 µm filter effectively eliminating metal contamination from the fluid path. Use them for IC and biochromatography applications.

No-Met filters can be used at flow rates up to 500 ml/min, measured with methanol/water (1:1), ultrasonically degassed. Flow rates can vary with solvent and tubing ID.

The economy version can easily be slipped over 1/8" OD tubing, with no fitting required.

Connection	*Filter material*	*Pore size*	*Maximum flow rate **	*Product No.*
1/4-28 nut and ferrule	PTFE	5 µm	2.2 ml/min	JR-32171
	Polyethylene	<20 µm	500 ml/min	JR-32178
Economy slip-on connection	Polyethylene	5 µm	300 ml/min	JR-32174

Replacement element

Filter material	*Pore size*	*Maximum flowrate **	*Product No.*
PTFE	5 µm	2.2 ml/min	JR-32172
Polyethylene	<20 µm	500 ml/min	JR-32179

NOTES
* Flowrate measured with methanol/water (1:1), ultrasonic degassed, helium sparging to prevent regassing.

TECH TIPS
- Because they are hydrophobic, No-Met filters may initially require some priming with methanol or acetonitrile.
- Connect the No-Met filter with 1/8" OD/ 1.59 mm OD tubing:
  PFA tubing 9
  PTFE tubing 12

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Last Drop filter/sparger

Low pressure

The Last Drop filter/sparger combines filtration and sparging in a single unit. The PTFE housing contains a mobile phase filter with a stainless steel, PTFE, or hydrophobic PE filter element.

Spargers have a porosity of 10 microns.

The filter/sparger includes:

- PEEK tripod connector which slips into 1.5, 2.2, or 3.5 mm ID solvent lines
- 1/4-28 nut and ferrule for the sparging line

Filter material	*Pore size*	*Maximum flow rate **	*Product No.*
PTFE	2.5 µm	1.2 ml/min	JR-9000-0602
	5 µm	2.6 ml/min	JR-9000-0603
	10 µm	3.5 ml/min	JR-9000-0604
Polyethylene	10 µm	11 ml/min	JR-9000-0604H
Stainless	2 µm	28 ml/min	JR-9000-0640
	5 µm	30 ml/min	JR-9000-0641
	10 µm	30 ml/min	JR-9000-0642

SPECS

- Materials
  Body: PTFE
  Frits: PTFE/316 SS/PE
  Stepped tubing connector: PEEK
  Nut: PEEK
  Ferrule: ETFE
- Stepped tubing connector for 1.5, 2.2, and 3.5 mm ID tubing
- PEEK 1/4-28 nut with ETFE ferrule for 1/8" OD tubing

Stainless steel mobile phase filter/helium sparger

Low pressure

- Ideal for helium sparging
- Four porosities
- Fitting and pipe connectors

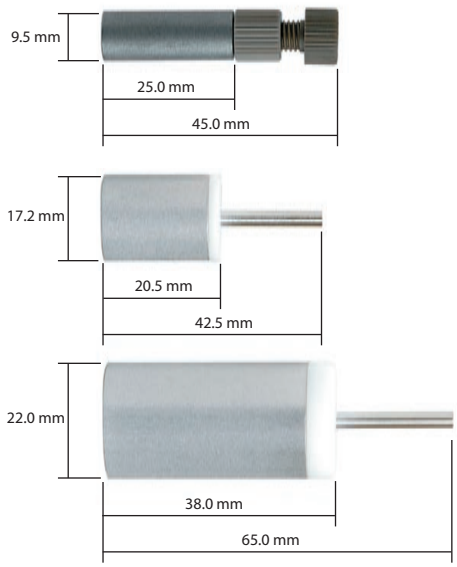
VICI Jour mobile phase filters protect HPLC systems from small particles in the mobile phase. These filters are made from SS316 with PEEK or PTFE connectors and are suitable for most solvents. The complete line has versions for both analytical and preparative applications.

VICI Jour helium spargers (2 µm versions) offer an inexpensive way to prepare and maintain mobile phases free of dissolved gases. Connected to a regulated supply of helium gas (0-400 mL/min.) they effectively remove dissolved oxygen, nitrogen, and other atmospheric gases from the mobile phase.

SPECS

- Materials
  Body: SS316
  Pipe: SS316
  Pipe adapter: PTFE
  Fitting adapter: PEEK
  Fittings: PEEK
  Ferrules: ETFE

Fitting type	*Tubing/ pipe size*	*Pore size*	*Maximum flow rate **	*Product No.*
1/4-28 fitting	1/16"	2 µm	35 ml/min	JR-367016-2
		10 µm	35 ml/min	JR-367016-10
		20 µm	35 ml/min	JR-367016-20
	1/8"	2 µm	35 ml/min	JR-367008-2
		10 µm	100 ml/min	JR-367008-10
		20 µm	120 ml/min	JR-367008-20
Pipe	1/8"	2 µm	50 ml/min	JR-3675-2
Pipe	1/8"	2 µm	95 ml/min	JR-3678-2
		25 µm	100 ml/min	JR-3678-25



TECH TIPS

- We recommend metal free PTFE filters for sensitive biochromatography applications where metal surfaces may corrode or itneract with samples.
- We recommend our impermeable tubing to prevent "regassing" of helium-degassed solvents.

RELATED PRODUCTS

Last Drop mobile phase filters 51

PEEK in-line filter kit

HPLC

SPECS
- For 1/16" OD tubing
- Materials
  Body: PEEK
  Frit: Titanium, Polyethylene
- 0.25/0.4 mm bore
- 10-32 threads
- Pressure rating: <350 bar (< 5000 psi)

- Replaceable metal-free polyetheylene frits and biocompatible titanium frits
- 100% biocompatible
- Minimal hold-up volume
- Different porosities

The PEEK in-line filter traps fines and other particles from samples and mobile phases before they damage valuable instruments and columns.

This female-to-female design is made entirely of PEEK, with PEEK-encased titanium or polyethylene filter elements, for biocompatibility and chemical resistance. The design has virtually no hold-up volume and can be used in analytical applications with virtually no band broadening or loss of efficiency.

Sold individually.

Frit material	*Pore size*	*Internal volume (µL) **	*Maximum flow rate ***	*Product No.*
Titanium	0.5 µm	9.50	25 ml/min	JR-68247
	2 µm	11.85	30 ml/min	JR-68253
	5 µm	12.7	30 ml/min	JR-68256
	10 µm	13.2	30 ml/min	JR-68257
Polyethylene	10 µm	13.9	30 ml/min	JR-68257PE

Sure-Guard in-line filter kit

HPLC

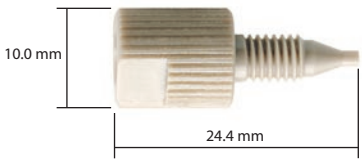
SPECS
- Materials
  Body: PEEK
  Frit: Stainless, Titanium
- 0.4 mm bore
- 10-32 female to 10-32 male threads
- Pressure rating: <350 bar (< 5000 psi)

- Disposable filter guard
- Minimal hold-up volume
- Titanium (biocompatible) and stainless steel frits, permanently pressed in place
- Two porosity options

The VICI Jour Sure-Guard disposable in-line filter offers an easy and inexpensive way to protect valuable columns against fines and particles. It is easily connected directly to any column, with an inlet for 1/16" OD tubes and 10-32 threads. The VICI Jour Sure-Guard can be changed in seconds without tools.

Sold in packages of three. Waters type filter kits are sold individually.

Frit material	*Pore size*	*Internal volume **	*Maximum flow rate ***	*Product No.*	*Product No.* **Waters type**
Stainless steel	0.5 µm	0.45 µL	30 ml/min	JR-0611-SS05-3	JR-0641-SS05
	2 µm	0.61 µL	30 ml/min	JR-0611-SS2-3	JR-0641-SS2
Titanium	0.5 µm	0.45 µL	30 ml/min	JR-0611-TI05-3	JR-0641-TI05
	2 µm	0.61 µL	30 ml/min	JR-0611-TI2-3	JR-0641-TI2



NOTES / TECH TIPS
See facing page.

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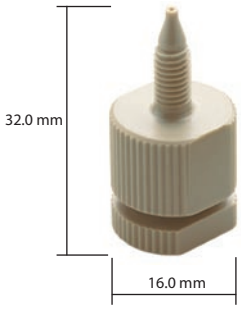


PEEK precolumn filter kit

HPLC

- 100% biocompatible
- Minimal hold-up volume
- Replaceable metal-free polyetheylene frits and biocompatible titanium frits encased in PEEK
- Different porosities

The VICI Jour precolumn filter kit has a standard 10-32 fitting and fits direct to most column types without introducing additional dead volume.

The filter kit protects expensive columns against fine particles, which may otherwise accumulate on the column frit and lead to split peaks and high backpressure.

Sold individually.

Frit material	*Pore size*	*Internal volume (µL) **	*Maximum flow rate ***	*Product No.*
Titanium	0.5 µm	11.5	30 ml/min	JR-68258
	2 µm	13.85	30 ml/min	JR-68262
	5 µm	14.7	30 ml/min	JR-68263
	10 µm	15.2	30 ml/min	JR-68264
Polyethylene	10 µm	15.9	30 ml/min	JR-68264P

SPECS

- Materials
  Body: PEEK
  Frit: Titanium, Polyethylene
- 0.25/0.4 mm bore
- 10-32 threads
- Pressure rating: <350 bar (< 5000 psi)

Replacement frits

for PEEK in-line and precolumn filter kits

Replacement frits for PEEK precolumn filter kit and PEEK in-line filter kit (*see facing page*).

Frit material	*Pore size*	*Internal volume (µL) **	*Qty/pkg*	*Product No.*
Titanium	0.5 µm	6.87	5	JR-1125-05P-5
	2 µm	9.24	5	JR-1125-2P-5
	5 µm	10.04	5	JR-1125-5P-5
	10 µm	10.56	5	JR-1125-10P-5
Polyethylene	10 µm	11.31	5	JR-1151-10P-5

NOTES

* The internal volume is the hold-up volume between the end of the connecting tube and the filter 10-32 connector outlet, including the frit volume.

** Flowrate measured with methanol/water (1:1), ultrasonic degassed, helium sparging to prevent regassing.

TECH TIP

We recommend 2 µm frits for columns with 5 µm or larger particles, and 0.5 µm frits for smaller particles.

NOTE

Polyethylene frits are for single use only.

MORE INFORMATION

Calculation of frit volume 95
PEEK-encased stainless frits. 74

Stainless steel precolumn filter NEW UHPLC

SPECS

- Materials
  Body: 316 SS
  Frit: PEEK-encased SS
- 10-32 threads
  Female for inlet
  Male for outlet
- Pressure rating with ZN1 nut and ZF1S6 ferrule: 1375 bar (20,000 psi)

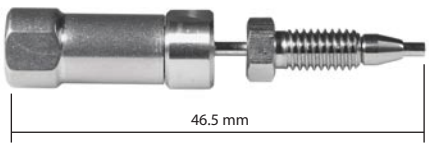
- UHPLC
- Mimimized hold-up volume
- Three porosity options
- Fewer connections compared to in-line filters
- Works with 1/16" column connections from all manufacturers

VICI Jour's new stainless steel precolumn filter is based on our well-known in-line filter. The design of this precolumn filter reduces the number of connections compared to a standard in-line filter, increasing the stability and reducing the potential of leakage.

The small bore sizes (0.15 mm in the nut/body and 0.13 mm in the tubing) guarantee a very small (virtually zero) hold-up volume.

With minimal dead-volume and available with three porosities, these filters are the best column protectors.

Bore size	*Pore size*	*Internal volume*	*Product No.*
0.13/0.15 mm	0.5 µm	0.61 µl	JR-69230-05
	2 µm	0.66 µ	JR-69230-2
	5 µm	0.68 µ	JR-69230-5



Inlet nuts and ferrules

Includes one 1/16" stainless nut and one 1/16" stainless ferrule.

Pore size	*Product No.*
0.5 um	JR-69330-05
2 um	JR-69330-2
5 um	JR-69330-5

Replacement PEEK-encased SS frits

Pore size	*Frit volume*	*Qty/pkg*	*Product No.*
0.5 um	0.13 uL	5	JR-1110-05P-5
2 um	0.18 uL	5	JR-1110-2P-5
5 um	0.20 ul	5	JR-1110-5P-5

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Stainless steel in-line filter

UHPLC

- UHPLC (up to 1375 bar / 20,000 psi)
- Minimized hold-up volume
- Two bores for analytical and semi-prep flow rates
- Three porosity options

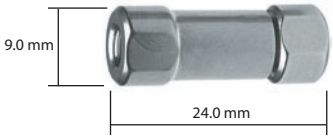
The stainless steel in-line filter has virtually no hold-up volume and can be used in various applications without significant band broadening or loss of efficiency.

The 0.25 mm bore versions are intended for analytical use between autosampler/injection valve and column. The 0.75 mm bore versions are suitable for higher flow rates in semi-prep systems or for solvent supply from pump to autosampler.

With minimal dead volume and available frit porosities of 0.5, 2 or 5 µm, these in-line filters are the ideal column protectors

Sold individually.

Bore size	*Pore size*	*Internal volume **	*Product No.*
0.25 mm	0.5 µm	0.2 µL	JR-68230-05
	2 µm	0.3 µL	JR-68230-2
	5 µm	0.3 µL	JR-68230-5
0.75 mm	0.5 µm	1.7 µL	JR-68231-05
	2 µm	1.9 µL	JR-68231-2
	5 µm	1.9 µL	JR-68231-5



SPECS

- Materials
  Body: 316 SS
  Frit: PEEK-encased 316 stainless
- 0.25 or 0.75 mm bore
- 10-32 female to 10-32 male threads
- Pressure rating with ZN1 nut and ZF1S6 ferrule: 1375 bar (20,000 psi)

Nuts and ferrules

Includes one 1/16" stainless nut and one 1/16" stainless ferrule.

Bore size	*Pore size*	*Product No. volume **
0.25 mm	0.5 µm	JR-68330-05
	2 µm	JR-68330-2
	5 µm	JR-68330-5
0.75 mm	0.5 µm	JR-68331-05
	2 µm	JR-68331-2
	5 µm	JR-68331-5

Replacement PEEK-encased SS frits

for filter above

Bore size	*Pore size*	*Frit volume*	*Qty/pkg*	*Product No.*
0.25 mm	0.5 µm	0.13 µL	5	JR-1110-05P-5
	2 µm	0.18 µL	5	JR-1110-2P-5
	5 µm	0.20 µL	5	JR-1110-5P-5
0.75 mm	0.5 µm	0.55 µL	5	JR-1111-05P-5
	2 µm	0.74 µL	5	JR-1111-2P-5
	5 µm	0.80 µL	5	JR-1111-5P-5
	10 µm	0.87 µL	5	JR-1111-10P-5

NOTES

* The internal volume is the hold-up volume between the end of the connecting tube and the filter 10-32 connector outlet, including the frit volume.

Safety products

AND MOBILE PHASE HANDLING SYSTEMS

- Save cost on solvents
- Avoid hazardous air in the laboratories
- Increase reproducibility of chromatographic analyses

VICI strives to provide customers with the best solutions for their problems, making the work better and/or easier with respect to environment and health.

Safety products index

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Safety-coated glass bottles 70

Solviflex tubing 70

Flexible coiled PFA tubing expands and contracts, giving flexibility to move mobile phase bottles on the bench.

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Safety air inlet valves

- No evaporation of volatile compounds into lab air
- Better composition stability of the mobile phases
- Less shift of retention times
- No bacterial contamination
- Fit any VICI cap or VICI safety cap

SPECS
- Connections
  Valve to cap: 1/4-28
  Filter: Female Luer
- Materials
  Housing: Polypropylene
  Filter: Cellulose
  O-ring: NBR (O-ring is not a wetted part)

The air inlet valve has a check valve which blocks vapors of the solution in a bottle, preventing the vapors from escaping into the lab. The mobile phase composition remains stable, resulting in constant retention times.

The check valve regulates the pressure when the negative pressure reaches 1.5 psi or 0.1 bar. This small negative pressure prevents evaporation of the liquid (lower vapor pressure) and still guarantees the stability of the flow rate. A negative pressure which is too high can influence the aspiration of a constant flow.

Several tests have indicated that the 0.2 µm cellulose filter will keep mobile phase liquid free of bacteria and dust particles over time. If you use a filter and still have bacteria growth in your liquid, it is likely due to the presence of bacteria in the deionized water used.

Air inlet valves fit on any VICI safety cap or VICI cap.

Description	*Product No.*
With 4 mm filter	JR-S-20003
With 15 mm filter	JR-S-20009
Without filter	JR-S-20006
Spare parts	
Replacement cellulose filter	
0.2 µm x 4 mm	JR-S-20007
0.2 µm x 15 mm	JR-S-20008

with 4 mm filter

with 15 mm filter

with no filter

Safety air outlet filters

The VICI safety air outlet filter regulates the pressure during helium sparging.

Air outlet filters fit on any VICI safety cap or VICI cap.

Description	*Product No.*
Safety air outlet filter	JR-S-20004

SPECS
- Connections
  Valve to cap: 1/4-28
  Filter: Female Luer
- Materials
  Housing: Polypropylene
  Filter: Cellulose
  O-ring: NBR (O-ring is not a wetted part)

TECH TIPS
- The air inlet valve is not suitable when helium sparging is used.
- We recommend that safety air inlet valves and safety air outlet valves be replaced every 6-7 months to guarantee correct operation of the check valve. The lifetime of the check valve and the filter depend on the intensity of use and the quality of the ambient air.

RELATED PRODUCTS
Safety caps 62-63
VICI caps 64-65

- Prevents pollution of ambient air with volatile compounds
- Large capacity and long lifetime
- Break-through detector available, alerting users to saturation of the filter absorbent
- Universal 1/4-28 connection – fit all VICI safety caps and VICI caps
- Adapter to competitor products available

Our improved exhaust filter is the center of the VICI Jour safety program, ridding ambient air of solvent vapors which could adversely affect the health of lab workers. When placed on the waste bottle of an HPLC system, the specially-treated absorbent filters out nearly all organic solvent vapor evaporationg out of the waste solution.

Our new absorbent as an increased capacity over our previous filter and definitely over a competing brand. Excellent capacity leads to longer lifetime of the exhaust filter: up to 10 months* for methanol, and up to 8 months* for acetonitile. The new design also has improved stability at the connecting threads.

The optional break-through detector recognizes trace amounts of acetone, acetonitrile, ethanol, ethyl acetate, methanol, methylene chloride and THF. When the absorbent is saturated, break-through is indicated by a color change in the detector from orange/pink to dark purple. A small charcoal filter absorbs the vapors after they pass the detector.

Detector is unexposed
(Color is orange/pink)

Detector is exposed
(Color is dark purple)

Exhaust filter without detector

Exhaust filter with detector

*Based on results of our tests (water/organics = 50/50; flow rate 1.0 ml/min during the day, 0.5 ml/min overnight, 0.1 ml/min during weekends).

Safety exhaust filters

1/4-28

SPECS

- Connections: 1/4-28
- Materials
  - *Filter housing:* POM
  - *Detector housing:* PC
  - *Frits:* Polyethylene
  - *O-ring:* NBR (O-ring is not a wetted part)

Description	*Product No.*
Exhaust filter	
With detector	JR-S-20005
Without detector	JR-S-20002
Adapter Connects VICI safety exhaust filter to SCAT® waste caps and A.I.T. smart waste caps	JR-S-40004

NOTE

Disposal of the saturated filters must be done according to the local regulations for chemical waste.

TECH TIPS

- Larger capacity = longer lifetime = lower costs
- As a general rule, halving the flow rate doubles the lifetime at constant composition and temperature. Doubling the flow rate halves it.

RELATED PRODUCTS

Carbon dioxide filter . . . 71
Humidity filter 71
Safety caps 62-63
VICI caps 64-65

See additional information about VICI safety exhaust filters on the facing page.

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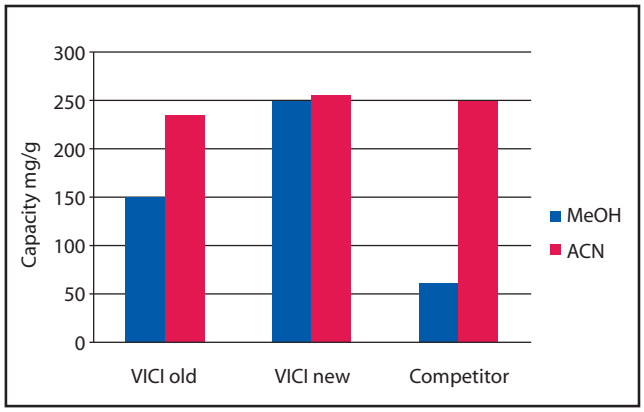
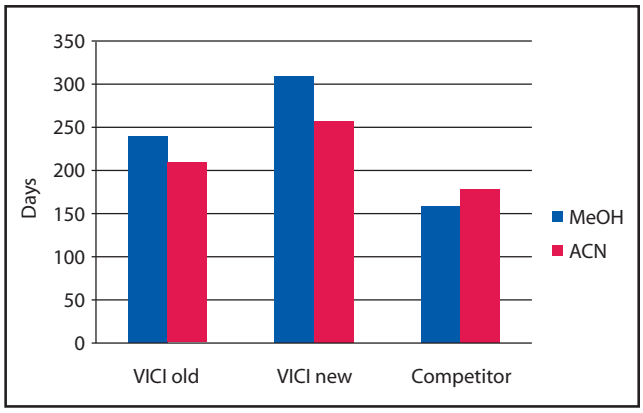


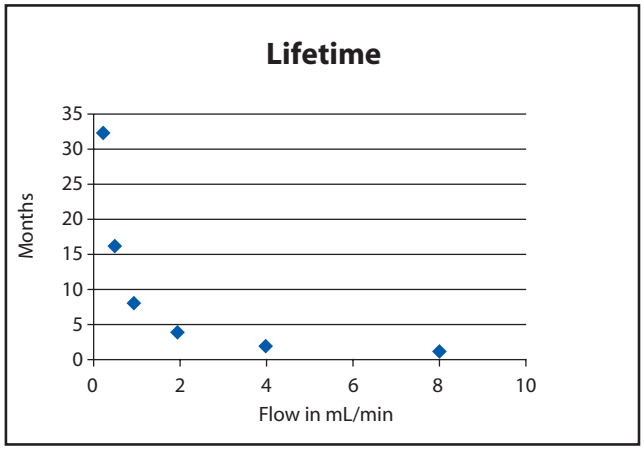
Optimized absorbent of safety exhaust filters

In our continuous work to improve our products, VICI has optimized the absorbent for increased capacity.



The excellent capacity of our new absorbent leads to longer lifetimes – up to 10 months for methanol and 8 months for acetonitrile.*

*Based on results of our tests (water/organics = 50/50; flow rate 1.0 ml/min during the day, 0.5 ml/min overnight, 0.1 ml/min during weekends).



Safety exhaust filter lifetime

The lifetime of the filter depends on:

- Composition of the mobile phase
- Flow rate
- Ambient temperature: a higher temperature leads to an increased vapor pressure of the volatile compound

The theoretical lifetime of an exhaust filter, depending on the flow rate, is shown here.

TECH TIP

Acetonitile and water form an "azeotropic" mixture at 85% acetonitrile. Due to this physical property, the vapor of an acetonitrile/water mixture always corresponds to the 85/15 mixture. This explains the non-linearity of the lifetime for acetonitrile compared to methanol.

ADDITIONAL APPLICATIONS

Other applications for safety filters are possible, e.g. an exhaust filter for the GC split vent.

Contact Tech Support for more information.

SAFETY PRODUCTS

Safety caps have built-in stopcocks to close off unused ports or to provide a convenient cut off of the liquid stream when tubing is removed.

- Stopcocks rated up to 72 psi gas at 25°C
- Prevent evaporation of volatile compounds
- Ideal for delivery of mobile phase or collection of waste LC solutions
- 2, 3, or 4 ports with 1/4-28 threads for 1/8" or 1/16" tubing
- Optional bottom-sealing barbed adapter to connect 1/8" (3.2 mm) ID tubing *(shown at right – order separately from "Spare Parts")*

Safety cap kit

GL45 threads

SPECS

- Connections: 1/4-28
- Materials
  Closure: PP (polypropylene)
  Insert: PTFE
  Stopcock: CTFE
  O-ring: EPDM (alternative: FEP-coated)
  Nuts: PPS
  Ferrules: ETFE
  Sleeves: PP
  Bottle: Borosilicate 3.3, safety coated
  Filter: Polyethylene

* GL45 caps produced beginning in 2012 will seal with an O-ring behind a PTFE lip.

In addition to a GL45 safety cap with color-coded fittings, this kit offers a safety bottle (1 or 2 liter), PFA tubing, and a mobile phase filter.

GL45 safety caps seal to the bottle with an O-ring* (EPDM) which is resistant to commonly used HPLC solvents. If improved chemical resistance is required (*e.g.* for halogenated hydrocarbons), order an FEP-coated O-ring separately.

Bottle size:		**1 Liter**	**2 Liters**
	No. of ports	*Product No.*	*Product No.*
Safety cap kit, GL45	2	JR-S-11111	JR-S-11211
	3	JR-S-11112	JR-S-11212
	4	JR-S-11113	JR-S-11213
		Qty/pkg	*Product No.*
O-ring, FEP-coated, GL45		1	JR-S-40008

INCLUDES

1 safety cap, GL45 thread, with fittings
1 safety-coated glass bottle (option: 1L or 2L)
3 m, PFA tubing
1 No-Met mobile phase filter, 5 µm

- Additional nuts and ferrules for the bottom side connections

Spare parts

for safety cap kit

	Tubing OD	*Qty/pkg*	*Product No.*
1/4-28 flangeless nuts, PPS	1/16" OD	10	JR-55070-10
	1/8" OD	10	JR-55071-10
Inverted ferrules, ETFE	1/16" OD	10	JR-041-10
	1/8" OD	10	JR-051-10
Safety-coated bottle with solid cap			
1 Liter		1	JR-9000-0005
2 Liters		1	JR-9000-0010
Plug, 1/4-28 , PEEK		1	JR-409
Barbed hose adapter for 1/8" ID tubing		1	JR-075013
Color-Sleeve adapters, 12 colors (2 each)		24	JR-5508X-24
No-Met biocompatible mobile phase filter, economy slip-on connection, 5 µm pore		1	JR-32174
PFA tubing, 1/8" x 1.59 mm x 3m		1	JR-T-4003-M3

TECH TIP

PFA tubing provides less re-gassing of the mobile phase.

RELATED PRODUCTS

Color-Sleeve adapters 17

No-Met mobile phase filters 52
PFA tubing 9
Safety-coated bottles (for additional sizes) . 70
Safety air inlet valves . . 59

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Safety caps

GL45 threads

INCLUDES
1 cap, GL45 thread, with stopcocks
1 O-ring, EPDM
1 set: 1/16" nut/ferrule/ color-sleeve adapter
1, 2, or 3 sets: 1/8" nut/ferrule/ color-sleeve adapter
- Additional nuts and ferrules for the bottom side connections

- Fit all bottles or canisters with GL45 thread
- Built-in stopcocks for easy interruption of solvent lines
- 2, 3, or 4 ports with 1/4-28 threads for 1/8" or 1/16" tubing

GL45 safety caps seal to the bottle with an O-ring* (EPDM) which is resistant to commonly used HPLC solvents. If improved chemical resistance is required (*e.g.* for halogenated hydrocarbons), order an FEP-coated O-ring separately.

	No. of ports	*Product No.*
Safety cap, GL45	2	JR-S-11011
	3	JR-S-11012
	4	JR-S-11013
O-ring, FEP-coated, GL45		JR-S-40008

SPECS
- Connections: 1/4-28
- Materials
  Closure: PP (Polypropylene)
  Insert: PTFE
  Stopcock: CTFE
  O-ring: EPDM (alternative: FEP-coated)
  Nuts: PPS
  Ferrules: ETFE
  Sleeves: PP

* GL45 caps produced beginning in 2012 will seal with an O-ring behind a PTFE lip.

Safety caps

DIN50 threads

INCLUDES
1 cap, DIN50 thread, with stopcocks
1 O-ring,
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1, 2, or 3 sets: 1/8" nut/ferrule/ color-sleeve adapter
- Additional nuts and ferrules for the bottom side connections

- Fit all bottles or canisters with DIN50 thread
- Built-in stopcocks for easy interruption of solvent lines
- 2, 3, or 4 ports with 1/4-28 threads for 1/8" or 1/16" tubing

DIN50 safety caps seal to the bottle/canister with an O-ring behind a PTFE lip, so the O-ring is therefore not a wetted part.

	No. of ports	*Product No.*
Safety cap, DIN50	2	JR-S-15011
	3	JR-S-15012
	4	JR-S-15013

SPECS
- Connections: 1/4-28
- Materials
  Closure: PP (Polypropylene)
  Insert: PTFE
  Stopcock: CTFE
  O-ring: EPDM/ NBR
  Nuts: PPS
  Ferrules: ETFE
  Sleeves: PP

NOTE
One port must be reserved for the exhaust filter or the air inlet valve.

MORE INFORMATION
Chemical resistance 96-98

RELATED PRODUCTS
Air inlet valves 59
Exhaust filters 60-61

Spare parts

for safety caps

	Tubing OD	*Qty/pkg*	*Product No.*
1/4-28 flangeless nuts, PPS	1/16"	10	JR-55070-10
	1/8"	10	JR-55071-10
Inverted ferrules, ETFE	1/16"	10	JR-041-10
	1/8"	10	JR-051-10
Barbed hose adapter for 1/8" ID tubing		1	JR-075013
Color-Sleeve adapters, 12 colors (2 each)		24	JR-5508X-24

VICI caps seal to the bottle with an O-ring (EPDM) which is resistant to commonly used HPLC solvents. If improved chemical resistance is required (*e.g.* for halogenated hydrocarbons), order an FEP-coated O-ring separately. Unused ports should be closed with plugs, available in PEEK or polypropylene. *(See "Spare Parts," below)*

- Prevent evaporation of volatile compounds
- 2, 3, or 4 ports with 1/4-28 threads for 1/8" or 1/16" tubing
- 6 or 7 ports available in some models
- Optional bottom-sealing barbed adapter to connect 1/8" (3.2 mm) ID tubing *(shown at right – order separately from "Spare Parts")*

VICI cap kit

GL45 threads

SPECS

- Connections: 1/4-28
- Materials
  - *Closure:* PP (polypropylene)
  - *Insert:* PTFE
  - *O-ring:* EPDM (alternative: FEP-coated)
  - *Nuts:* PPS
  - *Ferrules:* ETFE
  - *Sleeves:* PP
  - *Bottle:* Borosilicate 3.3, safety coated
  - *Filter:* Polyethylene

In addition to a GL45 VICI cap with fittings, this kit includes a safety bottle (1 or 2 liter), PFA tubing, and a mobile phase filter.

Bottle size:		**1 Liter**	**2 Liters**
	No. of ports	*Product No.*	*Product No.*
VICI cap kit, GL45	2	JR-S-11101	JR-S-11201
	3	JR-S-11102	JR-S-11202
	4	JR-S-11103	JR-S-11203
		Qty/pkg	*Product No.*
O-ring, FEP-coated, GL45		1	JR-S-40008

INCLUDES

1 VICI cap, GL45 thread, with fittings
1 safety-coated glass bottle (option: 1L or 2L)
3 m, PFA tubing
1 No-Met mobile phase filter, 5 µm

VICI caps

GL45 threads

SPECS

- Connections: 1/4-28
- Materials
  - *Closure:* PP (Polypropylene)
  - *Insert:* PTFE
  - *Stopcock:* CTFE
  - *O-ring:* EPDM (alternative: FEP-coated)
  - *Nuts:* PPS
  - *Ferrules:* ETFE
  - *Sleeves:* PP

* GL45 caps produced beginning in 2012 will seal with an O-ring behind a PTFE lip.

- Fit all bottles or canisters with GL45 thread
- 2, 3, 4, 6, and 7 ports with 1/4-28 threads for 1/8" or 1/16" tubing

GL45 safety caps seal to the bottle with an O-ring* (EPDM) which is resistant to commonly used HPLC solvents. If improved chemical resistance is required (e.g. for halogenated hydrocarbons), order an FEP-coated O-ring separately.

	No. of ports	*Product No.*
VICI cap, GL45	2	JR-S-11001
	3	JR-S-11002
	4	JR-S-11003
	6	JR-S-11005
	7	JR-S-11006
O-ring, FEP-coated, GL45		JR-S-40008

INCLUDES

1 cap, GL45 thread
1 O-ring, EPDM
1 set: 1/16" nut/ferrule/ color-sleeve adapter
1, 2, 3, 5, or 6 sets: 1/8" nut/ferrule/ color-sleeve adapter

PTFE insert for 6 port cap

PTFE insert for 7 port cap

Spare parts

for VICI caps

		Tubing OD	*Qty/pkg*	*Product No.*
1/4-28 flangeless nuts, PPS		1/16"	10	JR-55070-10
		1/8"	10	JR-55071-10
Inverted ferrules, ETFE		1/16"	10	JR-041-10
		1/8"	10	JR-051-10
Plug, 1/4-28	PEEK		1	JR-409
	Polypropylene		1	JR-201999
Barbed hose adapter for 1/8" ID tubing			1	JR-075013
Color-Sleeve adapters, 12 colors (2 each)			24	JR-5508X-24

Additional spare parts for VICI cap kits	*Qty/pkg*	*Product No.*
Safety-coated bottle with solid cap		
1 Liter	1	JR-9000-0005
2 Liters	1	JR-9000-0010
No-Met biocompatible mobile phase filter, economy slip-on connection, 5 µm pore	1	JR-32174
PFA tubing, 1/8" x 1.59 mm x 3m	1	JR-T-4003-M3

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VICI caps *NEW* *S40 threads*

INCLUDES
1 cap, S40 thread
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
2 sets: 1/8" nut/ferrule/ color-sleeve adapter

- Fit all bottles with S40 thread
- 3 ports with 1/4-28 threads for 1/8" or 1/16" tubing

The latest addition to the Jour Safety product line, the S40 VICI cap seals to the bottle with an O-ring (EPDM) which is resistant to commonly used HPLC solvents.

	No. of ports	*Product No.*
VICI cap, S40	3	JR-S-14002

SPECS
- Connections: 1/4-28
- Materials
  Closure: PP* (Polypropylene)
  Insert: PTFE
  O-ring: EPDM
  Nuts: PPS*
  Ferrules: ETFE
  Sleeves: PP*
  *not a wetted part

VICI caps *DIN50 threads*

INCLUDES
1 cap, DIN50 thread
1 O-ring,
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1, 2, or 3 sets: 1/8" nut/ferrule/ color-sleeve adapter

- Fit all bottles or canisters with DIN50 thread
- 2, 3, or 4 ports with 1/4-28 threads for 1/8" or 1/16" tubing

DIN50 safety caps seal to the bottle/canister with an O-ring behind a PTFE lip, so the O-ring is therefore not a wetted part.

	No. of ports	*Product No.*
VICI cap, DIN50	2	JR-S-15001
	3	JR-S-15002
	4	JR-S-15003

SPECS
- Connections: 1/4-28
- Materials
  Closure: PP (Polypropylene)
  Insert: PTFE
  Stopcock: CTFE
  O-ring: EPDM/ NBR
  Nuts: PPS
  Ferrules: ETFE
  Sleeves: PP

VICI caps *GL38 threads*

INCLUDES
1 cap, GL37/430 thread
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1, 2, or 3 sets: 1/8" nut/ferrule/ color-sleeve adapter
1 adapter ring

- Fit all bottles or canisters with GL38/430 thread *(See NOTES, below)*
- 2, 3, or 4 ports with 1/4-28 threads for 1/8" or 1/16" tubing

Color-coded PP sleeves fit on all ports on 2 and 3 port caps. With 4 port caps, the use of PP sleeves is limited to two sleeves per cap. (Four colors are included.)

	No. of ports	*Product No.*
VICI cap, GL38	2	JR-S-13001
	3	JR-S-13002
	4	JR-S-13003
O-ring, FEP-coated, GL38		JR-S-40009

SPECS
- Connections: 1/4-28
- Materials
  Closure: PP (Polypropylene)
  Insert: PTFE
  O-ring: EPDM (alternative: FEP-coated)
  Adapter ring: PA/PP
  Nuts: PPS
  Ferrules: ETFE
  Sleeves: PP

TECH TIP
PFA tubing provides less re-gassing of the mobile phase.

MORE INFORMATION
Chemical resistance 96-98

RELATED PRODUCTS
Color-Sleeve adapters . 17
No-Met mobile phase filters 52
PFA tubing 9
Safety-coated bottles (for additional sizes) . 70
Safety air inlet valves . . 59

NOTES
GL38 thread is available in different variations. Please check the inside diameter of the neck:
- For 21-24 mm ID (e.g. Wheaton® bottles), use the GL38 cap as is, without an adapter.
- For 24-28 mm ID (e.g. Nalgene® bottles), use the adapter ring (JR-S-40006) which is included with this VICI cap.

Waste caps seal the bottle/canister with an O-ring behind a PTFE lip, so the O-ring is therefore not a wetted part. Unused ports should be closed with plugs, available in PEEK or polypropylene. *(See "Spare Parts" on page 66.)*

- Prevent evaporation of volatile compounds
- 3 or 4 ports with 1/4-28 threads for 1/8" or 1/16" tubing
- Additional port with 1/2-20 thread for 1/4" OD tubing or M10 x 1 thread for a barbed adapter
- Thread-sealing barbed adapters available in three sizes, to connect 4 mm, 6 mm, or 8 mm ID tubing *(shown at right – order separately)*

Waste caps *NEW* — *GL45 threads*

SPECS
- Connections: 1/4-28, 1/2-20
- Materials
  - *Closure:* PP (Polypropylene)
  - *Insert:* PTFE
  - *O-ring:* NBR
  - *Nuts:* PPS/POM
  - *Ferrules:* ETFE/CTFE
  - *Plug:* PTFE
  - *Barbed adapter:* PA/PP

- Fits all bottles or canisters with GL45 thread
- 4 ports with with one M10 x 1 port for barbed/angled adapters

This waste cap seals the bottle/cannester with an O-ring behind a PTFE lip, so the O-ring is therefore not a wetted part.

	No. of ports	*Product No.*
Waste cap, GL45	4	JR-S-11023

INCLUDES
1 cap
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
2 sets: 1/8" nut/ferrule/ color-sleeve adapter

Waste caps — *GLS80 threads*

SPECS
- Connections: 1/4-28, 1/2-20
- Materials
  - *Closure:* PP (Polypropylene)
  - *Insert:* PTFE
  - *O-ring:* NBR
  - *Nuts:* PPS/POM
  - *Ferrules:* ETFE/CTFE
  - *Plug:* PTFE
  - *Barbed adapter:* PA/PP

- Fits all bottles or canisters with GLS80 thread
- 4 ports with 1/4-28 thread for 1/8" or 1/16" tubing
- Fifth port with choice of threads

	Product No.
Waste cap, GLS80	
Fifth port:	
1/2-20 thread for 1/4" OD tubing, with 1/4" plug	JR-S-18004
M10 x 1 thread for barbed adapter	JR-S-18014
(Order barbed adapter from "Spare Parts" on page 66)	

INCLUDES
1 cap
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1 set: 1/4" nut/ferrule
3 sets: 1/8" nut/ferrule/ color-sleeve adapter
1 plug, 1/4" (1/2-20), where noted in product number chart

NOTES
One port must be reserved for the exhaust filter or the air inlet valve.

MORE INFORMATION
Spare parts for waste caps 68
Chemical resistance 96-98

RELATED PRODUCTS
Waste caps
B53 threads 68
B83 threads 68

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Waste caps

DIN60 threads

INCLUDES
1 cap
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1 set: 1/4" nut/ferrule
2 sets: 1/8" nut/ferrule/ color-sleeve adapter
1 plug, 1/4" (1/2-20), where noted in product number chart

- Fits all bottles or canisters with DIN60 thread
- 3 ports with 1/4-28 thread for 1/8" or 1/16" tubing
- Fourth port with choice of threads

	Product No.
Waste cap, DIN60	
Fourth port:	
1/2-20 thread for 1/4" OD tubing, with 1/4" plug	JR-S-16003
M10 x 1 thread for barbed adapter	JR-S-16013

(Order barbed adapter from "Spare Parts" on page 64)

SPECS
- Connections: 1/4-28, 1/2-20
- Materials
  Closure: PP (Polypropylene)
  Insert: PTFE
  O-ring: NBR
  Nuts: PPS/POM
  Ferrules: ETFE/ CTFE
  Plug: PTFE
  Barbed adapter: PA/PP

Waste caps

S51 threads

INCLUDES
1 cap
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1 set: 1/4" nut/ferrule
2 sets: 1/8" nut/ferrule/ color-sleeve adapter
1 plug, 1/4" (1/2-20), where noted in product number chart

- Fits all bottles or canisters with S51 thread
- 3 ports with 1/4-28 thread for 1/8" or 1/16" tubing
- Fourth port with choice of threads

	Product No.
Waste cap, S51	
Fourth port:	
1/2-20 thread for 1/4" OD tubing, with 1/4" plug	JR-S-15103
M10 x 1 thread for barbed adapter	JR-S-15113

(Order barbed adapter from "Spare Parts" on page 66)

SPECS
- Connections: 1/4-28, 1/2-20
- Materials
  Closure: PP (Polypropylene)
  Insert: PTFE
  O-ring: NBR
  Nuts: PPS/POM
  Ferrules: ETFE/ CTFE
  Plug: PTFE
  Barbed adapter: PA/PP

Waste caps

S61 threads

INCLUDES
1 cap
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1 set: 1/4" nut/ferrule
2 sets: 1/8" nut/ferrule/ color-sleeve adapter
1 plug, 1/4" (1/2-20), where noted in product number chart

- Fits all bottles or canisters with S61 thread
- 3 ports with 1/4-28 thread for 1/8" or 1/16" tubing
- Fourth port with choice of threads

	Product No.
Waste cap, S61	
Fourth port:	
1/2-20 thread for 1/4" OD tubing, with 1/4" plug	JR-S-16103
M10 x 1 thread for barbed adapter	JR-S-16113

(Order barbed adapter from "Spare Parts" on page 66)

SPECS
- Connections: 1/4-28, 1/2-20
- Materials
  Closure: PP (Polypropylene)
  Insert: PTFE
  O-ring: NBR
  Nuts: PPS/POM
  Ferrules: ETFE/ CTFE
  Plug: PTFE
  Barbed adapter: PA/PP

RELATED PRODUCTS
Color-Sleeve adapters. 17
Exhaust filters 60-61
Air inlet valves. 59

Waste caps

B53 threads

SPECS

- Connections: 1/4-28, 1/2-20
- Materials
  - *Closure:* PP (Polypropylene)
  - *Insert:* PTFE
  - *O-ring:* NBR
  - *Nuts:* PPS/POM
  - *Ferrules:* ETFE/CTFE
  - *Plug:* PTFE
  - *Barbed adapter:* PA/PP

- Fits all bottles or canisters with B53 thread
- 3 ports with 1/4-28 thread for 1/8" or 1/16" tubing
- Fourth port with choice of threads

	Product No.
Waste cap, B53	
Fourth port:	
1/2-20 thread for 1/4" OD tubing, with 1/4" plug	JR-S-15303
M10 x 1 thread for barbed adapter	JR-S-15313
(Order barbed adapter from "Spare Parts" below)	

INCLUDES

1 cap
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1 set: 1/4" nut/ferrule
2 sets: 1/8" nut/ferrule/ color-sleeve adapter
1 plug, 1/4" (1/2-20), where noted in product number chart

Waste caps

B83 threads

SPECS

- Connections: 1/4-28, 1/2-20
- Materials
  - *Closure:* PP (Polypropylene)
  - *Insert:* PTFE
  - *O-ring:* NBR
  - *Nuts:* PPS/POM
  - *Ferrules:* ETFE/CTFE
  - *Plug:* PTFE
  - *Barbed adapter:* PA/PP

- Fits all bottles or canisters with B83 thread
- 4 ports with 1/4-28 thread for 1/8" or 1/16" tubing
- Fifth port with choice of threads

	Product No.
Waste cap, B83	
Fifth port:	
1/2-20 thread for 1/4" OD tubing, with 1/4" plug	JR-S-18304
M10 x 1 thread for barbed adapter	JR-S-18314
(Order barbed adapter from "Spare Parts" below)	

INCLUDES

1 cap
1 O-ring
1 set: 1/16" nut/ ferrule/ color-sleeve adapter
1 set: 1/4" nut/ferrule
3 sets: 1/8" nut/ferrule/ color-sleeve adapter
1 plug, 1/4" (1/2-20), where noted in product number chart

Spare parts

for waste caps

	Material	*Tubing OD*	*Qty/pkg*	*Product No.*
1/4-28 flangeless nuts	PPS	1/16"	10	JR-55070-10
		1/8"	10	JR-55071-10
Inverted ferrules	ETFE	1/16"	10	JR-041-10
		1/8"	10	JR-051-10
1/2-20 nut	POM	1/4"	1	JR-CFL-4D
Collapsible ferrule	CTFE	1/4"	1	JR-CFL-CB4KF-S
Adapter				
1/2-20 to 1/4-28	POM	***NEW***	1	JR-S-40200
Barbed adapter, M10 x 1				
For 4 mm ID tubing	PA		1	JR-S-40104
For 6 mm ID tubing	PA		1	JR-S-40106
For 8 mm ID tubing	PA		1	JR-S-40108
Barbed hose adapter				
For 1/8" ID tubing	PA/PP		1	JR-075013
Plug, 1/4-28	PEEK		1	JR-409
	Polypropylene		1	JR-201999
Plug, 1/2-20	PTFE		1	JR-S-40007
Color-Sleeve adapters, 12 colors (2 each)			24	JR-5508X-24

NOTES

One port must be reserved for the exhaust filter or the air inlet valve.

MORE INFORMATION

Chemical resistance 96-98

RELATED PRODUCTS

Waste caps
DIN60 threads 67
GL45 threads 66
GLS80 threads 66
S51 threads. 67
S61 threads. 67
Color-Sleeve adapters. 17
Exhaust filters 60-61
Air inlet valves. 59

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Eco cap kit

GL45 threads

INCLUDES
1 cap, GL45 thread, with three ports
1 safety-coated glass bottle (option: 1 L or 2 L)
1 male Luer plug, polypropylene

In addition to an Eco cap with polypropylene male Luer plug, this kit offers a safety bottle (1 or 2L).

The Eco cap consists of a three-hole ETFE insert with a polyethylene collar, compatible with all standard GL45 thread bottles. The Eco cap has no threading for fittings on the inside of the tubing ports – the tubing is just inserted.

	Product No.
Eco cap kit	
1 Liter bottle	JR-9000-0013
2 Liter bottle	JR-9000-0014

SPECS
- Materials
  Screw collar: PP (polypropylene)
  Pouring ring: PP
  Insert: ETFE
  O-rings: EPDM
  Luer plug: PP

Eco cap

GL45 threads

INCLUDES
1 cap, GL45 thread, with three ports
1 male Luer plug, polypropylene

- Competitively priced alternative to sparge and deliver mobile phases
- Also available as bottle kit

The Eco cap consists of a three-hole ETFE insert with a polyethylene collar, compatible with all standard GL45 thread bottles. The Eco cap has no threading for fittings on the inside of the tubing ports – the tubing is just inserted.

	Product No.
Eco cap	JR-9000-0007

SPECS
- Materials
  Screw collar: PP (polypropylene)
  Pouring ring: PP
  Insert: ETFE
  O-rings: EPDM
  Luer plug: PP

Spare parts

for Eco cap

	Product No.
Male Luer plug, polypropylene 10/pkg	JR-070350-10

NOTE
These caps are not usable for building up a helium atmosphere within in the solvent bottle, but only for continuous helium sparging.

TECH TIP
Once the mobile phase is degassed, we recommend our impermeable tubing between bottle cap and pump to prevent regassing of helium degassed solvents.

RELATED PRODUCTS
Impermeable tubing . . 13
Polymeric tubing 9-13
Waste caps 66-68

Safety-coated glass bottles

SPECS
- Pressure rating 0.8 bar (11.6 psi)
- Materials
  Bottle: Borosilicate 3.3 glass
  Cap: PP (Polypropylene)
  Pouring ring: PP

- Special design for helium sparging of LC mobile phases
- Safety coating to minimize risk of injury
- Available in 0.25, 0.5, 1 and 2 Liter sizes

These glass bottles with GL45 screw threading are made of chemical resistant Borosilicate 3.3 and are coated on the outside with a layer of sturdy polymer, decreasing the chances of breakage if the bottle is dropped. Even if the bottle breaks, glass fragments will be kept within the polymer coating. Solvents will be kept within the coating for a short while. The coating also protects solvents against UV light up to 385 nm.

These safety-coated glass bottles cannot be autoclaved.

Bottles include a solid cap.

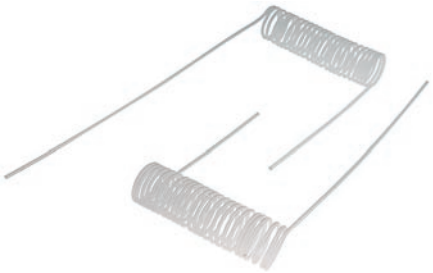
	Bottle size	*Product No.*
Safety-coated bottle	0.25 L	JR-9000-0011
	0.5 L	JR-9000-0012
	1 L	JR-9000-0005
	2 L	JR-9000-0010

SolviFlex

SPECS
- 1/18" OD tubing
- Materials
  Tubing: PFA
  Nuts: PPS
  Ferrules: ETFE
  Filter: PE (Polyethylene)

- Be "mobile" with mobile phase bottles
- Ideal for with VICI safety caps or VICI caps
- Customized version on request

The SolviFlex is made of flexible telephone cable-like PFA tubing which expands and contracts, providing flexibility to move mobile phase bottles up to 1.5 m radius on the bench. Approximately 3 m of tubing is coiled with straight stretches of tubing at each end.



Includes:
- ~3 m coiled 1/8" PFA tubing
- 2 sets: 1/4-28 nut/ferrules for 1/8" OD tubing
- 1 No-Met mobile phase filter with economy slip-on connection (JR-32174)

	Product No.
SolviFlex assembly	JR-6120-50030

A typical use of SolviFlex
Shown installed on a VICI cap and bottle, along with an exhaust filter

NOTES
- The bottles are not suitable to be stressed with pressures above 0.8 bar (11.6 psi), but only for continuous helium sparging.
- The safety coating on a bottle is not intended to replace safe working conditions and precautions in laboratories.

RELATED PRODUCTS
No-Met biocompatible mobile phase filter . . . 52
Safety caps 63
Safety cap kit 62
Safety exhaust filter 60-61
VICI caps 64-65
VICI cap kit 64

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Carbon dioxide filter *NEW* CO_2

In ion chromatography, a basic solution is often used as mobile phase. The buffer capacity of such solutions is small, so the pH of the solution can be affected by the carbon dioxide in the air.

Using a bottle in combination with a VICI cap and a carbon dioxide filter prevents any change in the pH of the mobile phase, thus increasing the stability of the analysis. In this application, the carbon dioxide filter also functions as an air inlet valve.

Description	*Product No.*
Carbon dioxide filter	JR-S-20100

Humidity filter *NEW* H_20

In applications requiring a non-aquaeous organic solvent, the moisture in the ambient air can influence the results. The use of a humidity filter in combination with a VICI cap solves this problem.

Description	*Product No.*
Humidity filter	JR-S-20200

RELATED PRODUCTS
Safety exhaust filters. . . 60

Frits

REPRODUCIBILITY AND PRECISION

VICI Jour unidense frits, with uniform flow across the entire frit, offer unexcelled reproducibility and precision. Proprietary manufacturing processes ensure uniformity and precise, repeatable dimensional control.

PEEK-encased frits surround the frit with a ring of PEEK, reducing the actual porous surface to the ID of an HPLC column or filter.

Frits index

Unidense frits
Stainless . . . . . page 73
Titanium 73
Polyethylene 72

PEEK-encased frits
Stainless 74
Titanium 75
Polyethylene 75

Polyethylene frits – unidense type

SPECS
- Material: UHMWPE
- Tolerances: ±0.08 mm (.003")

- Biocompatible
- Metal free

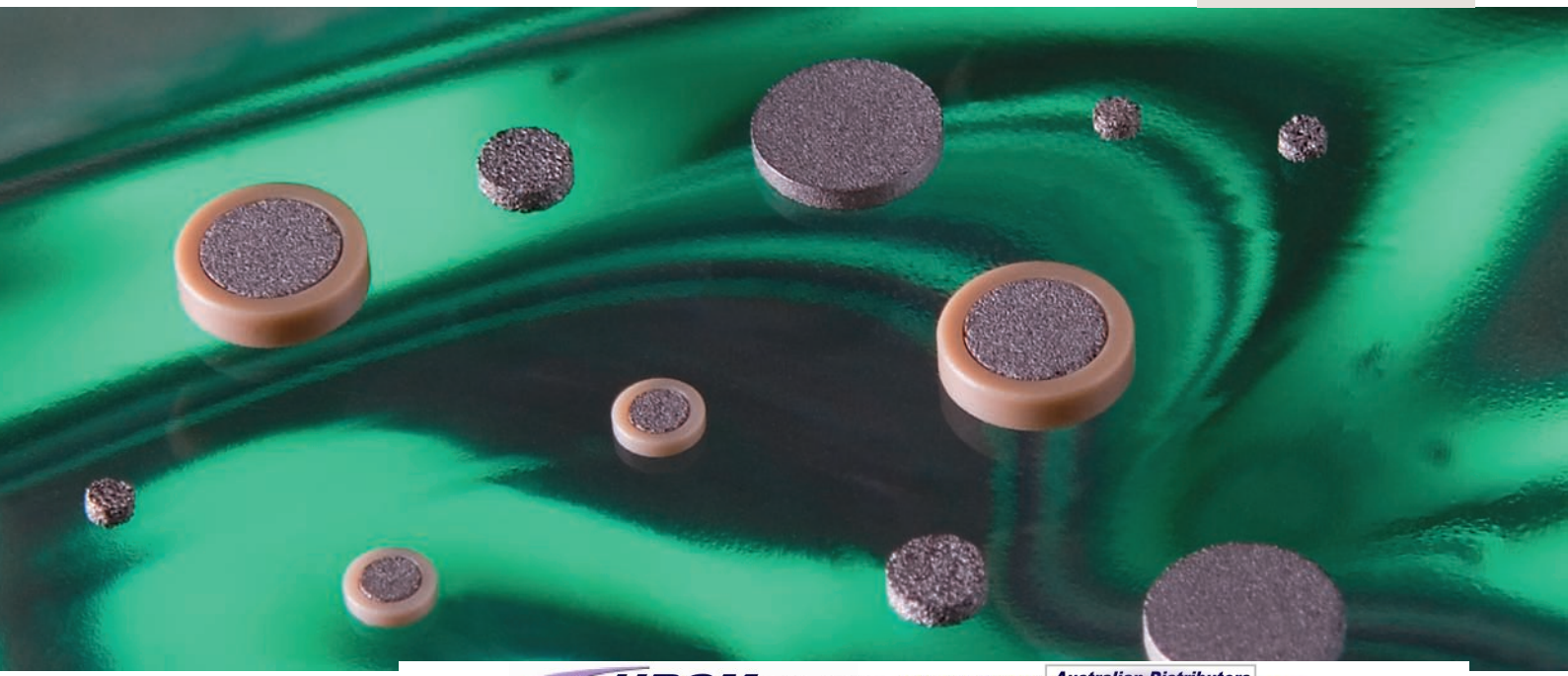
Our completely metal-free polymer frits are made of UHMWPE (Ultra High Molecular Weight PolyEthylene), and offer a competitively priced alternative to titanium.

For single use only. Sold in packages of 5.

OD		*Thickness*		*Porosity*	*Frit volume*	*Product No.*
inches	*mm*	*inches*	*mm*	*µm*	*µL*	
.255"	6.50	..079""	2.00	10	26.5	JR-F-255-079-10PE-5

OPTIONS AND MORE INFORMATION
See facing page.

RELATED PRODUCTS
PEEK-encased polyethylene frits 75



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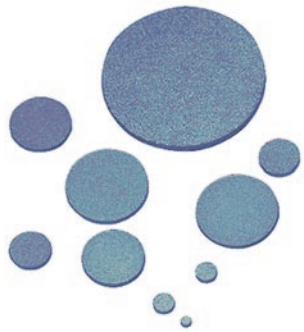


Stainless steel frits – unidense type

For both standard frits and those produced to custom specifications, these frits offer unexcelled reproducibility and precision. Proprietary manufacturing processes ensure uniformity and precise, repeatable dimensional control.

Stainless steel frits are manufactured of SS316L, which has extra-low carbon content. The sintering process used results in a strong bonding of the sinter metal particles. Depending on the grade of powder used, the porosity of the frit can be precisely tuned.

Sold in packages of 5.

SPECS
- Material: Stainless steel Type 316L sintered
- Tolerances: See chart below

OD		Thickness		Porosity	Frit volume	Product No.
inches	*mm*	*inches*	*mm*	*µm*	*µL*	
1/16"	1.59	.030"	0.76	0.5	0.39	JR-.5FR1-5
				1	0.45	JR-1FR1-5
				2	0.53	JR-2FR1-5
				10	0.60	JR-10FR1-5
1/8"	3.18	.040"	1.02	0.5	2.10	JR-.5FR2-5
				1	2.43	JR-1FR2-5
				2	2.83	JR-2FR2-5
				10	3.24	JR-10FR2-5
1/4"	6.35	.040	1.02	0.5	8.39	JR-.5FR4-5
				2	11.30	JR-2FR4-5
				10	12.91	JR-10FR4-5
3/8"	9.53	.040"	1.02	0.5	18.91	JR-.5FR6-5
				2	25.45	JR-2FR6-5
				10	29.09	JR-10FR6-5
1/2"	12.70	.040"	1.02	0.5	33.58	JR-.5FR8-5
				2	45.2	JR-2FR8-5
				10	51.66	JR-10FR8-5
1"	25.40	.060"	1.52	2	269.43	JR-2FR1K-5
				10	307.92	JR-10FR1K-5

OPTIONS
- Standard frits do not have chamfers. Chamfered frits are available on request.
- Other dimensions and porosities are available on request. Minimum order quantity: 100 pieces. Please contact your local distributor or VICI directly.

TOLERANCES

OD (mm)	*Tolerance*
<5	±0.05 mm (.002")
5-12	±0.08 mm (.003")
12.5-25.4	±0.20 mm (.008")

NOTES
- Stated porosities are only nominal and do not reflect the maximum pore size of a frit.
- See frit volume chart for help chosing the right frit and porosity for your application. 95
- Frit volumes are theoretical and are calculated by multiplying overall frit volume times the porosity proportion.

RELATED PRODUCTS

PEEK-encased frits
Stainless 74
Titanium 75

Titanium frits – unidense type

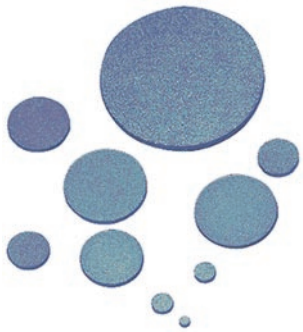
- Biocompatible
- Recommended for protein analysis
- High corrosion resistance
- Various pore sizes and diameters

SPECS
- Material: Titanium, sintered
- Tolerances: See chart at left

Titanium is preferred over stainless steel for applications related to the analysis of sensitive substances in general and large biomolecules in particular. Evidently proteins have a tendency to adsorb on the stainless steel (iron) frit and consequently reduce recovery or may even decompose. Titanium also offers higher corrosion resistance and can be used with solvents containing halides.

Sold in packages of 5.

OD		Thickness		Porosity	Frit volume	Product No.
inches	*mm*	*inches*	*mm*	*µm*	*µL*	
1/16"	1.59	.030"	0.76	0.5	0.82	JR-.5FR1TI-5
				2	0.71	JR-2FR1TI-5
1/8"	3.18	.040	1.02	2	2.83	JR-2FR2TI-5
1/4"	6.35	.040	1.02	2	11.30	JR-2FR4TI-5
3/8"	9.53	.040	1.02	2	25.45	JR-2FR6TI-5
1/2"	12.70	.040	1.02	2	45.2	JR-2FR8TI-5
				10	51.66	JR-10FR8TI-5
1"	25.40	.060"	1.52	2	180.80	JR-2FR1KTI-5



PEEK-encased frits surround the frit with a ring of PEEK, reducing the actual porous surface to the ID of an HPLC column or filter.

The compressed PEEK ring forms a seal between the bottom of the fitting and the column end, preventing the mobile phase and the sample from entering the previously accessible poorly swept areas.

Stainless steel frits – PEEK-encased

SPECS

- Material:
  Frit Stainless SS316L
  Ring PEEK
- Tolerances: ±0.05 mm (.002")

- For HPLC columns or in-line filters
- Eliminate poorly swept volume and improves peak symmetry
- Various porosities and dimensions available

Our PEEK-encased frits with 0.118" or 1/4" OD ring are intended for HPLC columns with IDs of 3.2, 3.9, and 4.6 mm. With the frit surrounded by a PEEK ring, the actual porous surface is reduced to the column ID.

The compressed PEEK ring forms a seal between the bottom of the fitting and the column end, preventing the mobile phase and the sample from entering the previously accessible poorly swept areas.

Sold in packages of 5.

Ring OD		*Frit OD*		*Thickness*		*Porosity*	*Frit volume*	*Product No.*
inches	*mm*	*inches*	*mm*	*inches*	*mm*	*µm*	*µL*	
.118"	3.00	.038"	0.97	.028"	0.70	0.5	0.13	JR-1110-05P-5
						2	0.18	JR-1110-2P-5
						5	0.20	JR-1110-5P-5
		.077"	1.96	028"	0.70	0.5	.0.55	JR-1111-05P-5
						2	0.74	JR-1111-2P-5
						5	0.80	JR-1111-5P-5
						10	0.87	JR-1111-10P-5
.25"	6.35	.078"	2.00	062"	1.59	0.5	1.30	JR-1104-05P-5
						2	1.74	JR-1104-2P-5
		.125"	3.20	062"	1.59	0.5	3.32	JR-1102-05P-5
						2	4.47	JR-1102-2P-5
		.153"	3.90	062"	1.59	0.5	4.94	JR-1101-05P-5
						2	4.47	JR-1101-2P-5
		.181"	4.60	062"	1.59	0.5	6.87	JR-1100-05P-5
						2	9.24	JR-1100-2P-5
		.125"	3.20	.062""	1.59	0.5	1.75	JR-1103-05P-5
						2	2.25	JR-1103-2P-5

OPTIONS

- Other dimensions and porosities are available on request. Minimum order quantity: 100 pieces. Please contact your local distributor or VICI directly.

NOTES

- Stated porosities are only nominal and do not reflect the maximum pore size of a frit.
- See frit volume chart for help chosing the right frit and porosity for your application. 95
- Frit volumes are theoretical and are calculated by multiplying overall frit volume times the porosity proportion.

RELATED PRODUCTS

Unidense type frits
Polyethylene 72
Stainless 73
Titanium 73

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Titanium frits – PEEK-encased

- For HPLC columns or in-line filters
- Biocompatible – recommended for protein analysis
- Eliminate poorly swept volume and improves peak symmetry
- Higher corrosion resistance
- Various porosities and dimensions available

SPECS
- Material:
  Frit Titanium
  Ring PEEK
- Tolerances:
  ±0.05 mm
  (.002")

In terms of biocompatibility, the frit is the critical spot for contributing metal ions to the mobile phase and for interaction with protein samples.

VICI Jour PEEK-encased frits with 1/5" or 1/4" OD ring are intended for HPLC columns with IDs of 3.2 and 4.6 mm. With the frit surrounded by a PEEK ring, the actual porous surface is reduced to the column ID.

The compressed PEEK ring forms a seal between the bottom of the fitting and the column end, preventing the mobile phase and the sample from entering the previously accessible poorly swept areas.

Sold in packages of 5.

Ring OD		*Frit OD*		*Thickness*		*Porosity*	*Frit volume*	*Product No.*
inches	*mm*	*inches*	*mm*	*inches*	*mm*	*µm*	*µL*	
1/5"	5.08	.102"	2.60	.062"	1.59	5	3.20	JR-1128-5P-5
.25"	6.35	.125"	3.20	.062"	1.59	0.5	3.32	JR-1127-05P-5
						2	4.47	JR-1127-2P-5
		.181"	4.60	.062"	1.59	0.5	6.87	JR-1125-05P-5
						2	2.94	JR-1125-2P-5
						5	10.04	JR-1125-5P-5
						10	10.56	JR-1125-10P-5

Polyethylene frits – PEEK-encased

- Biocompatible
- Metal free

SPECS
- Material:
  Frit UHMWPE
  Ring PEEK
- Tolerances:
  ±0.05 mm
  (.002")

Our polymer frits are made of UHMWPE (Ultra High Molecular Weight PolyEthylene). They are a competitively priced alternative to titanium and are completely metal free.

With the frit surrounded by a PEEK ring, the actual porous surface is reduced to the column ID. The compressed PEEK ring forms a seal between the bottom of the fitting and the column end, preventing the mobile phase and the sample from entering the previously accessible poorly swept areas.

Sold in packages of 5.

Ring OD		*Frit OD*		*Thickness*		*Porosity*	*Frit volume*	*Product No.*
inches	*mm*	*inches*	*mm*	*inches*	*mm*	*µm*	*µL*	
1/5"	5.08	.098"	2.50	.059"	1.50	10	2.94	JR-1150-10P-5
.25"	6.35	.181"	4.60	.059"	1.50	10	11.31	JR-1151-10P-5

OPTIONS AND MORE INFORMATION
See facing page.

TECH TIPS
- PEEK-encased titanium frits can also be used as spare parts frits for the PEEK in-line filter kit . .54
- PEEK-encased polyethylene frits can be used as spare parts for:
  PEEK in-line filter kit. 54
  PEEK columns 77

Columns

PEEK COLUMNS ■ GUARD COLUMNS

Columns index

PEEK columns
2.1 mm ID ..... page 77
4.0 mm ID 77

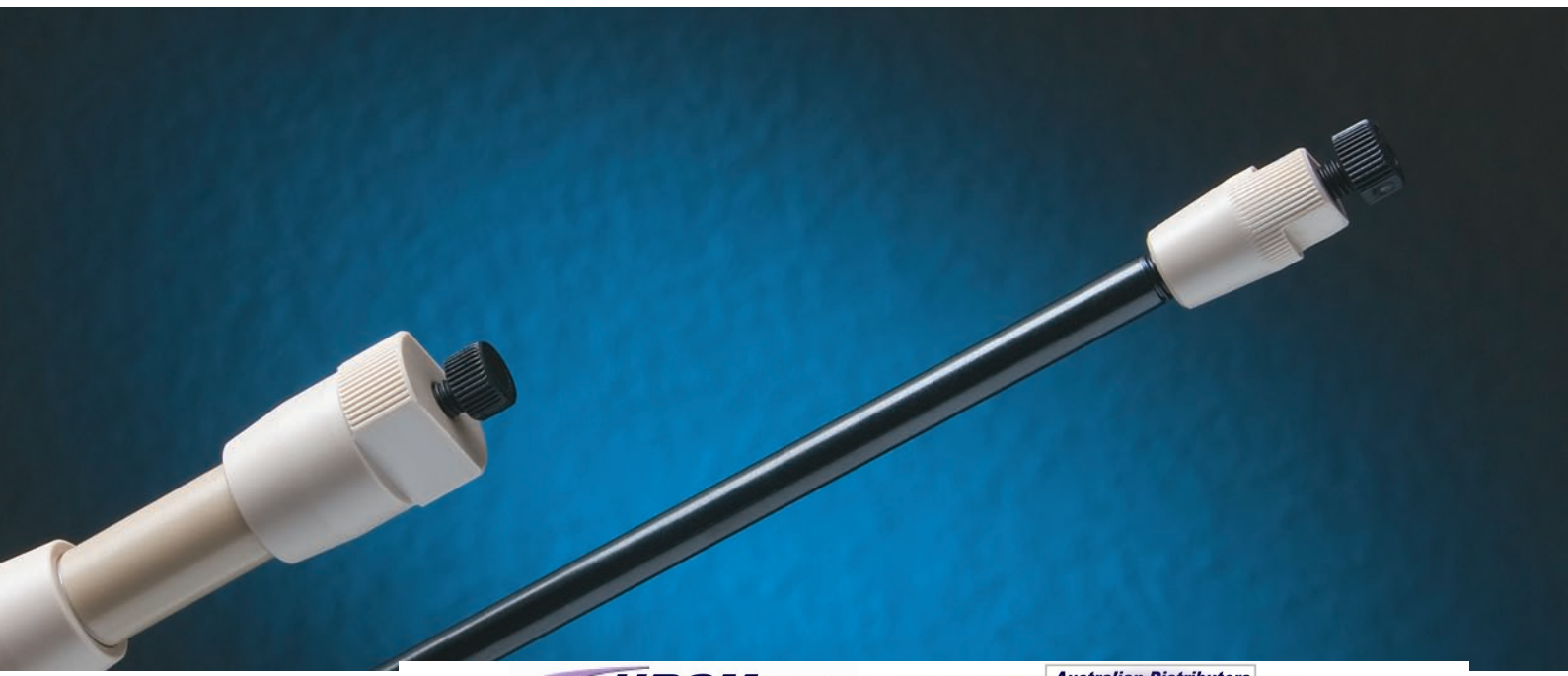
In-line biocompatible guard columns 78

This PEEK guard column system extends the life of valuable analytical columns by trapping contaminants from the sample and mobile phase. Only PEEK and titanium contact the mobile phase and sample.

Column couplers and plugs
Column coupler, one-piece fingertight 79
Column end plugs 79
Column end plugs, logotype 79

Packing kits 78

VICI Jour column packing kits are ready-to-use tools to pack our PEEK columns and PEEK guard columns. Includes needed slurry reservoir, packing adapter, and packing seals.



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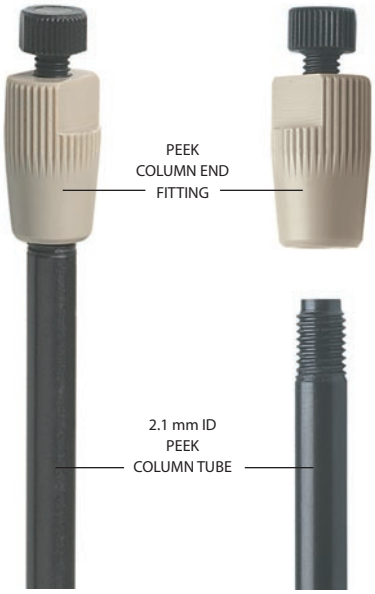


2.1 mm ID PEEK columns

- Biocompatible
- High pressure applications
- Packing devices available

We have designed this column for narrow-bore applications, and for those when a limit amount of sample is available for analysis.

Because 2.1 mm ID columns operate at 1/5th of the flow rate of their 4.6 mm counterparts, the same sample mass injected on a 2.1 mm column will produce five times the detector signal. This greater mass sensitivity provides the same analysis as on a 4.6 mm column with only 20% of the sample.

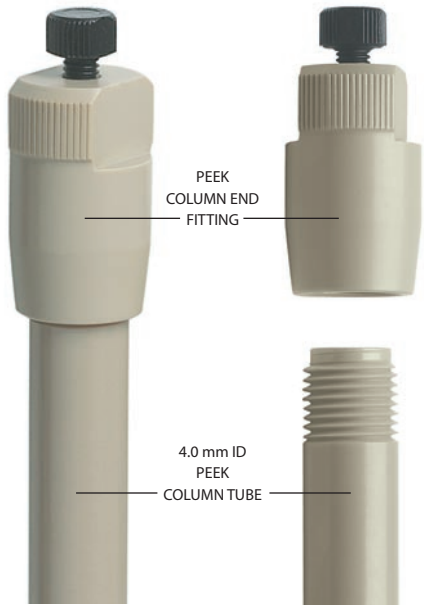
All our columns are delivered without frits. Purchase frits separately.

SPECS
- Material: PEEK, black and natural
- Tolerances: ±0.05 mm (.002")
- Pressure rating maximum: 210 bar (3000 psi)
  During packing, using a VICI Jour packing kit: 350 bar (5000 psi)

Length	*Product No.*
30 mm	JR-65001NF
50 mm	JR-65002NF
100 mm	JR-65003NF
150 mm	JR-65005NF
250 mm	JR-65006NF

Spare parts

Description	*Qty/pkg*	*Product No.*
Column end fitting	1	JR-062
PEEK-encased frit		
Titanium, 5 µm	5	JR-1128-5P-5
Polyethylene, 10 µm	5	JR-1150-10P-5



4.0 mm ID PEEK columns

- Biocompatible
- High pressure applications
- Packing devices available

Today's HPLC and IC applications are more demanding than ever. The limitations of traditional stainless steel pose significant problems for a growing number of important biotechnology and ion chromatography applications.

All our columns are delivered without frits. Purchase frits separately.

SPECS
- Material: PEEK, black and natural
- Tolerances: ±0.05 mm (.002")
- Pressure rating maximum: 350 bar (5000 psi)
  During packing, using a VICI Jour packing kit: 560 bar (8000 psi)

Length	*Product No.*
50 mm	JR-68181NF
100 mm	JR-68182NF
125 mm	JR-68183NF
150 mm	JR-68184NF
250 mm	JR-68185NF
300 mm	JR-68186NF

Spare parts

Description	*Qty/pkg*	*Product No.*
Column end fitting	1	JR-66140
PEEK-encased frit		
Titanium, 5 µm	5	JR-1125-2P-5
Polyethylene, 10 µm	5	JR-1151-10P-5

RELATED PRODUCTS

Column packing kit 78
PEEK-encased frits
Titanium 75
Polyethylene frits 75

In-line biocompatible guard column

SPECS
- Material: PEEK, titanium
- Pressure rating: < 350 bar (< 5000 psi)

- Biocompatible
- Easy to fill
- Packing device for self-packing available

The VICI Jour in-line PEEK guard column system extends the life of valuable analytical columns by trapping contaminants from the sample and mobile phase, thereby preventing loss of retention.

Only PEEK and titanium contact the mobile phase and sample. This system is ideal for use with proteins or other biopolymers that may be contaminated or absorbed by steel surfaces. VICI Jour guard columns can be easily dry packed or slurry packed. Guard columns may be changed in minutes without the use of tools – all connections may be made by hand.

Guard column system includes:
- Guard column cartridge
- 2 Titanium frits
- Housing
- O-ring

Guard column cartridge includes:
- Guard column cartridge
- 2 Titanium frits (2 µm or 5 µm)

Description		*Product No.*
Guard column system	2 µm	JR-68252TI2
	5 µm	JR-68252TI
Guard cartridge with 2 frits	2 µm	JR-68242TI2
	5 µm	JR-68242TI

Spare parts

Description		*Qty/pkg*	*Product No.*
Replacement frit, titanium	2 µm	1	JR-F-197-062-2TINC
	5 µm	1	JR-F-197-062-5TI
Packing seal		1	JR-9

Packing kits

SPECS
- Material: PEEK
- Pressure ratings during packing, using a VICI Jour packing kit:

Column ID	Packing pressure
2.1 mm	350 bar (5000 psi)
4.0 mm	560 bar (8000 psi)

See column pages for operating pressure ratings.

VICI Jour column packing kits are ready-to-use tools to pack our PEEK columns and PEEK guard columns. Every kit consists of the needed slurry reservoir, packing adapter, and packing seals.

Description	*Product No.*
For 2.1 mm ID columns	
Packing kit	JR-67-250-2A
Replacement PEEK packing adapter	JR-67140-1A
Replacement PEEK packing seal	JR-65011
For 4.0 mm ID columns	
Packing kit	JR-67-250-4
Replacement PEEK packing adapter	JR-67140-2B
Replacement PEEK packing seal	JR-65158
For in-line biocompatible guard columns	
Packing kit	JR-27305
Replacement CTFE packing seal	JR-9

TECH TIP
Our packing kit is a "ready-to-use" tool to pack our PEEK guard cartridges. Every kit consists of the needed slurry reservoir, packing adapter, and packing seals.

RELATED PRODUCTS
PEEK columns
2.1 mm ID 77
4.0 mm ID 77

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One-piece fingertight column couplers

- Self-adjusting – zero dead volume for all fitting types
- Four bore sizes
- Biocompatible

Choose from a variety of coupler IDs, indicated by the color of the sleeve. A unique feature of this column coupler is that it adapts automatically to fit all pilot lengths – Valco, Waters, Upchurch, Rheodyne, etc. Since the tubing bottoms out in any fitting detail, added void volume is minimal.

Sold individually.

Color	*ID*	*Product No.*
Red	0.13 mm	JR-26501
Yellow	0.17 mm	JR-26502
Blue	0.25 mm	JR-26503
Orange	0.50 mm	JR-26504

SPECS
- Material:
  Tubing PEEK
  Fittings PEEK
  Sleeve PP (Polypropylene)
- Threads: 10-32 male to 10-32 male
- Pressure rating: <350 bar (5000 psi)

Coupler shown installed between two columns
(columns not included)

Column end plugs – logotype

- Customizable with your logo and color (OEM version)
- Same features as column end plugs below

Ensure safe closure of valuable columns with your own customized column end plugs. Easy handling is guaranteed by the 5/16" wrench flat. Fit all columns with 10-32 thread.

Sold in packages of 10.

Color	*Product No.*
White	JR-4081-10
Black	JR-4082-10
Red	JR-4083-10
Green	JR-4084-10
Blue	JR-4085-10

SPECS
- Material: Nylon
- Threads: 10-32
- Tolerances: ±0.05 mm (.002")

Column end plugs

- Seal analytical columns
- One size fits all
- Fingertight, with wrench flats as well

Fingertight column end plugs fit all columns with 10-32 threads. Easy handling is guaranteed by an additional 5/16" wrench flat, which allows the plug to be loosened by a wrench if it gets stuck. The long design and threading down to the ferrule ensure safe closing of valuable columns.

Sold in packages of 10.

Color	*Product No.*
White	JR-4071-10
Black	JR-4072-10
Red	JR-4073-10
Green	JR-4074-10
Blue	JR-4075-10

SPECS
- Material: Nylon
- Threads: 10-32
- Tolerances: ±0.05 mm (.002")

RELATED PRODUCTS
Color-coded PEEK tubing 6-8

Sample loops

VALCO ■ CHEMINERT® ■ RHEODYNE®

Sample loops are accurately sized for each valve type. However, with small volume loops, the tolerance on the ID of the tubing (±0.001") can have a significant effect on the volume. Therefore loop volume and loop appearance may differ from batch to batch.

Sample loops index

PEEK loops

PEEK loops for:

Cheminert ..... page 81
Rheodyne 81
Valco 81

Stainless steel loops

Stainless loops for:

Cheminert 82
Rheodyne 83
Valco 82

SPECS

- Material:
  - *Loops* PEEK
  - *Nuts* PEEK
  - *Ferrules* PEEK
  - *Caps* PE (Polyethylene)
- Tolerances: ±0.025 mm (.001")

PEEK loops

- Wide range of volumes available
- Biocompatible

VICI Jour PEEK sample loops are made from striped color-coded PEEK tubing and PEEK fittings. PEEK is a mechanically strong, chemically inert polymer ideal for HPLC applications. Since our PEEK sample loops contain no metals or other extractable compounds, no foreign materials will be introduced into the system. Softener-free polyethylene caps are used to avoid contamination of the tubing.

PEEK sample loops are particularly well suited for separations involving proteins, peptides, nucleic acids or other samples of biological origin as well as in IC systems where metal traces may interact with ionic samples or release transition metals that may deactivate ion exchange columns.

PEEK hex-head nuts and PEEK ferrules provide reliable connections, and avoid twisting of the tube.

DISCLAIMER

The maximum holding pressure for any type of connections involving tubing and a ferrule varies considerably with the tubing material the ferrule material, the clearance between tubing OD and ferrule ID, and the shape of the fitting detail.

MORE INFORMATION

ValvTool 88

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PEEK loops *for Cheminert valves*

Fit all Cheminert C1, C1CF, C2, C2V, and C3 type valves.

Sample size	Pressure * bar	psi	Product No.	Sample size	Pressure * bar	psi	Product No.
5 µl	400	5800	JR-SLC-85-5	250 µl	240	3500	JR-SLC-85-250
10 µl	400	5800	JR-SLC-85-10	300 µl	240	3500	JR-SLC-85-300
20 µl	400	5800	JR-SLC-85-20	500 µl	240	3500	JR-SLC-85-500
50 µl	400	5800	JR-SLC-85-50	1 ml	240	3500	JR-SLC-85-1000
100 µl	400	5800	JR-SLC-85-100				
200 µl	240	3500	JR-SLC-85-200				

PEEK loops *for Rheodyne valves*

Fit all Rheodyne metal and metal-free valves.

Sample size	Pressure * bar	psi	Product No.	Sample size	Pressure * bar	psi	Product No.
1 µl	435	6300	JR-SLR-2190	50 µl	350	4500	JR-SLR-2202
2 µl	420	6100	JR-SLR-2191	100 µl	350	4500	JR-SLR-2204
3 µl	420	6100	JR-SLR-2192	200 µl	240	3500	JR-SLR-2206
4 µl	420	6100	JR-SLR-2193	250 µl	240	3500	JR-SLR-2207
5 µl	400	5800	JR-SLR-2194	500 µl	240	3500	JR-SLR-2210
10 µl	400	5800	JR-SLR-2196	1 ml	240	3500	JR-SLR-2222
20 µl	386	5600	JR-SLR-2195				
30 µl	386	5600	JR-SLR-2200				
40 µl	386	5600	JR-SLR-2201				

* Recommended maximum permanent working pressure

PEEK loops *for Valco valves*

Fit all 1/16" Valco W and UW type valves.

Sample size	Pressure * bar	psi	Product No.
5 µl	400	5800	JR-SLV-75-5
10 µl	400	5800	JR-SLV-75-10
20 µl	400	5800	JR-SLV-75-20
50 µl	400	5800	JR-SLV-75-50
100 µl	400	5800	JR-SLV-75-100
250 µl	240	3500	JR-SLV-75-250
500 µl	240	3500	JR-SLV-75-500
1 ml	240	3500	JR-SLV-75-1000

TECH TIPS

- See general information about PEEK loops on facing page.
- The tighter ID tolerance of the tubing minimizes the tolerance of the loop volume.
- The ValvTool tightens nuts with tube or loop installed, providing easy access to many hard-to-reach areas. 88

OPTIONS

Other sample sizes are available on request. Please contact your distributor or VICI Jour directly.

MORE INFORMATION

Chemical resistance 96-98
About PEEK 99

Spart parts *for PEEK Cheminert, Rheodyne, and Valco loops*

Sold in packages of 5.

Description	Product No.
PEEK nuts for use with double ferrules, 1/16" hex head long, 10-32	JR-5510-5
PEEK single ferrules, 1/16" (Use 2 per nut, as shown at right.)	JR-5005-5

SAMPLE LOOPS

SPECS
- Material:
  Loops SS316
  Nuts SS303
  Ferrules SS316
  Caps PE (Polyethylene)
- Tolerances: ±0.05 mm (.002")
- Pressure rating: ≤ 1375 bar (≤ 20,000 psi)

- Wide range of volumes available
- Ultra high pressure resistance

VICI Jour stainless steel sample loops are made of high quality SS316. They are cut using an electrolytic cutting process, cleaned with ultrasound and high pressure steam to remove contaminants, dried, and capped with softener-free caps to avoid recontamination of the tubing.

All loops are supplied with stainless hex-head nuts and stainless ferrules for reliable connections.

Stainless steel loops *for Cheminert valves*

Fit all Cheminert C1, C1CF, C2, C2V, and C3 type valves.

Sample size	*Product No.*
5 µl	JR-SLC-86-5
10 µl	JR-SLC-86-10
20 µl	JR-SLC-86-20
50 µl	JR-SLC-86-50
100 µl	JR-SLC-86-100
250 µl	JR-SLC-86-250
500 µl	JR-SLC-86-500
1 ml	JR-SLC-86-1000

Stainless steel loops *for Valco valves*

Fit all 1/16" Valco W and UW type valves.

Sample size	*Product No.*
5 µl	JR-SLV-76-5
10 µl	JR-SLV-76-10
20 µl	JR-SLV-76-20
50 µl	JR-SLV-76-50
100 µl	JR-SLV-76-100
250 µl	JR-SLV-76-250
500 µl	JR-SLV-76-500
1 ml	JR-SLV-76-1000

Spart parts *for stainless Cheminert and Valco loops*

Sold in packages of 5.

Description	*Product No.*
1/16" stainless nuts, 10-32	JR-ZN1-5
1/16" stainless ferrules	JR-ZF1S6-5

TECH TIPS AND OPTIONS
See facing page.

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Stainless steel loops *for Rheodyne valves*

- Fit all Rheodyne valves
- Special loops for valve Model 7725

Sample size	*Product No.*
5 µl	JR-SLR-111
10 µl	JR-SLR-112
20 µl	JR-SLR-113
50 µl	JR-SLR-114
100 µl	JR-SLR-115
200 µl	JR-SLR-116
500 µl	JR-SLR-117
1 ml	JR-SLR-118

Loops for Rheodyne valve 7725, 1/16"

Sample size	Product No.
5 µl	JR-SLR-111-77
10 µl	JR-SLR-112-77
20 µl	JR-SLR-113-77
50 µl	JR-SLR-114-77
100 µl	JR-SLR-115-77
200 µl	JR-SLR-116-77
500 µl	JR-SLR-117-77
1 ml	JR-SLR-118-77

Spart parts *for stainless Rheodyne loops*

Sold in packages of 5.

Description	*Product No.*
1/16" Rheodyne type stainless nuts	
For valve 7725, long head	JR-57-5
X-long	JR-58-5
Stainless ferrules	
1/16"	JR-59-5
2-step Rheodyne type, 1/16"	JR-60-5

TECH TIPS

- Not recommended for use with halides.
- We offer nuts in three lengths to facilitate wrench access on valves. For loops that will be replaced frequently, we recommend our longest nut – particularly when space is restricted. See long nuts 31
- The ValvTool tightens nuts with tube or loop installed, providing easy access to many hard-to-reach areas. 88

OPTIONS

Other sample sizes are available on request. Please contact your distributor or VICI Jour directly.

MORE INFORMATION

About stainless steel. . 100

Accessories

TOOLS ■ STARTER KITS ■ BACK-PRESSURE REGULATOR

Our low pressure fittings are ideally suited for flow injection analysis, low pressure liquid chromatography, and stream sampling devices. They may be safely used at pressures up to 500 psi and temperatures to 50°C.

Accessories index

Accessories for tubing

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Easy-Flange combi kit 85
PEEK tubing elbows 86
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LC tubing organizer 86
Tubing cutters for polymeric tubing
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  Cutting wheel type 87
  Plier type 87

Accessories for fittings

Color-It fingertight adapters 17
  Work great with all our PEEK and stainless hex head nuts for 1/16" tubing.
Color-Sleeve adapters 17
  Designed to be used with our black PPS nuts and one-piece fittings.

Back-pressure regulators 88
  Our back-pressure regulator improves baseline stability by preventing bubble formation in the flow cell.

Tools

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Wrench 89
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Starter kits

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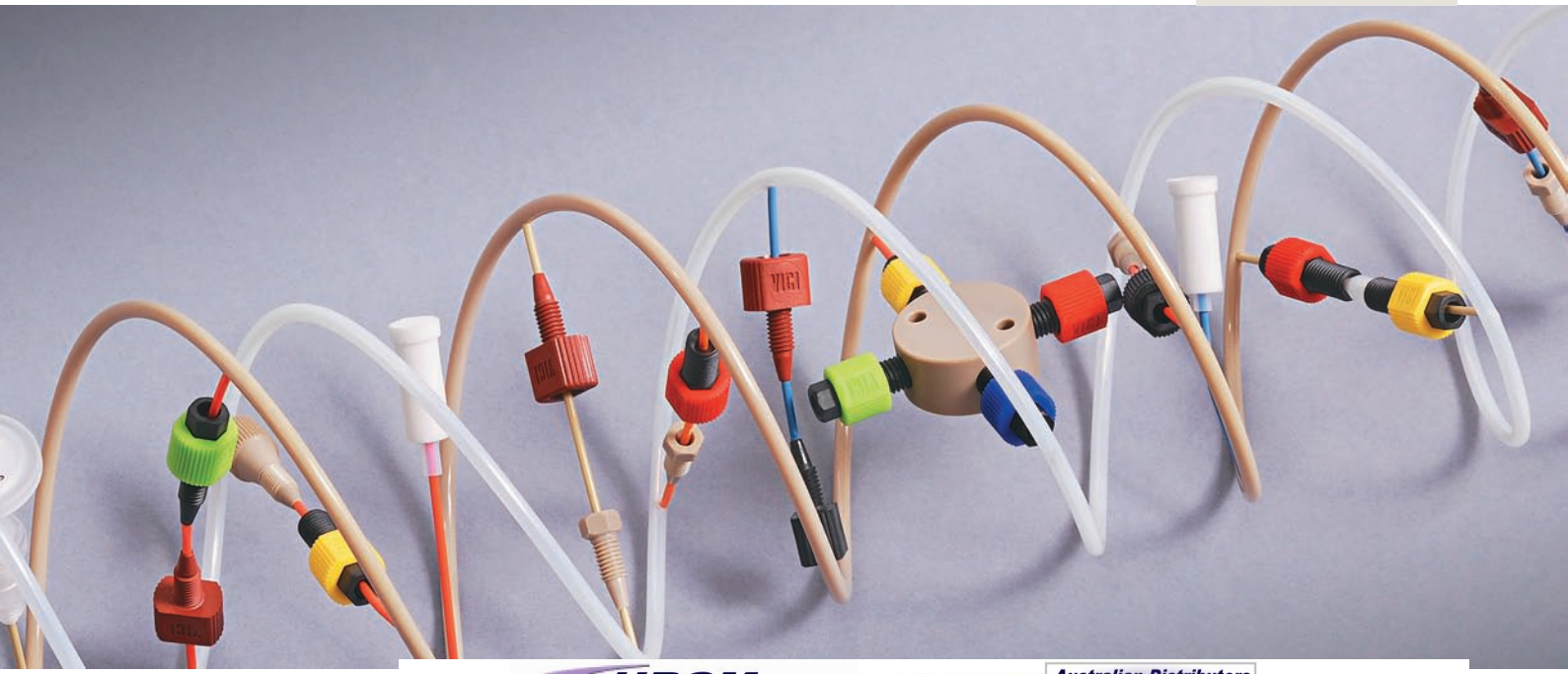
PEEK starter kit 90
  PEEK fittings and tubing
Stainless starter kit 90
  Stainless steel fittings and tubing
ChromBox kit 91
  PEEK and stainless fittings and tubing

RELATED PRODUCTS

Color-Sleeve adapters turn PPS nuts into fingertight fittings and color-code different solvent lines. 17

Color-It fingertight adapters work great with all our PEEK and stainless hex head nuts for 1/16" tubing. 17



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Easy-Flange kit

- Handy tool for perfect flanges
- No heat or electricity required
- No contamination

The Easy-Flange flange-rolling tool for flanged fittings is suitable for PTFE and PTFE-like tubes with OD between 1/16" and 1/8". The tool forms the flange by applying a mechanical force and does not require electrical power.

The quality of the flange is considerably improved over other available methods, since the tubing is not stressed by heat and because the specially-designed negative conical profile of the flange-forming part yields an ideal shape for optimized sealing properties.

Description		*Product No.*
Easy-Flange kit		JR-201540
Kit includes:	*Qty*	*Product No.*
Flanging clamp	1 pair	JR-201531
Flanging discs with:		
0.5 mm SS pin for PEEK tubing	1	JR-202235
0.8 mm polymer pin	1	JR-201541
0.8 mm titanium pin	1	JR-201554
1.3 mm polymer pin	1	JR-201536
1.3 mm titanium pin	1	JR-201537
Clean-Cut tubing cutter	1	JR-797
Tubing, PTFE, 1/16" x 0.75 mm ID	2 m	JR-T-4036
Plastic box	1	JR-201540L
Flanger/distance gauge	1	JR-201532

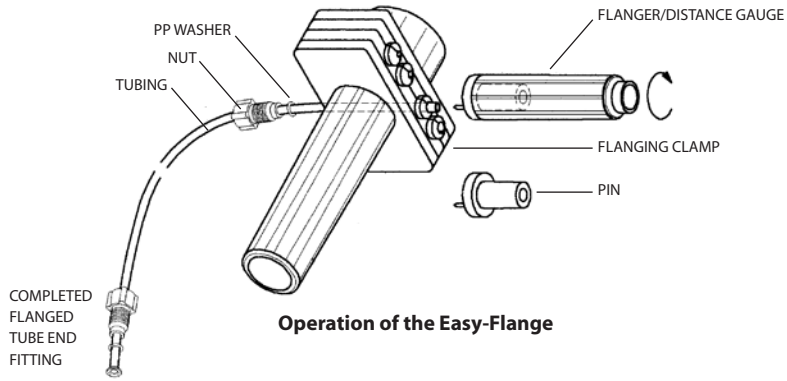
Easy-Flange combi kit

In addition to the contents of the Easy-Flange kit, the combi kit includes 1/8" PTFE tubing, nuts/rings for tube end fittings, and color-coded adapters.

Description			*Product No.*
Easy-Flange combi Kit			JR-201539
Includes:		*Qty*	*Product No.*
Easy-Flange kit above		1	JR-201540
PPS nuts, 1/4-28, flanged			
	White, for 1/16" tubing	10	JR-201094WH-10
	Black, for 1/8" tubing	10	JR-201580BK-10
PP washers	For 1/16" tubing	10	JR-201926-10
	For 1/8" tubing	10	JR-201928-10
PTFE tubing	1/16" x 0.75 mm ID	3m	JR-T-4036-M3
	1/8" x 1/16" ID	3m	JR-T-680 0-M3

OPTIONS
Additional sizes of flanging discs are available.
Flanging disc with
1.0 mm
polymer pin JR-201662
1.5 mm
polymer pin JR-201663

MORE INFORMATION
Flanged fittings. . . . 41, 43
Polymeric
tubing. 9-13



Operation of the Easy-Flange

PEEK tubing elbows

Tubing elbows (90° and 180°) are ideal for routing 1/16" PEEK tubing through an LC system. These elbows are proportioned to bend PEEK tubing at the optimum radius for maximum chemical resistance and burst pressure. Installation is simple –just snap the tubing into the elbow.

Sold in packages of 5.

Description	*Product No.*
90° elbow	JR-357090
180° elbow	JR-357180

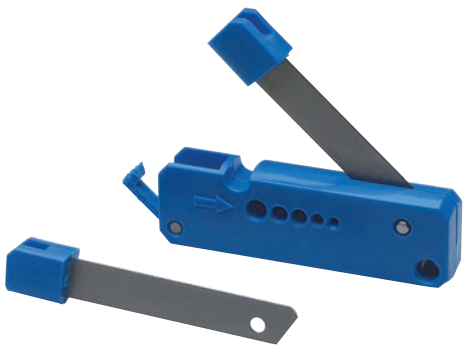
Tubing clip – the LC tubing organizer

- Fixes 1/16" and 1/8" tubing to beakers, flasks, or bottles
- Stainless steel spring for long life

This convenient device holds both 1/16" and 1/8" polymer tubes precisely where they should be in your beakers, flasks and bottles etc. up to 4 mm wall thickness. The stainless steel spring will keep your tubing clip working for a long time, and helps keep the solvent line in the solvent.

Description	*Product No.*
Tubing clip	JR-9001

Clean-Cut tubing cutter *for polymeric tubing*



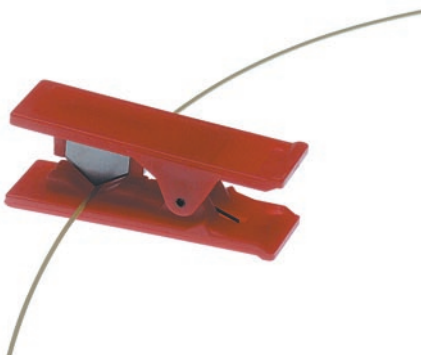
- Cuts PEEK, PTFE, ETFE, and other polymeric tubing
- No distortion to OD or ID
- Ideal for the most demanding LC applications
- Safety lock secures the blade

Right angles and clean cuts are essential in LC to avoid leaks and dead volume. This handy tool makes it easy to get burr-free, perpendicular ends on polymeric tubing without distorting the outside diameter and/or closing the inside diameter of the tubing.

It is designed to cut PTFE, ETFE and polymers in general and PEEK capillary tubing in particular. The compact design and unique safety locking mechanism allow every chromatographer to keep one in their pocket.

Description	*Product No.*
Clean-Cut tubing cutter	JR-797
Replacement blade	JR-798

Guillotine tubing cutter *for polymeric tubing*



- Cuts PEEK, PTFE, ETFE, and other polymeric tubing
- Ideal for less demanding LC applications

Description	*Product No.*
Guillotine tubing cutter	JR-794
Replacement blade	JR-795

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Stainless steel tubing cutter – cutting wheel type

- For 1/16" and 1/8" SS tubing
- Leaves smooth, uniform cuts
- Minimal deburring and/or reaming required
- Easy replacement of the cutting wheel

This is the ideal tool for cutting 1/16" and 1/8" stainless steel tubing, leaving smooth, uniform cuts requiring a minimum of deburring and/or reaming. The easily replaced cutting wheel scores tubing, leaving cuts which allow tube-to-tube and tube-to-frit connections.

Description	*Product No.*
Tubing cutter for metal tubing	JR-792
Replacement cutting wheel	JR-793

Stainless steel tubing cutter – plier type

- For easy cutting of 1/16" tubing off a coil
- Reach "hard-to-get" places in an HPLC system
- Delivered in a plastic sheath

These pliers can be used for quick cuts for non-critical applications or at "hard to get" places. However, for scientific equipment, we strongly recommend our pre-cut and cleaned stainless tubing.

Description	*Product No.*
Tubing pliers for metal tubing	JR-796

File

This deburring file is handy tool for cleaning up metal tubing ends.

Description	*Product No.*
Deburring file	JR-802

TECH TIP
Between the sample injector, column, and detector, use our pre-cut stainless steel tubing, which has been electrolytically cut and steam cleaned. 14

MORE INFORMATION
Pre-cut stainless steel tubing. 14

Backpressure regulator

SPECS
- For 1/16" OD tubing
- Materials
  Wetted parts:
  Housing: PEEK/ CTFE
  Membrane: Polyimide
- 10-32 threads
- Dead volume: 0.25 µl (theoretical)

- Improves baseline stability by preventing bubble formation in the flow cell
- Adjust backpressure without disconnecting anything
- Completely biocompatible fluid path, with low dead volume
- Easy mount with 17 mm panel hole, 9 mm maximum thickness

Even properly degassed mobile phases may contain some dissolved gases that can release bubbles in the detector flow cell resulting in baseline noise and drift. The VICI Jour backpressure regulator provides a quick and convenient way to improve the stability of detector baseline by providing a constant back-pressure on the flow cell, which stops the release of dissolved gases from the mobile phase.

Because of the unique design, the backpressure regulator has a very small internal volume. The peak shape is not affected when the regulator is installed between two detectors in a multi-detector system, or between a detector and a fraction collector or fraction collector system. Typically, 90% or more of a given component's efficiency will be retained upon passing through the regulator.

A spring-loaded diaphragm provides the force that generates the back-pressure. Spring tension may be adjusted using the backpressure adjustment screw on the top of the regulator to vary the backpressure without disconnecting any lines.

Backpressure regulators are available in two ranges: 1-20 bar (15-300 psi) and 20-103 bar (300-1500 psi)., and two housing types: PEEK and CTFE.

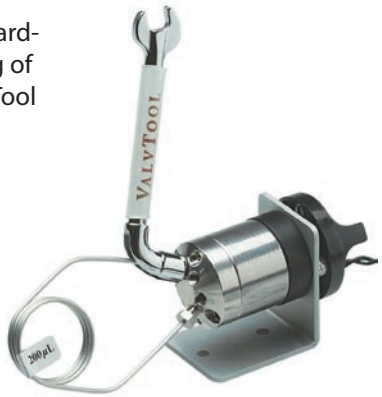
Range		*Housing*	*Product No.*
1-20 bar	15-300 psi	PEEK	JR-BPR1
		CTFE	JR-BPR1KF
20-103 bar	300-1500 psi	PEEK	JR-BPR2
		CTFE	JR-BPR2KF

ValvTool

- For making connections in hard-to-reach areas
- Ideal for nuts with 1/4" hex and 5/16" heads

The ValvTool is a time-saving device which provides easy access to many hard-to-reach areas. The unique design with its slotted wrench allows tightening of nuts where a loop or a capillary might otherwise make it difficult. The ValvTool is ideal for Valco and Rheodyne® valves and fittings, as well as most of the HPLC and PEEK fittings on the market with 1/4" and 5/16" heads.

Description	*Product No.*
ValvTool wrench 1/4" and 5/16"	JR-800



ValvTool shown loosening a nut on a valve
(Valve and loop not included)

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Ferrule removal kit
For 360 µm and 1/32" ferrules

Ferrule removal kit
For 1/16" and 1/8" ferrules

Ferrule removal kits

- Remove polymeric ferrules stuck in fitting details
- One version for 1/32" and 360 micron ferrules
- Another version for 1/16" and 1/8" ferrules

Ferrule removal kits are easy-to-handle tools for removing ferrules stuck in a fitting detail. Two versions cover four different ID's of ferrules.

Description	*For use with*	*Product No.*
Ferrule removal kits	360 µm and 1/32" ferrules	JR-FRK1
	1/16" and 1/8" ferrules	JR-FRK2

Tightening tools for PEEK fittings

These handy tools make it fast and easy to tighten hex-head fittings. The green tool is for any 1/32" fitting with a 3/16" hex head nut, and the blue version fits the 1/4" hex common in fittings for 1/16" tubing.

Color	*For use with*	*Prod No*
Green	1/32" fittings (6-40 threads)	JR-CNFT
Blue	1/16" fittings	JR-ZNFT

Hex key set

The hex key set has a wrench to fit any socket head screw on any VICI valve or actuator. Includes the following sizes: .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", and 5/32".

Description	*Product No.*
Hex ket set	JR-HKS3

Tweezer

Ideal for picking up small fittings, etc.

Description	*Product No.*
Tweezer	JR-806

Wrenches

Open end wrenches for nuts with 1/4", 5/16", 3/8", or 7/16" heads.

Description	*Product No.*
Open end wrench	
1/4" and 5/16"	JR-804
3/8" and 7/16"	JR-805

RELATED PRODUCTS
Deburring file 87
Tools for tubing 86-87

PEEK starter kit

- All parts biocompatible
- Ideal kit for all HPLC users

The PEEK starter kit is ideal for anyone working in the field of biochromatography. It consists of fittings, ferrules, tubing, and mobile phase filters, as well as a union, our Clean-Cut tubing cutter, and other useful accessories like our tubing elbows – all boxed together for a very competitive price.

For a number of interesting LC applications involving proteins, peptides, nucleic acids, or other samples of biological origin, metal systems may interact with samples or release transition metals that will deactivate columns. Replacing stainless steel parts (such as tubing fittings, ferrules, filters, etc.) with PEEK creates a biocompatible environment for samples and mobile phase.

Description			*Product No.*
PEEK starter kit			**JR-35P**
Kit includes:		*Qty*	*Product No.*
PEEK fittings	One-piece 10-32 fittings	10	JR-55020-5
	Fingertight 10-32 nuts	5	JR-5580-5
	Hex-head long 10-32 nuts	5	JR-5510-5
	1/16" double ferrules	20	JR-5004-10
	Union body, 0.25 mm bore	1	JR-061
PEEK tubing, 1/16" OD			
	0.25 mm ID x 3 m, blue stripe	1	JR-T-6001-M3
	0.50 mm ID x 3 m, orange stripe	1	JR-T-6002-M3
Filters	PEEK in-line filter kit	1	JR-68256
	Last Drop mobile phase filter, 5 µm, PTFE	1	JR-9000-0521
Accessories	Tubing elbow, 90°	2	JR-357090
	Tubing elbow, 180°	2	JR-357180
Tools	Clean-Cut polymeric tubing cutter	1	JR-797
	Tweezer	1	JR-806

Stainless steel starter kit

UHPLC

The kit consists of stainless fittings, ferrules, tubing, and solvent filters, as well as a union, our cutting-wheel type metal tubing cutter, and other useful items like our ValvTool. All boxed together for a very competitive price.

Description			*Product No.*
Stainless steel starter kit			**JR-35S**
Kit includes:		*Qty*	*Product No.*
Stainless fittings			
	1/16" nuts, 10-32	10	JR-ZN1-5
	1/16" nuts, 10-32, 19 mm long	10	JR-LZN1-5
	1/16" ferrules	20	JR-ZF1S6-5
	1/16" union with nuts/ferrules, 0.25 mm bore	1	JR-ZU1CS6
Stainless tubing			
	1/16" x 0.25 mm x 3 m	1	JR-T-625-10-M3
	1/16" x 0.50 mm ID x 3 m	1	JR-T-625-20-M3
	1/16" x 0.18 mm ID x 100 mm	2	JR-T-97030
	1/16" x 0.25 mm ID x 200 mm	2	JR-T-97060
Filters	Mobile phase, 2 µm, 1/8" pipe OD	1	JR-3675-2
	Stainless in-line, 0.25 mm ID	1	JR-68230-5
	Last Drop, 10 µm	1	JR-9000-0532
Tools	ValvTool 1/4" x 5/16" wrench	1	JR-800
	Open end wrench, 1/4" x 5/16"	1	JR-804
	Tubing cutter	1	JR-792
	Tweezer	1	JR-806

RELATED PRODUCTS

IN THE PEEK KIT
PEEK fittings
One-piece 10-32 fittings 20
Nuts for double ferrule
Fingertight 23
Hex-head, long 23
Double ferrules 23
Union body 26
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1/16" ferrules 32
1/16" union 34
Stainless tubing 15
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Last Drop 51
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Open end wrench . . . 89
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Tweezer 89

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ChromBox kit

Includes
- PEEK, PTFE, and stainless tubing
- PEEK and stainless nuts, ferrules, and unions
- Tubing cutters and wrenches
- More accessories, all in a convenient carrying case

The ChromBox is an all-purpose analytical spare parts kit for all our customers using HPLC. It contains the most often used spare parts made both of high quality Type 316L stainless steel as well as PEEK and PTFE.

Description			*Product No.*
ChromBox kit			**JR-34N**
ChromBox kit includes:			
PEEK fittings	One-piece 10-32 fittings	5	JR-55020-5
	Fingertight 10-32 nuts	5	JR-5580-5
	Long hex-head 10-32 nuts	5	JR-5510-5
	1/16" double ferrules	10	JR-5004-10
	Union, 0.25 mm bore, body only	1	JR-061
SS fittings	1/16" nuts, 10-32, 13 mm long	5	JR-MZN1-5
	1/16" nuts, 10-32, 19 mm long	5	JR-LZN1-5
	1/16" ferrules	10	JR-ZF1S6-5
	1/16" union with nuts and ferrules, 0.50 mm bore	1	JR-ZU1MS6
Tubing			
PEEK	1/16" x 0.25 mm ID x 3 m, blue stripe	1	JR-T-6001-M3
	1/16" x 0.50 mm ID x 3 m, orange stripe	1	JR-T-6002-M3
PTFE	1/8" x 1/16" ID x 3 m	1	JR-T-6800-M3
Stainless	1/16" x 0.25 mm x 3 m	1	JR-T-625-10-M3
	1/16" x 0.50 mm ID x 3 m	1	JR-T-625-20-M3
Filters	PEEK in-line filter kit	1	JR-68256
	Stainless Last Drop, 2 µm	1	JR-9000-0530
Accessories	Tubing elbow, 90°	1	JR-357090
	Tubing elbow, 180°	1	JR-357180
	Tubing clip	2	JR-9001
Tools	Clean-Cut polymeric tubing cutter	1	JR-797
	Plier style SS tubing cutter	1	JR-796
	ValvTool 1/4" x 5/16" wrench	1	JR-800
	Open end wrench, 1/4" x 5/16"	1	JR-804
	Deburring file	1	JR-802
	Tweezer	1	JR-806

RELATED PRODUCTS

IN THE CHROMBOX KIT

PEEK fittings
One-piece 10-32 fittings 20
Nuts for double ferrule
Fingertight 23
Hex-head, long 23
Double ferrules 23
Union body 26
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CHEMICAL RESISTANCE ■ MATERIALS ■ GLOSSARY

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General conversion factors

inches to mm	inches x 25.4 = mm
feet to meters	feet x 0.3048 = meters
meters to feet	meter x 3.28 = feet

bar to psi	bar x 14.5 = psi
psi to bar	psi x 0.069 = bar
psi to kPa	psi x 6.9 = kPa

RELATED PRODUCTS

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PEEK 5-8

Dual-layer 7

Natural 5

Solid-color..... 8

Striped 6

PFA..... 9

PTFE 12

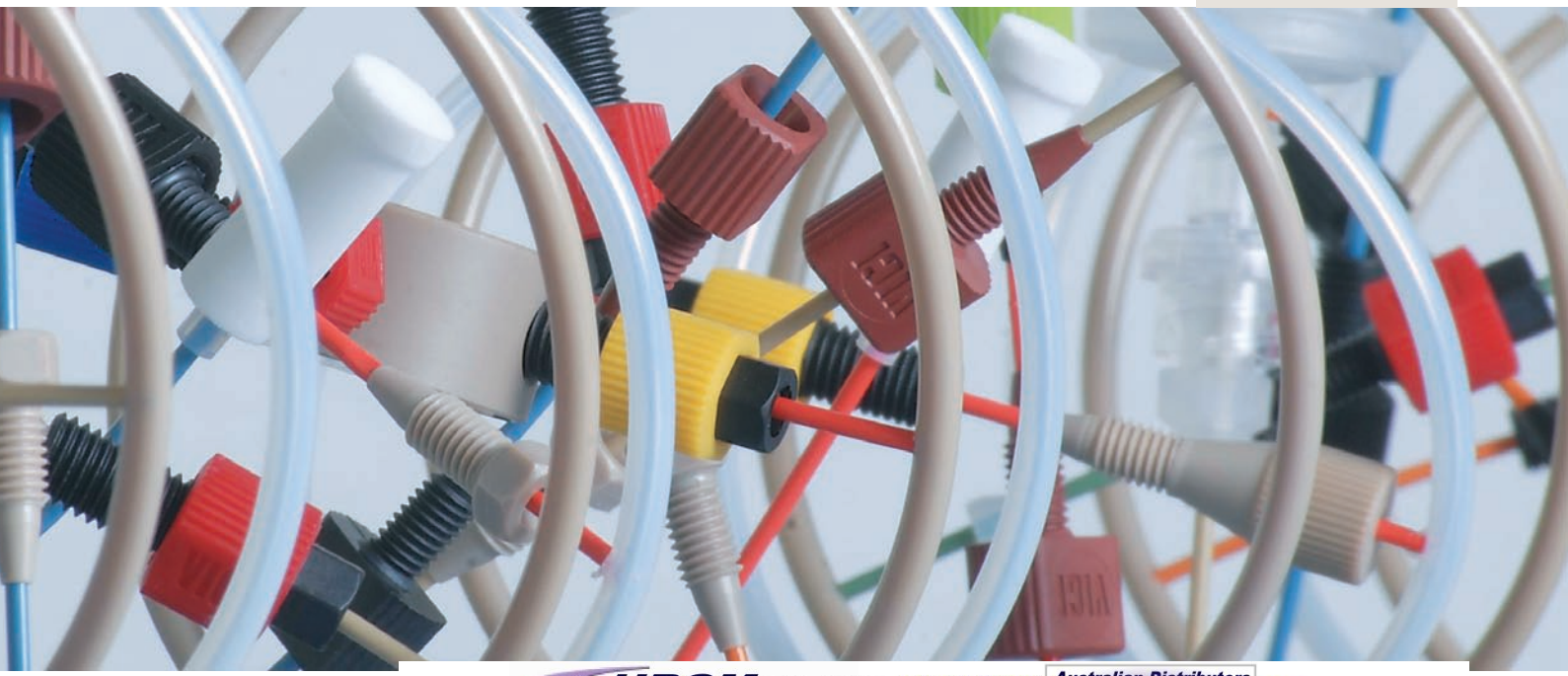
Natural 12

Solid-color..... 12

Stainless steel

Premium grade 15

Welded..... 15



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Tubing volume/length conversion chart

1/16" OD tubing sold by VICI typically has an ID tolerance of ±0.025 mm. This is much tighter than normal commercial grades of tubing; however, it is enough to result in noticeable error if exact volumes are not measured, according to the equation $V = \Pi (½ D)^2 L$.

Tubing ID		Volume/ length	
mm	inches	µl/cm	µl/in
0.050	.002"	0.02	0.05
0.064	.0025"	0.03	0.08
0.075	.003"	0.04	0.12
0.10	.004"	0.08	0.21
0.13	.005"	0.13	0.32
0.17	.0067"	0.23	0.58
0.18	.007"	0.25	0.63
0.25	.010"	0.51	1.29
0.38	.015"	1.14	2.90
0.50	.020"	2.03	5.15
0.64	.025"	3.17	8.04
0.75	.030"	4.56	11.58

Tubing ID		Volume/length	
mm	inches	µl/cm	µl/in
1.00	.040"	8.11	20.59
1.40	.055"	15.39	38.93
1.52	.060"	18.24	46.33
1.59	.062"	19.86	49.47
1.65	.065"	21.38	54.38
1.70	.067"	22.70	57.78
1.78	.070"	24.83	63.06
2.00	.079"	31.42	80.32
2.10	.083"	34.64	88.66
2.16	.085"	36.61	92.99
2.40	.094"	45.24	113.72
3.18	.125"	79.4	201
3.76	.148"	111	282
4.35	.171"	149	376

Maximum recommended working pressures for stainless steel tubing

PREMIUM GRADE STAINLESS TUBING			
OD	ID (mm)	bar	psi
1/32"	0.13	1735	25,160
	0.18	1601	23,225
	0.25	1395	20,230
	0.50	734	10,645
1/16"	0.13	1902	27,580
	0.18	1835	26,610
	0.25	1735	25,160
	0.50	1395	20,230
	0.75	1067	15,480
	1.00	734	10,645
1/8"	0.68	1622	23,520
	0.75	1572	22,800
	1.00	1406	20,400
	1.50	1075	15,600
	1.70	960	13,920
	2.16	662	9,600
1/4"	4.65	554	8,040

WELDED STAINLESS TUBING			
OD	ID (mm)	bar	psi
1/16"	0.13	1871	27,140
	0.18	1794	26,025
	0.25	1717	24,910
	0.50	1384	20,080
	0.75	1076	15,610
	1.00	743	10,780
1/8"	2.10	680	9,860
1/4"	4.65	538	7,800

WORKING PRESSURE FOR STAINLESS STEEL TUBING

The working pressure for stainless tubing is calculated from the burst pressure by dividing by 2.5. The theoretical burst pressure(s) were calculated using Lame's formula and a safety factor of 2. Additionally, these results assume the tubing is not subject to any other stresses (e.g. temperaure different from ambient, bends) that would influence the calculations. the end user must decide the safe maximum working pressure based on this information and the specific application.

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Maximum recommended working pressures for PEEK tubing

PEEK TUBING

OD	ID (µm)	bar	psi
360 µm	50	358	5200
	75	345	5000
	100	300	4400
	125	275	4000
	150	240	3500

OD	ID (mm)	bar	psi
1/32"	0.050	455	6600
	0.064	455	6600
	0.075	455	6600
	0.100	455	6600
	0.13	414	6000
	0.15	400	5800
	0.18	386	5600
	0.20	369	5350
	0.25	338	4900
	0.38	269	3900
	0.50	207	3000

OD	ID (mm)	bar	psi
1/16"	0.050	480	7000
	0.064	480	7000
	0.075	470	6800
	0.100	460	6700
	0.13	460	6700
	0.18	440	6400
	0.25	420	6100
	0.50	345	5000
	0.75	262	3800
	1.00	179	2600
	1.40	55	800
1/8"	0.75	379	5500
	1.59	248	3600
	2.00	179	2600
1/4"	3.17	227	3300

Maximum recommended working pressures for polymeric tubing

FEP TUBING

OD	ID (mm)	bar	psi
1/32"	0.10	82	1200
	0.13	78	1100
	0.15	78	1100
	0.18	72	1050
	0.25	68	980
	0.38	51	750
	0.50	35	500

OD	ID (mm)	bar	psi
1/16"	0.10	124	1800
	0.13	124	1800
	0.15	117	1700
	0.18	117	1700
	0.20	117	1700
	0.25	117	1700
	0.50	96	1400
	0.75	76	1100
	1.00	52	750

OD	ID (mm)	bar	psi
1/8"	1.59	69	1000
	2.10	41	600
3/16"	3.18	41	600
1/4"	4.35	45	650
1.0 mm	0.50	62	900
2.0 mm	1.00	62	900
3.0 mm	1.00	82	1200
	2.00	41	600

ETFE TUBING

OD	ID (mm)	bar	psi
1/32"	0.25	152	2200
1/16"	0.17	200	2900
	0.25	186	2700
	0.50	152	2200
	0.75	117	1700
	1.00	83	1200
1/8"	1.59	110	1600
3.0 mm	1.00	138	2000
6.0 mm	4.00	69	1000

PFA TUBING

OD	ID (µm)	bar	psi
360 µm	50	103	1500
	75	96	1400
	100	90	1300
	150	75	1100

OD	ID (mm)	bar	psi
1/16"	0.50	100	1450
	0.75	76	1100
	1.00	55	800
1/8"	1.59	72	1050
	1.70	65	940
3/16"	3.20	41	600
1/4"	4.35	45	650

PTFE TUBING

OD	ID (mm)	bar	psi
1/16"	0.18	62	900
	0.25	55	800
	0.50	48	700
	0.75	37	550
	1.00	25	350
1/8"	1.59	35	500
	2.40	18	250
1/4"	4.75	17	250
2.0 mm	1.70	10	150
4.0 mm	3.00	17	250
4.76 mm	3.76	14	200

WORKING PRESSURE FOR POLYMERIC TUBING

The quoted maximum working pressure(s) were calculated from the burst pressure and the factor 2.5.

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Tolerances – PEEK tubing

Due to tighter tolerances, VICI Jour PEEK tubing is the best choice for chromatography applications in which exact flow rates or tube volume are of importance. The tighter tolerance ensures a more consistent internal volume of transfer lines.

PEEK TUBING		
Tubing OD	**OD** (±) (mm)	**ID** (±) (mm)
360 µm	0.025	0.013
1/32"	0.025	0.013
1/16" *	0.025	0.013
1/16" **	0.025	0.025
1/8"	0.050	0.050

* For ID up to 0.25 mm
** For ID over 0.25 mm

Tolerances – polymeric tubing

POLYMERIC TUBING		
Tubing OD	**OD** (±) (mm)	**ID** (±) (mm)
360 µm	0.025	0.013
1/32"	0.025	0.025
1/16"	0.050	0.025
1/8"	0.10	0.10
3/16'	0.10	0.10
1/4"	0.10	0.10

Frit volume

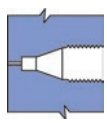
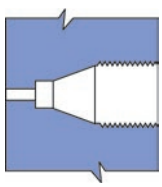
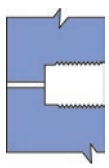
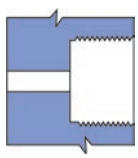
Stainless, titanium, and polymer frits

Internal frit volumes are theoretical and are calculated by multiplying the total frit volume by the proportion of the pores in the frit (porosity proportion). Stated frit porosities are only nominal and do not relect the maximum pore size of a frit. The chart below will help you in selecting the right frit for your application.

Porosity in µm	Max pore size in µm	Particles retained in µm	Porosity in %
0.2	1	≥ 1.0	22
0.5	2	≥ 1.5	26
1	3	≥ 3.0	30
2	5	≥ 3.5 - 5.0	35
5	15	≥ 15.0	38
10	30	≥ 30	40

Standard threads

Following are illustrations of standard threads for VICI Jour fittings. Place your fitting on the drawings below to identify the thread size.

2-56	6-40	10-32	5/16-24	1/4-28	1/2-20
for 360 µm OD tubing	for 1/32" OD tubing	for 1/16" OD tubing	for 1/8" OD tubing	for 1/16" and 1/8" OD tubing	for 1/4" OD tubing
					

Chemical resistance of PEEK at high temperature

Chemical	°C	°F	Rating
Acetic acid	200	420	□
Ammonia gas	200	420	■
Carbon monoxide gas	200	420	■
Ethylene glycol	200	420	□
Ethylene glycol (50%)	140	284	■
Hydrogen sulphide gas	200	420	■
Liquid ammonia	200	420	□
Methane	200	420	■
Methylethylketone	200	420	■
Nitrobenzene	200	420	■
Phosphoric acid (50%)	200	420	■
Sodium hydroxide solution	200	420	■
Sulphuric acid (50%)	200	420	□
Sulphur dioxide gas	200	420	■

Chemical characteristics of PEEK®

PEEK exhibits excellent resistance to a wide range of organic and inorganic chemicals. The compatibility of PEEK with many chemicals at 20°C (68°F) has been investigated and the results for unreinforced grades are given in the table below.

PEEK is compatible with almost any of the solvents used in HPLC. The only solvents which will attack PEEK are concentrated nitric acid and sulphuric acids. However, PEEK tubing can safely withstand 20-30% nitric acid when passivating a system.

Methylene chloride, DMSO, and THF may cause swelling in PEEK. The highest temperature we recommend for PEEK is 100°C. The tubing will maintain the stated pressure rating up to this temperature.

Chemical resistance of PEEK and other polymers

A

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Acetaldehyde	■	■	–	–	–	■	–	■	–	■	■
Acetic acid (20 %)	■	■	■	■	■	■	■	■	■	□	■
Acetic acid (80 %)	■	■	■	■	■	■	–	■	■	–	–
Acetic acid (glacial)	■	■	■	■	■	■	■	■	■	■	■
Acetone	■	■	□	■	■	■	■	■	■	■	■
Acetonitrile	■	■	–	–	■	■	■	■	■	□	■
Acrylic acid	■	–	–	–	■	■	–	■	–	–	–
Ammonia, anhydrous	■	□	–	–	■	■	–	■	–	–	–
Ammonia (10 %)	■	□	□	■	■	■	■	■	■	–	–
Ammonia (Liquid)	□	■	–	–	■	■	–	■	–	–	–
Ammonium hydroxide	■	–	■	■	■	■	■	■	■	–	–
Aqua regia	■	■	–	–	■	■	–	■	–	■	■
Aromatic hydrocarbons	■	–	□	■	■	■	–	■	–	–	–

B

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Benzene	■	■	□	■	■	■	■	■	■	–	–
Benzoic acid	■	–	–	–	■	■	–	■	–	–	–
Benzaldehyde	■	–	–	–	■	■	–	■	–	–	–
Bromine/dibromoethane	■	–	–	–	■	■	–	■	–	–	–
Bromine (dry)	■	–	–	–	■	■	–	■	–	–	–
Bromine (wet)	■	□	–	–	■	■	–	■	–	■	■
Boric acid	■	–	–	–	■	■	–	■	–	–	–
Butanol	■	–	■	■	■	■	■	■	■	–	–

LEGEND

- ■ Suitable
- □ Marginal; dependent on application
- ■ Not recommended
- – No data available

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C

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Calcium hydroxide	■	–	–	–	■	■	–	■	–	–	–
Carbon tetrachloride	■	–	–	–	■	■	–	■	–	–	–
Chlorine (gas)	■	■	–	–	■	■	–	■	–	■	■
Chlorine (liquid)	■	■	–	–	■	■	–	■	–	–	–
Chloroacetic acid	■	–	□	□	■	■	■	■	■	–	–
Chlorobenzene	■	■	–	–	■	■	–	■	–	–	–
Chloroform	■	■	□	□	■	■	■	■	■	–	–
Cyclohexane	■	■	□	■	■	■	■	■	■	–	–
Cyclohexanone	■	■	■	■	■	■	■	■	■	■	■

D

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Diethylamine	■	–	■	■	–	■	■	■	■	–	–
Diethylether	■	■	–	–	■	■	–	■	–	–	–
Diethylformamide	■	■	■	■	■	■	■	■	■	■	■
Dioxane	■	■	–	–	■	■	■	■	–	–	–

E

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Ethanol	■	■	□	■	■	■	■	■	■	■	■
Ether	■	■	□	■	■	■	■	■	■	–	–
Ethyl acetate	■	■	□	■	■	■	■	■	■	■	■
Ethylene chloride	–	■	□	□	■	■	■	■	■	–	–
Ethlene glycol	■	■	■	■	■	■	■	■	■	■	■

H

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Heptane	■	□	□	□	■	■	■	■	■	■	■
Hexane	■	■	□	□	■	■	■	■	■	–	–
Hydrobromic acid (100%)	■	–	□	□	■	■	–	■	■	–	–
Hydrobromic acid (20%)	■	–	□	■	–	■	■	■	■	–	–
Hydrochloric acid (100%)	■	–	–	□	■	■	■	■	■	–	–
Hydrochloric acid (20%)	■	–	■	□	■	■	■	■	■	–	–
Hydrofluoric acid (100%)	■	–	–	□	■	■	■	■	■	–	–
Hydrofluoric acid (20%)	–	–	■	■	■	■	■	■	■	–	–
Hydrogen peroxide (100%)	■	–	□	□	■	■	–	■	■	–	–
Hydrogen peroxide (50%)	■	–	□	□	–	■	■	■	■	–	–
Hydrogen peroxide (10%)	■	–	■	■	■	■	■	■	■	–	–

I

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Iso-octane	■	–	–	■	■	■	–	■	■	–	–
Isopropanol	■	□	■	■	■	■	–	■	■	□	■
Isopropyl ether	–	■	■	□	–	■	–	■	■	–	–

K

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Ketones	■	–	□	□	■	■	–	■	■	–	–

GENERAL REFERENCE

M

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Methanol	■	■	■	■	■	■	■	■	■	■	■
Methyl dichloride	–	□	–	■	–	■	–	■	–	–	–
Methyl ethylketone	■	■	□	□	■	■	■	■	■	–	–
Methlyene chloride	□	□	□	□	■	■	■	■	■	■	■

N

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Nitric acid (100%)	■	–	□	■	■	■	■	■	■	–	–
Nitric acid (20%)	■	–	□	■	■	■	■	■	■	–	–

P

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Pentane	■	–	■	■	–	■	–	■	■	–	–
Perchloric acid	■	–	□	□	–	□	–	□	■	–	–
Phenol (dilute)	■	–	–	–	■	■	–	■	–	–	–
Phenol (concentrated)	■	–	–	–	■	■	–	■	–	–	–
Phosphoric acid (100%)	■	–	□	■	■	■	■	■	■	–	–
Phosphoric acid (40%)	■	–	■	■	■	■	■	■	■	–	–
Potassium hydroxide (dilute)	■	–	–	–	■	■	–	■	–	–	–
Potassium hydroxide (70%)	■	–	–	–	■	■	–	■	–	–	–
Propanol	■	□	–	–	–	■	–	■	–	■	■
Pyridine	■	–	□	■	■	■	■	■	■	–	–

S

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Sodium hydroxide (80%)	■	□	□	■	■	■	–	■	■	–	–
Sodium hydroxide (20%)	■	□	■	■	■	■	■	■	■	–	–
Sulfuric acid (100%)	■	■	□	□	■	■	■	■	■	–	–
Sulfuric acid (75%)	■	□	■	■	■	■	■	■	■	–	–
Sulfuric acid (40%)	■	■	■	■	■	■	■	■	■	–	–

T

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Tetrahydrofuran	□		□	□	■	■	■	■	■	–	–
Toluene	■		□	□	■	■	■	■	■	–	–
Trichloroacetic acid	■		■	■	■	■	■	■	■	–	–
Trichloroethane	■		–	□	–	■	–	■	■	–	–
Trichloroethylene	■		–	–	■	■	–	■	–	–	–
Triethylamine	–		–	■	–	■	■	■	■	–	–

W

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Water	■	■	■	■	■	■	■	■	■	■	■
Water (distilled)	■	–	■	■	■	■	■	■	■	–	–

X

Resistance at 20°C	PEEK	PA	PE	PP	PPS	FEP	ETFE	PFA	PTFE	NBR	EPDM
Xylene	■	–	–	–	■	■	–	■	–	–	–

LEGEND

- ■ Suitable
- □ Marginal; dependent on application
- ■ Not recommended
- – No data available

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Properties of polymers

CTFE
Chlorotrifluoroethylene, is the generic name for the material produced as Kel-F®. It is very resistant to all chemicals except THF and some halogenated solvents, and is resistant to all inorganic corrosive liquids, including oxidizing acids. CTFE can be used at temperatures up to 100°C. Swells in ketones.

EPDM
Ethylene Propylene Diene Monomer. Ethylene-propylene synthetic rubbers offer excellent heat resistance as well as resistance to aging from oxidation, ozone, and weather due to their stable, saturated polymer backbone structure. As non-polar elastomers, they have good electrical resistivity as well as resistance to polar solvents such as water, acids, alkanes, phosphates, esters, and many ketones and alcohols.

ETFE
Ethyltrifluoroethylene is the generic name for the material such as Tefzel®. A fluoropolymer used for sealing surfaces, it is resistant to most chemical attack; however, some chlorinated chemicals will cause a physical swelling of ETFE tubing.

FEP
Fluorinated ethylene propylene is another member of the fluorocarbon family with similar chemical properties. It is generally more rigid than PTFE, with somewhat increased tensile strength. It is typically more transparent than PTFE, slightly less porous, and less permeable to oxygen. FEP is not as subject to compressive creep at room temperature as PTFE, and because of its slightly higher coefficient of friction is easier to retain in a compression fitting.

FFKM
FFKM (perfluorinated rubber) is a perfluoroelastomer, a class of materials such as Kalrez®. It is chemically resistant to polar solvents, organic solvents, inorganic and organic acids and bases, fuels, oils, lubricants, inorganic salts, aldehydes, metal halogen compounds, chlorine, sodium hydroxide, aromatics, alcohols, steam, and strong oxidizing agents. The normal temperature service range is -40°C to 315°C, with up to 343°C in intermittent service.

PEEK™
Considered relatively inert and biocompatible, polyetheretherketone tubing can withstand temperatures up to 100°C. Under the right circumstances, .005" - .020" ID tubing can be used up to 5000 psi for a limited time, and 0.030" to 3000 psi. Larger IDs are typically good to 500 psi. These limits will be substantially reduced at elevated temperatures and in contact with some solvents or acids.

Its mechanical properties allow PEEK to be used instead of stainless in many situations and in some environments where stainless would be too reactive. However, PEEK can be somewhat absorptive of solvents and analytes, notably methylene chloride, DMSO, THF, and high concentrations of sulfuric and nitric acid. This tubing is highly prone to "kinking", or sealing off, if held in a sharp bend over time.

PFA
Perfluoroalkoxy is a fluorocarbon with chemical and mechanical properties similar to FEP. More rigid than either PTFE or FEP. Commonly used for injection molded parts.

PPS
Polyphenylene sulphide is the generic name for the material produced as Fortron®, Ryton®, and Techtron®. It is very resistant to all solvents, acids, and bases.

PTFE
Polytetrafluoroethylene is the generic name for the class of materials such as Teflon®. It offers superior chemical resistance but is limited in pressure and temperature capabilities. Because it's so easy to handle, it is often used in low pressure situations where stainless steel might cause adsorption. PTFE tubing is relatively porous, and compounds of low molecular weight can diffuse through the tubing wall.

Polyacetal
Polyacetal or polyoxymethylene (POM) is the generic name for the material produced as Delrin®. It is an engineering polymer with high mechanical strength and rigidity, excellent dimensional stability and excellent resistance to moisture and solvents. It has a wide useful temperature range in air of -50°C to +90°C.
It is not suitable for use with acids, alkalis, or oxidizing agents, and has limited resistance to dichloromethane and methyl ethyl ketone.

Continued, next page.

Polyamide
Polyamide is a thermoplastic polymer also known as nylon. Nylon has very good physical properties, but moisture can have a significant effect. It exhibits very good heat resistance and excellent chemical and wear resistance.

Polyethylene
Polyethylene is a semi-crystalline material with excellent chemical resistance, plus good fatigue and wear resistance. Polyethylenes provide good resistance to organic solvents and staining, and have low moisture absorption rates.

Polypropylene
Widely used polymer for non-wetted parts. Attacked by strong oxidizers as well as aromatic and chlorinated hydrocarbons.

PVDF
PVDF, or polyvinylidene fluoride, has excellent resistance to most mineral and organic acids, aliphatic and aromatic hydrocarbons, and halogenated solvents. Poor resistance to acetone, MEK, THF, and potassium and sodium hydroxide. Often supplied as Kynar®.

Properties of metals

Stainless steel, Type 316
This is the standard tubing material for chromatography, suitable for a wide variety of applications. It is cold drawn seamless, not welded, with close tolerances held on both ID and OD. We neither recommend nor offer Type 304 stainless steel for analytical applications.

Austenitic stainless steels may be used for most chromatographic applications. Type 316 is most commonly used for HPLC because of its superior chloride ion resistance.

Stainless steel, Type 303
Recommended for GC use and general purpose connections, combining excellent machining characteristics with good resistance to corrosion and high temperature oxidation. Susceptible to attach by chlorides, iodides, and bromides.

Titanium
Although it is more difficult to machine than common alloys containing aluminum and vanadium, VICI uses Grade 2 pure titanium in order to avoid possible contamination of the sample stream with these metals. Good for organic and inorganic salts except aluminum and calcium chlorides, and all alkalis except boiling concentrated potassium hydroxide.

Good with dilute, low temperature formic, lactic, sulfuric, hydrochloric, and phosphoric acids, but rapidly attacked by hydrofluoric acid. Good with dilute nitric acid at low temperatures; corrodes at high concentrations and temperatures. Can ignite with fuming nitric acid. Attacked by oxalic acid, concentrated phosphoric acid, hot trichloroacetic acid, and zinc chloride.

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Safety

1. Never tighten or loosen a fitting or valve connection while it is pressurized. Provisions should be made within the system to release pressure via suitable valve components.
2. Do not exceed pressure or temperature specifications. Note that in many cases, the system pressure is limited by the tubing used, not the fittings.
3. The use of toxic or hazardous fluids requires extra caution during operation or maintenance. The user is responsible for insuring safe operation and for understanding the nature of the fluids and chemistry involved.
4. The use of thread lubricants or sealants is required only on tapered pipe threads. These sealants and lubricants may have different temperature limits or chemical compatibility than the valves or fittings.

Trademarks

Trademarks of materials and products found in VICI Jour products or referred to in this website. Please contact us regarding errors, omissions, or discrepancies.

Cheminert®	Valco Instruments Co. Inc. and VICI AG International
Delrin®	E.I. duPont de Nemours
Duran®	Schott AG
Fortron®	Fortron Industries LLC
Kalrez®	DuPont Dow Elastomers
Kel-F®	3M Company
Kynar®	Elf Atochem North America Inc.
Nanovolume®	Valco Instruments Co. Inc.
PEEK™	Victrex plc
PEEK HT™	Victrex plc
Rheodyne®	Rheodyne LLC
Ryton®	Chevron Phillips Chemical Company LLC
SCAT®	SCAT-Europe GmbH
Techtron®	Quadrant Engineering Plastic Products
Teflon®	E.I. duPont de Nemours
Valco®	Valco Instruments Co. Inc.
VICI®	Valco Instruments Co. Inc. and VICI AG International
VICI Jour®	Valco Instruments Co. Inc. and VICI AG International

CAUTION
The improper selection or use of components or systems described herein can cause personal injury or property damage.

The system designer and user are solely responsible for the selection of products suitable for the specific requirements of the application, as well as proper installation, operation, and maintenance of these products.

Compatibility with hazardous fluid streams, environmental conditions, and mechanical requirements are the responsibility of the user.

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A

Adapter
A type of fitting which provides a method of joining two components of differing thread types or systems.

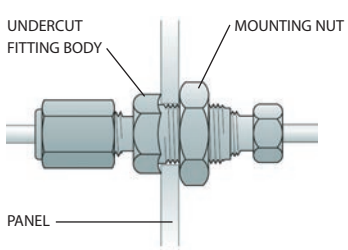
Analytical column
A long narrow tube packed or coated with one of many available chemically diverse compounds that can separate the components in a sample according to their boiling point, polarity, molecular size, or combination thereof. A column of some kind is used with most chromatographic techniques.

B

Biocompatibility
Defines the materials used in a system (i.e. fittings, tubing, and valves) that do not change the bioactivity of the biological substances that come into contact with the surface of these materials. Note that in chromatographic systems, the tubing and column contribute over 99% of the surface area and the valves and fittings are insignificant.

Bore
The diameter of the minimum orifice through the fitting. See capillary bore, through-type bore, and large bore.

Bulkhead fitting
A type of fitting in which the fitting body is inserted through an instrument panel or mounting bracket, to which it is affixed with a mounting nut. The Valco fitting body is uniquely undercut so that it "bites" into the panel when the mounting nut is tightened, eliminating the need for a lock washer.



Butt connection
A type of connection in which the two tube ends are directly and squarely in contact, usually effected with a through-type union. Typically used with fused silica connections, or small bore metal tubing.

C

Cap
A cap is used to dead-end a piece of tubing with a nut and ferrule attached.

Capillary bore
The smallest available standard orifice in a given fitting design (usually 0.25 mm). Typically denoted by suffix "C" in the product number.

Collapsible ferrule
A one-piece ferrule engineered to collapse as it is tightened. The collapse takes place in two very narrow areas, and results in a very effective seal with virtually no distortion of the tubing ID and no dead volume. Patent No. 6,575,501

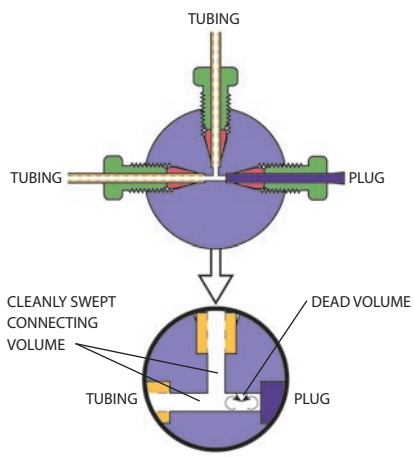
Compression fitting
A style of fitting in which a threaded nut compresses a tapered ferrule onto tubing as the nut is tightened. Valco metal ferrules cut a ring into the tubing wall while polymer types rely on surface compression to form a seal.

Connecting volume
The volume between two or more connections. This may be cleanly swept, thus not contributing to peak distortion, or may be "dead volume" such as that found in fittings with larger bores than the connecting tubing.

Cross
A type of distribution fitting which connects four pieces of tubing, arranging them in the pattern of a cross.

D

Dead volume
Any volume which a component introduces to a system that is not cleanly swept and relies on diffusion to clear the space. See connecting volume.



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Detail
See fitting detail.

Distribution fitting
A generic term for tees, crosses, and manifolds, used to provide multiple access points to "distribute" a gas or liquid through a system. CAUTION! Using a distribution fitting in reverse to coalesce multiple streams may create dead volume. Special manifolds are available for this application.

F

FIA
Flow Injection Analysis.

A simple and versatile analytical technique for automating wet chemical analyses based on the manipulation of a sample zone formed from the injection of the sample into a continuous stream of fluid used as a carrier.

Female nut
A nut with female threads; also called external nut.

Ferrule
One of the components of a compression fitting; the conical piece of metal or plastic that compresses onto the tube as it is forced into a tapered seat. Valco metal ferrules are unique in that they attach to and seal at the tube by cutting a shallow ring into it, instead of by actually swaging it. This is preferable since it introduces no flow restriction.

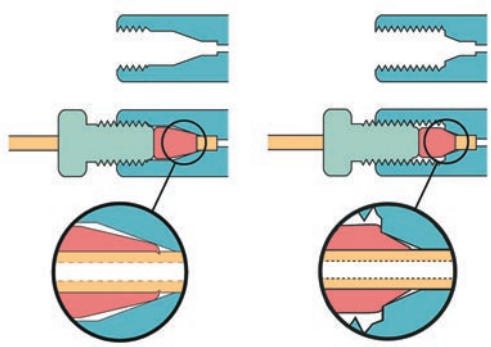
Filter
A type of union or reducing union which traps the particulates in a stream. The filtering element is typically a mesh screen or sintered frit.

Fingertight fitting
A fingertight fitting is a knurled or winged nut which is hand tightened to compress the ferrule. Note: Polymeric ferrules rely on surface compression to form a seal and hold the tube by friction.

Fitting detail
A fitting detail includes the thread to accept the nut, a tapered ferrule seat, and the pilot for the tube. The nut, ferrule, and tube go into the fitting detail to make the seal.

Valco fitting details have the perfect shape, with a smooth transition from the ferrule seat into the cylindrical and threaded part. Many other fitting details are poor in design where the ferrule is forced in a too shallow ferrule seat. The result is a "nicked" ferrule which can no longer apply its sealing force to the front of the ferrule.

Valco fitting detail **Other style**



Flanged fitting
A type of fitting used with fluoropolymer tubing (PTFE, FEP) in which a flange is made at the tube end. Connections are made at the flange either by compressing the flange into a flat detail (typically 1/4-28 threaded) or by butting two flanges together. A special flanging tool forms the flanges.

Flangeless fitting
Similar in application to the flanged fitting, but the flange is not required. A ferrule system is used which grips/compresses the tube. This fitting type can be used with virtually any polymeric tubing since the tube end does not have to be formed, but simply square cut. Typically used in 1/4-28 threaded fittings, it is usually interchangeable with flanged fittings.

Frit
A filter element typically made of stainless, Hastelloy, Titanium, or polymers, usually 0.75 mm or 1 mm thick. Frits may provide better filtration than screens, but because they are thicker there is greater mixing potential, and they typically result in increased pressure drop.

G

GC
Gas Chromatography.
An analytical method incorporating an injection system, analytical column, controlled temperature zone, and detector. An inert carrier gas moves the sample through the column, which separates the sample components into discrete bands which are measured as they pass through the detector.

Guard column
A column used in series between the injector and analytical column to prevent certain types of components from entering the analytical column.

H

HPLC
High Performance Liquid Chromatography.
An analytical system consisting of an injector, pump, analytical column, and detector. Using a liquid mobile phase, the sample is pumped through the column, where it is separated into discrete sample component bands which are detected and measured as the bands elute from the column.

I

ID
Internal diameter.

Inert
Technically, unreactive with other substances; however, in the instrumentation field, "inert" is a relative term. Often polymers are termed inert but are soluble in some fluids and can react with some compounds.

Internal fitting
A type of compression fitting in which the fitting body has female threads; an internal nut has male threads.

L

LC
Liquid Chromatography.
Any of a variety of low to medium pressure techniques which use a liquid mobile phase as the carrier to move sample. Similar to HPLC .

Large bore
A bore that is larger than the standard for a given fitting; a fitting ordered with a large bore will have a larger flow orifice than the standard or capillary bore fitting of the same design. Denoted by suffix "L" in the product number.

Luer adapter
An adapter that connects a tapered luer fitting (square nib) of a syringe to a tube or tube fitting.

M

Male nut
A nut with male threads.

Make up
The point at which a ferrule, nut, and tube are assembled in the fashion which will effect a leak-free seal. In most compression fittings, that is accomplished by compressing the tube with the small end of the ferrule. With Valco metal ferrules, the ferrule usually makes up on the tube by cutting a shallow ring in it.

Manifold
A type of distribution fitting in which a single source is directed to multiple outlets, or vice versa. Caution! Using a common distribution fitting in reverse to merge multiple streams may create dead volume. Special manifolds are available for this application.

Microbore column
A liquid chromatography column of narrow bore (typically 2 mm or less) for improved resolution.

N

NPT
National Pipe Thread; a standardized tapered pipe fitting. See pipe thread.

Nanobore
Nanobore generally refers to components with bore sizes less than 250 µm (0.010").

Nanovolume®
The trademark registered to Valco Instruments Co. Inc. and VICI AG International, applied to our nanobore components with bore sizes less than 250 µm (0.010").

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Nut
The tensioning component of a compression fitting. As the threaded nut is tightened into the fitting detail, it pushes the ferrule forward into the tapered ferrule seat, causing it to make up on the tube.

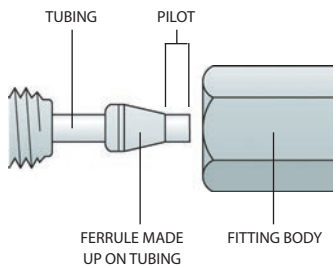
O

OD
Outside diameter.

One-piece fingertight
A one-piece fingertight fitting is a knurled or winged nut with integrated ferrule. It is convenient to use since the ferrule is retrieved from the port with the nut. Note: Polymer type ferrules rely on surface compression to form a seal and hold the tube by friction.

P

Pilot
The tubing which extends beyond the ferrule in a made-up fitting, or the integral portion of a ZRF internal reducing ferrule which extends beyond the ferrule. See also pilot depth, below.



Pilot depth
The length of the tubing diameter cavity beyond the tapered ferrule seat within a fitting detail. Valco fitting pilot depths are tightly controlled to facilitate the interchangeability of components without the risk of leaks or dead volume.

Pipe thread
The external or internal threads of a fitting designed to effect a metal-to-metal seal on the conical thread faces. This type of fitting does not "bottom out" in the detail. Typically used with PTFE tape or other compound to lubricate the threads; however, since the diffusion rate of air components through the PTFE tape is considerable, pipe fittings should not be used in systems where leakage rates are critical.

Plug
A plug is used to block a fitting detail in a union, tee, cross, or valve.

R

Reducing ferrule
A ferrule which allows a smaller tube to be used in a fitting detail designed for a larger tube. Caution should be taken if standard reducing ferrules without integral pilots are used, since dead volume may be created in the fitting pilot depth.

Reducing union
A fitting which joins two tubes of different ODs. The bore of the fitting should typically match the ID of the smaller tube.

S

SFE
Supercritical Fluid Extraction.
An extraction technique using a fluid in its supercritical state as the extraction medium. Some liquids and mixtures maintained above a critical temperature and pressure exhibit properties of both the liquid and gas phases of the element. These are defined as supercritical. CO_2 is a common supercritical fluid. Extreme caution must be used with supercritical CO_2, since uncontrolled expansion (leaks) can be very hazardous due to the substantial stored energy.

SFC
Supercritical Fluid Chromatography.
An analytical technique using a supercritical fluid (see SFE) as the mobile phase/carrier.

Standard bore
A bore which was chosen as the standard for a particular fitting, typically based on the most common tubing ID used with that fitting.

T

Tee
A type of distribution fitting which connects three pieces of tubing, arranging them in the pattern of a "T".

Through-type bore
A bore which is slightly larger than the OD of the tubing which is used with the given fitting. A union with a through-type bore allows the tube ends to butt directly together, or for one tube to run completely through the fitting. Denoted by suffix "T" in the product number. In order to assure correct pilot lengths, we recommend that ferrules be made up on the tubing in a standard union.

U

Union
A fitting for connecting two pieces of tubing of the same OD.
See also reducing union.

Female union
A type of compression fitting in which the fitting body has female threads. Also referred to as internal union.

Male union
A type of compression fitting in which the fitting body has male threads. Also referred to as external union.

Unswept volume
The volume of any portion of a fitting which is in the flowpath but which is a different diameter than the primary flow orifice through the tubing/fitting assembly, or any area not directly swept by the fluid flow. This can also be known as "dead volume" if it is very poorly swept.

V

VICI
VICI® is an acronym for Valco Instruments Company Inc.

VICI now defines multiple companies which manufacture various products for the analytical industry.

W

Wetted surfaces
The surfaces which are contacted by the sample stream.

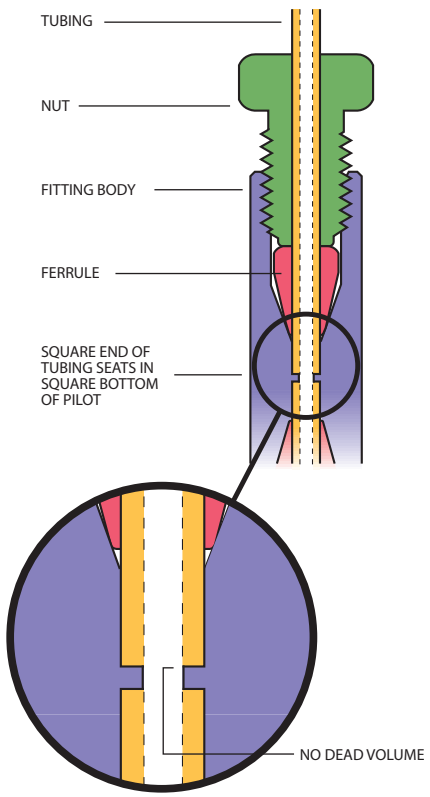
Y

Y ("Wye")
A type of distribution fitting which connects three pieces of tubing, arranging them in the pattern of a "Y". Occasionally referred to as a "wye".

Z

ZDV
Zero dead volume. See definition below.

Zero dead volume
Describes a connection which does not add volume to the system beyond what an extension of tubing would in its place.



Zero volume
While often used interchangeably with zero dead volume, it ideally describes a fitting design in which there is no internal volume, such as a through-type union designed to butt-fit two pieces of tubing.

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Temperature conversions

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-40	-40	65	149	170	338	275	527	500	932
-35	-31	70	158	175	347	280	536	525	977
-30	-22	75	167	180	356	285	545	550	1022
-25	-13	80	176	185	365	290	554	575	1067
-20	-4	85	185	190	374	295	563	600	1112
-15	5	90	194	195	383	300	572	625	1157
-10	14	95	203	200	392	305	581	650	1202
-5	23	100	212	205	401	310	590	675	1247
0	32	105	221	210	410	315	599	700	1292
5	41	110	230	215	419	320	608	725	1337
10	50	115	239	220	428	325	617	750	1382
15	59	120	248	225	437	330	626	775	1427
20	68	125	257	230	446	335	635	800	1472
25	77	130	266	235	455	340	644	825	1517
30	86	135	275	240	464	345	653	850	1562
35	95	140	284	245	473	350	662	875	1607
40	104	145	293	250	482	375	707	900	1652
45	113	150	302	255	491	400	752	925	1697
50	122	155	311	260	500	425	797	950	1742
55	131	160	320	265	509	450	842	975	1787
60	140	165	329	270	518	475	887	1000	1832

Pressure conversions

bar	psi	kPa	MPa	bar	psi	kPa	MPa	bar	psi	kPa	MPa
0.1	1.5	10	0.01	6	87.0	600	0.6	100	1,450	10,000	10
0.2	2.9	20	0.02	7	101.5	700	0.7	200	2,900	20,000	20
0.3	4.4	30	0.03	8	116.0	800	0.8	300	4,350	30,000	30
0.4	5.8	40	0.04	9	130.5	900	0.9	400	5,800	40,000	40
0.5	7.3	50	0.05	10	145	1,000	1	500	7,250	50,000	50
0.6	8.7	60	0.06	20	290	2,000	2	600	8,700	60,000	60
0.7	10.2	70	0.07	30	435	3,000	3	700	10,150	70,000	70
0.8	11.6	80	0.08	40	580	4,000	4	800	11,600	80,000	80
0.9	13.1	90	0.09	50	725	5,000	5	900	13,050	90,000	90
1	14.5	100	0.1	60	870	6,000	6	1,000	14,500	100,000	100
2	29.0	200	0.2	70	1,015	7,000	7	1,100	15,950	110,000	110
3	43.5	300	0.3	80	1,160	8,000	8	1,200	17,400	120,000	120
4	58.0	400	0.4	90	1,305	9,000	9	1,300	18,850	130,000	130
5	72.5	500	0.5								

Length

µm	inches
100	.004"
150	.006"

mm	inches
0.050	.002"
0.064	.0025"
0.075	.003″
0.100	.004"
0.13	.005"
0.15	.006"
0.18	.007"
0.20	.008"
0.25	.010"
0.38	.015"
0.40	.016"
0.50	.020"
0.75	.030"
1.00	.039"
1.50	.059"
2.00	.079"
3.00	.118"
4.00	.157"
4.60	.181"
6.00	.236"
6.35	.250"
6.40	.252"
7.00	.276"
10.00	.394"
12.70	.500"

inches	mm
1/32"	0.79
1/16"	1.59
3/32"	2.38
1/8"	3.18
1/4"	6.35
5/16"	7.94
3/8"	9.50
1/2"	12.70
1"	25.40

feet	mm
1 ft	304.8

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JR-.5FR1TI-5 73
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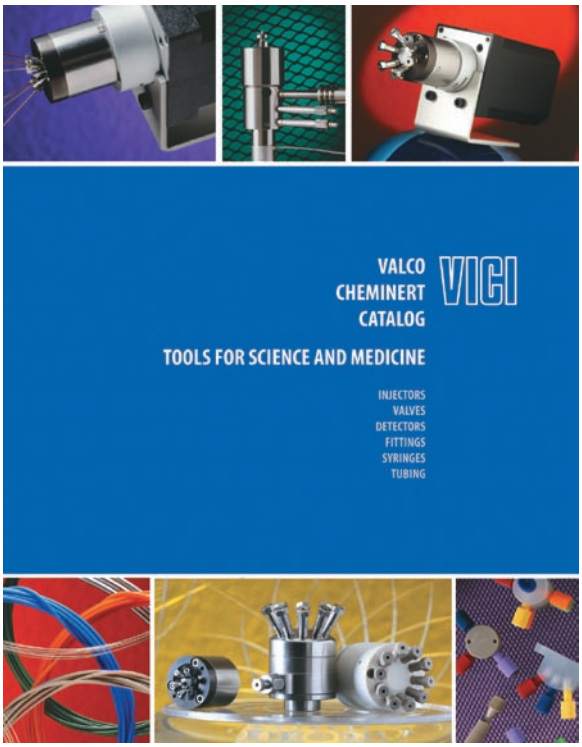

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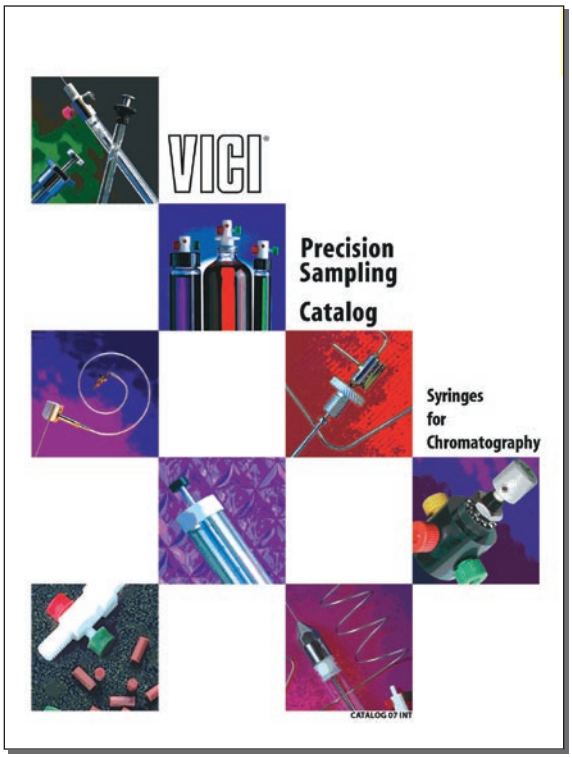
- Instrumentation
- GC columns
- GC purifiers



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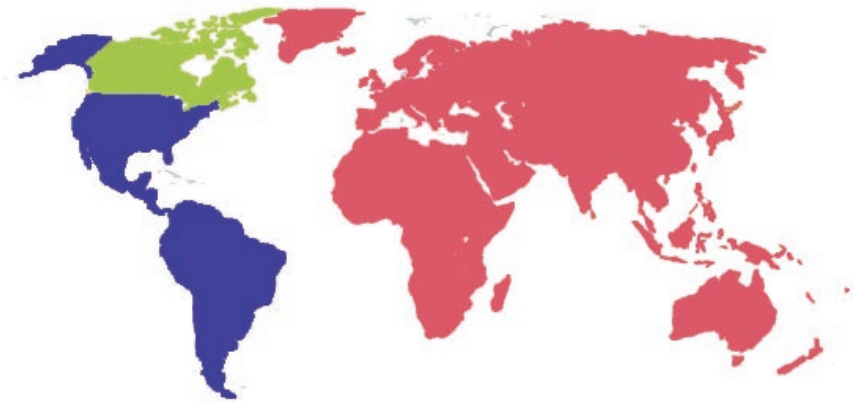

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Valco Fittings

The two piece compression fitting (**Figure 1**), in which a ferrule is compressed onto the tube as a nut is tightened, offers reliability in high pressure situations and in connecting metal tubing. Valco excels in all critical areas of the design and manufacture of such fittings. Quality considerations, which cannot be ignored if an analytical system is to reach and maintain optimum performance levels, include interchangeability, counterbore tolerances, ID/OD concentricity, mixing potential, cleaning procedures, and the method employed to "make up" the ferrule on the tube.

No Tubing Deformation

The basic concept of compression fittings carries the inherent danger of tube deformation (**Figure 2**). While some manufacturers emphasize this positively as a method of ensuring that the tubing doesn't blow out of the ferrule, the flow anomalies introduced by the restricted ID make these fittings a poor choice for many instrument applications.

Valco metal ferrules cut a ring near the end of the tube (**Figure 3**), which prevents tube release at high pressures without significantly deforming and restricting the tube interior. Because our ferrules have a sharp edge at the ID near the nose, this usually takes only about 1/4 turn beyond the point where the ferrule first starts to grab the tubing. There is so little tube distortion that they are routinely used with glass-lined tubing! Only Valco's polymer fittings rely on friction to hold a tube.

CAUTION!
The analytical devices market has attracted numerous companies which copy Valco/Cheminert designs. Please exercise caution in the use of copies, which may not be compatible with the original versions in this catalog.

Because of VICI's high volume production and dedicated machinery, our fittings are often less expensive and of consistently higher quality than competing copies.

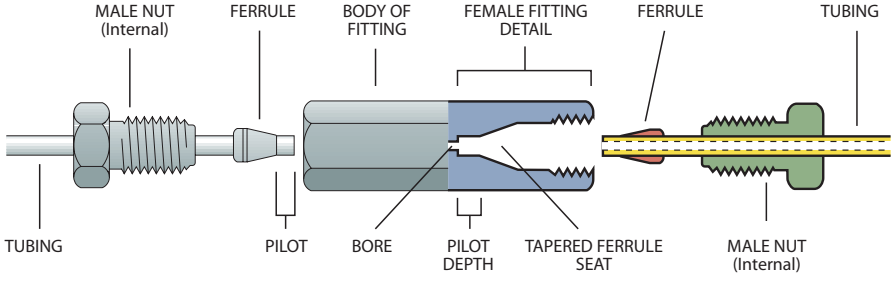

Figure 1
Valco compression fitting

TECH TIP
For optimal zero dead volume connections, make sure your tubing meets the best industry standards—OD tolerance should be nominal dimension ± .002".

Fractional dimension	Nominal dimension
1/32"	.031
1/16"	.062
1/8"	.125
1/4"	.250
3/8"	.375
1/2"	.500

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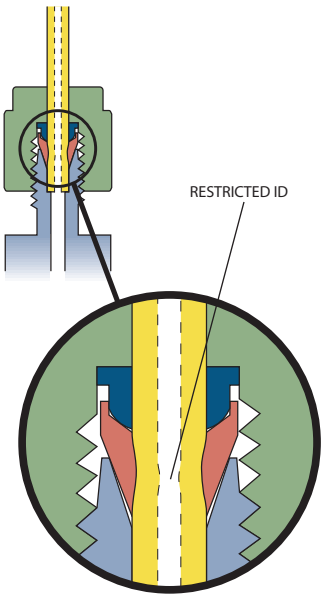


Figure 2
ID restriction
in common compression fitting

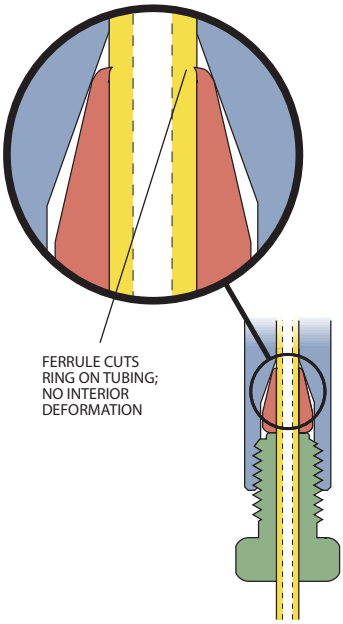


Figure 3
No ID restriction
in Valco compression fitting

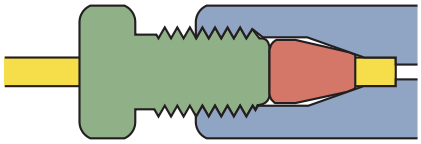
Interchangeability

Valco fitting details are designed with a consistent pilot depth, permitting reliable interchangeability as connections are revised or fittings are replaced. This interchangeability extends throughout the Valco and Cheminert fitting and valve product lines. Indeed, the Valco standard has been so widely copied that Valco and Cheminert fittings are, in general, fully interchangeable with those of our major competitors. In initial installations, Valco ferrules will often improve other manufacturers' fitting connections.

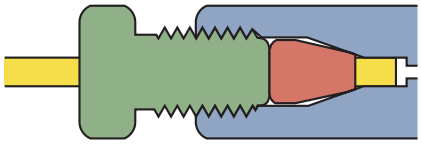
Because of variations in tubing OD and in pilot and taper designs from manufacturer to manufacturer, the amount of tubing extending beyond the made up ferrule can vary. (The most radical variation is in the fittings manufactured by Waters. Based on the old Swagelok design, they have a pilot depth considerably longer than standard.) **Figure 4a** shows a properly made up fitting. If that same fitting is installed in a detail which was designed for a slightly longer tube extension (as in **Figure 4b**), dead volume will be introduced. In the opposite case, with the pilot shorter than the pilot depth (**Figure 4c**), the tube will bottom out before the ferrule has sealed. However, our tests prove that except in the most extreme cases, a Valco ferrule will "creep" on the tubing until it reaches the bottom of the ferrule taper, making a proper seal.

Reliably Clean

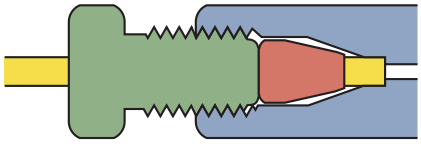
Most of our state of the art CNC machines use water-based lubricants. After each part comes off the machine, it is cleaned with water-soluble detergents and then rinsed in hot deionized water. Finally, every metal fitting that we make is given a thorough cleaning with steam from deionized water at 140°C. Any critical parts processed with oil-based lubricants are baked to remove all traces. The practical result of the extra effort is this: you don't have to be concerned about solvent residues.



a. Tubing seats correctly at bottom of detail



b. Tubing doesn't reach bottom of detail, introducing dead volume



c. Tubing reaches bottom of detail before ferrule seats

Figure 4

Introduction

Precision Machining, Finishing, and Tolerances

The machining methods used by different manufacturers to finish the detail of compression fittings vary in several ways that affect performance, as shown below. The fitting in **Figure 5** is the best choice for high performance fittings, as the tube fits squarely into the bottom of the detail. This is the detail used in Valco and Cheminert high pressure fittings.

Some fitting manufacturers omit a critical finishing operation which makes the bottom of the detail square, leaving the shape of the typical tapered drill bit instead. This results in the fitting shown in **Figure 6**, which introduces extra volume and mixing potential. VICI uses proprietary tooling specifically designed to produce the same high precision detail in every Valco and Cheminert fitting.

Although sometimes the tube end may seal in the bottom of the detail, the intent is for the seal to be made at the ferrule. This leaves the possibility of seepage up around the tube and into the minute cavities between the end of the ferrule and the bottom of the ferrule seat. The probability of this seepage increases when there is an excessive variance between the tubing OD and the diameter of the counterbored pilot in which it sits, and between the ferrule OD and the ferrule ID at the point where it "bites" or crimps the tubing. The possibility is virtually eliminated in VICI's fittings, which are manufactured with the precise dimensions that chromatographic applications demand. Use of VICI precut tubing, which is manufactured to quality standards in excess of most commercial tubing, further assures the best fitting connection.

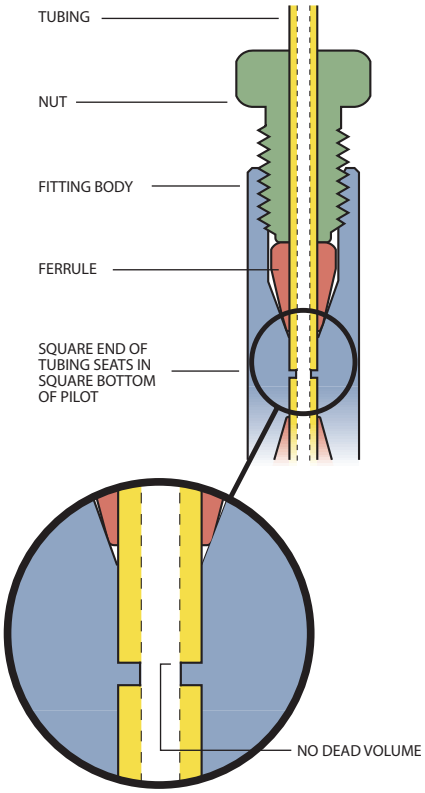


Figure 5
Valco/Cheminert high pressure compression fitting

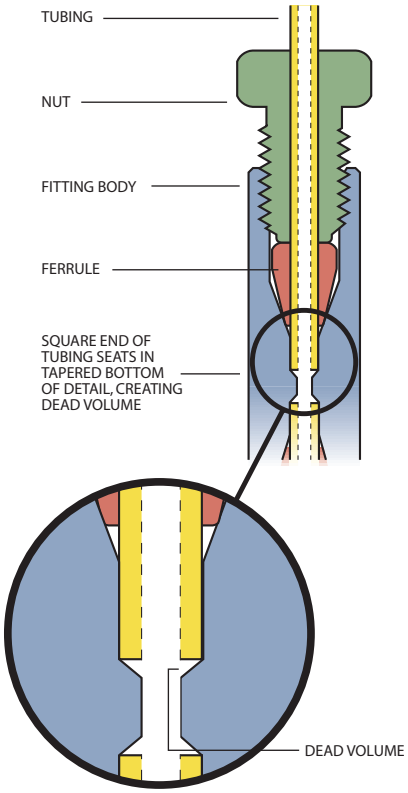


Figure 6
Poor quality compression fitting

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Comparison of Compression Fitting Designs

The potential for dead volume and mixing is a consideration in other aspects of fitting design as well, and varies considerably among manufacturers. For example, the common gas distribution reducing union in **Figure 7** illustrates two problems for instrumentation: a large connecting volume, and various steps and restrictions which cause mixing. While there are many uses for these fittings upstream of the analytical system (such as bulk gas distribution), they cause problems when used downstream in critical applications.

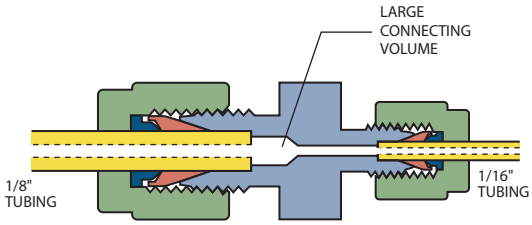

Figure 7
Common commercial reducing union

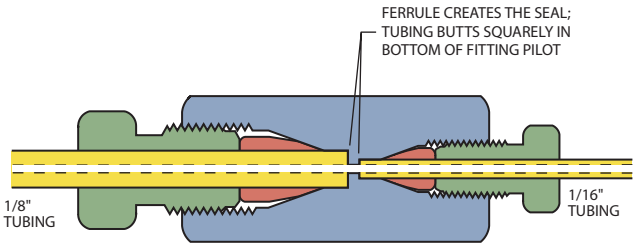

Figure 8
Valco zero dead volume reducing union

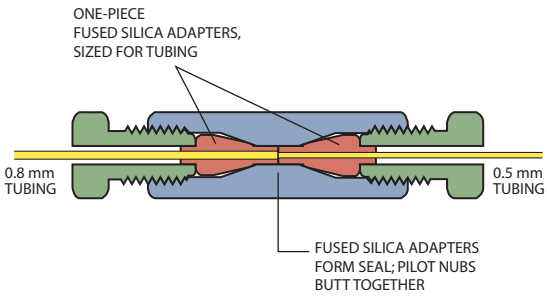

Figure 9
Valco zero dead volume through-bore union

Additional difficulties may be encountered if this type of fitting is loosened and retightened repeatedly. The male threaded part can become flared to the point where it is impossible to get the nut on, and the tube end often flares out in the fitting detail so that it's difficult to remove the tube.

The Valco internal union (**Figure 8**) has a larger mass surrounding the ferrule, so that even with repeated remakes or overtightening, it's impossible to flare the fitting as in the external design. When a union is selected with a bore to match the ID of the connecting tubing, mixing and dead volume are virtually eliminated.

For connection of fused silica tubing of the same or differing sizes, the through-bore union shown in **Figure 9** is recommended. This fitting permits the use of our one-piece fused silica adapters to effect a true zero dead volume connection. The ferrule features an integrated pilot which adapts to the ID of the unions, resulting in an inert, zero volume connection.

Every Valco and Cheminert fitting is manufactured to exacting specifications. Fitting concentricity – the relationship of the center of one fitting to another – is held to within 10% of the bore size (0.05 mm in a typical 1/16" union with 0.5 mm bore), which is better than that of commonly used *tubing*. This results in fittings which contribute no "extra column effects" or loss of efficiency to the chromatographic system.

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Nuts

Internal nuts – stainless steel

Nuts with product numbers starting with Z are for use with all standard Valco internal fittings and most valves. They may be used with fittings from other manufacturers as well. The L (long) and XL (extra-long) types are for situations where the fitting head may be otherwise inaccessible or where interference between fittings exists, as on many Valco multiposition valves. Standard material is 300 series stainless.

Stainless nuts

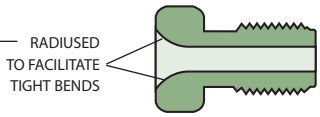
Package of 10:	*Length*	*Prod No*	*Price*
1/32" nut	.30"	ZN.5-10	
1/32" nut	.45"	LZN.5-10	
1/16" nut	.43"	ZN1-10	
1/16" nut	.50"	MZN1-10	
1/16" nut	.75"	LZN1-10	
1/16" nut	1.00"	XLZN1-10	
1/8" nut	.57"	ZN2-10	
1/8" nut	.82"	LZN2-10	
1/8" nut	1.07"	XLZN2-10	
1/4" nut	.70"	ZN4-10	
1/4" nut	1.11"	LZN4-10	

NEW Specialty nuts – stainless steel

These special purpose nuts facilitate a tight bend as the tube exits the fitting, and can also help prevent kinks in very thin wall tubing. Quick bend nuts are available in standard length (.43") and in a short version (.30") for certain custom applications. Note that the short version (ZSN1) can *only* be used in certain applications. Call for more information.

Stainless nuts

Description	*Length*	*Prod No*	*Price*	
1/16", standard	.43"	ZN1Q		
1/16", short	.30"	ZSN1		



Specialty nut
Standard length

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TECH TIP
Fittings for **360 micron** tubing are available on pages 57-58.

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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External nuts – stainless steel

External nuts are used with external fittings, such as our column end fittings (ECEF series) and external unions (EZU and EZRU series). They may also be used with Valco ferrules on Parker CPI and Swagelok type fittings. Standard material is 300 series stainless.

* PTFE-coated threads standard.

	Stainless nuts	
Description	*Prod No*	*Price*
1/32″ external nut	EN.5	
1/32″ external nut, knurled	EN.5KN	
1/16" external nut	EN1	
1/8" external nut	EN2	
1/4" external nut	EN4 *	
3/8" external nut	EN6 *	
1/2" external nut	EN8 *	
1" external nut	EN1K *	

Plugs – stainless steel and high pressure

Stainless plugs consist of a zero volume nut with a ferrule made up on a solid rod. For high pressure applications such as UHPLC, SFE, and SFC (>7000 psi), we recommend the special high pressure plugs with the ferrule and rod machined as a single, solid piece.

		Stainless plugs		High pressure Stainless plugs	
Description	*Length of nut**	*Prod No*	*Price*	*Prod No*	*Price*
1/32"	.30"	ZP.5		ZP.5H	
1/16"	.43"	ZP1		ZP1H	
1/16"	.75"	LZP1		LZP1H	
1/8"	.57"	ZP2		ZP2H	
1/8"	.82"	LZP2		LZP2H	
1/4"	.70"	ZP4		–	

Caps – stainless steel

A cap is essentially a piece of hex stock with a zero volume fitting detail machined into it, but with no through-hole.

		Stainless caps	
Description	*Length of nut**	*Prod No*	*Price*
1/32"	.30"	ZC.5	
1/16"	.43"	ZC1	
1/8"	.57"	ZC2	
1/4"	.70"	ZC4	

MORE INFORMATION

PEEK plugs . . pages 64, 71
PEEK plugs for high pressure Cheminert valves 64
PEEK caps 57, 64

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Ferrules

Valco metal ferrules cut a ring near the end of the tube, preventing tube release at high pressures without significantly deforming and restricting the tube interior. (However, if the hardness of the tubing is equal to or greater than that of the ferrule, deformation of the tube rather than a cut ring is likely.) Make up usually takes only about a 1/4 turn beyond the point where the ferrule first starts to grab the tubing. Polymeric ferrules seal by the increased friction from compression.

Valco zero volume ferrules may be used with all Valco fittings and with those of most other manufacturers. The maximum pressure limit is generally determined by the yield strength of the tubing. The maximum pressure for softer materials (such as brass and polymers) is lower, and depends on the tubing used. If in doubt about a particular combination, consult our technical staff.

For trace gas analysis, use gold-plated ferrules to achieve sealing with $<10^{-9}$ cc/atm/sec leakage.

MORE INFORMATION
For more detailed information on metals, refer to the discussion on pages 254-255.

Metal ferrules

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 10:	**Stainless, Type 303**		**Stainless, Type 316**		**Stainless, Gold-plated**	
1/32"	ZF.5-10		ZF.5S6-10	$40	ZF.5GP-10	
1/16"	ZF1-10		ZF1S6-10	30	ZF1GP-10	
1/8"	ZF2-10		ZF2S6-10	22	ZF2GP-10	
1/4"	–		ZF4S6-10	19	ZF4GP-10	
Sold individually:	**Hastelloy C**		**Nickel**		**Titanium**	
1/32"	ZF.5HC		ZF.5NI	$9	ZF.5TI	
1/16"	ZF1HC		ZF1NI	8	ZF1TI	
1/8"	ZF2HC		ZF2NI	8	ZF2TI	
1/4"	ZF4HC		ZF4NI	9	ZF4TI	
Package of 10:	**Brass**					
1/32"	ZF.5B-10					
1/16"	ZF1B-10					
1/8"	ZF2B-10					
1/4"	ZF4B-10					

– Not available
Larger sizes and/or specific materials may be available on special order.

METALS AT A GLANCE

Hastelloy C ® .....HC
Resistant to pitting; Resists oxidizing atmospheres

Nickel ..... NI
Resistant to caustics, high temp halogens, and hydrogen halides

Stainless steel, Gold-plated .....GP
More inert than standard stainless

Stainless steel, Type 303
GC, gas lines, general purpose

Stainless steel, Type 316 ..... S6
LC with high chloride ion in solutions

Titanium .....TI
Outstanding resistance to most media except hydrofluoric acids

Brass ..... B
Not recommended for most chromatographic applications

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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Polymeric ferrules

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 10:	**PTFE, Virgin**		**PTFE, Glass-filled**		**FEP**	
1/32"	ZF.5TF-10		ZF.5TFG-10		ZF.5FEP-10	
1/16"	ZF1TF-10		ZF1TFG-10		ZF1FEP-10	
1/8"	ZF2TF-10		ZF2TFG-10		ZF2FEP-10	
1/4"	ZF4TF-10		ZF4TFG-10		ZF4FEP-10	
3/8"	ZF6TF-10		ZF6TFG-10		ZF6FEP-10	
1/2"	ZF8TF-10		ZF8TFG-10		ZF8FEP-10	

Package of 10:	**PFA**	**CTFE**
1/32"	ZF.5PFA-10	ZF.5KF-10
1/16"	ZF1PFA-10	ZF1KF-10
1/8"	ZF2PFA-10	ZF2KF-10
1/4"	ZF4PFA-10	ZF4KF-10
3/8"	ZF6PFA-10	ZF6KF-10
1/2"	ZF8PFA-10	ZF8KF-10

Package of 5:	**Polyimide, Graphite**	**Polyimide, Valcon**	**Polyimide, Virgin**
1/32"	ZF.5GV-5	ZF.5V-5	ZF.5V1-5
1/16"	ZF1GV-5	ZF1V-5	ZF1V1-5
1/8"	ZF2GV-5	ZF2V-5	ZF2V1-5
1/4"	ZF4GV-5	ZF4V-5	ZF4V1-5
3/8"	ZF6GV-5	ZF6V-5	ZF6V1-5
1/2"	ZF8GV-5	ZF8V-5	ZF8V1-5

MORE INFORMATION

PEEK ferrules .... page 63
Grooved PEEK ferrules..... 63

For more detailed information on polymers, refer to the discussion on page 256.

POLYMERS AT A GLANCE

CTFE ..... KF
Resists all inorganic corrosives. Produced as Kel-F ®

FEP ..... FEP
Chemical resistance equals PTFE, but lower creep and higher friction

PTFE, Glass-filled..... TFG
Inert, mechanically stable

PTFE, Virgin..... TF
Inert; very soft, easily cold flows. Produced as Teflon ®

Polyimide, Graphite....GV
Soft, easy to form ferrules

Polyimide, Valcon..... V
High temp, graphite reinforced

Polyimide, Virgin..... V1
High temp, electrical insulator

FERRULE IDENTIFICATION

To differentiate among the most commonly ordered metal ferrules, ring(s) are engraved on the non-sealing surfaces.

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Reducing Ferrules

Reducing ferrules provide an inexpensive way to connect small temporary transfer lines to valves or fittings designed for larger tubing. For long term use, we recommend our reducing unions, internal reducers (IZRs), or external reducers (EZRs), as appropriate.

Internal ZDV (zero dead volume) reducing ferrules are designed for use with all standard Valco internal style fittings – that is, those with a male nut and female fitting detail. The ferrule features an integral pilot which fills the pilot cavity (the space between the end of the ferrule and the bottom of the detail), yielding a zero dead volume fitting.

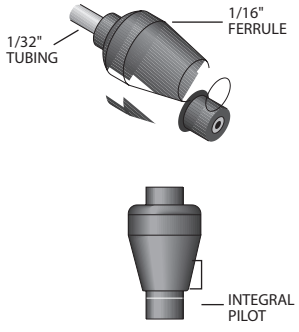
External ZDV reducing ferrules are designed for use with all standard external style fittings – that is, those with a female nut and a male fitting detail. This ferrule has a slightly longer pilot than the internal version, to accommodate the longer external detail. The result is a zero dead volume fitting. A single groove indicates that the ferrule has the longer pilot and is for use in an external detail.

Standard reducing ferrules can be used where mixing is not a problem, such as with liquid or gas delivery. A 1/16" to 1/32" ferrule of this style is simply a 1/16" ferrule with a 1/32" hole.

nternal reducing ferrules

Use these ferrules in internal type fitting details, with nuts that have external threads.

	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Package of 5:	**PTFE, Glass-filled**		**PEEK**		**Polyimide, Valcon**	
1/16" to 1/32"	ZRF1.5TFG-5		ZRF1.5PK-5		ZRF1.5V-5	
1/8" to 1/32"	ZRF2.5TFG-5		ZRF2.5PK-5		ZRF2.5V-5	
1/8" to 1/16"	ZRF21TFG-5		ZRF21PK-5		ZRF21V-5	
1/4" to 1/16"	ZRF41TFG-5		ZRF41PK-5		ZRF41V-5	
1/4" to 1/8"	ZRF42TFG-5		ZRF42PK-5		ZRF42V-5	
Package of 5:	**CTFE**		**Polyimide, Virgin**			
1/16" to 1/32"	ZRF1.5KF-5		ZRF1.5V1-5			
1/8" to 1/32"	ZRF2.5KF-5		ZRF2.5V1-5			
1/8" to 1/16"	ZRF21KF-5		ZRF21V1-5			
1/4" to 1/16"	ZRF41KF-5		ZRF41V1-5			
1/4" to 1/8"	ZRF42KF-5		ZRF42V1-5			



Internal reducing ferrule
(ZRF)

PEEK reducing ferrule and internal nut
(Order nut separately.)

MORE INFORMATION
Internal reducers (IZR) . . . . . page 34
External reducers (EZR) 35
Ferrule removal kits. . . . 16

For 1/16" and 1/32" reducing ferrules with smaller ODs for use with fused silica, see the FS and FSR adapters on pages 16-17.

TECH TIP
Fittings for **360 micron** tubing are available on pages 57-58.

TECH TIP
If you are doing resistive heating of traps or columns, note that our virgin polyimide reducing ferrules are effective electrical insulators.

Virgin polyimide is produced as Vespel ®.

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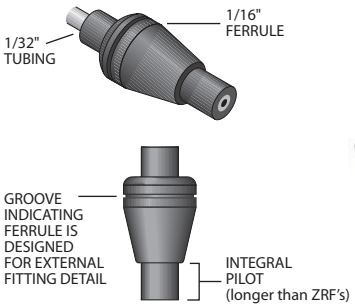
OPTION
Available in Virgin Polyimide.

External reducing ferrules

Use these ferrules in external type fitting details, with nuts that have internal threads.

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 5:	**PTFE, Glass-filled**		**PEEK**		**Polyimide, Valcon**	
1/16" to 1/32"	EZRF1.5TFG-5		EZRF1.5PK-5		EZRF1.5V-5	
1/8" to 1/32"	EZRF2.5TFG-5		EZRF2.5PK-5		EZRF2.5V-5	
1/8" to 1/16"	EZRF21TFG-5		EZRF21PK-5		EZRF21V-5	
1/4" to 1/16"	EZRF41TFG-5		EZRF41PK-5		EZRF41V-5	
1/4" to 1/8"	EZRF42TFG-5		EZRF42PK-5		EZRF42V-5	
Package of 5:	**CTFE**					
1/16" to 1/32"	EZRF1.5KF-5					
1/8" to 1/32"	EZRF2.5KF-5					
1/8" to 1/16"	EZRF21KF-5					
1/4" to 1/16"	EZRF41KF-5					
1/4" to 1/8"	EZRF42KF-5					



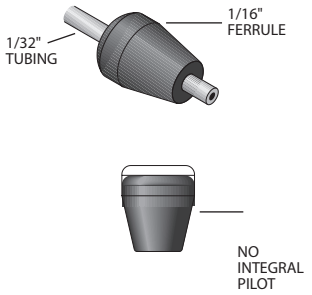
External reducing ferrule
(EZRF)

PEEK reducing ferrule and external nut
(Order nut separately.)

Standard reducing ferrules

Use these ferrules for bulk distribution only, since the resulting connection will not be zero dead volume. These ferrules can be used in either internal or external type fitting details.

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 5:	**PTFE, Glass-filled**		**PEEK**		**Polyimide, Valcon**	
1/16" to 1/32"	RF1.5TFG-5		RF1.5PK-5		RF1.5V-5	
1/8" to 1/32"	RF2.5TFG-5		RF2.5PK-5		RF2.5V-5	
1/8" to 1/16"	RF21TFG-5		RF21PK-5		RF21V-5	
1/4" to 1/16"	RF41TFG-5		RF41PK-5		RF41V-5	
1/4" to 1/8"	RF42TFG-5		RF42PK-5		RF42V-5	
Package of 5:	**CTFE**					
1/16" to 1/32"	RF1.5KF-5					
1/8" to 1/32"	RF2.5KF-5					
1/8" to 1/16"	RF21KF-5					
1/4" to 1/16"	RF41KF-5					
1/4" to 1/8"	RF42KF-5					



Standard reducing ferrule
(RF)

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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Fused Silica Adapters

Fused silica adapters are available in Valcon polyimide for use up to 350°C and in PEEK for lower temperature applications (up to 175°C). Valcon polyimide is a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at high temperatures. Small blocks are subjected to extreme loads by a process known as hot isostatic pressing, with individual ferrules subsequently machined from these blocks. The result of this two-step process is a fused silica adapter with high temperature stability which far exceeds that of parts produced by conventional molding. Note that the determining factor in adapter size selection is the fused silica tubing's outer diameter, or OD. Typical ODs for common columns are included in the product number tables.

One piece fused silica adapter (FS)

The one piece FS adapter, essentially a reducing ferrule, is recommended for use in fittings where the polyimide ferrule will not be removed. Connections are made and disconnected by loosening the fitting nut and sliding the tube out.

Package of 5:		Polyimide, Valcon		PEEK		Polyimide, Virgin	
		Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/32" Adapters	Tubing OD:						
	< 0.25 mm	FS.25-5		FS.25PK-5		FS.25V1-5	
	0.25 ≤ 0.40 mm	FS.4-5		FS.4PK-5		FS.4V1-5	
	0.40 ≤ 0.50 mm	FS.5-5		FS.5PK-5		FS.5V1-5	
	0.50 ≤ 0.80 mm	ZF.5V-5		ZF.5PK-5		ZF.5V1-5	
1/16" Adapters	Tubing OD:						
	<0.25 mm	FS1.2-5		FS1.2PK-5		FS1.2V1-5	
	0.25 ≤ 0.30 mm	FS1.25-5		FS1.25PK-5		FS1.25V1-5	
	0.30 ≤ 0.35 mm	FS1.3-5		FS1.3PK-5		FS1.3V1-5	
	0.35 ≤ 0.40 mm	FS1.4-5		FS1.4PK-5		FS1.4V1-5	
	0.40 ≤ 0.50 mm	FS1.5-5		FS1.5PK-5		FS1.5V1-5	
	0.50 ≤ 0.80 mm	FS1.8-5		FS1.8PK-5		FS1.8V1-5	
	0.80 ≤ 0.90 mm	FS1.9-5		FS1.9PK-5		FS1.9V1-5	
	0.90 ≤ 1.0 mm	FS11.0-5		FS11.0PK-5		FS11.0V1-5	

Ferrule removal kit

These tapered tools have teeth designed to grip and remove fused silica adapters if they get stuck in a fitting detail. Each kit has two sizes of tools, so they can retrieve 1/32" and 1/16" adapters.

Prod No	*Price*
FRK1	$23

TEMPERATURE RATINGS
Polyimide adapters can be used at temperatures up to 350°C.

PEEK adapters are not recommended for use above 175°C.

TECH TIP
Virgin polyimide adapters are effective electrical insulators, making them the ideal choice for capillary electrophoresis.

Virgin polyimide is produced as Vespel®.

TECH TIP
If a fused silica tube breaks off in a through-type union, remove the nuts and the tube opposite the broken one. Clear the fitting by passing a drill or wire of the appropriate diameter into the unbroken side and through the center of the fitting.

Our **ferrule removal kit**, left, can be used to remove ferrules from all types of fittings.

WHICH ADAPTER FOR WHICH COLUMN?

Column ID	Typical column OD	1/32" adapter	1/16" adapter
< 0.20 mm	0.25 mm	FS.25	FS1.25
0.25 mm	0.4 mm	FS.4	FS1.4
0.32 mm	0.5 mm	FS.5	FS1.5
0.53 mm	0.8 mm	ZF.5V	FS1.8

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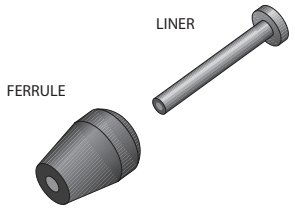
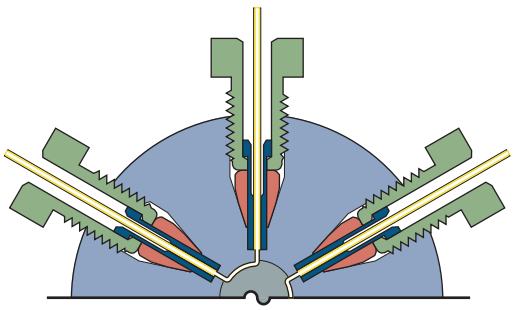


Removable fused silica adapters (FSR)

The FSR adapter is the only adapter recommended for use in valves. It consists of a liner which slides over the fused silica tubing and a ferrule which makes up on the liner. The polyimide liner has an enlarged diameter at one end which is captured by the nut, so the liner and the tube within it are removed as the nut is unscrewed from the valve. The 1/16" FSR adapter includes a special counter-bored 1/16" nut. The 1/32" FSR adapter uses standard Valco 1/32" nuts.

Package of 5:		**Polyimide, Valcon** *Prod No*	*Price*
1/32" Removable adapters	Tubing OD:		
	< 0.25 mm	FSR.25-5	
	0.30 ≤ 0.35 mm	FSR.3-5	
	0.35 ≤ 0.40 mm	FSR.4-5	
	0.40 ≤ 0.50 mm	FSR.5-5	
1/32" Replacement liners	Tubing OD:		
	< 0.25 mm	FSL.25-5	
	0.25 ≤ 0.40 mm	FSL.4-5	
	0.40 ≤ 0.50 mm	FSL.5-5	

Package of 5:		**Polyimide, Valcon** *Prod No*	*Price*	**PEEK** *Prod No*	*Price*
1/16" Removable adapters	Tubing OD:				
	< 0.15 mm	–		FS1R.15PK-5	
	< 0.20 mm	FS1R.2-5		FS1R.2PK-5	
	0.20 ≤ 0.40 mm	FS1R.4-5		FS1R.4PK-5	
	0.40 ≤ 0.50 mm	FS1R.5-5		FS1R.5PK-5	
	0.50 ≤ 0.80 mm	FS1R.8-5		FS1R.8PK-5	
	0.90 ≤ 1.0 mm	FS1R1.0-5		FS1R1.0PK-5	
1/16" Replacement liners	Tubing OD:				
	< 0.15 mm	–		FS1L.15PK-5	
	< 0.20 mm	FS1L.2-5		FS1L.2PK-5	
	0.20 ≤ 0.40 mm	FS1L.4-5		FS1L.4PK-5	
	0.40 ≤ 0.50 mm	FS1L.5-5		FS1L.5PK-5	
	0.50 ≤ 0.80 mm	FS1L.8-5		FS1L.8PK-5	
	0.90 ≤ 1.0 mm	FS1L1.0-5		FS1L1.0PK-5	



Removable FSR adapters in a valve

MORE INFORMATION

Fused silica
Unions . pp 18-19, 58, 61
Fittings 18-21
A pin vise and drill index are useful for enlarging the inner diameters of the FS adapters.
Pin vise and drill index 55

REPLACEMENT PARTS

Ferrules	*(package of 5)*	
1/32" Polyimide	ZF.5V-5	$30
1/16" Polyimide	ZF1V-5	25
	(package of 10)	
1/16" PEEK	ZF1PK-10	33
Nuts	*(package of 10)*	
1/32" SS	ZN.5-10	29
Special nuts for FSRs:		
1/16" SS	ZCN1-10	30
1/16" SS long	LZCN1-10	45

100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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Fused Silica Fittings

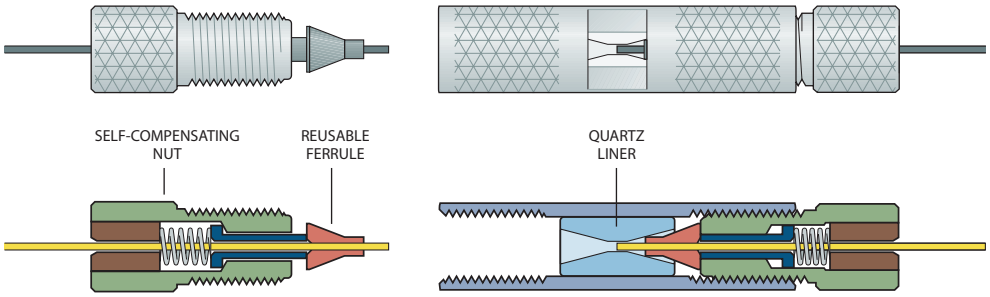
The patented design of our fused silica fittings ensures stable, leak-free connections at temperatures up to 400°C, and undistorted ferrules that are easily removed and reused. Columns may be changed without the risk of the leaks which can devastate systems such as mass spectrometers or atomic emission detectors. This is accomplished with a spring-loaded self-compensating nut which provides a constant sealing force as the temperature varies.

Self-compensating nuts are currently employed in two basic designs: a fused silica-lined union and an injector/detector nut for Agilent 6890 and 5890 GCs.

Fused silica unions

The fused silica union* has a quartz liner, providing an inert connection zone of minimal volume. Since the seal occurs only at the ferrule tip, the total sealing force is minimized, leaving the ferrule undistorted and reusable.
Note: The ferrules used in this union are unique, due to the seal at the tip. Standard ferrules will not work in this union.

Description	*Prod No*	*Price*
Fused silica union	FSKZU1	
Replacement liner	FSQ1	
Replacement nut	FSZN1	



Fused silica union
with self-compensating nut

Replacement ferrules for fused silica unions and self-compensating nuts (Agilent injector nuts)

These reusable ferrules seal at the tip, and are different from standard ferrules. Order for use with FSKZU1 fused silica unions and FSZNA-HP nuts on these two pages.

Package of 10:		*Prod No*	*Price*
Column ID:	.20 –.25 mm	FS1.35-R10	
	.32 mm	FS1.45-R10	
	.53 mm	FS1.75-R10	

*U.S. patent numbers 5,234,235 and 4,991,883.

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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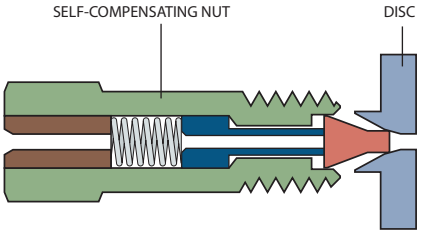
Injector nut for Agilent 6890 and 5890, Series I and II

This self-compensating nut is a direct replacement for the standard nut on the split/splitless injectors of Agilent 6890 and 5890 series GCs. This retrofit offers enhanced ferrule reusability and temperature stability, resulting in fingertight leak-free connections over the full programmed temperature range of mass spectrometry and gas chromatography. To use this nut, the split/splitless disk must also be upgraded; the new disk will also work with older HP nuts and ferrules.

	Prod No	*Price*
Injector nut system Includes nut and seal disk	FSZA-HP	
Replacement parts		
Self-compensating nut	FSZNA-HP	
HP-5890 split/splitless seal disk	SEAL1-HP	

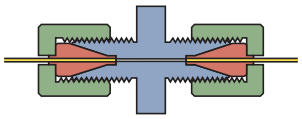


Self-compensating nut
for the 6890/5890 GC

1/32" Ultra low mass external unions

The 1/32" external union is specially designed for use with capillary columns in GC. It has very low mass and does not require wrenches to seal. Use only with one-piece fused silica adapters, since metal ferrules will distort the detail. Order fused silica adapters separately *(see box at left)*.

Bore	*Prod No*	*Price*
0.25 mm	EU.5	
0.50 mm	EU.5L	
1/32"	EU.5T	



1/32" external union
for use with capillary columns in GC

MORE INFORMATION
1/32" fused silica adapter ferrules..... page 16

1/32" FUSED SILICA FERRULES
(package of 5)

Tubing OD:

	≤ 0.25 mm	FS.25-5	$25
0.25 mm	≤ 0.4 mm	FS.4-5	25
0.4 mm	≤ 0.5 mm	FS.5-5	25
0.5 mm	≤ 0.8 mm	ZF.5V-5	25

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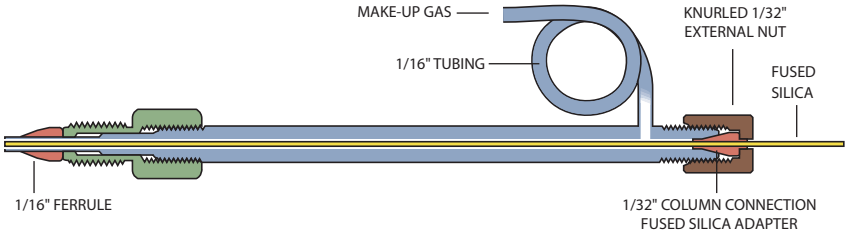
Fused Silica Adapters

Fused silica make-up adapters

The fused silica make-up adapter connects a fused silica capillary column to a valve or detector while adding a make-up gas. In the reverse mode it works like a splitter, without the uneven or erratic split seen with basic tees. Two lengths are available. Order 1/32" fused silica adapter ferrules separately *(see box on facing page)*.

Description	*Length*	*Bore*	*Prod No*	*Price*
1/16" to 1/32"	1.5"	0.5 mm	FSMUAS1.5M	
	1.5"	0.75 mm	FSMUAS1.5	
	1.5"	1.0 mm	FSMUAS1.5L	
	3.5"	0.75 mm	FSMUA1.5	



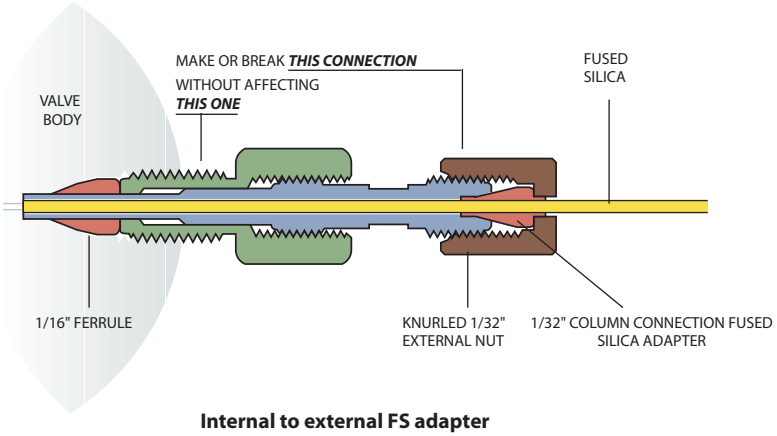
Fused silica make-up adapter
(FSMUA1.5)

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

Internal to external reducer/adapters

Internal fittings provide the smallest possible fitting volume. But there are situations, such as when you're using graphite ferrules which tend to become lodged in internal details, when an external fitting might be more desirable. A typical situation of that nature is the connection of a fused silica capillary to a valve. Our unique design permits the 1/32" nut to be tightened without affecting the 1/16" connection. Order 1/32" fused silica adapter ferrules separately *(see box below)*.

Description	*Bore*	*Prod No*	*Price*
1/16" to 1/32"	0.25 mm	IZERA1.5C	
	0.5 mm	IZERA1.5M	
	1.0 mm	IZERA1.5	



Internal to external FS adapter
(IZERA1.5)
shown installed in a valve

MORE INFORMATION
1/32" fused silica adapter ferrules..... page 16

CAUTION
Polymeric ferrules are strongly recommended for 1/16" and 1/32" external details. Metal ferrules may distort the fitting.

1/32" FUSED SILICA FERRULES
(package of 5)

Tubing OD:

	≤ 0.25 mm	FS.25-5	$30
0.25 mm	≤ 0.4 mm	FS.4-5	30
0.4 mm	≤ 0.5 mm	FS.5-5	30
0.5 mm	≤ 0.8 mm	ZF.5V-5	30

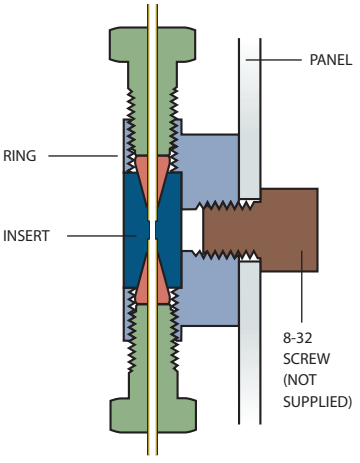
Microvolume Connectors

Micro-unions, -tees, -crosses, and -Y's have a unique two-piece design which allows us to provide an extremely small bore in a conventional ferrule and nut fitting. The actual connection area is separated from the nut threads, with the ferrule detail in a metal or polymer insert and the threads machined into a stainless steel or polymer ring. Since the insert has a much smaller diameter than a standard one-piece fitting, it can be drilled with much shorter tools; and, since a shorter drill has less tendency to wander or break, holes as small as .006" (0.15 mm) can be machined with the same high degree of concentricity found in all Valco fittings.

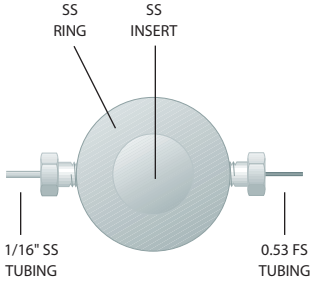
Valco microvolume fittings make it possible to couple 100 micron ID capillary GC, HPLC, or CZE columns without special nuts and ferrules. A stainless ring with one of the plastic inserts provides electrical insulation within the insert, while the PEEK ring achieves total isolation.

The ring containing the threads is made from PEEK or stainless steel. Inserts are made of stainless steel, Hastelloy C, Titanium, PEEK, or CTFE. PEEK rings are not as robust as stainless steel, and are not usable above 75°C. The stainless steel ring with a metal insert can operate at up to 10,000 psi for HPLC or SFC.

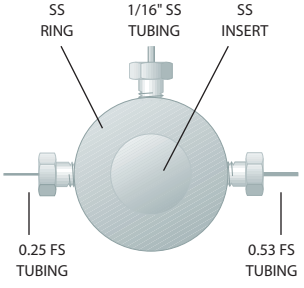
All standard Valco zero dead volume reducing ferrules (ZRF, FS, and FSR) will work in these fittings. They are uniquely designed to fill the void between the fitting pilot and the smaller tubing OD, eliminating any dead volume in the fitting. (Reducing ferrules such as Valco's RF series should be avoided, since they leave dead volume.)



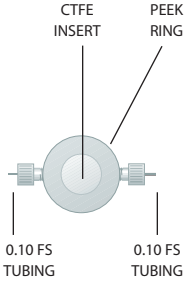
Panel mounting



Stainless to fused silica union
1/16" fittings



Make-up adapter
1/16" fittings



CZE union
1/32" fittings

MORE INFORMATION

FS fused silica adapters. . . . . page 16
FSR fused silica adapters. 17
ZRF internal reducing ferrules 14

Ferrules
Metal. 12
Polymeric 13

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
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1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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1/32" Microvolume connectors

Includes ring, nuts, and ferrules. With metal inserts: ferrules are the same material as the insert, and ring and nuts are stainless steel. With polymer inserts: ferrules are the same material as the insert, and ring and nuts are PEEK.

Insert Material:	Stainless steel		Hastelloy C		Titanium		PEEK		CTFE	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
0.15 mm bore										
Union	MU.5XCS6		MU.5XCHC		MU.5XCTI		MU.5XCPK		MU.5XCKF	
Tee	MT.5XCS6		MT.5XCHC		MT.5XCTI		MT.5XCPK		MT.5XCKF	
Y	MY.5XCS6		MY.5XCHC		MY.5XCTI		MY.5XCPK		MY.5XCKF	
Cross	MX.5XCS6		MX.5XCHC		MX.5XCTI		MX.5XCPK		MX.5XCKF	
0.25 mm bore										
Union	MU.5CS6		MU.5CHC		MU.5CTI		MU.5CPK		MU.5CKF	
Tee	MT.5CS6		MT.5CHC		MT.5CTI		MT.5CPK		MT.5CKF	
Y	MY.5CS6		MY.5CHC		MY.5CTI		MY.5CPK		MY.5CKF	
Cross	MX.5CS6		MX.5CHC		MX.5CTI		MX.5CPK		MX.5CKF	

1/16" Microvolume connectors

Includes ring, nuts, and ferrules. With metal inserts: ferrules are the same material as the insert, and ring and nuts are stainless steel. With polymer inserts: ferrules are the same material as the insert, and ring and nuts are PEEK.

Insert Material:	Stainless steel		Hastelloy C		Titanium		PEEK		CTFE	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No.*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
0.15 mm bore										
Union	MU1XCS6		MU1XCHC		MU1XCTI		MU1XCPK		MU1XCKF	
Tee	MT1XCS6		MT1XCHC		MT1XCTI		MT1XCPK		MT1XCKF	
Y	MY1XCS6		MY1XCHC		MY1XCTI		MY1XCPK		MY1XCKF	
Cross	MX1XCS6		MX1XCHC		MX1XCTI		MX1XCPK		MX1XCKF	
0.25 mm bore										
Union	MU1CS6		MU1CHC		MU1CTI		MU1CPK		MU1CKF	
Tee	MT1CS6		MT1CHC		MT1CTI		MT1CPK		MT1CKF	
Y	MY1CS6		MY1CHC		MY1CTI		MY1CPK		MY1CKF	
Cross	MX1CS6		MX1CHC		MX1CTI		MX1CPK		MX1CKF	

Replacement components

	1/32" connectors		1/16" connectors	
Description	*Prod No*	*Price*	*Prod No*	*Price*
SS ring for union, tee, or cross	MRX.5S6		MRX1S6	
SS ring for Y	MRY.5S6		MRY1S6	
PEEK ring for union, tee, or cross	MRX.5PK		MRX1PK	
PEEK ring for Y	MRY.5PK		MRY1PK	
Nuts for SS ring	ZN.5		ZN1	
Nuts for PEEK ring	ZN.5FPK		ZN1FPK	

Inserts for any connector:
To order an insert, add an "I" after the "M" in the product number, and deduct $5 from the connector price.
For example, to order an insert for a 1/16" microvolume union MU1CS6, order part number MIU1CS6.

OPTIONS
0.50, 0.75, and 1.0 mm bores are available in most materials and configurations.

NANOVOLUME CONNECTIONS
For 0.10 mm (100 µm) bore fittings, see pages 57- 60.

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Unions

Unions join two pieces of tubing of the same OD. Select the union with the bore that matches the ID of the tubing. If the IDs are different, choose the union with a bore which matches the smaller tube bore. Standard material is 300 series stainless steel.

- **Internal** unions have female threads and a fitting detail for zero volume fittings. The nuts have male (external) threads.
- **External** unions have male threads, requiring a nut with internal threads.
- **External/internal** unions have male threads on one end and female threads on the other, for connecting a standard zero dead volume fitting to an existing tube which already has an external nut made up on it.

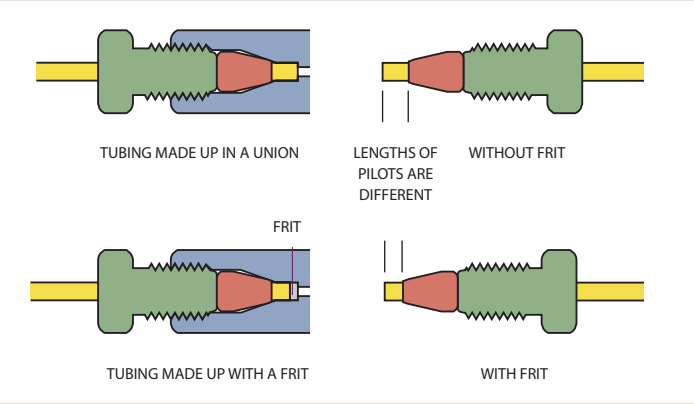
Internal fittings are almost always the best with tubing of 1/8" OD or smaller. They make a stronger connection and offer the lower volume necessary for high performance instrumentation. Also, because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. In sizes larger than 1/8", external fittings are generally easier to make up because of less thread friction.

Bulkhead versions can be mounted through an instrument panel or on a bracket. The fitting body is undercut so that it bites into the panel when the mounting nut is tightened, eliminating the need for a lock washer. An O-ring can be installed between the body and the panel to allow operation in purged environments. Typically the mounting nut goes inside the instrument, so that the long threaded portion will be out of sight. In the external/internal bulkhead unions, the mounting nut is on the side with the Valco internal fitting.

TECH TIP

Filtering capability can be added to a union by inserting a screen or frit into it before making up the fittings. However, when a fitting detail has a screen or frit in it, the pilot depth is reduced, so that the ferrule makes up closer to the tube end than it otherwise would. If that tube is used in any other Valco fitting, it will introduce unswept volume. Our filter design takes this into account, allowing our fittings to remain truly interchangeable.

Filters . . . . . pages 50-52
Frits and screens. 53



0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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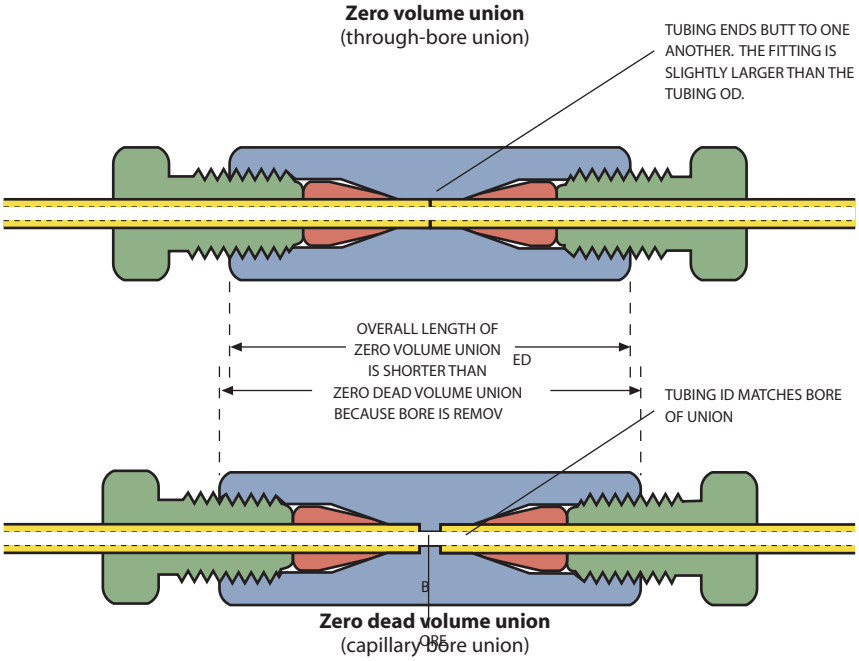
Zero Volume vs. Zero Dead Volume

A true zero volume fitting is one in which no part of the fitting actually becomes a part of the flow path. The only Valco fittings which fit this description are our through-bore unions, which allow tubing to butt end-to-end. (So these are only zero volume if the tube ends are perfectly square.)

All other fittings are designed with zero *dead* volume: that is, there is no volume introduced by the fitting which is not cleanly swept.



MORE INFORMATION

Reducing unions to connect two tubes with different ODs . . . . . p 29-31
Unions with 1/4-28 fittings 72

TECH TIP
Through-bore Union Installation
Because the tubing will pass all the way through a through-bore union, we suggest making up the first tube in a standard Valco fitting to establish the proper length of tubing extending beyond the ferrule. Install this made-up connection in the through-bore union; then the second tube can be butted against it for a zero volume connection.

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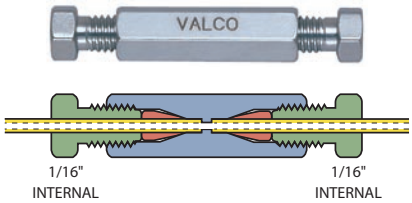
Unions

Internal unions – stainless steel

Standard material is 300 series stainless. Also available in Hastelloy C, gold-plated stainless, and titanium.

Standard internal unions

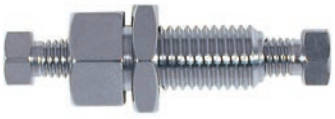
Tubing OD	*Bore*	*Prod No*	*Price*
1/32"	0.15 mm	ZU.5XC	
	0.25 mm	ZU.5	
	0.50 mm	ZU.5L	
	1/32"	ZU.5T	
1/16"	0.15 mm	ZU1XC	
	0.25 mm	ZU1C	
	0.50 mm	ZU1M	
	0.75 mm	ZU1	
	1.0 mm	ZU1L	
	1/16"	ZU1T	
1/8"	0.75 mm	ZU2	
	2.0 mm	ZU2L	
	1/8"	ZU2T	
1/4"	0.75 mm	ZU4	
	4.6 mm	ZU4L	
	1/4"	ZU4T	



Internal union – metal
Standard bore version
(ZU1)
Ends of tubing seat squarely
at bottoms of fitting details

Bulkhead internal unions

Tubing OD	*Bore*	*Prod No*	*Price*	**Bulkhead panel hole diameter**
1/32"	0.15 mm	ZBU.5XC		5/16"
	0.25 mm	ZBU.5		5/16"
	0.50 mm	ZBU.5L		5/16"
	1/32"	ZBU.5T		5/16"
1/16"	0.15 mm	ZBU1XC		5/16"
	0.25 mm	ZBU1C		5/16"
	0.50 mm	ZBU1M		5/16"
	0.75 mm	ZBU1		5/16"
	1.0 mm	ZBU1L		5/16"
	1/16"	ZBU1T		5/16"
1/8"	0.75 mm	ZBU2		7/16"
	2.0 mm	ZBU2L		7/16"
	1/8"	ZBU2T		7/16"
1/4"	0.75 mm	ZBU4		5/8"
	4.6 mm	ZBU4L		5/8"
	1/4"	ZBU4T		5/8"



Bulkhead internal union – metal
(ZBU1)

MORE INFORMATION
Internal unions, high pressure PEEK . . p 57, 65

For special materials and/or smaller bores:
Microvolume connectors offer a complete range of 1/32" and 1/16" unions in various metals and polymers, with bore sizes ranging from .006" (0.15 mm) to .040" (1.0 mm). Refer to pages 22-23.

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

5/16" = .312" = 7.9 mm
3/8" = .375" = 9.5 mm
7/16" = .437" = 11.1 mm

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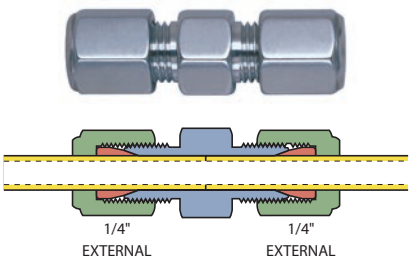


External union
Through-bore version
(EU4T)
Ends of tubing butt together

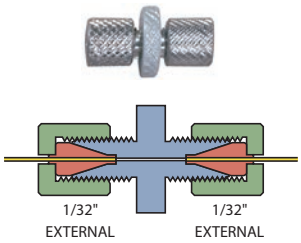
Bulkhead external union
(EBU2L)

External unions

Standard material is 300 series stainless. Also available in Hastelloy C and gold-plated stainless.

Note: Because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. We recommend the use of external/internal unions (below) when connecting to an installed external nut.

Tubing OD	*Bore*	**Standard** *Prod No*	*Price*	**Bulkhead** *Prod No*	*Price*	**Bulkhead panel hole diameter**
1/16"	See note above					
1/8"	1.0 mm	EU2		–		–
	2.0 mm	EU2L		EBU2L		5/16"
	1/8"	EU2T		EBU2T		5/16"
1/4"	2.0 mm	EU4		EBU4		7/16"
	4.6 mm	EU4L		EBU4L		7/16"
	1/4"	EU4T		EBU4T		7/16"

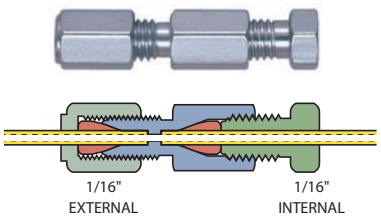


1/32" external union
(EU.5)
For use with GC capillary columns

External unions – 1/32" ultra low mass

The 1/32" external union is specially designed for use with capillary columns in GC. It is very low mass and does not require wrenches to seal. Use *only* with one-piece fused silica adapters, since metal ferrules will distort the detail. Order fused silica adapters separately *(page 16)*. Standard material is 300 series stainless.

Bore	*Prod No*	*Price*
0.25 mm	EU.5	
0.50 mm	EU.5L	
1/32"	EU.5T	



External/internal union
Standard bore
(EZU1)
Adapts existing external fittings
to Valco zero volume internal fittings

Bulkhead external/internal union
(EZBU1)

External/internal unions

Standard material is 300 series stainless. Also available in Hastelloy C and gold-plated stainless.

Tubing OD	*Bore*	**Standard** *Prod No*	*Price*	**Bulkhead** *Prod No*	*Price*	**Bulkhead panel hole diameter**
1/32"	0.25 mm	EZU.5		–		–
	0.50 mm	EZU.5L		–		–
1/16"	0.25 mm	EZU1C		EZBU1C		5/16"
	0.50 mm	EZU1M		EZBU1M		5/16"
	0.75 mm	EZU1		EZBU1		5/16"
	1/16"	EZU1T		EZBU1T		5/16"
1/8"	1.0 mm	EZU2		EZBU2		7/16"
	2.0 mm	EZU2L		EZBU2L		7/16"
	1/8"	EZU2T		EZBU2T		7/16"

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Reducing Unions

Reducing unions join two tubes of different outside diameters. Standard material is 300 series stainless.

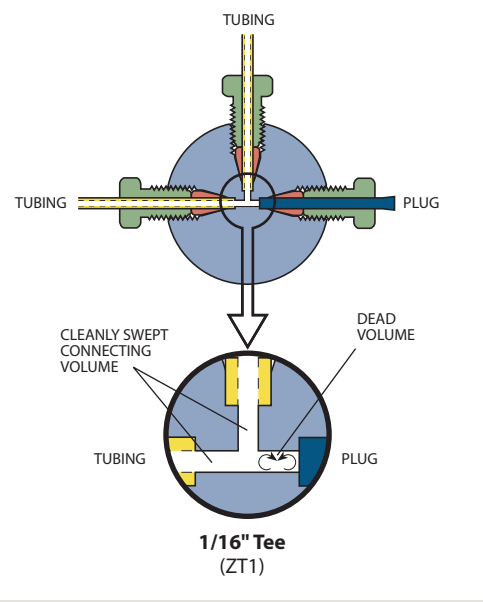
- Internal reducing unions have female threads and a fitting detail for zero volume fittings. The nuts have male (external) threads.
- External reducing unions have male threads, requiring a nut with internal threads.
- External/internal and internal/external reducing unions have male threads on one end and female threads on the other. We recommend the use of external/internal fittings when connecting to an existing external nut.

Internal fittings are almost always the best with tubing of 1/8" OD or smaller. They make a stronger connection and offer the lower volume necessary for high performance instrumentation. Also, because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. In sizes larger than 1/8", external fittings are generally easier to make up because of less thread friction.

Bulkhead versions can be mounted through an instrument panel or on a bracket. The fitting body is undercut so that it bites into the panel when the mounting nut is tightened, eliminating the need for a lock washer. An O-ring can be installed between the body and the panel to allow operation in purged environments. Typically the mounting nut goes inside the instrument, so that the long threaded portion will be out of sight. In the external/internal bulkhead unions, the mounting nut is on the side with the Valco internal fitting.

DEAD VOLUME

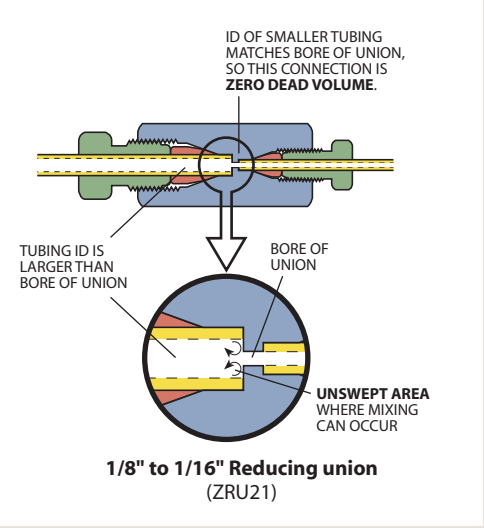
"Dead volume" is created in obvious situations such as the one shown.



1/16" Tee
(ZT1)

UNSWEPT VOLUME

Even in connections which are by most definitions "zero dead volume", unswept volume may be created where large ID transitions occur. The amount of mixing depends on the amount of mismatch in the IDs.



1/8" to 1/16" Reducing union
(ZRU21)

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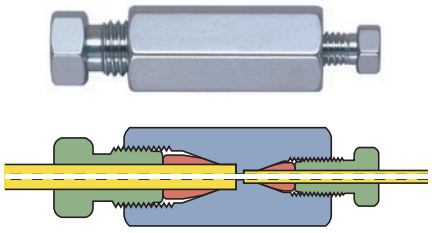


Internal reducing union – metal
Standard bore
(ZRU21)

Internal reducing unions – stainless steel

These unions connect two sizes of tubing, using zero dead volume internal fittings on each end. In the bulkhead version, the bulkhead nut is on the side with smaller tubing.

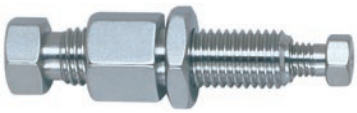
Standard material is 300 series stainless. Also available in Hastelloy C, gold-plated stainless, and titanium.

Standard internal reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*
1/16" to 1/32"	0.15 mm	ZRU1.5XC	
	0.25 mm	ZRU1.5	
	0.50 mm	ZRU1.5L	
	1/32"	ZRU1.5T	
1/8" to 1/32"	0.25 mm	ZRU2.5	
	0.50 mm	ZRU2.5L	
	1/32"	ZRU2.5T	
1/8" to 1/16"	0.25 mm	ZRU21C	
	0.75 mm	ZRU21	
	1/16"	ZRU21T	
1/4" to 1/16"	0.25 mm	ZRU41C	
	0.75 mm	ZRU41	
	1/16"	ZRU41T	
1/4" to 1/8"	0.75 mm	ZRU42	
	2.0 mm	ZRU42L	
	1/8"	ZRU42T	

Bulkhead internal reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*	**Bulkhead panel hole diameter**
1/16" to 1/32"	0.25 mm	ZBRU1.5		5/16"
	0.50 mm	ZBRU1.5L		5/16"
	1/32"	ZBRU1.5T		5/16"
1/8" to 1/32"	0.25 mm	ZBRU2.5		5/16"
	0.50 mm	ZBRU2.5L		5/16"
	1/32"	ZBRU2.5T		5/16"
1/8" to 1/16"	0.25 mm	ZBRU21C		5/16"
	0.75 mm	ZBRU21		5/16"
	1/16"	ZBRU21T		5/16"
1/4" to 1/16"	0.25 mm	ZBRU41C		7/16"
	0.75 mm	ZBRU41		7/16"
	1/16"	ZBRU41T		7/16"
1/4" to 1/8"	0.75 mm	ZBRU42		7/16"
	2.0 mm	ZBRU42L		7/16"
	1/8"	ZBRU42T		7/16"



Bulkhead internal reducing union – metal
(ZBRU21)

MORE INFORMATION

Internal reducing unions, high pressure PEEK ..... page 65
External/internal reducing unions 31
Internal/external reducing unions 31
Standard unions 26
Unions with 1/4-28 fittings 72

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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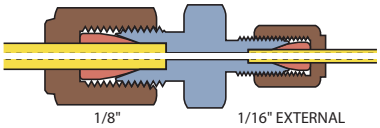
Reducing Unions

External reducing unions

These unions connect two sizes of tubing, using external fittings on each end. Standard material is 300 series stainless. Custom bulkhead versions are available in OEM quantities.



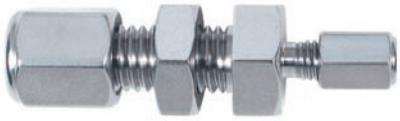
External reducing union
Standard bore
(ERU21)

Standard external reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*
1/8" to 1/16"	0.75 mm	ERU21	
	1.00 mm	ERU21L	
	1/16"	ERU21T	
1/4" to 1/16"	0.75 mm	ERU41	
	1/16"	ERU41T	
1/4" to 1/8"	1.0 mm	ERU42	
	2.0 mm	ERU42L	
	1/8"	ERU42T	

Bulkhead external reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*	**Bulkhead panel hole diameter**
1/8" to 1/16"	1.0 mm	EBRU12L		5/16"
	1/16"	EBRU12T		5/16"
1/4" to 1/16"	1.0 mm	EBRU14L		7/16"
	1/16"	EBRU14T		7/16"
1/4" to 1/8"	2.0 mm	EBRU24L		7/16"



Bulkhead external reducing union
(EBRU12L)

TECH TIP
Note: Because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. We recommend the use of 1/16" internal fittings when possible.

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

5/16" = .312" = 7.9 mm
3/8" = .375" = 9.5 mm
7/16" = .437" = 11.1 mm

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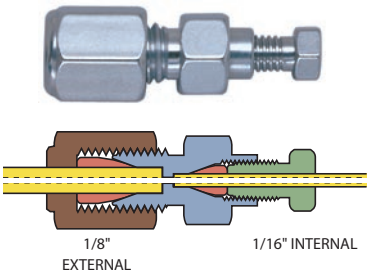
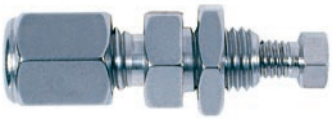
External/internal reducing unions



External/internal reducing union
Standard bore
(EZRU21)



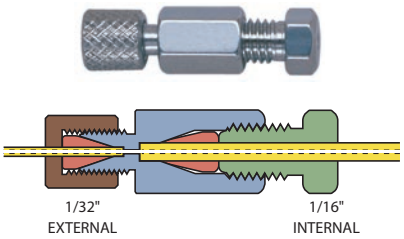
Bulkhead external/internal reducing union
(EZBRU21)

In these reducing unions, the larger size tubing is made up with an external fitting and the smaller size tubing is made up with an internal fitting. In the bulkhead version, the bulkhead nut is on the side with the internal fitting. Other configurations, such as an external nut on the locking nut side, are available on special request.

Standard material is 300 series stainless. Also available in Hastelloy C, gold-plated stainless, and titanium.

		Standard		Bulkhead		Bulkhead
Tubing OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	**panel hole diameter**
1/16" to 1/32"	0.25 mm	EZRU1.5		–		–
	0.50 mm	EZRU1.5L		EZBRU1.5L		5/16"
	1/32"	EZRU1.5T		EZBRU1.5T		5/16"
1/8" to 1/32"	0.25 mm	EZRU2.5		–		–
	0.50 mm	EZRU2.5L		EZBRU2.5L		5/16"
	1/32"	EZRU2.5T		EZBRU2.5T		5/16"
1/8" to 1/16"	0.25 mm	EZRU21C		–		–
	0.75 mm	EZRU21		EZBRU21		5/16"
	1/16"	EZRU21T		EZBRU21T		5/16"
1/4" to 1/16"	0.25 mm	EZRU41C		–		–
	0.75 mm	EZRU41		EZBRU41		7/16"
	1/16"	EZRU41T		EZBRU41T		7/16"
1/4" to 1/8"	1.0 mm	EZRU42		EZBRU42		7/16"
	2.0 mm	EZRU42L		EZBRU42L		7/16"
	1/8"	EZRU42T		EZBRU42T		

Internal/external reducing unions



Internal/external reducing union
Standard bore
(EZRU.51)

Bulkhead internal/external reducing union
(EZBRU.51)

These reducing unions are the opposite of the ones above. The larger size tubing is made up with an internal fitting and the smaller size tubing is made up with an external fitting. In the bulkhead version, the bulkhead nut is on the side with the internal fitting. Standard material is 300 series stainless.

Internal/external reducing unions are typically used to connect 1/16" stainless steel tubing to fused silica tubing.

Only polymeric ferrules should be used with 1/32" external details – metal ferrules will distort them. These unions include a stainless steel ferrule for the 1/16" SS tube, but because of the variety of fused silica ODs and corresponding ferrules, a 1/32" fused silica adapter must be ordered separately. *(See page 16.)*

		Standard		Bulkhead		Bulkhead
Tubing OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	**panel hole diameter**
1/16" to 1/32"	0.25 mm	EZRU.51		EZBRU.51		5/16"
	0.50 mm	EZRU.51L		EZBRU.51L		5/16"
	1/32″	EZRU.51T		EZBRU.51T		5/16"

MORE INFORMATION

Fused silica adapters. . . . page 16-17
Polymeric ferrules 13
External unions. 27
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Tees and Crosses

Tees

Tees connect three lines. Standard material is 300 series stainless. Also available in Hastelloy C, gold plated stainless, and titanium.

Tubing OD	*Bore*	*Prod No*	*Price*
1/32"	0.25 mm	ZT.5	
	0.50 mm	ZT.5L	
1/16"	0.25 mm	ZT1C	
	0.50 mm	ZT1M	
	0.75 mm	ZT1	
	1.00 mm	ZT1L	
1/8"	0.75 mm	ZT2	
	2.00 mm	ZT2L	
1/4"	1.00 mm	ZT4	
	4.60 mm	ZT4L	

Crosses

Crosses connect four lines. Standard material is 300 series stainless. Also available in Hastelloy C, gold plated stainless, and titanium.

Tubing OD	*Bore*	*Prod No*	*Price*
1/32"	0.25 mm	ZX.5	
	0.50 mm	ZX.5L	
1/16"	0.25 mm	ZX1C	
	0.50 mm	ZX1M	
	0.75 mm	ZX1	
	1.00 mm	ZX1L	
1/8"	0.75 mm	ZX2	
	2.00 mm	ZX2L	
1/4"	1.00 mm	ZX4	
	4.60 mm	ZX4L	

MORE INFORMATION

PEEK tees. . . . pages 57, 64
PEEK crosses 57, 64

SPECIAL METALS AND/OR SMALLER BORES

See microvolume connectors: 1/32" and 1/16" tees, crosses, Y's, and unions in various metals and polymers, with smaller bores.

Microvolume connectors . . . .pp 22-23
High pressure PEEK connectors. . 63-66
Nanovolume connectors 57-61

TECH TIP

To join tubes of different ODs, use the fitting sized for the largest tube along with IZR reducers for the smaller tubes.

IZR reducer. . . . . page 34

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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1/16" Manifolds

1/16" manifolds connect 4 - 16 inlet lines to a single outlet, and are often used to connect the outlets from several columns to a single detector. The unique angled entry of our design reduces dispersion to a minimum. Available with 1.00 mm inlet/outlet bore. Standard materials are PEEK or 300 series stainless.

	Inlet bore	*Outlet bore*	*Material*	*Prod No*	*Price*
4 inlets	0.25 mm	0.75 mm	Stainless steel	Z4M1	
	0.25 mm	0.75 mm	PEEK	Z4M1PK	
6 inlets	0.25 mm	0.75 mm	Stainless steel	Z6M1	
	0.25 mm	0.75 mm	PEEK	Z6M1PK	
8 inlets	0.25 mm	0.75 mm	Stainless steel	Z8M1	
	0.25 mm	0.75 mm	PEEK	Z8M1PK	
10 inlets	0.25 mm	0.75 mm	Stainless steel	Z10M1	
	0.25 mm	0.75 mm	PEEK	Z10M1PK	
12 inlets	0.25 mm	0.75 mm	Stainless steel	Z12M1	
	0.25 mm	0.75 mm	PEEK	Z12M1PK	
14 inlets	0.25 mm	0.75 mm	Stainless steel	Z14M1	
	0.25 mm	0.75 mm	PEEK	Z14M1PK	
16 inlets	0.40 mm	0.75 mm	PEEK	Z16M1PK	

1/8" Manifolds

1/8" manifolds connect 4 - 12 inlet lines to a single outlet, and are typically used in a gas distribution system to minimize the number of fitting connections. A manifold pipe fitting version is also available. (*See page 37.*) Standard material is 300 series stainless steel.

	Inlet bore	*Outlet bore*	*Prod No*	*Price*
4 inlets	2.00 mm	2.00 mm	Z4M2	
6 inlets	2.00 mm	2.00 mm	Z6M2	
8 inlets	2.00 mm	2.00 mm	Z8M2	
10 inlets	2.00 mm	2.00 mm	Z10M2	
12 inlets	2.00 mm	2.00 mm	Z12M2	

TECH TIP
A manifold used with an SD flowpath multiposition valve allows HPLC column selection with a single valve. See page 139 for an illustration.

SD UW valves. . . . . .pg 132

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Internal Reducers

NEW Internal reducers *for 360 µm tubing*

Directly connect 360 µm tubing into a 1/32" Valco valve or fitting detail, providing a positive leak-free seal with zero dead volume. The same patented design as our larger internal reducers (below). Both versions have a stainless steel body.

Tubing OD	*Nut/ferrule material*	*Prod No*	*Price*
1/32" to 360 µm	Stainless	C360IZR.5S6	
	PEEK	C360IZR.5S6PKG	

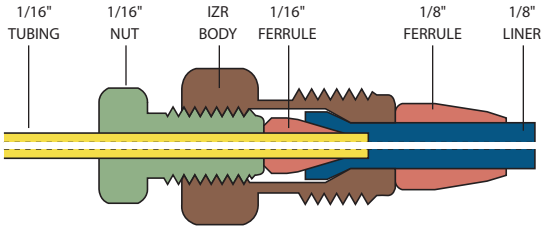
Internal reducers

Valco's patented internal reducer (IZR) allows smaller tubing to be used in valves with fitting details for larger tubing, forming a positive leak-free seal with zero dead volume. The small line from your system goes directly into the IZR and the sample goes directly into the valve, without the short pieces of connecting tubing required if a reducing union was used instead. (A reducing ferrule would also work, but makes a seal of less integrity.) Once the fitting is installed, only one wrench is required to remove and reinstall it.

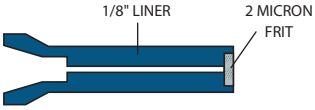
A second version has a 2 micron stainless steel frit pressed into the end of the liner, adding filtering capability. However, we suggest using these only as a final or backup filter, with a standard filter (*see page 52*) as the primary filter. Because IZRs have a much smaller surface area than the standard filter, they tend to plug too often if used in a stand-alone capacity.

Patent No. 4,173,363.

		Without frit		**With 2µ frit**	
Tubing OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/16" to 1/32"	0.25 mm	IZR1.5		IZR1.5F	
	0.50 mm	IZR1.5L		IZR1.5LF	
	1/32"	IZR1.5T		–	
1/8" to 1/16"	0.25 mm	IZR21C		IZR21CF	
	0.50 mm	IZR21		IZR21F	
	1.00 mm	IZR21L		IZR21LF	
	1/16"	IZR21T		–	
1/4" to 1/16"	1.00 mm	IZR41		IZR41F	
1/4" to 1/8"	1.00 mm	IZR42		IZR42F	
1/4" to 1/8"	2.00 mm	IZR42L		IZR42LF	



Valco's unique internal reducer
(IZR21)



IZR liner with pressed-in frit

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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External to internal adapters (injector/detector adapters)

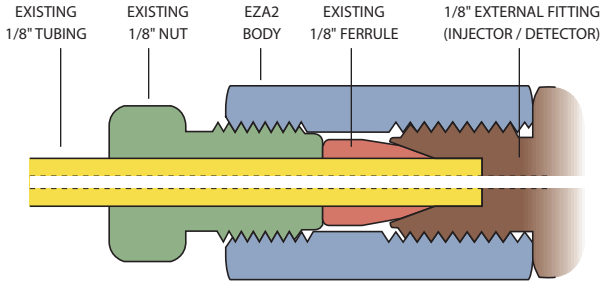
EZAs (external adapters) and EZRs (external reducers) adapt an external tee or union or the external type fittings common on injectors and detectors to Valco zero dead volume connections. Since EZAs are commonly used to connect an external fitting to an existing tube already made up with a Valco internal fitting, a nut and ferrule are not included.

Only one wrench is required to change tubes after the fitting is made up. While an external to internal union or reducing union plus a length of tubing can accomplish the same thing, these adapters do the trick with a single fitting.

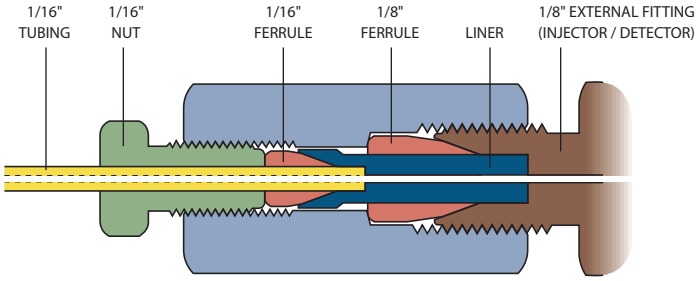
Standard material is 300 series stainless. The EZA does not include a nut or ferrule. The EZR includes a liner, one nut, and two ferrules.

Patent No. 4,173,363

Description	*Bore*	*Prod No*	*Price*
External to internal adapters			
1/16" ext. to 1/16" int.	–	EZA1	
1/8" ext. to 1/8" int.	–	EZA2	
External reducers			
1/16" ext. to 1/32" int.	0.25 mm	EZR1.5	
	1/32"	EZR1.5T	
1/8" ext. to 1/32" int.	0.25 mm	EZR2.5	
1/8" ext. to 1/16" int.	0.50 mm	EZR21	
	1/16"	EZR21T	
1/4" ext. to 1/16" int.	1.00 mm	EZR41	
	1/16"	EZR41T	
1/4" ext. to 1/8" int.	1.00 mm	EZR42	
	1/8"	EZR42T	



External to internal adapter (EZA2)



External to internal reducer (EZR21)

MORE INFORMATION

Ferrules ..... page 12
Nuts 10

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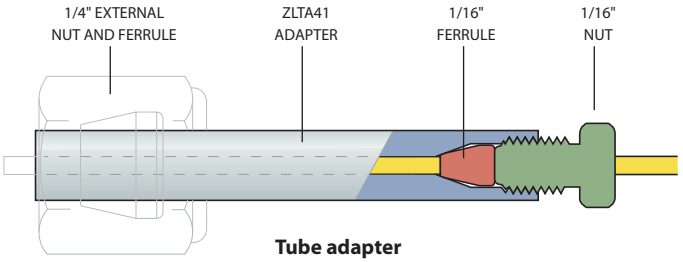
Special Fittings

Tube adapters

These external adapters are ideal for connecting 1/16" tubing to a detector or injector with a 1/4" fitting. The shorter size is used with 1/4" external fittings while the longer works with 1/4" internal or external fittings. (1/16" nut and ferrule are included; 1/4" nut and ferrule are not.) Standard material is 300 series stainless.

Description	*Bore*	*Prod No*	*Price*
1/4" to 1/16"			
0.975" long	1/16"	ZTA41	
2.075" long	1/16"	ZLTA41	
2.800" long	1/16"	ZXLTA41	



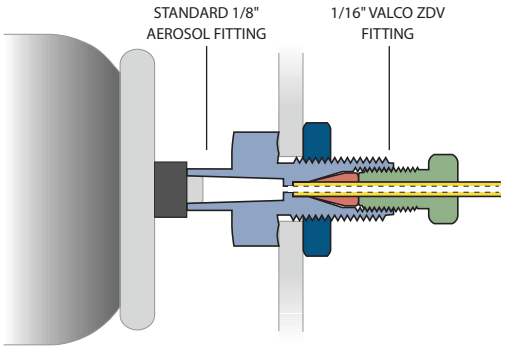
Tube adapter
(ZLTA41)

Aerosol adapter bulkhead union

This unique fitting provides an easy, direct method of connecting the nozzle of a standard aerosol can to a 1/16" Valco zero dead volume fitting.

As with all Valco bulkhead fittings, the flange is undercut to act as a "lock nut" against the instrument wall. Standard material is 300 series stainless.

Description	*Prod No*	*Price*
Aerosol adapter bulkhead union	ZBAA1	



Aerosol adapter bulkhead union
(ZBAA1)

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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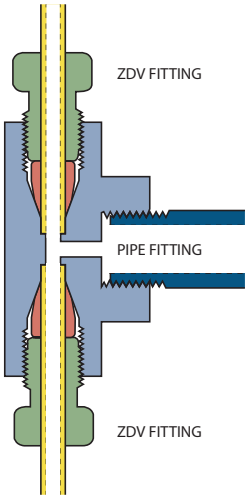
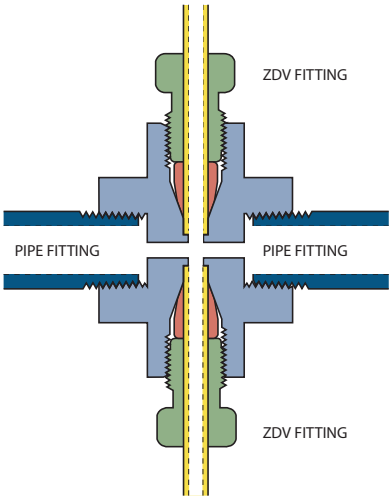
Manifold pipe adapters

These manifolds, which go from one or two pipe fittings to three or more Valco zero dead volume fittings, minimize the number of connections between a regulator and the various carrier gas lines in a chromatographic system. The models with two pipe fittings go a step further, allowing the support of a gauge, a second regulator, or a valve leading to a separate system. Additional Valco zero dead volume fittings can be machined on a special order basis. Standard material is 300 series stainless. Also available in Hastelloy C and titanium by special order.

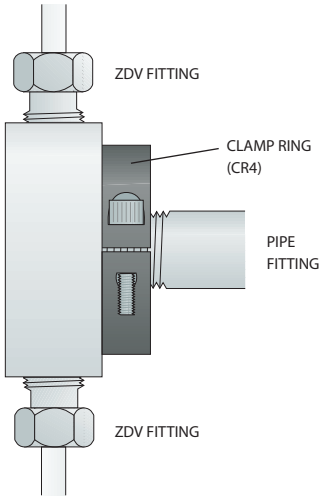
Description	*Bore*	*Prod No*	*Price*
One 1/8" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP1Z3M21	
three 1/8" ZDV fittings	2.0 mm	FP1Z3M22	
three 1/4" ZDV fittings	4.6 mm	FP1Z3M24	
One 1/4" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP1Z3M41	
three 1/8" ZDV fittings	2.0 mm	FP1Z3M42	
three 1/4" ZDV fittings	4.6 mm	FP1Z3M44	
Two 1/8" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP2Z3M21	
three 1/8" ZDV fittings	2.0 mm	FP2Z3M22	
three 1/4" ZDV fittings	4.6 mm	FP2Z3M24	
Two 1/4" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP2Z3M41	
three 1/8" ZDV fittings	2.0 mm	FP2Z3M42	
three 1/4" ZDV fittings	4.6 mm	FP2Z3M44	



One pipe fitting
to Valco ZDV fittings



Two pipe fittings
to Valco ZDV fittings



Adapter with optional mounting clamp ring

Pipe Adapters

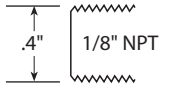
Male pipe to Valco internal adapters

Male pipe adapters make a minimum volume connection from the female pipe fittings on pressure gauges and regulators to Valco zero dead volume internal fittings. Standard material is 300 series stainless. Also available in Hastelloy C and titanium.

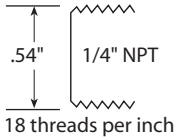
Description	*Bore*	*Prod No*	*Price*
1/8" NPT male to:			
1/16" ZDV fitting	1.0 mm	PZA21	
1/16" ZDV fitting	1/16"	PZA21T	
1/8" ZDV fitting	1.0 mm	PZA22	
1/4" NPT male to:			
1/16" ZDV fitting	1.0 mm	PZA41	
1/8" ZDV fitting	1.0 mm	PZA42	
1/8" ZDV fitting	2.0 mm	PZA42L	
1/4" ZDV fitting	4.6 mm	PZA44L	
1/2" NPT male to:			
1/16" ZDV fitting	1.0 mm	PZA81	
1/8" ZDV fitting	1.0 mm	PZA82	
1/8" ZDV fitting	2.0 mm	PZA82L	
1/4" ZDV fitting	4.6 mm	PZA84L	

MORE INFORMATION
Our manifold pipe adapters on page 37 allow you to connect one or two pipe fittings to three Valco zero dead volume fittings.

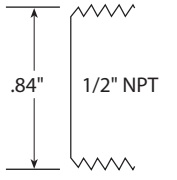
TECH TIP
NPT, National Pipe Thread, is a standard developed a long time ago by people without rulers. 1/8" NPT is nowhere close to 1/8"! Measure the diameter of the fitting across the narrow end. You can also count the number of threads in a 1" section. Then look at the diagrams below to determine the correct size needed.



27 threads per inch



18 threads per inch



14 threads per inch

Female pipe to Valco internal adapters

Female pipe adapters make a minimum volume connection from the male pipe fittings typically found in gas distribution plumbing to Valco zero dead volume internal fittings. Standard material is 300 series stainless. Also available in Hastelloy C and titanium.

Description	*Bore*	*Prod No*	*Price*
1/8" NPT female to:			
1/16" ZDV fitting	1.0 mm	FPZA21	
1/8" ZDV fitting	1.0 mm	FPZA22	
1/8" ZDV fitting	2.0 mm	FPZA22L	
1/4" NPT female to:			
1/16" ZDV fitting	1.0 mm	FPZA41	
1/8" ZDV fitting	1.0 mm	FPZA42	
1/8" ZDV fitting	2.0 mm	FPZA42L	
1/4" ZDV fitting	4.6 mm	FPZA44L	
1/2" NPT female to:			
1/16" ZDV fitting	1.0 mm	FPZA81	
1/8" ZDV fitting	1.0 mm	FPZA82	
1/8" ZDV fitting	2.0 mm	FPZA82L	
1/4" ZDV fitting	4.6 mm	FPZA84L	

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Male pipe to Valco external adapters

Male pipe adapters make a minimum volume connection from the female pipe fittings typically found on pressure gauges and regulators to Valco external fittings. Standard material is 300 series stainless.

Note: We do not manufacture adapters with 1/16" external fittings because they have very thin, easily distorted walls. We recommend use of the PZAs on the facing page.

Description	*Bore*	*Prod No*	*Price*
1/8" NPT male to:			
1/8" external fitting	2.0 mm	PEA22	
1/4" external fitting	4.6 mm	PEA24	
1/4" NPT male to:			
1/8" external fitting	2.0 mm	PEA42	
1/4" external fitting	4.6 mm	PEA44	
1/2" NPT male to:			
1/8" external fitting	2.0 mm	PEA82	
1/4" external fitting	4.6 mm	PEA84	

TECH TIP
Because of their dead volume and the risk of thread leaks, pipe fittings are a poor choice for trace gas analysis. Thread sealants, particularly PTFE tape, cannot boost their performance to adequate levels. For trace gas applications, choose Valco zero dead volume fittings with gold-plated stainless ferrules. *(See page 12.)*

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

Female pipe to Valco external adapters

Female pipe adapters make a minimum volume connection from the male pipe fittings typically found in gas distribution plumbing to Valco external fittings. Standard material is 300 series stainless.

Note: We do not manufacture adapters with 1/16" external fittings because they have very thin, easily distorted walls. We recommend use of the FPZAs on the facing page.

Description	*Bore*	*Prod No*	*Price*
1/8" NPT female to:			
1/8" external fitting	2.0 mm	FPEA22	
1/4" external fitting	4.6 mm	FPEA24	
1/4" NPT female to:			
1/8" external fitting	2.0 mm	FPEA42	
1/4" external fitting	4.6 mm	FPEA44	
1/2" NPT female to:			
1/8" external fitting	2.0 mm	FPEA82	
1/4" external fitting	4.6 mm	FPEA84	

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Syringe Adapters

NEW Zero dead volume fill ports

The ZVISF-1 is a unique fill port fitting designed so that a leaktight seal is formed against the face of the bottom of the fitting detail instead of at the end of an angular ferrule, resulting in a true zero dead volume connection with no carry over or sample loss. The polymer bushing snaps into the knurled PEEK nut, providing the convenience of a one-piece fitting. An ultrathin metal sleeve surrounds and supports the portion of the bushing which extends into the pilot of the fitting detail, preventing the bushing from mushrooming and getting stuck in the pilot as the fitting is tightened.

For use with 22 gauge blunt tip needle.

Description		*Prod No*	*Price*
For high pressure 1/16" Cheminert injectors with polymeric stators (C2, C3, C4, and C52 series)			
Most applications	PFA bushing	ZVISF-1PFAH	
High throughput applications	High density polyethylene bushing	ZVISF-1PEH	
For low pressure 1/16" Cheminert injectors, fittings, and most Valco injectors			
Most applications	PFA bushing	ZVISF-1PFA	
High throughput applications	High density polyethylene bushing	ZVISF-1PE	

Fill ports *for 1/16" polymeric Cheminert valves*

These fill ports provide direct syringe connections to polymeric valves and fittings. Since the fitting detail in the high pressure Cheminert valve is unique, be sure to order the high pressure version for polymeric HPLC injectors. For use with 22 gauge blunt tip needle.

Description	*Prod No*	*Price*
For high pressure injectors (C2, C3, C4, and C52 series injectors)	C-VISF-1H	
For fittings and low pressure injectors (C22Z and C62Z series injectors)	C-VISF-1	
Replacement liners and ferrules		
Liner for C-VISF-1	VISL-1	
Liner for C-VISF-1H	VISL-1H	
Ferrule for C-VISF-1 (or 1H)	ZF1VISF	

Fill ports *for metal Valco and Cheminert valves*

Fill ports provide direct syringe connections to valves and fittings, with the polymeric ferrule compressing a liner to seal around the needle. These fill ports are for use with metal valves.

Description	*Prod No*	*Price*
For use with blunt tip needle		
For 1/16" fittings and injectors - 22 ga	VISF-1	
For 1/32" fittings and injectors - 26 ga	VISF.5FPK	
For use with 2" 22 gauge blunt tip needle		
For 1/16" fittings and injectors	VISF-2	
For 1/8" fittings and injectors	VISF-A	
Replacement liners and ferrules		
Liner for VISF-1	VISL-1	
Liner for VISF-2 or VISF-A	VISL-2	
Ferrule for VISF-1 or VISF-2	ZF1VISF	

TECH TIP
When using Cheminert Nanovolume® CN2 injectors and valves, use fill ports designed just for them.

Nanovolume fill ports . . . . . page 60

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Syringe Adapters

for Cheminert C2 and C4 valves

Loop fill port assembly

The loop fill port assembly, for use with Cheminert high pressure valves (C2 and C4 series), permits sample loading and manual injection from the front of the valve. It includes an aluminum bracket, two syringe fill ports (for 3/4" or 2" needles), a bulkhead union, and two pieces of stainless tubing: one piece is 0.013" ID with a volume of 7 µl, and the other is 0.50 mm ID and 17 µl.

Description	*Prod No*	*Price*
Loop fill port assembly	C-LFP	

Female luer adapters

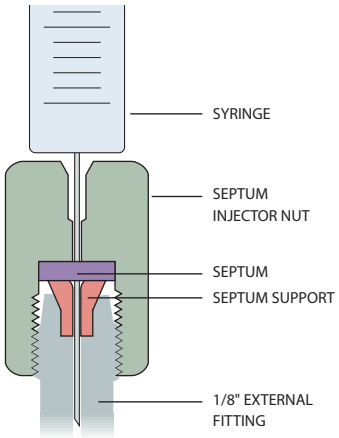
Female luer adapters provide direct syringe connections to zero dead volume fittings and valves.

Description		*Prod No*	*Price*
Female luer to:	1/32" fitting	ZLA-.5	
	1/16" fitting	ZLA-1	
	1/8" fitting	ZLA-2	

Septum injector nuts

Septum injector nuts are a simple way to provide syringe access to any point of a gas or liquid system. The injector nut includes a Valcon T polyimide septum support which accepts a standard 1/4" GC septum. The nut's 1/8" external fitting detail can connect directly to common external type fittings, or can be adapted to Valco internal fittings using an external/internal union or reducing union.

Description	*Prod No*	*Price*
Septum injector nut with support	EN2SI	
Replacement support	ZF2SI	
Septum, low bleed, pkg. of 10	SI4G	



Septum injector nut
with septum and support (EN2SI)

MORE INFORMATION

External/internal reducing unions . . pg 31
External/internal unions 27

Cheminert valves

Model C2 . . . . . 158, 161
Model C4 . . . . . 159, 162

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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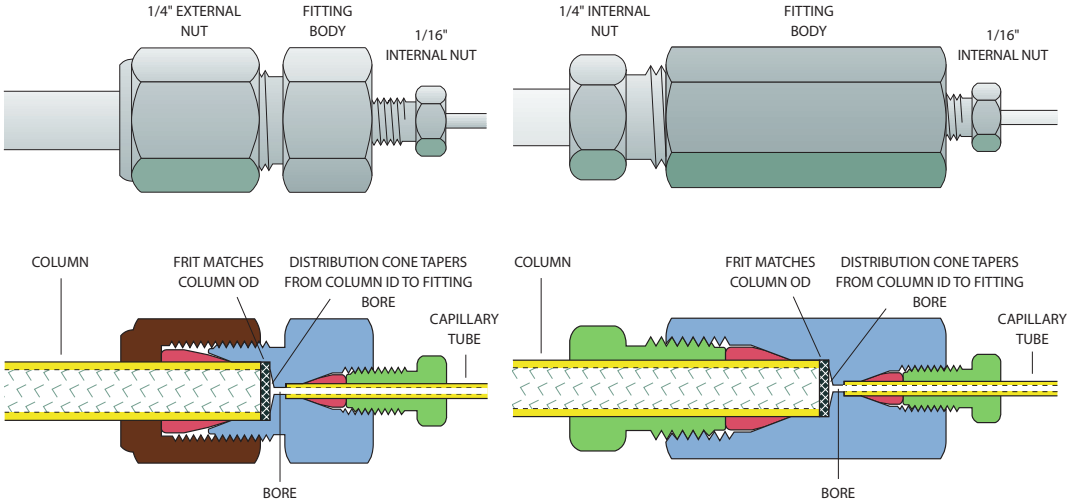
HPLC Column End Fittings

Although our column end fittings look like ordinary reducing unions, they are machined with a conical recess to match a specific column ID so that there are no abrupt or irregular diameter changes which can cause loss of theoretical plates. *(See illustrations, below.)* This optimization results in an assortment of column end fittings for each column OD. To receive full benefit of this design, use column end fittings only with the specific column ID for which they are intended. We can design special fittings for unusual sizes or OEM use.

If a temporary frit is used during column packing, the frit OD should match the column OD. Permanent frits should have an OD matched to the column ID, and should be pressed in to give the lowest dead volume. Our frits are available in a variety of pore sizes, and we offer titanium and Hastelloy C frits for systems sensitive to exposed stainless steel.

All column end fittings are rated to 10,000 psi. However, the functional limit is dictated by the yield strength of the tubing used with the fitting. Standard 1/4", 3/8", and 1/2" columns are usually packed at 8,000-10,000 psi, which is right at the yield strength for the tubing commonly used. Columns with 1" ID have a yield strength of 6,000-8,000 psi, and the fitting will not hold if the system pressure exceeds that limit.

The newest addition to the line is the Nanovolume® column end fitting. *(See page 62.)* These all-PEEK fittings feature fingertight zero dead volume connections with 100 or 150 micron bore. PEEK sleeves permit use with any fused silica tubing.



External column end fitting
1/4" to 1/16", 4.6 mm column ID, with removable frit
(ECEF414.6F)

Internal column end fitting
1/4" to 1/16", 4.6 mm column ID, with removable frit
(CEF414.6F)

MORE INFORMATION
Frits..... page 45

TECH TIP
Standard column end fittings are Type 316 stainless, but since the column wall and frit form over 99% of the column surface area, standard fittings with titanium frits can generally be used on inert columns.

TECH TIP
When packing columns, use Valco "through-type" unions to couple the column to the packing reservoir.

Size	*Prod No*
1/16" union	ZU1T
1/8" union	ZU2T
1/4" union	ZU4T

Through-type unions for packing columns..... page 26

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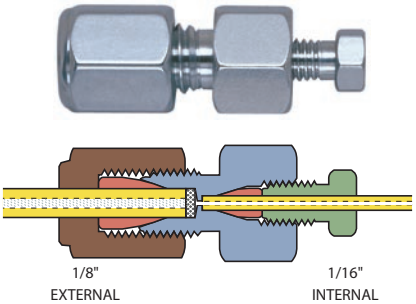
Microbore column end fittings *(1.0 mm – 2.0 mm column ID)*

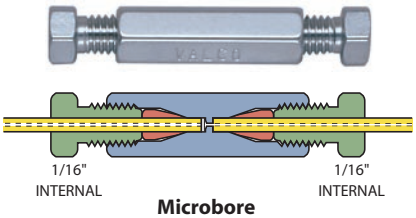
Standard material is Type 316 stainless.

	Bore	Column ID	Without frit Prod No	Price	Removable 2µ frit Prod No	Price
External column end fittings						
1/16" to 1/16"	0.25 mm	1.0 mm	ECEF111.0		ECEF111.0F	
1/8" to 1/16"	0.25 mm	1.0 mm	ECEF211.0		ECEF211.0F	



Microbore external column end fitting
(ECEF211.0F)

	Bore	Column ID	Without frit Prod No	Price	Removable 2µ frit Prod No	Price
Internal column end fittings						
1/16" to 1/32"	0.25 mm	1.0 mm	CEF1.5		CEF1.5F	
1/16" to 1/16"	0.25 mm	1.0 mm	CEF1		CEF1F	
1/8" to 1/32"	0.25 mm	1.0 mm	CEF2.51.0		CEF2.51.0F	
1/8" to 1/16"	0.25 mm	1.0 mm	CEF211.0		CEF211.0F	
1/8" to 1/16"	0.25 mm	2.0 mm	CEF212.0		CEF212.0F	



Microbore internal column end fitting
(CEF1F)

NANOBORE COLUMN END FITTINGS
See our complete line of 100 µm and 150 µm bore fittings on page 62.

100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
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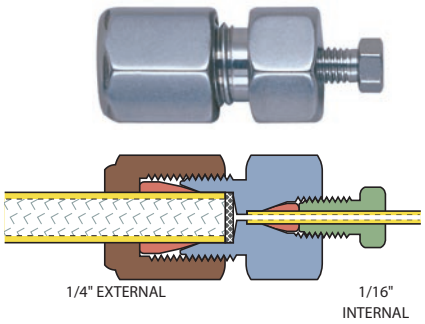
HPLC Column End Fittings

Analytical column end fittings *(2.0 mm – 4.6 mm column ID)*

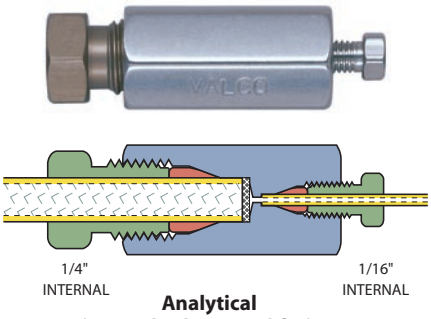
Standard material is Type 316 stainless.

			Without frit		Removable 2µ frit	
	Bore	*Column ID*	*Prod No*	*Price*	*Prod No*	*Price*
External column end fittings						
1/4" to 1/16"	0.4 mm	2.1 mm	ECEF412.1		ECEF412.1F	
1/4" to 1/16"	0.4 mm	3.0 mm	ECEF413.0		ECEF413.0F	
1/4" to 1/16"	0.4 mm	4.0 mm	ECEF414.0		ECEF414.0F	
1/4" to 1/16"	0.4 mm	4.6 mm	ECEF414.6		ECEF414.6F	



Analytical external column end fitting
with removable frit (ECEF414.6F)

			Without frit		Removable 2µ frit	
	Bore	*Column ID*	*Prod No*	*Price*	*Prod No*	*Price*
Internal column end fittings						
1/4" to 1/16"	0.4 mm	2.1 mm	CEF412.1		CEF412.1F	
1/4" to 1/16"	0.4 mm	3.0 mm	CEF413.0		CEF413.0F	
1/4" to 1/16"	0.4 mm	4.0 mm	CEF414.0		CEF414.0F	
1/4" to 1/16"	0.4 mm	4.6 mm	CEF414.6		CEF414.6F	



Analytical internal column end fitting
with removable frit (CEF414.6F)

NANOBORE COLUMN END FITTINGS
See our complete line of 100 µm and 150 µm bore fittings on page 62.

100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
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1.0 mm = .040"
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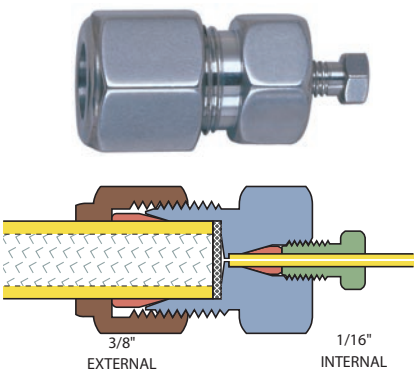
Semi-preparative and preparative column end fittings

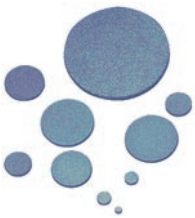
Standard material is Type 316 stainless.

			Without frit		Removable 2µ frit	
	Bore	*Column ID*	*Prod No*	*Price*	*Prod No*	*Price*
External column end fittings						
3/8" to 1/16"	0.40 mm	6.0 mm	ECEF616.0		ECEF616.0F	
3/8" to 1/16"	0.40 mm	7.0 mm	ECEF617.0		ECEF617.0F	
1/2" to 1/16"	0.75 mm	9.0 mm	ECEF819.0		ECEF819.0F	
1/2" to 1/16"	0.75 mm	10.0 mm	ECEF8110.0		ECEF8110.0F	
1" to 1/16"	0.75 mm	20.0 mm	ECEF1K1		ECEF1K1F	



Semi-preparative external column end fitting
(ECEF616.0F)

Replacement frits



1/16", 1/8" and 1/4" frits are sold in packages of 10. 3/8", 1/2", and 1" frits are sold individually. Other sizes may be available or special-ordered in OEM quantities.

			Stainless steel		Hastelloy C		Titanium	
	Pore Size	*Frit thickness*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Package of 10:								
1/16" frits	0.5µ	0.75 mm	.5FR1-10		.5FR1HC-10		–	
	2µ	0.75 mm	2FR1-10		2FR1HC-10		2FR1TI-10	
	10µ	0.75 mm	10FR1-10		–		–	
1/8" frits	0.5µ	1.00 mm	.5FR2-10		–		–	
	2µ	1.00 mm	2FR2-10		2FR2HC-10		2FR2TI-10	
	10µ	1.00 mm	10FR2-10		–		–	
1/4" frits	0.5µ	1.00 mm	.5FR4-10		–		–	
	2µ	1.00 mm	2FR4-10		2FR4HC-10		2FR4TI-10	
	10µ	1.00 mm	10FR4-10		10FR4HC-10		–	
Each:								
3/8" frits	2µ	1.00 mm	2FR6		2FR6HC		2FR6TI	
1/2" frits	2µ	1.00 mm	2FR8		2FR8HC		2FR8TI	
1" frits	2µ	1.50 mm	2FR1K		2FR1KHC		2FR1KTI	

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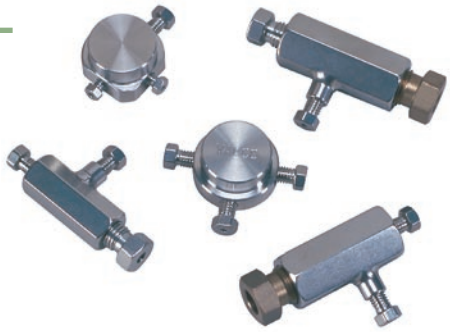
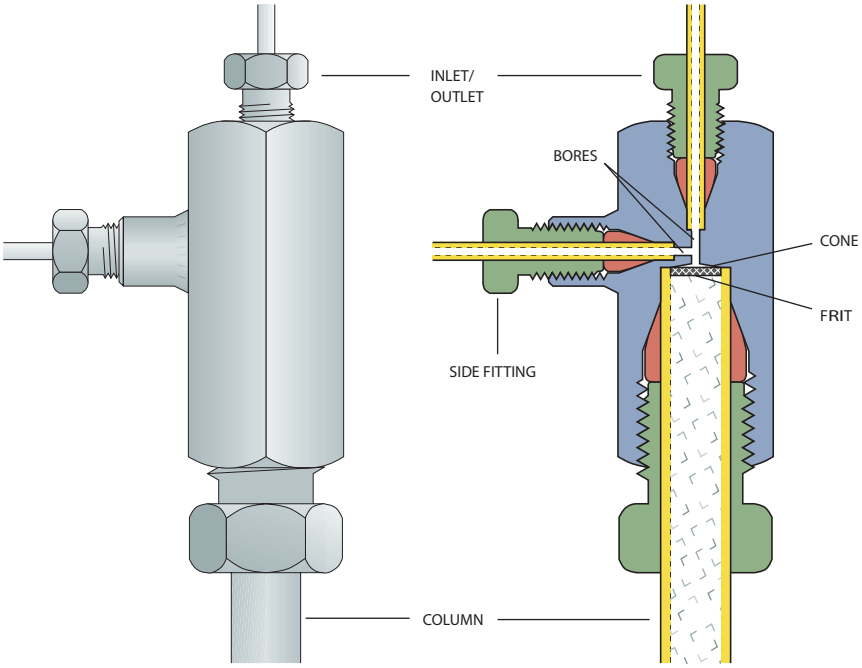
Post-Column Reaction Tee Fittings

Post-column reaction tee fitting



The tee column end fitting (TCEF) has a third connection perpendicular to the normal flowpath. The TCEF permits post-column derivation, or may be used as a curtain flow column inlet fitting. Standard material is Type 316 stainless.

Column OD	*Cone OD*	*Inlet/outlet OD*	*Bore*	*Side OD*	*Bore*	*Prod No*	*Price*
1/16"	1.0 mm	1/32"	0.25 mm	1/32"	0.25 mm	TCEF1.5.5C	
1/16"	1.0 mm	1/32"	0.90 mm	1/32"	0.25 mm	TCEF1.5.5T	
1/16"	1.0 mm	1/16"	0.25 mm	1/16"	0.25 mm	TCEF111	
1/8"	1.0 mm	1/16"	0.50 mm	1/16"	0.50 mm	TCEF211	
1/8"	1.0 mm	1/16"	1.65 mm	1/16"	0.40 mm	TCEF211T	
1/4"	4.6 mm	1/16"	0.25 mm	1/16"	0.25 mm	TCEF411C	
1/4"	4.6 mm	1/16"	0.75 mm	1/16"	0.75 mm	TCEF411	
1/4"	4.6 mm	1/16"	1.65 mm	1/16"	0.75 mm	TCEF411T	
1/4"	4.6 mm	1/8"	0.75 mm	1/16"	0.75 mm	TCEF421	
3/8"	6.0 mm	1/16"	0.75 mm	1/16"	0.75 mm	TCEF611	
3/8"	6.0 mm	1/16"	1.65 mm	1/16"	0.75 mm	TCEF611T	
1/2"	9.0 mm	1/16"	0.75 mm	1/16"	0.75 mm	TCEF811	
1/2"	9.0 mm	1/16"	1.65 mm	1/16"	0.75 mm	TCEF811T	



Post-column reaction fitting
(TCEF411)

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
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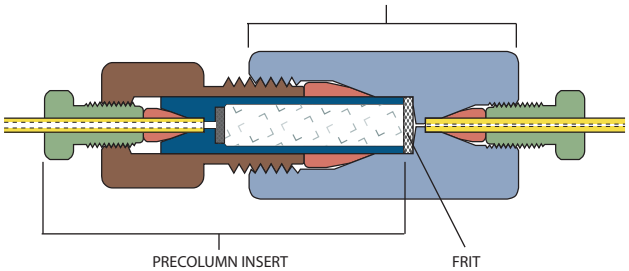
Precolumns (guard columns)

Precolumns are available in 2 cm and 5 cm lengths, and can be filled with either 5µ packing or 37 - 44µ pellicular packing. Both lengths are used in conjunction with a column end fitting. When packed for high efficiency they can be used as analytical columns, but a more typical use is as a guard column installed between the injector and the analytical column. Standard material is Type 316 stainless.

Description	*Prod No*	*Price*
1/4" x 2 cm precolumn system	PCS412F	
Includes:		
One precolumn insert		
One internal column end fitting		
One 2µ frit		
1/4" x 5 cm precolumn system	PCS415F	
Includes:		
One precolumn insert		
One external column end fitting		
One 2µ frit		
Precolumns (for use with existing column end fittings)		
1/4" x 2 cm precolumn insert	PCL412	
1/4" x 5 cm precolumn insert	PCL415	



1/4" x 2 cm precolumn system
(PCS412F)

Fingertight HPLC cartridge precolumns

This cartridge-based system is designed for use as a precolumn or concentrator column in HPLC and FIA applications. It is particularly suited to applications requiring frequent changes: snap-on seals are replaceable, the cartridge is reusable, and the tubing connections are stable since the end fittings do not rotate as the assembly is tightened. Standard material is Type 316 stainless, with PEEK seals and 2µ titanium frits.

Description	*Prod No*	*Price*
0.25 ml (4.0 mm ID x 2 cm)		
Fin gertight cartridge assembly	SFECH412	
Replaceable cartridge	SFEC42	

NOTE:
As a courtesy to our OEM customers, VICI does not supply pre-packed columns.

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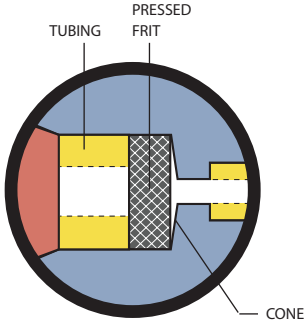
Filters

There are many flow elements of analytical instruments which require protection from foreign particles, such as orifices that may become plugged or surfaces that may get scratched. However, conventional filtering devices may have too large a volume to be consistent with good system performance – particularly in chromatographic applications.

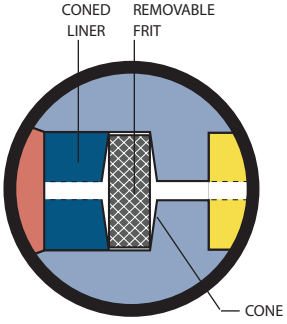
Valco's unique patented* filter design results in extremely low internal volume and simplifies filter element replacement. Filter bodies are "coned" for uniform flow and maximum filter surface area. The filters are made entirely of metal, so they can be used at any instrumentation temperature. While the standard metal is 316 series stainless, filters can be made from alloys that can be used in virtually any application.

We offer a choice of three different filtering elements. All styles are available in bulkhead configurations for mounting on a panel or instrument wall. (Please note that since frits and screens have significantly different thicknesses, they cannot be used interchangeably in the same filter body.)

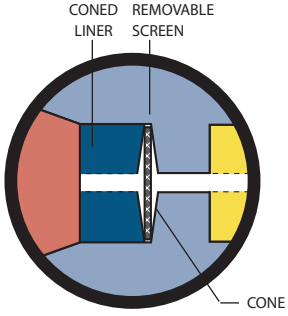
- **Pressed frits**, permanently installed in the filter, are recommended where contaminants are the exception and not the rule. The frits are 2µ stainless.
- **Removable frits** are the best choice for maximum filtration, or if the application requires Hastelloy C or titanium. However, they allow more mixing and tend to clog more than screens. A 2µ frit is included with the filter, but 0.5, 2, and 10µ replacement frits are available in three materials.
- **Removable screens** plug less rapidly and provide lower pressure drop than frits. Since they are thinner, there is less mixing and dispersal than might occur with a frit, but frits provide better filtration. A 2µ screen is included with the filter, and 2 and 10µ stainless replacement screens may be ordered.



Pressed frit



Removable frit



Removable screen

* Patent Numbers 4,281,679 and 4,173,363

MORE INFORMATION

Biocompatible filter . p 78
In-line filters for 1/4-28 fittings 78
Mobile phase filters. 79

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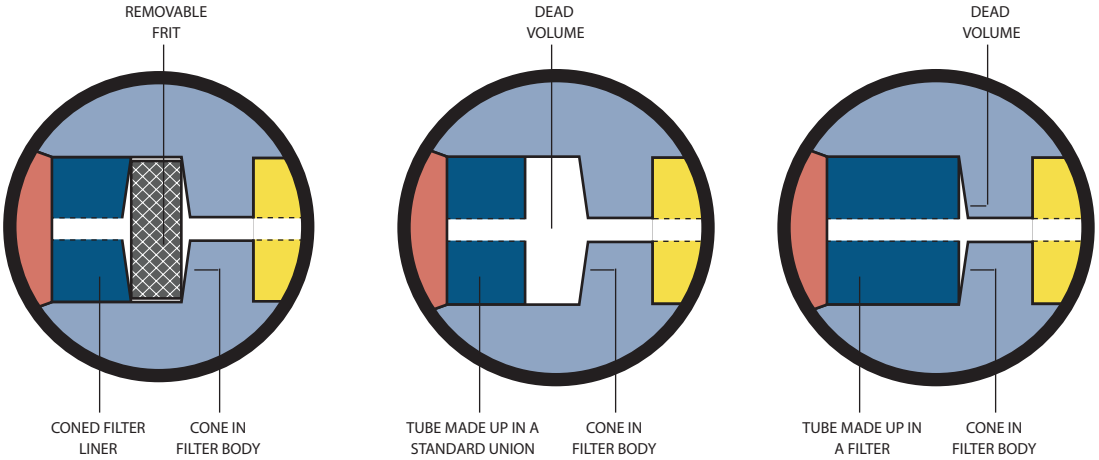
Filters with removable frits are designed to compensate for the thickness of the filter element – the resulting pilot depths are identical with the rest of the Valco product line, facilitating interchangeability of *made up* fittings. Therefore, although our filters look very much like our unions, they are not interchangeable with unions; a filter with its frit removed should not be substituted for a union, because the space designed for the frit introduces dead volume into the system. In addition, since filter bodies are coned, they will have dead volume when used as a union even if the tubing is made up in the filter with a longer, non-standard pilot length.

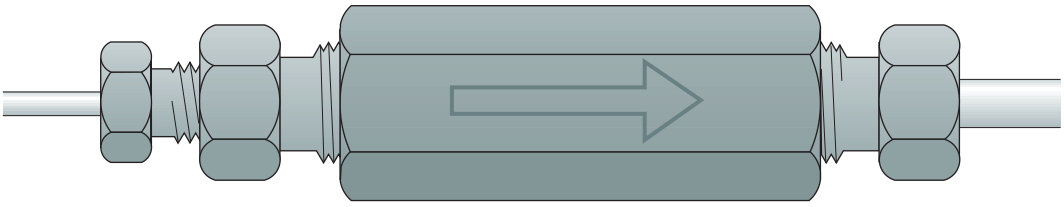
An arrow imprinted on all filter bodies serves to differentiate them from unions and to indicate recommended flow direction.



Filter with removable frit
Coned for uniform flow and maximum filter surface

Filter with frit removed being used as a reducing union
Dead volume is created where frit should be

Filter with frit removed being used as a reducing union
Cone in filter body creates dead volume



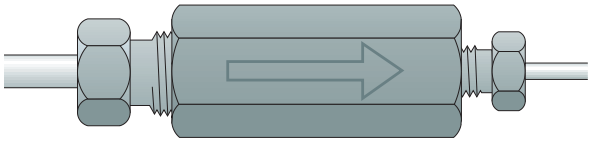
Arrow imprinted on filter body showing recommended direction of flow

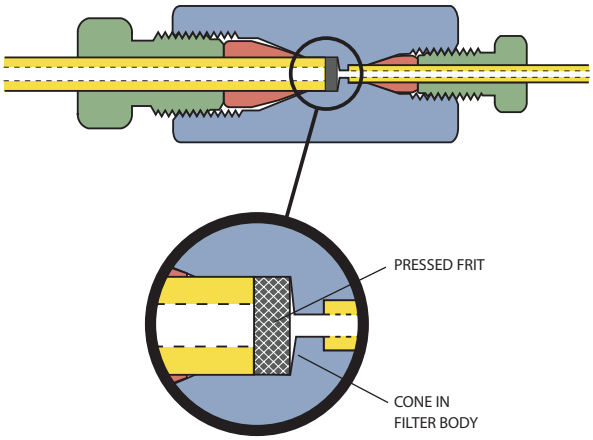
Filters

Filters with a pressed frit

Pressed frit filters contain a permanently installed stainless steel 2µ frit, and are recommended for applications where contaminants are the exception and not the rule – that is, when the sample is generally clean but you wish to guard against the stray burr from a carelessly prepared tube end that might find its way into the flowpath. Standard material is Type 316 stainless.

		Standard		Bulkhead	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/16" to 1/32"	0.25 mm	ZRUF1.5		ZBRUF1.5	
1/16" to 1/16"	0.75 mm	ZUF1		ZBUF1	
1/8" to 1/16"	0.75 mm	ZRUF21		ZBRUF21	
1/8" to 1/8"	0.75 mm	ZUF2		ZBUF2	
1/4" to 1/8"	2.00 mm	ZRUF42		ZBRUF42	
1/4" to 1/4"	4.60 mm	ZUF4		ZBUF4	





Reducing filter with a pressed frit
1/8" to 1/16"
(ZRUF21)

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
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1/4" = 6.4 mm
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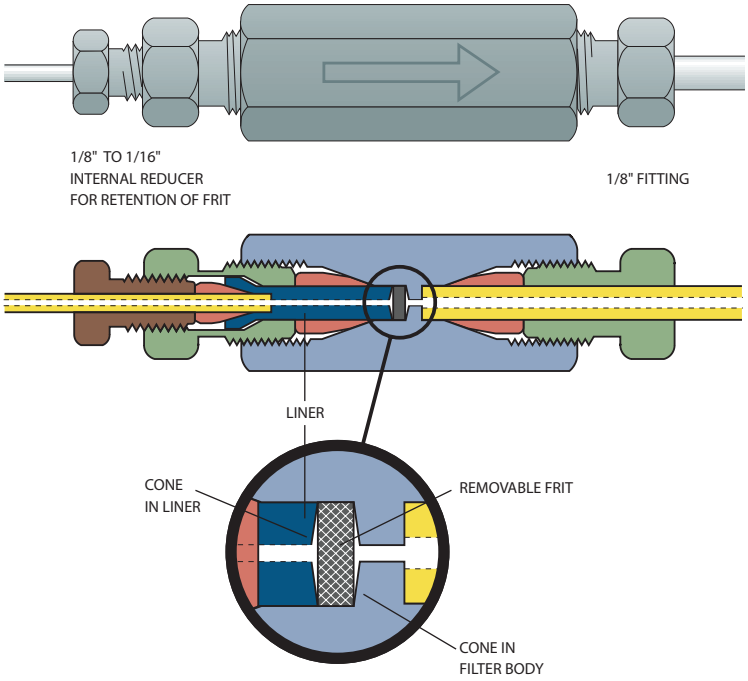
Filters with a removable frit

These filters come with a removable 2µ frit. The standard frit can be replaced with any frit of the proper diameter, *but not by a screen*. These filters are suitable for streams with frequent contamination, since the filtering element is easily changed. Standard material is Type 316 series stainless.

Patent Numbers 4,281,679 and 4,173,363

		Standard		Bulkhead	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/32" to 1/32"	0.25 mm	ZUFR.5F		ZBUFR.5F	
1/16" to 1/32"	0.25 mm	ZRUFR1.5F		ZBRUFR1.5F	
1/16" to 1/16"	0.25 mm	ZUFR1CF		ZBUFR1CF	
	0.50 mm	ZUFR1F		ZBUFR1F	
1/8" to 1/16"	0.75 mm	ZRUFR21F		ZBRUFR21F	
1/8" to 1/8"	2.00 mm	ZUFR2F		ZBUFR2F	
1/4" to 1/16"	1.00 mm	ZRUFR41F		ZBRUFR41F	
1/4" to 1/8"	2.00 mm	ZRUFR42F		ZBRUFR42F	



Reducing filter with a removable frit
1/8" to 1/16"
(ZRUFR21F)

TECH TIP
Should you use a filter with a frit or one with a screen?

Screens have much higher flow capacity (Cv), but frits are the best choice for maximum filtration or if your application requires Hastelloy C or titanium. However, since they are thicker than screens, frits allow more mixing, and the downside of their superior filtration is that they clog more often than screens.

Note! The difference in thickness also means that frits and screens cannot be used interchangeably in the same fitting body:

A frit must always be replaced with a frit.

A screen must always be replaced with a screen.

Replacement frits ..... page 53

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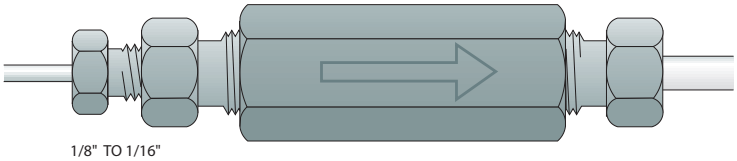
Filters

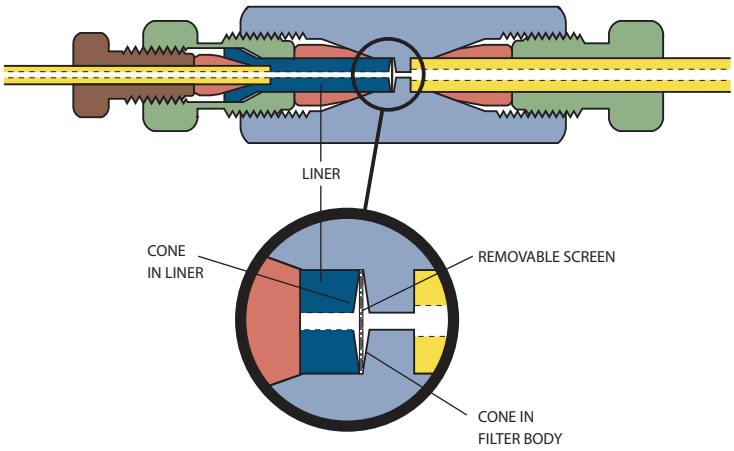
ilters with a removable screen

Fhese filters come with a removable 2µ screen. The standard screen can be replaced with any screen of the proper diameter, *but not by a frit*. These filters are suitable for streams with frequent contamination, since the filtering element is easily changed. Standard material is Type 316 series stainless.

Patent Numbers 4,281,679 and 4,173,363

		Standard		Bulkhead	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/32" to 1/32"	0.25 mm	ZUFR.5		ZBUFR.5	
1/16" to 1/32"	0.25 mm	ZRUFR1.5		ZBRUFR1.5	
1/16" to 1/16"	0.25 mm	ZUFR1C		ZBUFR1C	
	0.50 mm	ZUFR1		ZBUFR1	
1/8" to 1/16"	0.75 mm	ZRUFR21		ZBRUFR21	
1/8" to 1/8"	2.00 mm	ZUFR2		ZBUFR2	
1/4" to 1/16"	1.00 mm	ZRUFR41		ZBRUFR41	
1/4" to 1/8"	2.00 mm	ZRUFR42		ZBRUFR42	





Reducing filter with a removable screen
1/8" to 1/16"
(ZRUFR21)

TECH TIP
Should you use a filter with a frit or one with a screen?

Screens have much higher flow capacity (Cv), but frits are the best choice for maximum filtration or if your application requires Hastelloy C or titanium. However, since they are thicker than screens, frits allow more mixing, and the downside of their superior filtration is that they clog more often than screens.

Note! The difference in thickness also means that frits and screens cannot be used interchangeably in the same fitting body:

A frit must always be replaced with a frit.

A screen must always be replaced with a screen.

Replacement screens..... page 53

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

5/16" = .312" = 7.9 mm
3/8" = .375" = 9.5 mm
7/16" = .437" = 11.1 mm

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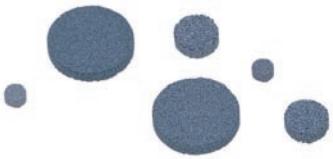
Replacement frits

Other sizes may be available or special ordered in OEM quantities.
Note: If a filter was ordered with a removable frit, the frit ***cannot*** be replaced with a screen.



Package of 10:	Pore Size	Frit Thickness	Stainless Steel Prod No	Stainless Steel Price	Hastelloy C Prod No	Hastelloy C Price	Titanium Prod No	Titanium Price
1/16" frits	0.5µ	0.75 mm	.5FR1-10		.5FR1HC-10		–	
	2µ	0.75 mm	2FR1-10		2FR1HC-10		2FR1TI-10	
	10µ	0.75 mm	10FR1-10		–		–	
1/8" frits	0.5µ	1.00 mm	.5FR2-10		.5FR2HC-10		–	
	1µ	1.00 mm	1FR2-10		1FR2HC-10		–	
	2µ	1.00 mm	2FR2-10		2FR2HC-10		2FR2TI-10	
	10µ	1.00 mm	10FR2-10		–		–	
1/4" frits	0.5µ	1.00 mm	.5FR4-10		–		–	
	2µ	1.00 mm	2FR4-10		2FR4HC-10		2FR4TI-10	
	10µ	1.00 mm	10FR4-10		10FR4HC-10		–	

WHICH FRIT FITS MY FILTER?

1/16" frit fits:
ZUFR.5F
ZBUFR.5F

ZRUFR1.5F
ZBRUFR1.5F

1/8" frit fits:
ZUFR1CF
ZBUFR1CF

ZUFR1F
ZBUFR1F

ZRUFR21F
ZBRUFR21F

1/4" frit fits:
ZUFR2F
ZBUFR2F

ZRUFR41F
ZBRUFR41F

ZRUFR42F
ZBRUFR42F

Replacement screens

Other sizes may be available or special ordered in OEM quantities.
Note: If a filter was ordered with a removable screen, the screen ***cannot*** be replaced with a frit.

Package of 10:	Pore Size	Screen Thickness	Stainless Steel Prod No	Stainless Steel Price
1/32" screens	0.5µ	0.040 mm	.5SR.5-10	
	1µ	0.050 mm	1SR.5-10	
	2µ	0.075 mm	2SR.5-10	
	10µ	0.125 mm	10SR.5-10	
1/16" screens	0.5µ	0.040 mm	.5SR1-10	
	1µ	0.050 mm	1SR1-10	
	2µ	0.075 mm	2SR1-10	
	10µ	0.125 mm	10SR1-10	
1/8" screens	0.5µ	0.040 mm	.5SR2-10	
	1µ	0.050 mm	1SR2-10	
	2µ	0.075 mm	2SR2-10	
	10µ	0.125 mm	10SR2-10	
1/4" screens	0.5µ	0.040 mm	.5SR4-10	
	1µ	0.050 mm	1SR4-10	
	2µ	0.075 mm	2SR4-10	
	10µ	0.125 mm	10SR4-10	

WHICH SCREEN FITS MY FILTER?

1/16" screen fits:
ZUFR.5
ZBUFR.5

ZRUFR1.5
ZBRUFR1.5

1/8" screen fits:
ZUFR1C
ZBUFR1C

ZUFR1
ZBUFR1

ZRUFR21
ZBRUFR21

1/4" screen fits:
ZUFR2
ZBUFR2

ZRUFR41
ZBRUFR41

ZRUFR42
ZBRUFR42

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Tools

Custom socket wrench

This 1/4" socket wrench with a slot to slip over 1/16" tubing works great for all types of 1/4" hex nuts (such as Valco 1/16" ZDV fitting nuts). It's especially useful when nuts are difficult to access with an open end wrench.

Prod No	*Price*
SWH4	

Ferrule removal kit

When polymeric ferrules get stuck in a fitting detail, these little ferrule spears will save you from becoming so irritated that you tear up your entire lab in frustration. Each kit includes two sizes of tapered stabbers for retrieving capillary size ferrules.

Prod No	*Price*
FRK1	

Hex key set

The hex key set has a wrench to fit any socket head screw on any VICI valve or actuator. Includes the following sizes: .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", and 5/32".

Prod No	*Price*
HKS	

TECH TIP
If a fused silica tube breaks off in a through-type union, remove the nuts and the tube opposite the broken one. Clear the fitting by passing a drill or wire of the appropriate diameter into the unbroken side and through the center of the fitting.

Our ferrule removal kit can be used to remove ferrules from tee and cross fittings.

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Open end wrenches

Size	*For use with*	*Prod No*	*Price*
3/16" x 1/4"	1/32" and 1/16" nuts	OEW	
3/8" x 7/16"	1/8" nuts	OEW-2	
1/2" x 9/16"	1/4" nuts	OEW-3	

Pin vise and drill index

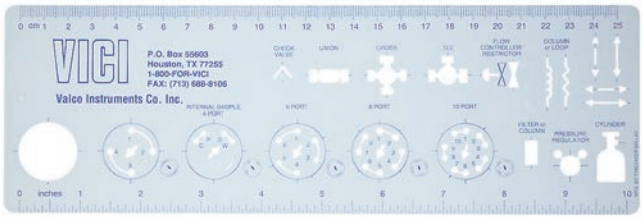
The drill index has drills sized from 0.0135" to 0.039" (0.34 to 1 mm). These are useful tools when a fused silica tube breaks in a union (see Tech Tip on the facing page) and for enlarging the inner diameter of fused silica adapters.

Prod No	*Price*
PV	

Template

This tool is just what you need when you're working out plumbing and valve switching schematics. It features templates for two position valves with 4, 6, 8, and 10 ports with indications of both positions, as well as various flow symbols. For added convenience, the sides are edged with metric and inch rulers.

Prod No	*Price*
TEMPLATE1	



MORE INFORMATION

Tools for valves
Pencil magnet . . . . p 210
Valve spanner handle. 211
Tightening tools for PEEK fittings. 67
Tubing accessories 90

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Cheminert® Fittings and Accessories

Cheminert fittings are ideally suited for applications requiring an inert, biocompatible, metal-free flowpath. Wetted materials are PFA, FEP, CTFE, or PEEK, and uniform flow passages minimize mixing. All connections have zero dead volume.

MORE INFORMATION

High pressure Cheminert fittings.....pp 63-67
Low pressure Cheminert fittings 68-81
Nanovolume fittings 57-62
Valco fittings 6-55

TECH TIP

For optimal zero dead volume connections, make sure your tubing meets the best industry standards. OD tolerance should be nominal dimension ± .002".

Fractional dimension	Nominal dimension
1/32"	.031
1/16"	.062
1/8"	.125
1/4"	.250
3/8"	.375
1/2"	.500

10,000 psi = 689.5 bar
20,000 psi = 1,378.9 bar

50 µm = .002"
100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
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1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

High Pressure Fittings

Cheminert high pressure fittings are rated at 5000 psi with fingertight nuts, well beyond the burst strength of most PEEK tubing. These fittings are machined from high quality inert polymers to the same exacting tolerances as our popular Valco zero dead volume fittings, and the taper angle and detail design conform to the industry standard established by the Valco line.

High Pressure Nanovolume® Fittings

Nanovolume generally refers to components with bore sizes of 100-150 µm (.004" - .006"). The minimal transfer volume contributed by nanovolume components makes them especially beneficial in applications with flow rates in the µl/min range, when the transfer volume can be critical.

NEW 360 Micron Nanovolume Fittings

Our newest high pressure fittings permit direct connection of 360 micron OD fused silica, PEEK, stainless, or electroformed nickel tubing without the use of liners. The ferrule snaps into the nut so that the fitting is "one-piece", but the ferrule remains free to rotate as the nut is tightened so that the tube doesn't twist. Because of the compact size and fine 2-56 threads, a leak-free connection that seals at pressures in excess of 20,000 psi can be easily formed with the available manual tool.

1/32" Nanovolume Fittings

1/32" Cheminert nanovolume fittings, with 100 µm or 150 µm bore, are ideal for high resolution capillary chromatography. Rated at 5,000 psi with fingertight nuts, they will remain leak-tight well beyond the burst strength of most PEEK tubing. These fittings are machined from high quality inert polymers to the same exacting tolerances as our popular Valco zero dead volume fittings, and the taper angle and detail design conform to the industry standard established by the Valco line.

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360 µm Nanovolume Fittings *NEW*

- For direct connection of 360 µm tubing
- Work with metal, fused silica, or PEEK
- Up to 20,000 psi with metal tubing
- Snap-in rotating ferrule for "one-piece" fitting with no tubing twist
- Eliminate use of troublesome liners

Our new high pressure fittings permit direct connection of 360 micron OD fused silica, PEEK, stainless, or electroformed nickel tubing without the use of liners. The ferrule snaps into the nut so that the fitting is "one-piece", but the ferrule remains free to rotate as the nut is tightened so that the tube doesn't twist. Because of the compact size and fine 2-56 threads, a leak-free connection that seals at pressures in excess of 20,000 psi can be easily formed with the available manual tool.

360 µm fittings are dedicated for use with either fused silica, metal, or PEEK tubing; components cannot be mixed or used with a different tubing material.

Tees and crosses offer a choice of three bore sizes, and feature a "quick-mount" base with adhesive backing to make sure that the fitting is stable and fragile tubing doesn't get broken. There is also a quick-mount PEEK union.

MORE INFORMATION
Nanovolume fittings
For fused silica tubing, 10,000+ psi . . . . . pg 58
For metal tubing, up to 20,000 psi. . . . 58

1/32" Nanovolume fittings 59-60
Injectors with 360 micron fittings. . 152

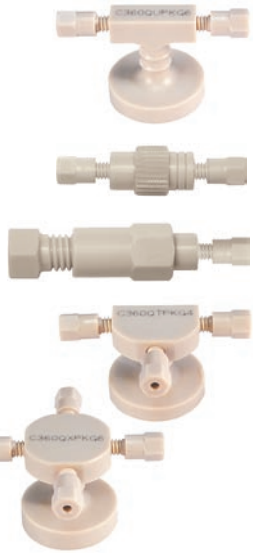
For PEEK or fused silica tubing — up to 10,000 psi

These fittings are constructed from premium grade natural PEEK material. They are intended for use with PEEK or fused silica tubing at pressures up to 10,000 psi, or the maximum pressure for which the tubing is rated, whichever is lower. Quick-mount versions have integral base with double stick tape to secure fittings to a surface.

Nut/ferrules, caps, plugs, tightening tool *for 360 µm tubing*

	Prod No	*Price*
Nut/ferrule	C360NFPKG	
Cap	C360CPKG	
Plug	C360PPK	
Tightening tool	C360ET	

Unions and reducing unions *for 360 µm tubing*



Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Union, quick mount	C360QUPKG2		C360QUPKG4	$65	C360QUPKG6	
Union	C360UPKG2		C360UPKG4	48	C360UPKG6	
Reducing union, 1/16" to 360 µm	—		—		C360RU1PK6	

Tees and crosses *for 360 µm tubing*

Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Tee, quick mount	C360QTPKG2		C360QTPKG4	$82	C360QTPKG6	
Cross, quick mount	C360QXPKG2		C360QXPKG4	100	C360QXPKG6	

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NEW 360 µm Nanovolume Fittings

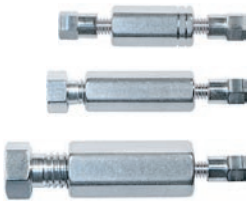
For fused silica tubing — 10,000 psi and above

These fittings are constructed from HPLC grade stainless steel, with stainless steel nut and a special ferrule which is precision machined from electroformed nickel. For optimal sealing characteristics, the ferrule is gold plated.

Nut/ferrules and caps — *for 360 µm FS tubing*

	Prod No	*Price*
Nut/ferrule	C360NFFS	
Cap	C360CFS	

Unions and reducing unions — *for 360 µm FS tubing*



Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Union	C360UFS2		C360UFS4		C360UFS6	
Reducing unions, 1/32" to 360 µm	C360RU.5FS2		C360RU.5FS4		C360RU.5FS6	
Reducing unions, 1/16" to 360 µm	—		—		C360RU1FS6	

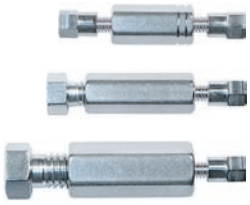
For metal tubing — up to 20,000 psi

Our highest pressure Nanovolume fittings are constructed of HPLC grade stainless steel, including stainless steel nut and ferrule. These fittings are optimized for use with stainless or electroformed nickel tubing.

Nut/ferrules and caps — *for 360 µm tubing*

	Prod No	*Price*
Nut/ferrule	C360NFS6	
Cap	C360C	

Unions and reducing unions — *for 360 µm tubing*



Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Union	C360US62		C360US64		C360US66	
Reducing unions, 1/32" to 360 µm	C360RU.5S62		C360RU.5S64		C360RU.5S66	
Reducing unions, 1/16" to 360 µm	—		—		C360RU1S66	

MORE INFORMATION

360 µm fittings for use below 10,000 psi. 57
360 µm tubing
Electroformed nickel. 87
PEEK 88
1/32" Nanovolume fittings 59-60

TECH TIP

Use these **metal 360 micron nuts** with nano injectors:

C72MU . . . . . p 152
C72MX 152

NEW INTERNAL REDUCERS FOR 360 µm TUBING

Directly connect 360 µm tubing into a 1/32" Valco valve or fitting detail, providing a positive leak-free seal with zero dead volume.
The same patented design as our larger internal reducers (page 34).
Both versions have a stainless steel body.

Tubing OD	*Nut/ferrule material*	*Prod No*	*Price*
1/32" to 360 µm	Stainless	C360IZR.5S6	$34
	PEEK	C360IZR.5S6PK	34

50 µm = .002"
100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
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1/4" = 6.4 mm
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Nanovolume Fittings for 1/32" Tubing

Designed for high resolution capillary HPLC, Cheminert nanovolume connectors include our one-piece 1/32" fingertight fittings, with a patented collapsible ferrule that makes fingertight nanovolume connections a snap. These fittings work with a variety of tubing, including PEEK, fused silica, and 1/32" electroformed nickel. Liners adapt the fittings for use with fused silica.

To avoid potential confusion, all fittings utilizing the Cheminert collapsible ferrule are made of black PEEK; fittings with a standard Valco ZDV fitting detail are natural PEEK.

Nuts and ferrules *for 1/32" tubing*

Valves and fittings are supplied with the appropriate quantity of nuts and ferrules. However, if additional fittings are required, they may be ordered separately. The two internal nuts include collapsible ferrules as an integral part of the fitting; the external nut must be used with the separate ferrule listed below.

	Prod No	*Price each:*
Internal nut with collapsible ferrule *For use with:* *Fittings on pages 60-62* *6 port valve CN2-4346, page 154* *4 port internal sampling injector CN4-4344, page 155*	C-NNFFPK	
Internal nut with collapsible ferrule *For use with:* *10 port nanovolume valve CN2-4340*, page 154	C-NNFLFPK	
External nut *For use with:* *Unions on page 61* *Column end fittings on page 62* Note: Requires collapsible PEEK ferrule, below	C-EN.5FPKB	
Collapsible PEEK ferrule *For use with:* *External nut, above*	ZGF.5PK	

Plugs *for 1/32" tubing*

	Prod No	*Price each:*
Internal plug *For use with:* *Fittings on page 60* *Nanovolume valves on pages 154-155*	C-NPFPK	

MORE INFORMATION

360 µm fittings . .pp 57-58
1/32" Nanovolume
column end fittings . . 62
Tubing
PEEK 88-89
Electroformed
nickel. 87

TECH TIP

Use these **collapsible ferrule-nuts** with:
1/32" Nanovolume
fittings . . . . . .pp 60-62
and with injectors:
CN2 154
CN4 155

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Nanovolume Unions, Tees, Y's, and Crosses for 1/32" Tubing

Unions *for 1/32" tubing*

	100 µm bore Prod No	Price	150 µm bore Prod No	Price
Union for 1/32" PEEK or electroformed nickel tubing Does not require or include liners.	C-NEU.5XFPK	$43	C-NEU.5FPK	

Reducing unions *for 1/32" tubing*

	200 µm bore Prod No
Reducing union, 1/32" to 1/16" tubing, natural PEEK	ZERU1.5FPK

Tees, y's, and crosses *for 1/32" tubing or FS* tubing*

		100 µm bore Prod No	Price	150 µm bore Prod No	Price
Tee	1/32" tubing or fused silica*	C-NTXFPK	$105	C-NTFPK	
Y	1/32" tubing or fused silica*	C-NYXFPK	105	C-NYFPK	
Cross	1/32" tubing or fused silica*	C-NXXFPK	120	C-NXFPK	

*A liner is needed for use with fused silica. Order 27 mm length, page 61.

Fill ports *for 1/32" nanovolume® valves*

These fill ports provide direct syringe connections to Model CN2 nanovolume valves. For use with 26 gauge blunt tip needle.

	Prod No
Fill port for 1/32" CN2 series HPLC injectors	C-NVISF

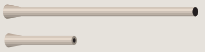
1/32" Nanovolume frits

These frits are the answer to filtration of 1/32" nanovolume fitting connections. A mere .25 mm (0.010") thin and 1/32" in diameter, they can be placed in any 1/32" fitting detail and add minimal volume. Price is for a package of 5 frits.

Pkg/5:	*Pore size*	*Prod No*
	0.2 micron	.2FR.5-5
	0.5 micron	.5FR.5-5

MORE INFORMATION
Unions for fused silica
. . . p. 18, 19, 57-58, 61

TECH TIP
Liners adapt nanovolume fittings for use with fused silica tubing. They are included with nanovolume **unions** for fused silica, but must be ordered separately for other fittings.



Liners . . . . . page 61

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
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10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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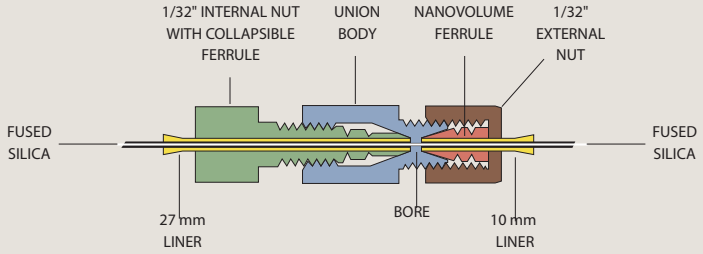
Nanovolume Unions and Liners for FS Tubing

Unions *for fused silica tubing*

	FS tubing OD	100 µm bore Prod No	150 µm bore Prod No
Union for fused silica tubing Includes liners.	125 -175 µm	C-NEU.5XFPK.15	C-NEU.5FPK.15
	175 -225 µm	C-NEU.5XFPK.20	C-NEU.5FPK.20
	225 -275 µm	C-NEU.5XFPK.25	C-NEU.5FPK.25
	275 -325 µm	C-NEU.5XFPK.30	C-NEU.5FPK.30
	325 -375 µm	C-NEU.5XFPK.35	C-NEU.5FPK.35



Union for use with fused silica
liners included
(C-NEU.5FPK.35)

Liners for 1/32" connectors *for use with fused silica tubing*

Use these liners with nanovolume connectors to adapt to the most common sizes of fused silica tubing. Natural PEEK.

The 27 mm liners are for internal nuts with collapsible ferrules. 10 mm liners are for use with external nuts. Sold in packages of 5.

27 mm liners
Use with internal nuts C-NNFFPK or C-NNFLFPK

For tubing OD	Prod No
125 - 175 µm	C-NL.15L-5
175 - 225 µm	C-NL.20L-5
225 - 275 µm	C-NL.25L-5
275 - 325 µm	C-NL.30L-5
325 - 375 µm	C-NL.35L-5

10 mm liners
Use with external nut C-EN.5FPKB

For tubing OD	Prod No
125 - 175 µm	C-NL.15S-5
175 - 225 µm	C-NL.20S-5
225 - 275 µm	C-NL.25S-5
275 - 325 µm	C-NL.30S-5
325 - 375 µm	C-NL.35S-5

MORE INFORMATION

360 µm fittings . .pp 57-58
1/32" nanovolume
Fittings 59-60
External nuts 59
Internal nuts with
collapsible ferrules . 59
Liners for column end
fittings 62

TECH TIP
Use **27 mm liners**

with internal nuts with collapsible ferrules:

Use **10 mm liners**

with external nuts:

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Nanovolume Column End Fittings for FS Capillaries

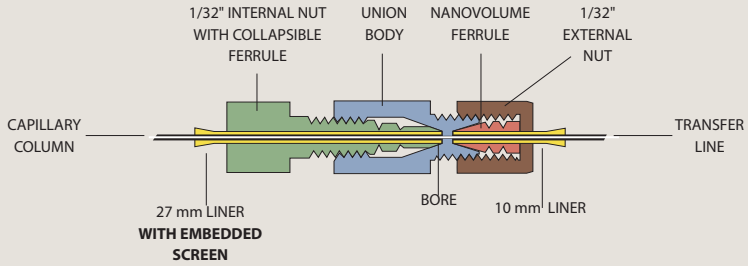
Nanovolume column end fittings include two liners to adapt the 1/32" fitting to fused silica. The 27 mm liner, used inside the internal nut, has a 1 µm 316 stainless steel screen embedded in the PEEK to provide closure for fused silica columns. The 10 mm liner is used with the external nut.

Like other nanovolume fittings, they include our one-piece 1/32" fingertight fittings, with a patented* collapsible ferrule. To avoid potential confusion, all fittings utilizing the Cheminert collapsible ferrule are made of black PEEK. The liners are natural PEEK.

Screen embedded in end of liner for column end fittings

Column end fittings *for 1/32" tubing*

Each:	*For tubing OD*	**100 µm bore** *Prod No*	**150 µm bore** *Prod No*
Column end fitting	125 - 175 µm	C-NEF.5XFPK.15S1	C-NEF.5FPK.15S1
for fused silica tubing	175 - 225 µm	C-NEF.5XFPK.20S1	C-NEF.5FPK.20S1
Includes liners	225 - 275 µm	C-NEF.5XFPK.25S1	C-NEF.5FPK.25S1
	275 - 325 µm	C-NEF.5XFPK.30S1	C-NEF.5FPK.30S1
	325 - 375 µm	C-NEF.5XFPK.35S1	C-NEF.5FPK.35S1



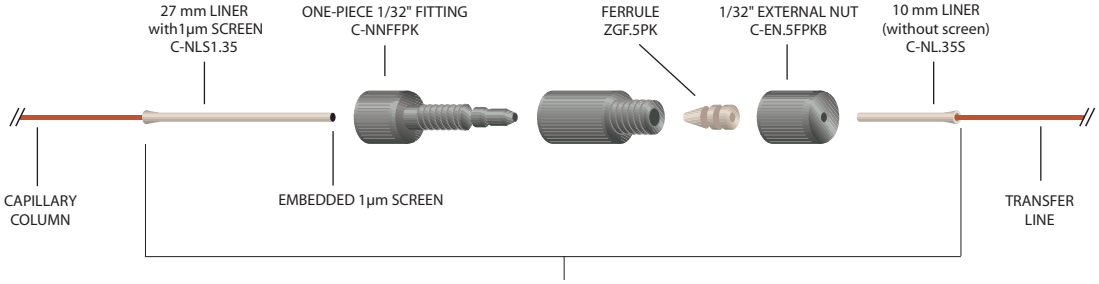
Cross-section
Column end fitting (C-NEF.5FPK.35S1)

Replacement liners for column end fittings *for FS capillaries*

Use these liners with nanovolume column end fittings to adapt to the most common sizes of fused silica tubing. Natural PEEK, with embedded screen to provide full closure for fused silica capillaries.
Sold individually.

27 mm liners for column end fittings

For tubing OD	*Prod No*
125 - 175 µm	C-NL S1.15
175 - 225 µm	C-NLS1.20
225 - 275 µm	C-NLS1.25
275 - 325 µm	C-NLS1.30
325 - 375 µm	C-NLS1.35



Column end fitting for 360 µm fused silica columns
(C-NEF.5FPK.35S1)

*U.S. patent no. 6,575,501.

MORE INFORMATION
Liners for 1/32" fittings . . page 61

TECH TIP
Liners with embedded screens are also available for 1/16" PEEK tubing. Consult the factory for sizes and product numbers.

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No twist one-piece fittings

10-32 for 1/16" tubing

These new fittings offer the convenience of a one-piece fitting while solving a problem inherent to such designs. In other one-piece designs, the ferrule rotates against the fitting detail, creating particulates. The no twist design has a separate ferrule that snaps into the nut, so it's attached but still free to avoid rotation during tightening.

Since the ferrule is not machined onto the nut, it can be made from a different material. PEEK nut with PEEK ferrule, or PEEK nut with CTFE ferrule – the possibilities are endless.

Package of 5:	**Glass-filled PEEK ferrule**	**PEEK ferrule**	**CTFE ferrule**
Nut type Length	*Prod No*	*Prod No*	*Prod No*
PEEK, hex short	ZNF1PKG-5	ZNF1PK-5	ZNF1KF-5
PEEK, hex medium	MZNF1PKG-5	MZNF1PK-5	MZNF1KF-5
PEEK, hex long	LZNF1PKG-5	LZNF1PK-5	LZNF1KF-5
PEEK, fingertight	ZNF1FPKG-5	ZNF1FPK-5	ZNF1FKF-5

Optional ferrule materials available – FEP, PFA, PTFE, and glass-filled PTFE. Call for availability.
Some 1/32" versions are available. Call for details.

Patent No. 7,316,777

Internal nuts – high pressure PEEK

PEEK nuts are used in Cheminert polymeric valves with zero dead volume fittings. They can also be used as alternatives to standard stainless steel Valco nuts when polymeric ferrules are used (up to approximately 175°C). Fingertight nuts have a knurled surface designed to provide sufficient sealing force on the ferrule without wrenches. Hex style nuts allow wrench tightening; however, since they are polymeric, they can break and are recommended for use only when space is limited and fingers won't fit.

Caution: PEEK nuts are intended for use only with polymeric ferrules, which seal with lower force than their stainless steel counterparts. Overtightening can result in breakage.

Package of 10:	*Prod no*	*Length*
1/32" fingertight	ZN.5FPK-10	.42"
1/32" fingertight	LZN.5FPK-10	.54"
1/16" fingertight	ZN1FPK-10	.88"
1/16" hex	ZN1PK-10	.45"
1/16" hex	MZN1PK-10	.62"
1/16" hex	LZN1PK-10	.87"
1/8" hex	ZN2PK-10	.62"

Ferrules – high pressure PEEK

PEEK ferrules seal by the increased friction from compression.

Package of 10:	*Prod No*	*Pkg of 10:*
1/32"	ZF.5PK-10	1/4"
1/16"	ZF1PK-10	3/8"
1/8"	ZF2PK-10	1/2"

Ferrules – grooved PEEK

These patented ferrules* feature a grooved design that permits the ferrule to grip the tube in multiple places. They work great on tubing that is softer than the ferrule material. For example, PEEK grooved ferrules work well on PTFE or FEP tubing. They are not generally recommended if the tubing is the same material as the ferrule.

Package of 10:		*Prod No*
	1/32"	ZGF.5PK-10
	1/16"	ZGF1PK-10

MORE INFORMATION

Tightening tool for hex-head PEEK nuts. . 67

POLYMERS AT A GLANCE

PEEK . . . . . PK
Chemical resistance; up to 225°C

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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High Pressure PEEK Fittings

Plugs and caps – high pressure PEEK

Polymeric plugs and caps are available in knurled finger-tight and wrench-tight hex nut designs, for use in valves or fittings. See discussion of PEEK nuts on page 63. PEEK caps include a PEEK nut and ferrule. For high pressure polymeric valve plugs, see below. For low pressure valve plugs, see page 71.

		PEEK plugs	PEEK caps
Description	*Length of nut**	*Prod No*	*Prod No*
1/32" fingertight	.42"	ZP.5FPK	ZC.5FPK
1/32" fingertight	.54"	LZP.5FPK	––
1/16" fingertight	.87"	ZP1FPK	ZC1FPK
1/16" hex	.62"	MZP1PK	ZC1PK
1/16" long hex	.87"	LZP1PK	––
1/8" hex	.62"	ZP2PK	ZC2PK

PEEK plugs for high pressure polymeric valves

These PEEK plugs are for use ***only*** in Cheminert HPLC polymeric valves (C1-C5 series) since the fitting detail in these valves is unique.

Description	*Length of nut**	*Prod No*
1/16" hex	.62"	C-MZP1PK
1/16" long hex	.87"	C-LZP1PK
1/16" fingertight	.88"	C-ZP1FPK

POLYMERS AT A GLANCE

PEEK . . . . . PK
Chemical resistance; up to 225°C

Tees and crosses – high pressure PEEK

Tees connect three lines. Crosses connect four lines. The 1/32" and 1/16" nuts are fingertight; 1/8" nuts are hex, for wrench tightening.

		PEEK tees	PEEK crosses
Tubing OD	*Bore*	*Prod No*	*Prod No*
1/32"	0.25 mm	ZT.5FPK	ZX.5FPK
	0.50 mm	ZT.5LFPK	ZX.5LFPK
1/16"	0.25 mm	ZT1CFPK	ZX1CFPK
	0.50 mm	ZT1MFPK	ZX1MFPK
	0.75 mm	ZT1FPK	ZX1FPK
	1.00 mm	ZT1LFPK	ZX1LFPK
1/8"	0.75 mm	ZT2PK	ZX2PK
	2.00 mm	ZT2LPK	ZX2LPK

TECH TIP

Ferrules for high pressure PEEK fittings are available in PEEK and PFA.

PEEK ferrules . . . . page 63
PFA ferrules 13

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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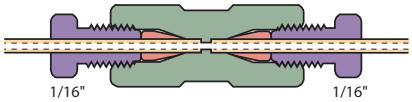
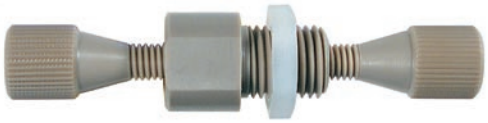
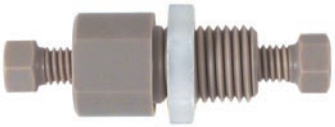


Internal union – PEEK
Standard bore version
(ZU1PK)



Bulkhead fingertight internal union – PEEK
(ZBU1FPK)

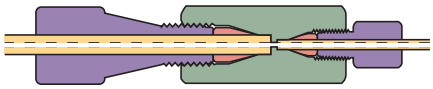


Bulkhead hex internal union – PEEK
(ZBU1PK)

Internal unions – high pressure PEEK

The 1/32" nuts are fingertight; 1/16" nuts are available in a choice of fingertight or hex; and 1/8" nuts are hex, for wrench tightening.

Tubing OD	*Bore*	**Standard** *Prod No*	**Bulkhead** *Prod No*	**Bulkhead panel hole diameter**
1/32" fingertight				
	0.25 mm	ZU.5FPK	ZBU.5FPK	5/16"
	0.50 mm	ZU.5LFPK	ZBU.5LFPK	5/16"
	1/32"	ZU.5TFPK	ZBU.5TFPK	5/16"
1/16" fingertight				
	0.25 mm	ZU1CFPK	ZBU1CFPK	3/8"
	0.50 mm	ZU1MFPK	ZBU1MFPK	3/8"
	0.75 mm	ZU1FPK	ZBU1FPK	3/8"
	1/16"	ZU1TFPK	ZBU1TFPK	3/8"
1/16" hex				
	0.25 mm	ZU1CPK	ZBU1CPK	3/8"
	0.50 mm	ZU1MPK	ZBU1MPK	3/8"
	0.75 mm	ZU1PK	ZBU1PK	3/8"
	1/16"	ZU1TPK	ZBU1TPK	3/8"
1/8" hex	0.75 mm	ZU2PK	ZBU2PK	7/16"
	2.0 mm	ZU2LPK	ZBU2LPK	7/16"
	1/8"	ZU2TPK	ZBU2TPK	7/16"



Internal reducing union – PEEK
Standard bore
(ZRU1.5FPK)

Bulkhead internal reducing union – PEEK
(ZBRU1.5FPK)

Internal reducing unions – high pressure PEEK

These unions connect two different sizes of tubing, with zero dead volume internal fittings on each end. In the bulkhead version, the bulkhead nut is on the side with smaller tubing. The 1/32" and 1/16" nuts are fingertight; 1/8" nuts are hex, for wrench tightening. A version with 1/16" and 1/8" hex nuts is also available.

Tubing OD	*Bore*	**Standard** *Prod No*	**Bulkhead** *Prod No*	**Bulkhead panel hole diameter**
1/16" to 1/32"	0.25 mm	ZRU1.5FPK	ZBRU1.5FPK	5/16"
	0.50 mm	ZRU1.5LFPK	ZBRU1.5LFPK	5/16"
	1/32"	ZRU1.5TFPK	ZBRU1.5TFPK	5/16"
1/8" to 1/32"	0.25 mm	ZRU2.5FPK	ZBRU2.5FPK	3/8"
	0.50 mm	ZRU2.5LFPK	ZBRU2.5LFPK	3/8"
	1/32"	ZRU2.5TFPK	ZBRU2.5TFPK	3/8"
1/8" to 1/16"	0.25 mm	ZRU21CFPK	ZBRU21CFPK	3/8"
	0.75 mm	ZRU21FPK	ZBRU21FPK	3/8"
	1.00 mm	ZRU21LFPK	ZBRU21LFPK	3/8"
	1/16"	ZRU21TFPK	ZBRU21TFPK	3/8"

High Pressure Specialty PEEK Fittings

One-piece fingertight fittings – color-coded PEEK

These molded fingertight fittings are rated to 5000 psi (350 bar), so they can be used in virtually any HPLC fitting detail with 10-32 threads. Six colors allow easy identification of tubing lines.

Package of 5:

Color	*Prod No*
Natural	JR-55020-5
Black	JR-55021-5
Red	JR-55022-5
Yellow	JR-55023-5
Blue	JR-55024-5
Green	JR-55025-5

One-piece PEEK fingertight fittings – narrow hex-head

This natural PEEK machined fitting has a narrow hex head and 10-32 threads.

Package of 5:

Color	*Prod No*
Natural	JR-5508-5

Color-It fingertight adapters

Use Color-It snap-on extensions to color-code our 1/4" hex-head nuts, and turn the nut into a fingertight fitting at the same time. Color-It adapters are available in six different colors, and can be used with PEEK and stainless hex-head nuts.

Package of 5:

Color	*Prod No*
Blue	JR-55010-5
Yellow	JR-55011-5
Green	JR-55012-5
Black	JR-55013-5
White	JR-55014-5
Red	JR-55015-5

Package of 12:

Color	*Prod No*
Multi-color (2 of each color)	JR-55016-12

MORE INFORMATION
Color-coded PEEK tubing . . . page 89

CAUTION
One-piece combination nuts and ferrules are not for high pressure gas service.

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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PEEK starter kit

In LC applications involving proteins, peptides, nucleic acids, or other samples of biological origin, metal systems may interact with samples or release transition metals that will deactivate columns. The PEEK starter kit facilitates replacement of stainless steel tubing, fittings, ferrules, mobile phase filters, etc., to create a biocompatible environment for samples and mobile phase.

	Prod No
PEEK starter kit	JR-35P

Includes:

- 1 Plastic box
- 10 PEEK one-piece fittings, 10-32
- 5 PEEK handtight fittings
- 5 PEEK nuts, hex-head long
- 20 PEEK ferrules, double-ended 1/16"
- 1 PEEK union, HP body only, 10-32
- 2 Tubing elbows 90°
- 2 Tubing elbows 180°
- 1 PEEK filter, in-line, incl. PAT frit 5 µm
- 1 Clean-cut tubing cutter
- 1 Last Drop PTFE filter 5 µm
- 3m PEEK tubing, 1/16" x 0.25 mm ID, blue stripe
- 3m PEEK tubing, 1/16" x 0.50 mm ID, orange stripe
- 1 Tweezers

Tightening tools for PEEK fittings

These handy tools make it fast and easy to tighten PEEK hex-head fittings. The red version is for use with the C360 series fittings shown on page 57. The green tool is for any 1/32" PEEK fitting with a 3/16" hex head nut, and the blue version fits the 1/4" hex common in fittings for 1/16" tubing.

Color	*For use with*	*Prod No*
Red	360 µm fittings	C360ET
Green	1/32" fittings	CNFT
Blue	1/16" fittings	ZNFT

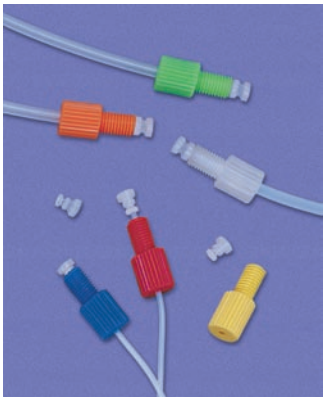
MORE INFORMATION

Hex-head PEEK fittings
360 µm..... page 57
1/32".....63-65
1/16"
High pressure...63-65
Low pressure 71

Low Pressure Flangeless Tube End Fittings

Cheminert low pressure fittings are ideally suited for flow injection analysis, low pressure liquid chromatography, and stream sampling devices. They may be safely used at pressures up to 500 psi and temperatures to 50°C. Two designs of low pressure tube end fittings are available. *Flangeless* tube end fittings utilize our new collapsible ferrule, which grips the tubing as the fitting is tightened without significantly reducing the tube ID. *Standard* tube end fittings are retained on polymeric tubing by a flange formed with a Cheminert flanging tool.

Flangeless tube end fittings *1/4-28*

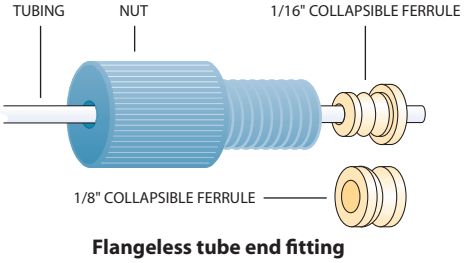


Flangeless tube end fittings eliminate the flanging tool required with standard tube end fittings. The nut turns on the tubing as freely as with our flanged fitting, eliminating the possibility of cracking or unscrewing that can occur when plastic tubing is subjected to twisting as fittings are connected.

Cheminert flangeless fittings include our patented* collapsible ferrule design. This innovative design utilizes a one-piece ferrule engineered to collapse as it is tightened. The collapse takes place in a very narrow area, resulting in a very effective seal with virtually no distortion of the tubing ID and no dead volume. The assembly is rated at 500 psi liquid when tightened by hand. Since only the tubing and the ferrule come into contact with the solution, the result is an inert system. Use CTFE ferrules for soft tubing (PTFE, FEP, etc.), but use PEEK ferrules for harder tubing (PEEK, ETFE, polyurethane, etc.)

Cheminert tube end fittings work with any 1/16" or 1/8" OD polymeric tubing, and come in twelve different colors for system color coding.

Flangeless fittings with CTFE ferrules		**1/16" OD**		**1/8" OD**	
	(pkg/5)	*Prod No*	*Price*	*Prod No*	*Price*
	Black	CFL-1BK		CFL-2BK	
	Blue	CFL-1BE		CFL-2BE	
	Brown	CFL-1BR		CFL-2BR	
	Dark gray	CFL-1DG		CFL-2DG	
	Green	CFL-1G		CFL-2G	
	Lavender/pink	CFL-1L		CFL-2L	
	Natural	CFL-1N		CFL-2N	
	Orange	CFL-1E		CFL-2E	
	Purple	CFL-1P		CFL-2P	
	Red	CFL-1R		CFL-2R	
	White	CFL-1W		CFL-2W	
	Yellow	CFL-1Y		CFL-2Y	
	Assorted *(pkg/12, one of each color)* with ferrule:				
	CTFE	CFL-1A		CFL-2A	
	PEEK	CFL-1A-PK		CFL-2A-PK	
Replacements					
PEEK ferrules	*(pkg/10)*	CFL-CB1PK		CFL-CB2PK	
CTFE ferrules	*(pkg/10)*	CFL-CB1KF		CFL-CB2KF	
PEEK nuts	*(pkg/5)*	CFL-1PK		CFL-2PK	
Setting tool		CST		CST	



Flangeless tube end fitting

Patent No. 6,575,501

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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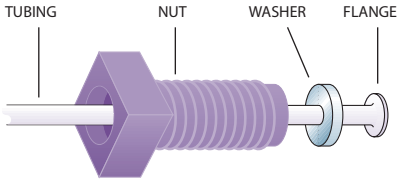
Low Pressure Standard Tube End Fittings and External Nuts

Standard flanged tube end fittings *1/4-28*

The basic component of the Cheminert system is the polypropylene nut, retained on PTFE or FEP tubing by a flange formed with a Cheminert flanging tool *(page 70)*. This is an excellent method for connecting fluorocarbon tubing, as there is no reduction of the inside diameter and no binding or twisting of the tubing when the fitting is tightened. A mating of the parts is achieved with zero dead volume, making this an ideal fitting for biological systems.

Cheminert tube end fittings come in twelve different colors for system color coding, and are available for 1/16" or 1/8" OD fluorocarbon tubing. (While in theory other polymers could be molded to form a flange, only fluorocarbons such as PTFE or FEP have low-temperature malleability and good form retention at operating temperatures.) Tube end fittings attach directly to Cheminert valves and fittings, and are easily joined to each other with a union. Tightening by hand is all that is required to make a leak-free seal at 500 psi liquid, although for long term reliability a wrench could be used to apply an additional 1/8 turn.

Packages include the same number of washers as fittings.



Flanged tube end fitting

Flanged fittings		**1/16" OD**		**1/8" OD**	
	(pkg/10)	*Prod No*	*Price*	*Prod No*	*Price*
	Black	CF-1BK		CF-2BK	
	Blue	CF-1BE		CF-2BE	
	Brown	CF-1BR		CF-2BR	
	Dark gray	CF-1DG		CF-2DG	
	Green	CF-1G		CF-2G	
	Lavender/pink	CF-1L		CF-2L	
	Natural	CF-1N		CF-2N	
	Orange	CF-1E		CF-2E	
	Purple	CF-1P		CF-2P	
	Red	CF-1R		CF-2R	
	White	CF-1W		CF-2W	
	Yellow	CF-1Y		CF-2Y	
	Assorted *(pkg/12, one of each color)*	CF-1A		CF-2A	
Washers	*(pkg/10)*	CF-W1		CF-W2	

MORE INFORMATION

High pressure fittings . . . . . .pp 63-66
PTFE and FEP tubing. 90

TECH TIP

To make up standard flanged tube end fittings, use the flanging tool on page 70.

A flanging starter kit, complete with flanging tool, flanging tips, and an array of tubing and fittings, is also available. *(See page 70.)*

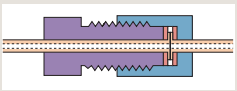
External nuts for flanged tube ends *1/4-28*

External nuts with female 1/4-28 threads are designed for use on tubing with a flanged end, just like the standard tube end fittings. Use them instead of a union or coupling to make a zero volume butt connection.

Package of 5:	**PEEK**		**CTFE**	
Tubing OD	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	CEN1PK		CEN1KF	
1/8"	CEN2PK		CEN2KF	

TECH TIP

Use our external nut tube end fittings to make true zero volume butt connections without a coupling.



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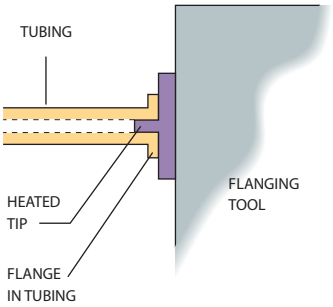
Flanging Tool, Starter Kit

Cheminert flanging tools

The flanging tool makes the flange which retains the standard 1/4-28 tube end fitting and washer on PTFE or FEP tubing. With this tool, lengths of tubing may be easily assembled to any required dimension. The time required is approximately 5 to 10 seconds per flange.

Flanging tools are available for 110 VAC or 230 VAC, and come complete with tips for 0.75 mm, 1.0 mm, and 2.00 mm ID tubing, a tubing holder for gripping the tubing during the flanging operation, a razor blade for tube cutting, and instructions.



Flange being made on tubing

		Prod No	*Price*
Flanging tools	110 VAC	CFT-110	
	230 VAC	CFT-220	
Flanging tool accessories			
Flanging tips			
	for tubing ID ≤ 0.25 mm	CFT-TXC	
	for tubing ID ≤ 0.75 mm	CFT-TC	
	for tubing ID ≤ 1.00 mm	CFT-TM	
	for tubing ID ≤ 1.50 mm	CFT-TL	
	for tubing ID ≤ 2.00 mm	CFT-TXL	
Razor blades *(pkg /10)*		CFT-R	
Tubing holder		CFT-H	

Cheminert starter kits

Starter kits come in either 1/16" or 1/8" versions, with flanging tools for 110 VAC or 230 VAC.

	110 VAC		**230 VAC**	
	Prod No	*Price*	*Prod No*	*Price*
Starter kits				
1/16" tubing	CFT1K-110		CFT1K-220	
1/8" tubing	CFT2K-110		CFT2K-220	

The starter kit includes:

- 1 flanging tool with 3 flanging tips
- 1 tubing holder
- 20 standard tube end fittings
- 20 stainless steel washers
- 10 couplings
- 20 feet of PTFE tubing
  (1/16" OD x 0.030" ID
  or
  1/8" OD x .060" ID)
- 1 male luer adapter
- 1 female luer adapter
- 1 plug
- 1 tee
- 1 glass connector

MORE INFORMATION

Standard tube end fittings ..... page 69
Stainless steel washers 69
Couplings 72
Male luer adapter..... 76
Female luer adapter ... 76
Plug..... 71
Tee 74
Glass connector 75

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Starter Kit, Low Pressure Plugs and Caps

Easy-Flange kit

The Easy-Flange flange-rolling tool uses mechanical force to form a flange on 1/16" - 1/8" OD PTFE tubing, offering an excellent non-electric alternative to the heated flanging tool.

The quality of the flange is excellent, since it is formed without stressing the tubing by heat. The specially designed negative conical profile of the flange-forming component yields an ideal shape for maximum sealing properties.

	Prod No	*Price*
Easy-Flange kit	JR-201540	

Includes:
- Plastic box
- Flanging discs with:
  - 0.5 mm SS pin for PEEK tubing
  - 0.8 mm polymer pin
  - 0.8 mm titanium pin
  - 1.3 mm polymer pin
  - 1.3 mm titanium pin
- Clean-cut tubing cutter
- PTFE tubing, 1/16" x 0.75 mm ID, 6 ft.

Plugs *1/4-28*

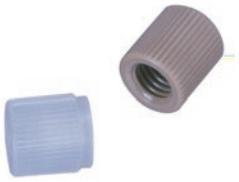
Plugs can be used to close off an unused port in a 1/4-28 valve or manifold.

	PEEK		CTFE	
Package of 5:	*Prod No*	*Price*	*Prod No*	*Price*
	CPPK		CPKF	

Low pressure PEEK plugs *10-32*

These all-PEEK plugs are for use in Cheminert PEEK fittings and low pressure polymeric valves (C20Z and C30Z series). For high pressure polymeric valves (C1-C5 series), use plugs on page 64.

		PEEK	
*Package of 1:Length of nut**		*Prod No*	*Price*
1/16" hex	.62"	MZP1PK	
1/16" long hex	.87"	LZP1PK	
1/16" fingertight	.88"	ZP1FPK	



Caps *1/4-28*

Caps are used to close off lines with 1/4-28 tube end fittings.

	PEEK		CTFE	
Package of 5:	*Prod No*	*Price*	*Prod No*	*Price*
	CCPK-5		CCKF-5	

MORE INFORMATION

Clean-cut tubing cutter ..... page 90
Tightening tool for hex-head PEEK nuts. . 67

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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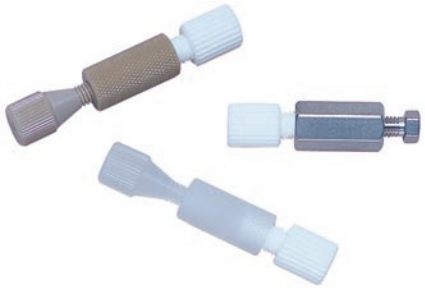
Low Pressure Unions

Unions — *Cheminert to Cheminert* — *1/4-28 to 1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated. Polypropylene unions are for use with flanged tubing only.

Tubing		**PEEK**		**CTFE**		**Polypropylene**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CUCPK		CUCKF		–	
1/16"	0.50 mm	CUPK		CUKF		–	
1/16"	0.75 mm	CUMPK		CUMKF		–	
1/8"	1.50 mm	CULPK		CULKF		–	
1/8"	Butt connection	CUTPK		CUTKF		CUTPP * (* pkg/5)	

Unions — *Cheminert to 1/16" ZDV* — *1/4-28 to 10-32*



Includes flangeless 1/4-28 and ZDV 10-32 fittings for 1/16" tubing.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CZUCPK		CZUCKF		CZUCS6	
1/16"	0.50 mm	CZUPK		CZUKF		CZUS6	
1/16"	0.75 mm	CZUMPK		CZUMKF		CZUMS6	

Unions — *Cheminert to 1/4" tubing* — *1/4-28 to 1/2-20*

Includes flangeless 1/4-28 and 1/2-20 fittings.

Tubing		**PEEK**		**CTFE**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/8" to 1/4"	1.50 mm	CU4LPK		CU4LKF	

Components	*Prod No*	*Price*
1/2-20 nut, CTFE	CFL-4KF	
1/2-20 nut, Delrin	CFL-4D	
CTFE ferrule	CFL-CB4KF-S	

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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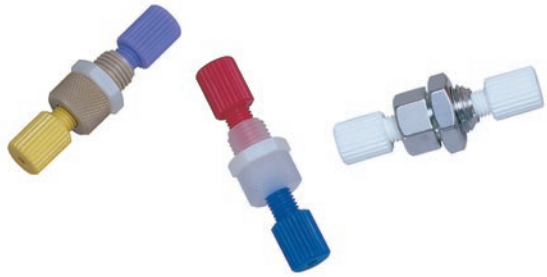
Low Pressure Bulkhead Unions

Bulkhead unions *Cheminert to Cheminert* *1/4-28 to 1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CBUCPK		CBUCKF		CBUCS6	
1/16"	0.50 mm	CBUPK		CBUKF		CBUS6	
1/16"	0.75 mm	CBUMPK		CBUMKF		CBUMS6	
1/8"	1.50 mm	CBULPK		CBULKF		CBULS6	



Bulkhead unions *Cheminert to 1/16" ZDV* *1/4-28 to 10-32*

Includes flangeless 1/4-28 and ZDV 10-32 fittings for 1/16" OD tubing.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CZBUCPK		CZBUCKF		CZBUCS6	
1/16"	0.50 mm	CZBUPK		CZBUKF		CZBUS6	
1/16"	0.75 mm	CZBUMPK		CZBUMKF		CZBUMS6	

Low Pressure Tees, Crosses, and Manifolds

Tees *1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing OD	*Bore*	**PEEK** *Prod No*	*Price*	**CTFE** *Prod No*	*Price*
1/16"	0.25 mm	CTCPK		CTCKF	
1/16"	0.50 mm	CTPK		CTKF	
1/16"	0.75 mm	CTMPK		CTMKF	
1/8"	1.50 mm	CTLPK		CTLKF	

Crosses *1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing OD	*Bore*	**PEEK** *Prod No*	*Price*	**CTFE** *Prod No*	*Price*
1/16"	0.25 mm	CXCPK		CXCKF	
1/16"	0.50 mm	CXPK		CXKF	
1/16"	0.75 mm	CXMPK		CXMKF	
1/8"	1.50 mm	CXLPK		CXLKF	

Manifolds *1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing OD	*Bore*	**PEEK** *Prod No*	*Price*	**CTFE** *Prod No*	*Price*
5 ports					
1/16"	0.75 mm	C5M1PK		C5M1KF	
1/8"	1.50 mm	C5M2PK		C5M2KF	
9 ports					
1/16"	0.75 mm	C9M1PK		C9M1KF	
1/8"	1.50 mm	C9M2PK		C9M2KF	

MORE INFORMATION
Flangeless tube end fittings . . . . . page 68

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
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Mixing tees

1/4-28

Includes flangeless 1/4-28 fittings for tubing OD indicated.

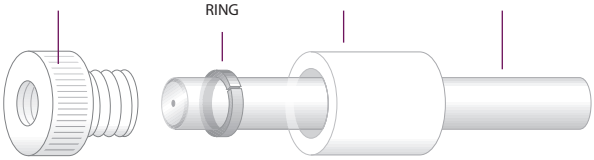
Tubing OD	*Bore*	PEEK *Prod No*	*Price*	CTFE *Prod No*	*Price*
1/16"	0.75 mm	CM1XPK		CM1XKF	
1/8"	1.50 mm	CM2XPK		CM2XKF	

Glass connectors

1/4-28 female to 1/4" glass tube

Glass connectors join a Cheminert tube end fitting to 1/4" OD glass tubing. They are available as individual components or as complete assemblies. Assemblies include a bushing and nut, a polypropylene or CTFE split ring, and a 1/4" OD x 3-1/4" long piece of 1 mm or 2 mm ID glass tube. This connector works only with our glass tubes.

Description	Acetal *Prod No*	*Price*	CTFE *Prod No*	*Price*
Complete assembly				
1 mm ID glass tubing	CGC41		CGC41KF	
2 mm ID glass tubing	CGC42		CGC42KF	
Components				
Bushing	CGCB		CGCBKF	
Nut	CGCN		CGCNKF	
Glass rod, 3-1/4" long				
1 mm ID	CGCG41		–	
2 mm ID	CGCG42		–	
Split rings *(package of 5)*	CGCR		CGCRKF	



Glass connector

Adapters

Tube adapters *1/4-28*

Tube adapters have male 1/4-28 threads going to 1/4" or 1/8" OD tubing.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/8"	1.5 mm	CTA2PK		CTA2KF		CTA2S6	
1/4"	1.5 mm	CTA4PK		CTA4KF		CTA4S6	

Luer adapters *Luer to 1/4-28 or 10-32*

Luer adapters make a leak-tight connection from male or female luer to 1/4-28 threads.

		PEEK		**CTFE**		**PFA**	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Female luer							
to 1/4-28	1.50 mm	CFLAPK		CFLAKF		CFLAPFA	
to 10-32	0.75 mm	ZUFLPK		ZUFLKF		–	
Male luer							
to 1/4-28	1.50 mm	CMLAPK		CMLAKF		CMLAPFA	

Luer adapter bulkhead unions *Luer to 1/4-28 or 10-32*

Our luer adapter bulkhead union connects a male or female luer to 1/4-28 or 10-32 fittings. These are the ideal fittings for through-the-panel syringe injections. The 1/4-28 versions include flangeless fittings for 1/16" OD tubing. Versions with 10-32 connections (for 1/16" OD tubing) include a fingertight PEEK nut and a ferrule of the same material as the union.

		PEEK		**CTFE**	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
Female luer					
to 1/4-28	1.50 mm	CBUFLPK		CBUFLKF	
to 10-32	1.00 mm	ZBUFLPK		ZBUFLKF	
Male luer					
to 10-32	1.00 mm	ZBUMLPK		ZBUMLKF	

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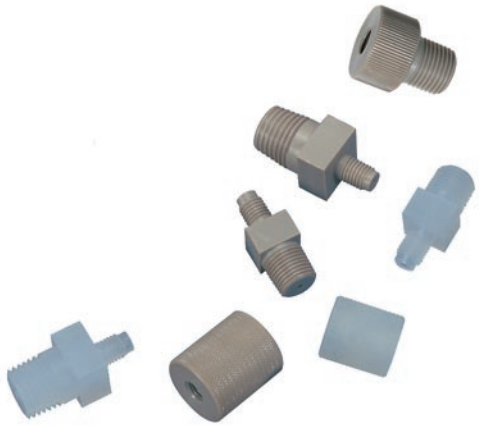


Pipe adapters

1/4-28 to NPT

Versions adapt male or female 1/4-28 fittings to male or female NPT.

		PEEK		CTFE	
NPT	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
Female 1/4-28 to male NPT					
1/8"	1.5 mm	CPA2PK		CPA2KF	$18
1/4"	1.5 mm	CPA4PK		CPA4KF	
Male 1/4-28 to male NPT					
1/8"	1.5 mm	CEPA2PK		CEPA2KF	
1/4"	1.5 mm	CEPA4PK		CEPA4KF	
Female 1/4-28 to female NPT					
1/8"	1.5 mm	CFPA2PK		CFPA2KF	
1/4"	1.5 mm	CFPA4PK		CFPA4KF	

NUT NOT INCLUDED

Cheminert 1/4-28 to Valco 10-32 ZDV adapter

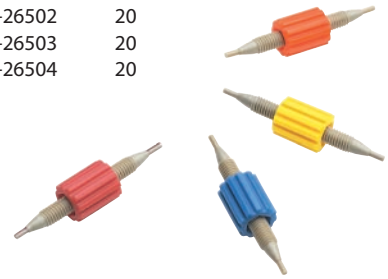
This adapter permits Valco 10-32 fittings to be installed into any 1/4-28 fitting detail. (Nut and ferrule are not included.)

Description	*Bore*	*Prod No*	*Price*
Port adapter	0.50 mm	ZLCA1PK	

One-piece fingertight column coupler

Choose from a variety of coupler IDs, indicated by the color of the sleeve (which parallels the color-coding of our PEEK tubing on page 89). A unique feature of this column coupler is that it adapts automatically to fit all pilot lengths – Valco, Waters, Upchurch, Rheodyne, etc. Since the tubing bottoms out in any fitting detail, added void volume is minimal. Material is PEEK.

Color	*Bore*	*Prod No*	*Price*
Red	0.13 mm ID	JR-26501	$20
Yellow	0.17 mm ID	JR-26502	20
Blue	0.25 mm ID	JR-26503	20
Orange	0.50 mm ID	JR-26504	20



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6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

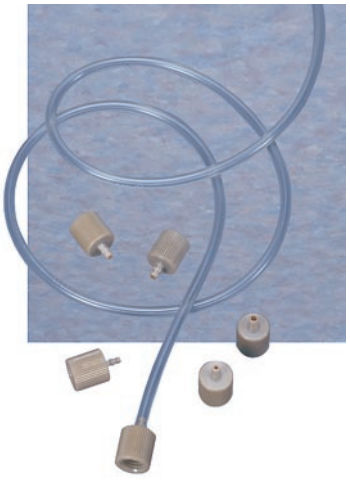
1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

Filters and Perifit Fittings

Perifit fittings for peristaltic pump tubing

The Cheminert Perifit is a unique fitting with a barb on one end and a 1/4-28 female fitting on the other end, for connecting a FIA line with the most commonly used peristaltic tubing. The fitting is compact and easy to install while providing a secure, trouble-free connection. A Perifit can be used as a "stop" on standard inexpensive Tygon® tubing, eliminating the need to buy the more expensive pre-cut tubing with pre-installed stops. Unlike many competitive systems, Perifits are reusable as the tubing wears.



Three sizes of Perifits are available to cover the range of tubing most commonly used in FIA.

For use with tubing sizes	*Prod No*	*Price*
0.50 to 1.02 mm ID	C-PFS	
1.12 to 1.65 mm ID	C-PFM	
1.85 to 2.29 mm ID	C-PFL	
Kit with 2 of each size above	C-PF	

In-line filters *1/4-28*

These convenient filters can be simply dropped into any 1/4-28 fitting detail. Constructed of PTFE and CTFE, with 316 stainless low-pressure-drop screen. (Fitting shown is not included.)

Pore size	*Prod No*	*Price*
2 micron	CFE-S2	
10 micron	CFE-S10	
75 micron	CFE-S75	

Biocompatible filter

This all-PEEK filter can be placed in any 1/16" line, providing filtration to 0.5 microns. The filter can be changed without tools, since both the filter housing and the fittings are designed to be hand tightened.

Tubing OD	*Bore*	*Prod No*	*Price*
1/16"	0.5 mm	ZU1FPK.5	

Replacement elements (PEEK-encapsulated titanium)

Pore size	*Prod No*	*Price*
0.5 micron	C-F1.5TI	

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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Last Drop mobile phase filter

The Last Drop mobile phase filter allows more analyses per batch of mobile phase and helps reduce hazardous waste. The flat filter element sits parallel to the bottom of the reservoir, allowing the Last Drop to filter all but the last 2% of the mobile phase from the reservoir without drawing air into the system. Compare this with conventional cylindrical filters that can begin to draw air into the system when nearly 10% of the solvent remains in the reservoir.

The Last Drop mobile phase filter consists of a 316 stainless or PTFE filter element pressed into an inert PTFE housing. The top of the housing has a PEEK tripod which slips into 1.5, 2.2, or 3.5 mm ID pump inlet lines. It will also work with our 1/16" and 1/8" flangeless fittings.

Use the metal-free PTFE version for sensitive biochromatography applications where metal surfaces may corrode or interact with samples.

	Filter element	*Prod No*	*Price*
Last drop filter, 2.5µm	PTFE	JR-9000-0520	
	Stainless steel	JR-9000-0530	

Last Drop filter/spargers

The Last Drop filter/sparger combines filtration and sparging in a single unit. The PTFE housing contains a mobile phase filter with either a stainless steel or a PTFE filter element. The filter/sparger features a PEEK tripod connector for the solvent line, and a nut and ferrule for the sparging line.

	Filter element	*Prod No*	*Price*
Last drop filter/sparger			
2.5 µm filter, 10 µm sparger	PTFE	JR-9000-0602	
	Stainless steel	JR-9000-0640	

Filters

No-Met biocompatible mobile phase filter

Stainless steel in the flowpath is not acceptable in a growing number of applications involving the separation of biomolecules. High salt buffers can corrode stainless steel, and the metal ions released from metallic filters may contaminate or otherwise react with the biomolecules of interest.

The No-Met polyethylene filter is designed for these applications, with inert polymeric fittings and 20 µm filter effectively eliminating metal contamination from the fluid path. Use them for IC and biochromatography applications.

Because they are hydrophobic, No-Met filters may initially require some priming with methanol or acetonitrile.

	Prod No	*Price*
No-met mobile phase filter, 1/8"	JR-32178	
Replacement element	JR-32179	

Stainless steel mobile phase filters and helium spargers

Mobile phase filters protect your HPLC system from small particles in the mobile phase. These filters are made from 316 stainless and PEEK or PTFE, and are suitable for use with most solvents.

Helium spargers offer an inexpensive way to prepare and maintain mobile phases free of dissolved gases. Connect these spargers to a regulated supply of helium gas (0-400 ml/min) to remove dissolved gases from the mobile phase. Spargers are made from 10 micron porosity stainless steel.

Tubing OD	*Porosity*	*Suggested Max. Flow Rate (ml/min)*	*Prod No*	*Price*
1/16"	2 µm	8	JR-367016-2	
1/16"	10 µm	20	JR-367016-10	
1/16"	20 µm	20	JR-367016-20	
1/8"	2 µm	8	JR-367008-2	
1/8"	10 µm	20	JR-367008-10	
1/8"	20 µm	20	JR-367008-20	

Mobile phase filters *Direct connect*

Cheminert mobile phase filters provide point-of-use filtering of common HPLC or FIA solvents. They are designed to connect directly to 1/8" OD PTFE or PEEK tubing using a simple press fit. The filter housing is PTFE and includes a 2 or 10 micron titanium frit.

Pore size	*Prod No*	*Price*
2 micron	C-MPFTI2	
10 micron	C-MPFTI10	

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

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Mobile phase or solvent reservoirs *1/4-28*

These high density polyethylene reservoirs for in-line solvent use come with polypropylene caps, 1/4-28 flangeless fittings, and 1/8" PTFE tubes for one or two lines plus vent. Plugs are included for conversion to solvent storage when the reservoir is removed from the system. Optional PTFE filters with titanium frits are available on the facing page.

Capacity	*Cap*	*Prod No*	*Price*
0.5 liter	2-hole	C-MPR2	
0.5 liter	3-hole	C-MPR3	
0.5 liter	plain	C-BOT16	
1.0 liter	plain	C-BOT32	

VICI-cap

The VICI-cap is the most economical way to helium sparge and deliver HPLC mobile phases. The insert is manufactured from PTFE with an EPDM* O-ring and a polypropylene screw cap.

The VICI-cap is available for either GL45 or S40 threaded bottles. It has a 1/4-28 female port and three ports for tubing insertion: two 1/8" tubing ports and a 1/16" tubing port. The tubing ports are made so that you push the tubing through the hole, while 1/4-28 fittings provide the best connection. Unused ports can be plugged as required.

	Prod No	*Price*
VICI-cap GL-45	JR-9000-0001	
VICI-cap S40	JR-9000-0006	

Valves for vials

The screw-cap Mininert is available in a variety of sizes. The crimp-top valve for 13 mm ID glassware slides into the neck of the vial and features a threaded flange, which is turned to provide a leak-tight fit.

Pkg/12:	*Cap/thread size*	*Prod No*	*Price*
	13 mm-425	PS-614158	
	15 mm-425	PS-614160	
	18 mm-400	PS-614161	
	20 mm-400	PS-614170	
	24 mm-400	PS-614163	
	Crimp top	PS-614250	

MORE INFORMATION

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TECH TIP

The VICI-cap is not usable for building up a helium atmosphere within the solvent bottle. It is only designed for continuous helium sparging.

*Ethylene Propylene Diene Monomer

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Welcome To Value Plastics' Interactive Catalog!

In order to meet the needs of our customers, Value Plastics has chosen to develop a user-friendly tool that allows for quick and easy access to our vast selection of parts, along with their specifications and technical information. Within this PDF, you will enjoy the following features:

Part Description And Image Hyperlinks

Click on each part to view pricing, see part drawings, and add parts to your shopping cart

Various Messages Within Sections

These messages will link you to product line details such as datasheets and part drawings

Online Technical Information

Use the catalog's technical charts to link to online data

Bookmarks And Interactive Table of Contents

For easy navigation, use these tools to jump to different product lines within the catalog

Barb Style Descriptions

Click on this section to access specifications for each style

Material Data Panels

Refer to these side panels for definitions of part extensions and click to view material data online

In-Text References

E-mails, page number, and website references will link you to the appropriate location

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Welcome to Value Plastics!

Thank you for your interest in our products. If you're a current customer, we thank you for your past support and look forward to exceeding your expectations in the future. If you're seeing us for the first time, we welcome the opportunity to earn your trust.

What we do:

Value Plastics designs and manufactures a proprietary line of plastic connectors for low pressure fluid management applications. Products available from stock include over 4,000 different style and material combinations with tubing IDs ranging from 1/16" to 1". We also offer custom component manufacturing, tubing, select medical OEM components and our TUBESETTER® fitting inserters to facilitate device assembly.

Where we come from:

We're located in Fort Collins, Colorado, at the base of the Rocky Mountains, 55 miles north of Denver. Our facility is state-of-the-art and self-contained from in-house product design through tooling, manufacturing, assembly and packaging. Customer support, sales and marketing resources support the world from this single facility.

Our quality commitment to you:

We are dedicated to exceeding your expectations. We operate a quality system registered under the guidelines of ISO 9001:2008 and maintain full traceability for all our manufactured products. We welcome our customers to conduct an on-site supplier audit with the knowledge that our systems have satisfied the most demanding requirements of medical device manufacturers worldwide.

Your assurance of VP quality:

How can you be sure that you're getting a genuine Value Plastics® fitting? Look for our logo. Molded into every component we manufacture, our logo is your assurance you are producing the highest quality items. By relying on our superior tooling and craftsmanship, you can be assured that you will have the best OEM tubing components in your products.

To protect our intellectual property and our customers, it is important to be aware of the patents and trademarks that apply to our products. Look for the Value Plastics logo (℣) to ensure you do not mistakenly use a poor quality counterfeit of a Value Plastics® fitting, thereby jeopardizing the integrity and quality of your product. Many attributes of our components are covered by patent, including but not limited to, barb, grips, function and other design features.

Quality Management System

At Value Plastics, quality is designed in from the outset; it's not an add-on at the end of the process. Our Quality Management System is registered under the auspices of ISO 9001:2008 and passes the most stringent evaluations possible – our customers' audits. We anticipate your needs and modify our systems to exceed your expectations. Our quality and consistency help you save money through your ability to implement dock-to-stock programs.

Design, Engineering and R&D

Value Plastics' staff of product development professionals uses the most modern equipment to design the best fluid management products available anywhere. Whether your need is for new products or custom solutions, our focus on healthcare OEM means we understand your needs and don't need to be coached to your industry requirements. Designs incorporating human factors, finite element analysis, DFMA, rapid prototyping and concurrent engineering are just some of the tools used to bring you the components you require, when you want them.

Manufacturing Consistency

Our all-electric injection molding presses are chosen for shot-to-shot consistency and outfitted with the most up-to-date process monitoring software available. Each operator is responsible for product quality at the press and has every tool at their disposal. All molding, secondary operations and packaging take place in a controlled environment to assure component readiness for your production floor.

Clean Room Manufacturing

All Value Plastics' products are now manufactured and packaged in an environment that meets the requirements of ISO 14644-1:1999 (E) Class 8 (Class 100,000) standards.

Value Plastics supplies the world with precision molded components, which are designed, manufactured and distributed from our facility in Fort Collins, Colorado, USA.

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BPL Series

Value Plastics introduces the BPL Series of tubing connectors, a new alternative to Luer fittings. The BPL Series of connectors incorporates a quarter-turn design that is commonly used in blood pressure applications – particularly blood pressure cuffs. Features such as Value Plastics' 10-point grip coupled with the BPL's patent pending winged male fitting provide superior ergonomics, while the snap-on design makes it easy to confirm that components are properly connected. **Pg 36**

SCV Series Additions and Price Incentives

We are pleased to announce that we are extending our inline check valve product line this year with two new fittings, as well as some ground breaking innovations in the near future. There will also be new volume price incentives in the coming months, please call your account manager for futher details. **Pg 16**

-6 Polypropylene Discontinuation

You will notice that there are no longer any parts with the -6 polypropylene resin available in this catalog. Value Plastics has received notice from LyondellBasell that they are discontinuing the manufacture of this resin. We are now offering an alternate polypropylene resin -6005 which has the added benefit of being animal-free, and USP Class VI.

We apologize for any inconvenience that this situation creates for our customers. Although this decision is entirely out of our control Value Plastics is here to assist our customers through this transition and will strive to ensure the timely delivery of our products. Please contact Value Plastics sales at 1-888-404-5837 or sales@valueplastics.com to get price and availability of parts in the -6005 polypropylene.

PharmaLok™ Sanitary Clamps

Value Plastics' new clamp series is a revolutionary addition to the biopharm industry due to its unique, user-friendly design. The clamps can easily be closed with one hand, allowing end users the ability to work quickly and efficiently. The PharmaLok series may be found beginning on **page 19.**

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What is ISO 80369

Hospitals and other healthcare facilities depend on a variety of catheters, tubing and syringes to deliver medications and other substances to patients through vascular, enteral, respiratory, epidural and intrathecal delivery systems. These delivery systems frequently employ fittings called luer connectors to link various system components. Unfortunately, because luer connectors are ubiquitous, easy-to-use and compatible between different delivery systems, clinicians can inadvertently connect wrong systems together, causing medication or other fluids to be delivered through the wrong route. Such errors can cause serious patient injuries and deaths. To further reduce the occurrence of these misconnections, the FDA is actively participating in an international effort to develop and implement standards for noninterchangeable connectors for small bore medical connectors. A joint working group established by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) leads this effort to develop a series of standards for incompatible connectors. ISO 80369-1 is the first in the series of standards and establishes the applications specified below that will have their own unique connector geometries.

ISO 80369-2: Breathing Systems and Driving Gases
ISO 80369-3: Enteral and Gastric
ISO 80369-4: Urethral and Urinary
ISO 80369-5: Limb Cuff Inflation
ISO 80369-6: Neuraxial
ISO 80369-7: Intravascular (IV)

When will it come into effect?

Each section of the ISO 80369 standard is being defined separately. Currently, ISO 80369-2 and ISO 80369-7 are the farthest along in development, yet it is difficult to say when the entire standard will be complete.

How does it impact me?

Compliance with the ISO 80369 standard may require major changes on the part of medical device manufacturers. In the next few years, if these standards are approved it could mean new designs, new parts, new moldings and updating or replacing millions of components. While you may choose to manufacture your own custom fittings, you must consider the significant costs associated with such an endeavor. There is also the possibility that these custom fittings may inadvertently connect with other applications' fittings that are not yet defined.

It is important to note that if this standard passes, it does not mean that luers can no longer be used in the referenced markets. Until connectors are defined and approved for each market, no definitive action can be taken.

How can I prepare?

While the standards have not yet been completely established, the main precaution that medical device manufacturers can take to help prevent any future problems is to stay up-to-date on ISO 80369 news. Value Plastics is one of only a few connector companies worldwide actively participating on ISO 80369 committees. To keep the medical device community apprised of new developments, we have chosen to provide information in one web location. Value Plastics has set up an online resource to help medical device OEMs stay informed of the changes and updates to this standard.

To read the latest updates, subscribe to alerts, and view related resources, go to Value Plastics' online resource at **i8.valueplastics.com.**

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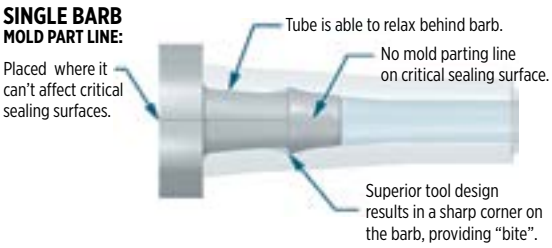
Our Single Barb Concept

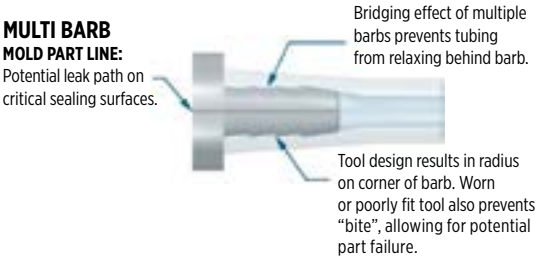
Many designers are not aware of the benefits of using a single barb versus a multi-barb fitting, but the barb design greatly affects the security of your tube connection.

Because of the shape of a barb, it is impossible to injection mold any but the first barb without a parting line. The parting line creates a potential leak path that becomes more pronounced as the tooling wears, increasing the likelihood of failure.

Two other problems exist with multiple barb fittings. First, it is impossible to fabricate tooling that creates a perfectly sharp



edge on each barb of a molded multi-barb fitting – a feature critical to the performance of the connection.
Second, multiple barb fittings do not allow the tubing to relax behind the first barb. Because the tubing "bridges" from barb to barb it is not allowed an uninterrupted interface with the fitting. This results in compromised pressure and tensile capacities. Value Plastics® single barb design avoids these shortcomings. Our expert tooling design assures the sharpest edge possible allowing the barb to "bite" into the tubing. Then, the cylindrical surface behind the barb allows the tubing to relax against the fitting. The result is a connection with excellent tensile and pressure performance.



The **CLASSIC SERIES** is characterized by a longer barb that extends the sealing surface of the fitting. Tubing is expanded from 42% to 69% above its nominal ID.

The **200 SERIES** offers outstanding performance characteristics when used with flexible tubing. Tubing is expanded by 50% above its nominal ID, permitting high-pressure capabilities.

The **300 SERIES** offers outstanding performance characteristics when used with flexible tubing. Tubing is expanded by 35% above its nominal ID, permitting high-pressure capabilities in the larger tube sizes.

The **400 Series** provides easy assembly while maintaining excellent pressure and tensile capabilities. Originally created for semi-rigid tubing, this series is preferred for applications where tensile/pressure properties are not highly critical, or when ease of assembly is desired. The 400 Series expands the tubing 25% above its nominal ID.

The **500 SERIES** profile is composed of blended radii, giving it the distinct look. Each barb is designed to accommodate a range of tube sizes and tube types. Consideration should be given to flow restriction, pressure capability, and the force required for assembly of the tube.

The **600 SERIES** barbs are designed for use with silicone, C-Flex® and PVC tubing sizes commonly used in biopharm and other applications. Tubing is expanded from 18% to 34% above its nominal ID to maintain a low profile and ease of assembly, and the straight barb stem facilitates use of recommended cable tie retainers or hose clamps.

The **700 SERIES** barb is designed for use with Value Plastics' XQ Series quick connect fittings. This unique single barb is available in sizes to fit the 1/4" (6.4 mm), 5/16" (7.9 mm) and 3/8" (9.5 mm) ID tubing sizes and materials commonly used in disposable and reusable medical equipment. Reinforced PVC, unreinforced PVC and polyurethane tubing materials work well with this barb style.

The **900 SERIES** offers outstanding performance characteristics when used with flexible tubing. Tubing is expanded from 8% to 17% above its nominal ID. This barb provides high flow efficiency and excellent tensile strength. A hose clamp is recommended for this series.

The data presented here is for reference only. It was compiled to provide our customers with a means of comparing the characteristics of components at the time of publication. The particular conditions of your use and application of our products are beyond our control. Thus, it is imperative that you test our products in your specific application to determine their suitability. All information is provided without implied or expressed warranty or guarantee by Value Plastics® or other manufacturers. None of the information provided constitutes a recommendation or endorsement of any kind by Value Plastics®.

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DESIGN CENTER

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Fitting The World's Most Fluid Designs

How it works:

1 Define your product requirements:

Describe your application and requirements or provide us with a drawing or simple sketch. From here we can determine what details are needed and can help define the most ideal and cost-effective connector concept for your application.

2 Call the Design Center to explore your connector options:

There may be a suitable off the shelf solution or perhaps we can adapt an existing connector to your application. Often the modification of an existing mold can be significantly faster and less expensive.

3 Collaborate:

Working with your requirements, we can help walk you through the most cost effective solutions to achieve your desired performance. That may mean simply taking 2 or 3 connectors and identifying a low-cost means to roll them into a single connector.

4 Go-to-market:

As we arrive at a solution together, we closely involve your team in the design and development process to ensure that as we approach production you have everything you need for qualification to get you to market both quickly and safely. The rest is up to you!

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What happens when "off-the-shelf" just doesn't work? The Design Center builds a new shelf!

Your Solution. Faster. For less.

With project requirements and timelines becoming increasingly demanding, it's critical to partner with a team who understands fluid management solutions and the rigors of today's medical device and biotech markets. Team up with the Value Plastics Design Center for your custom connector needs, whose market leading service, quality and delivery you've already come to know.

Here's what you can expect from our Design Center and the "Specialists in Fluid Connections":

Save Time – Talk to someone who understands your application requirements. The Design Center works with you to determine the most suitable material and design options to deliver the best performing product as cost-effectively as possible. We also utilize state of the art rapid prototyping techniques and in-house testing facilities to keep your project moving quickly and economically.

Save Money – Start with our existing product offering of over 4,000 fluid connectors, or utilize some of our existing mold configurations toward perfectly customizing a part to your application. Don't forget, our technical and design assistance is FREE!

Save Trouble – Ensure that everything around your project will be done right the first time. Our dedicated and experienced staff will make sure that the finest details are covered from the time that we review your product requirements to the final product qualification.

The Design Center can also assist you in developing fluid connectors that comply to emerging standards. Value Plastics is an active member of the ISO 80369 standards group defining new standard connectors for small bore, medical device connections.

To get started today contact your Value Plastics Design Services Manager:

Toll Free - +1 (866) 582-0965

Email - designcenter@valueplastics.com

dc.valueplastics.com

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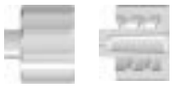
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

CUSTOM LUERS:

CF104 (-6005)
Male Luer Integral Lock Ring Plug, Ø.033 Orifice at Luer Tip



CF226 (-6005)
High Flow Connector to 500 Series Barb, 1/4" (6.4 mm) ID Tubing (May be used with separate rotating lock ring; CF227)

CF015 (-1)
Female Luer Lug Style Flare to M6x.75 Thread

CF131 (-1)
Male Luer Integral Lock Ring Plug, Closed at Grip (Short Luer)

CF141 (-9)
Male Luer to Female Luer Thread Style Coupler (Ø.045 Thru Bore with Ø.055 Male Side Bond-in Port)

CF148 (-9002)
Male Luer to Female Luer Thread Style Coupler (Ø.045 Thru Bore with Ø.080 Male Side Bond-in Port)

CUSTOM LUERS:

CF210 (-6005)
Male Luer to Female Luer Thread Style Coupler (Ø.125 Center Bond-in Port)

CF213 (-3)
Male Luer Integral Lock Ring Plug, Closed at Grip (Ø.055 to Ø.060 Core)

CF224 (-9)
Male Luer Integral Lock Ring to 500 Series Barb, 5/32" (4 mm) ID Tubing (Ø.076 Bore)

CF233 (-6005)
Female Extended Luer Thread Style to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

CF235 (-9 -91)
Male Luer to Female Luer Thread Style Coupler (Ø.023 Thru Bore with Ø.033 Male Side Bond-in Port)

CF239 (-6005)
Male Luer Integral Lock Ring to Female Luer Thread Style Extended Coupler

CF322 (-1)
Female Luer Lug Style Flare to 1/4-32 UNF Thread

CUSTOM TUBE-TO-TUBE FITTINGS:

CF079 (-1)
1/8" Tee With Blank Single Leg to 200 Series Barb, for 1/8" (3.2 mm) ID Tubing

CF128 (-1)
Straight Through Connector for Orifice Insert, 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

CF302 (-1)
Tee Reduction Connector with 400 Series Barbs, 1/16" (1.6 mm) and 3/32" (2.4 mm) ID Tubing

CUSTOM THREADED:

CF001 (-6005)
Bottom Sealing 1/4-28 UNF Thread To Classic Series Barb, 1/16" (1.6 mm) ID Tubing

CF165 (-6005)
1/4-28 UNF Thread with O-Ring Seal and 5/16" Hex to Classic Series Barb 1/16" (1.6 mm) ID Tubing

CF166 (-6005)
1/4-28 UNF Thread Plug with O-Ring Seal and 5/16" Hex

CF173 (-6005)
Bottom Sealing 1/4-28 UNF To 200 Series Barb, 3/16" (4.8 mm) ID Tubing

CF202 (-J1A)
10-32 UNF To Tube Elbow With Custom Thread Orientation and 400 Series Barb, 3/32" (2.4 mm) ID Tubing

Looking for Something Different?

"It would have taken me two to three times as long and two to three times as much money without Value Plastics. This is who you want to work with. They have become part of our team."

— Murat Kuru
Founder of Lipocosm, LLC

Need more details?

Check out the Design Center Datasheet at **www.valueplastics.com** or contact Sales at **sales@valueplastics.com**

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-CM030 Dark Blue Nylon
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-EP EPDM O-ring
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-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

QUICK CONNECT

FITTINGS

Female Open Flow Straight
PG-13

Male Open Flow Straight
PG-13

Female Open Flow Straight
PG-13

Male Open Flow Straight
PG-13

Female Open Flow Straight
PG-14

Female Valved Straight
PG-14

Female Open Flow Panel Mount
PG-14

Female Valved Panel Mount
PG-14

Male Open Flow Straight
PG-14

Male Valved Straight
PG-14

Male Open Flow Panel Mount
PG-15

Male Valved Panel Mount
PG-15

Male Open Flow Elbow
PG-15

Male Valved Elbow
PG-15

Value Plastics offers three distinct families of quick connect fittings (quick disconnect couplings), the MQC, SBL and XQ Series products, for applications covering 1/8" (3.2 mm) through 3/8" (9.5 mm) ID tubing.

The MQC Series is an easy to use Push-to-Connect design and arguably one of the most versatile quick connect solutions on the market. With its large, ergonomic buttons and wide selection of colors, both designers and end users will embrace its unique features. The MQC Series of connectors are available in nylon and fit 1/8" (3.2 mm), 5/32" (4.0 mm) and 3/16" (4.8 mm) ID tubing. Between its versatility, one-of-a-kind design, and loud "click" indicating a secure fit, misconnects will be a problem of the past!

MQC Series

The SBL Series connector system is so intuitive that users just automatically know how to operate it the minute they pick it up. SBL Series quick connect fittings are cost effective and designed to meet your needs for a reusable component for small-bore applications in all fluid delivery areas. The SBL Series range is available in nylon, in two contrasting colors and fits 1/8" (3.2 mm) and 3/16" (4.8 mm) ID tubing for in-line applications.

SBL Series

The XQ Series quick connect fittings, available in open flow and with integral shutoff valves, bring performance, convenience and utility to your tubing applications. XQ Series products fit 1/4" (6.4 mm), 5/16" (7.9 mm) and 3/8" ID (9.5 mm) tubing and are produced in acetal and polypropylene in five basic configurations – in-line male, in-line female, male panel mount, female panel mount and elbow. For versatility, durable XQ Series couplings interchange with other plastic and metal button-type couplings. Bring performance and service to your tubing applications by specifying XQ Series quick connects.

XQ Series

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MQC SERIES:
Female Open Flow

MQCF230 (-1 -2 -3 -4 -5 -8)
Dual Latch Quick Connect Female 200 Series Barb 1/8" (3.2 mm) ID Tubing

MQCF240 (-1 -2 -3 -4 -5 -8)
Dual Latch Quick Connect Female 200 Series Barb 5/32" (4.0 mm) ID Tubing

MQCF250 (-1 -2 -3 -4 -5 -8)
Dual Latch Quick Connect Female 200 Series Barb 3/16" (4.8 mm) ID Tubing

MQC Series:
Male Open Flow

MQCRM230 (-001 -002 -003 -004 -005 -08B) Nylon, Buna-N O Ring
Dual Latch Quick Connect Male 200 Series Barb 1/8" (3.2 mm) ID Tubing

-001 White Nylon
-005 Blue Nylon

MQCRM240 (-001 -002 -003 -004 -005 -08B) Nylon, Buna-N O Ring
Dual Latch Quick Connect Male 200 Series Barb 5/32" (4.0 mm) ID Tubing

-001 White Nylon
-005 Blue Nylon

MQCRM250 (-001 -002 -003 -004 -005 -08B) Nylon, Buna-N O Ring
Dual Latch Quick Connect Male 200 Series Barb 3/16" (4.8 mm) ID Tubing

-001 White Nylon
-005 Blue Nylon

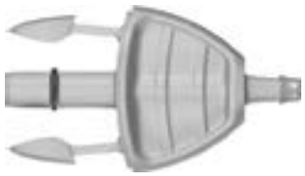
SBL SERIES:
Female Open Flow

SBLF013 (-1 -2 -8B -CM030)
Side Latch Quick Connect Female 500 Series Barb, 1/8" (3.2 mm) ID Tubing

SBLF035 (-1 -2 -8B -CM030)
Side Latch Quick Connect Female 500 Series Barb, 3/16" (4.8 mm) ID Tubing

SBL Series:
Male Open Flow

SBLM013 (-001 -002 -004 -005) Nylon, Buna-N O Ring
Side Latch Quick Connect Male 500 Series Barb, 1/8" (3.2 mm) ID Tubing



-001 Gray Nylon
-002 Blue Nylon

SBLM035 (-001 -002 -004 -005) Nylon, Buna-N O Ring
Side Latch Quick Connect Male 500 Series Barb, 3/16" (4.8 mm) ID Tubing

-001 Gray Nylon
-002 Blue Nylon

Need samples for evaluation?
You can call to request most of our standard product in quantities of 5, or less, for free **application evaluation.**
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Need more details?
Check out the MQC, SBL, and XQ Datasheets at **www.valueplastics.com** or contact Sales at **sales@valueplastics.com**

QUICK CONNECTS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
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-8B Gray Nylon
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-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

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-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
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Pg 85 Typical Properties

XQ SERIES: Female Open Flow Straight

XQSF755 (-1006)
XQ Series Female Open Flow Connector, 700 Series Barb, 1/4" (6.4 mm) ID Tubing

XQSF770 (-1006 -1007)
XQ Series Female Open Flow Connector, 700 Series Barb, 3/8" (9.5 mm) ID Tubing

XQ Series: Female Valved Straight

XQSVF755 (-1006-B -1007-B -6006-EP)
XQ Series Female Valved Connector, 700 Series Barb, 1/4" (6.4 mm) ID Tubing

XQSVF765 (-1006-B -1007-B)
XQ Series Female Valved Connector, 700 Series Barb, 5/16" (8.0 mm) ID Tubing

XQSVF770 (-1006-B -1007-B -6006-EP)
XQ Series Female Valved Connector, 700 Series Barb, 3/8" (9.5 mm) ID Tubing

XQ Series: Female Open Flow Panel Mount

XQSBF755 (-1006)
XQ Series Female Open Flow Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 1/4" (6.4 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQSBF770 (-1006)
XQ Series Female Open Flow Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 3/8" (9.5 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQ SERIES: Female Valved Panel Mount

XQSVBF755 (-1006-B)
XQ Series Female Valved Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 1/4" (6.4 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQSVBF770 (-1006-B)
XQ Series Female Valved Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 3/8" (9.5 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQ Series: Male Open Flow Straight

XQCM755 (-1006-B)
XQ Series Male Open Flow Connector, 700 Series Barb, 1/4" (6.4 mm) ID Tubing

XQCM770 (-1006-B)
XQ Series Male Open Flow Connector, 700 Series Barb, 3/8" (9.5 mm) ID Tubing

XQ Series: Male Valved Straight

XQCVM755 (-1006-B -6006-EP)
XQ Series Male Valved Connector, 700 Series Barb, 1/4" (6.4 mm) ID Tubing

XQCVM765 (-1006-B -1007-B)
XQ Series Male Valved Connector, 700 Series Barb, 5/16" (7.9 mm) ID Tubing

XQ SERIES:
Male Valved Straight

XQCVM770 (-1006-B -1007-B -6006-EP)
XQ Series Male Valved Connector, 700 Series Barb, 3/8" (9.5 mm) ID Tubing

XQ Series:
Male Open Flow Panel Mount

XQCBM755 (-1006-B)
XQ Series Male Open Flow Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 1/4" (6.4 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQCBM770 (-1006-B)
XQ Series Male Open Flow Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 3/8" (9.5 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQ Series:
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XQCVBM755 (-1006-B)
XQ Series Male Valved Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 1/4" (6.4 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQCVBM770 (-1006-B)
XQ Series Male Valved Panel Mount Connector with 11/16-24 UNEF thread, 700 Series Barb, 3/8" (9.5 mm) ID Tubing, Nickel-Plated Brass Hex Nut (included)

XQ SERIES:
Male Open Flow Elbow

XQCLM755 (-1006-B)
XQ Series Male Open Flow Elbow Connector, 700 Series Barb, 1/4" (6.4 mm) ID Tubing

XQCLM770 (-1006-B)
XQ Series Male Open Flow Elbow Connector, 700 Series Barb, 3/8" (9.5 mm) ID Tubing

XQ Series:
Male Valved Elbow

XQCVLM755 (-1006-B)
XQ Series Elbow Male Valved Connector, 700 Series Barbs, 1/4" (6.4 mm) ID Tubing

XQ Series:
Panel Mount Nut

PM4N (Nickel-Plated Brass)
XQ Series 11/16-24 UNEF Panel Mount Nut

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Resin Reference

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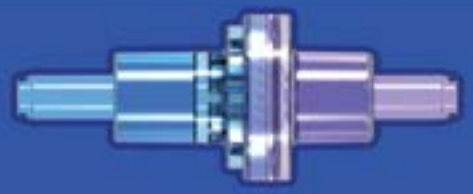
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

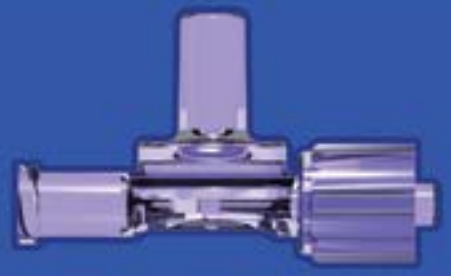
CHECK VALVES

One Way Check Valves
PG-16

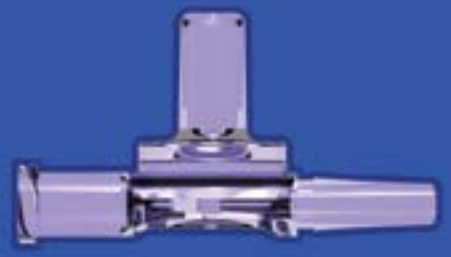


Anti-Siphon Check Valves
PG-17

Double Check Valves, Tubing Pocket Chimney Port
PG-17



Double Check Valves, Female Luer Chimney Port
PG-17



SCV Series: One-Way Check Valve

SCV01092 (Blue and Clear Polycarbonate w/Silicone Diaphragm)
Check Valve, Socket for .122" (3.1 mm) ID x .165" (4.2 mm) OD Tubing x 2

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

SCV08053 (White SAN w/Silicone Diaphragm w/Natural LDPE)
Check Valve, Female Locking Luer to Male Locking Luer w/Cap

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

SCV10090 (Clear Polycarbonate w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Pocket for .118" (3.0 mm) OD Tubing

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

SCV17090 (Clear Polycarbonate w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Socket for .118" (3.0 mm) ID x .161" (4.1 mm) OD Tubing

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

SCV21053 (Clear and White ABS w/Silicone Diaphragm)
Check Valve, Socket for .118" (3.0 mm) ID x .161" (4.1 mm) OD Tubing x 2

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

SCV22050 (Clear SAN and Clear ABS w/Silicone Diaphragm)
Check Valve, Socket for .118" (3.0 mm) ID x .161" (4.1 mm) OD to Male Locking Luer

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

SCV23050 (Clear SAN w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Male Locking Luer

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

SCV25052 (Clear ABS and Blue SAN w/Silicone Diaphragm)
Air Pressure Relief Valve, Stem for .157" (4.0 mm) ID Tubing to Stem for .118" (3.0 mm) ID Tubing

Cracking Pressure: ≤ .174 psig
Max. Back Pressure: 87.023 psig
Flow Rate: ≥ 90ml/min
Flow Direction: Left to right

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SCV SERIES:
Anti-Siphon Check Valve

SCV03052 (Clear and Blue ABS w/Silicone Diaphragm)
Check Valve, Pocket for .165" (4.2 mm) OD Tubing to Socket Fitting .122" (3.1 mm) ID x .165" (4.2 mm) OD Tubing

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 304.579 psig, max 30 sec.
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV04052 (Clear and Blue SAN w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Male Locking Luer

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 304.579 psig, max 30 sec.
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV05052 (Clear SAN and Blue Acrylic w/Silicone Diaphragm)
Check Valve, Pocket for .165" (4.2 mm) OD Tubing to Male Locking Luer

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 304.579 psig, max 30 sec.
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV06052 (Clear and Blue ABS w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Socket for .122" (3.1 mm) ID to .165" (4.2 mm) OD Tubing

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 304.579 psig, max 30 sec.
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV06248 (Blue SAN and Clear MABS w/ Silicone Diaphragm)
Check Valve, Pocket for .161" (4.0 mm) OD Tubing to Male Locking Luer

Cracking Pressure: 2.176 – 3.626 psig
Max. Back Pressure: 304.579 psig, max 30 sec.
Flow Rate: 170 ml/min
Flow Direction: Left to right

SCV06272 (Clear SAN and Blue MABS w/ Silicone Diaphragm)
Check Valve, Pocket for .161" (4.0 mm) OD Tubing to Female Locking Luer

Cracking Pressure: 2.176 – 3.626 psig
Max. Back Pressure: 304.579 psig, max 30 sec.
Flow Rate: 170 ml/min
Flow Direction: Left to right

SCV07052 (Clear ABS and Blue SAN w/Silicone Diaphragm)
Check Valve, Pocket for .122" (3.1 mm) OD Tubing to Male Locking Luer

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 87.023 psig
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV09093 (Clear and White Polycarbonate w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Pocket for .118" (3.0 mm) OD Tubing

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 87.023 psig
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV11095 (Clear and Green Polycarbonate w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Pocket for .098" (2.5 mm) OD Tubing

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 87.023 psig
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV SERIES:
Anti-Siphon Check Valve

SCV12052 (White and Blue SAN w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Male Locking Luer

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 87.023 psig
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV15050 (Clear ABS and Clear SAN w/Silicone Diaphragm)
Check Valve, Pocket for .165" (4.2 mm) OD Tubing to Male Locking Luer

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 87.023 psig
Flow Rate: max 200 ml/min
Flow Direction: Left to right

SCV16090 (Clear Polycarbonate w/Silicone Diaphragm)
Check Valve, Female Locking Luer to Pocket for .118" (3.0 mm) OD Tubing

Cracking Pressure: 1.450-4.351 psig
Max. Back Pressure: 87.023 psig
Flow Rate: max 200 ml/min
Flow Direction: Left to right

DCV Series:
Double Check Valve, Tubing Pocket Chimney Port

DCV114 (-001) Radiation-Stable Polycarbonate
Double Check Valve, Tubing Pocket Chimney Port

Cracking Pressure: 2-5 psi

DCV115 (-001) Radiation-Stable Polycarbonate
Double Check Valve, Tubing Pocket Chimney Port, Rotating Luer Lock Exit Port

Cracking Pressure: 2-5 psi

DCV Series:
Double Check Valve, Female Luer Chimney Port

DCV118 (-001) Radiation-Stable Polycarbonate
Double Check Valve, Female Luer Chimney Port

Cracking Pressure: 2-5 psi

DCV125 (-001) Radiation-Stable Polycarbonate
Double Check Valve, Female Luer Chimney Port, Rotating Luer Lock Exit Port

Cracking Pressure: 2-5 psi

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

BIOPROCESS
FITTINGS

PharmaLok™ Clamps
PG-19

Bag Ports
PG-20

Mini Flange Fittings 3/4"
PG-22

Maxi Flange Fittings 1-1/2"
PG-23

Mini Flange Accessories 3/4"
PG-24

Maxi Flange Accessories 1-1/2"
PG-24

PHARMALOK™
Series

Value Plastics' new sanitary fitting clamp was created with the end user in mind. Easily closed with one hand, the clamp's unique and innovative design is one-of-a-kind!

The biopharmaceutical industry has made a strong move towards single-use technology so Value Plastics has developed a ground-breaking design that simplifies the assembly process by making it effortless to securely attach the fittings to bag ports and filters. Complies with ASME BPE 2009 DT-10.4 Hygienic Clamp Ferrule: Design Criteria.

Features:

- ASME BPE 2009 DT-10.4 compliant
- Multiple colors for color coding applications
- Connects both plastic and stainless steel fittings
- Zip tie compatible
- Easy to use, one-handed closure (no tools needed)
- 360° compression
- Tamper evident
- SIP/CIP compatible

Specifications:

Material: USP Class VI & ISO 11137 Certified glass-filled nylon

Sterilization: Gamma Radiation up to 50 kGy, Autoclavable up to 273°F (134° C) for a max of 30 min.

Size: .75" & 1.5", for use with "Mini" & "Maxi" flange sanitary fittings

Operating Temperature: -94° (-70° C) to 140° (60° C)

Maximum Pressure: 80 psi

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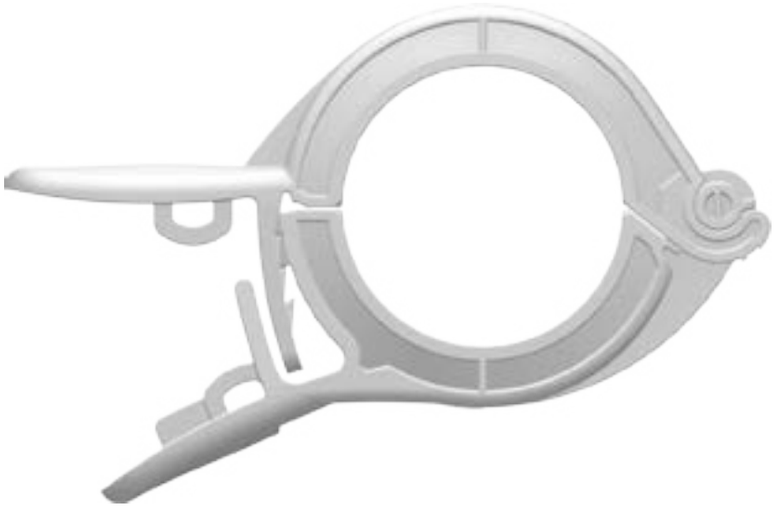
CPX150 (-U71)
Single-Use Sanitary Fitting Clamp for "Maxi" Flange, TC Version 1" to 1.5"



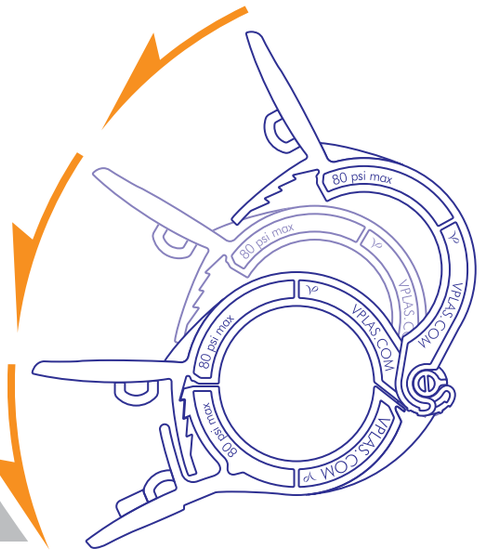
CPN75 (-U71)
Single-Use Sanitary Fitting Clamp for "Mini" Flange, TC Version .5" to .75"

CPX150 (-U75)
Single-Use Sanitary Fitting Clamp for "Maxi" Flange, TC Version 1" to 1.5"

CPN75 (-U75)
Single-Use Sanitary Fitting Clamp for "Mini" Flange, TC Version .5" to .75"

Need more details?

Check out the PharmaLok Datasheets at **www.valueplastics.com** or contact Sales at **sales@valueplastics.com**



1. 2. 3. Done!

BIOPROCESS FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
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BIOPROCESS FITTINGS

BAG PORTS

Value Plastics' new high tech series of bag ports offers a variety of benefits new to the biopharmaceutical industry through a combination of Value Pharma™ resin and a unique design. Value Pharma™ resin holds credentials that many manufacturers deem fundamental, such as animal derivative free qualification, USP Class VI certification, and the guarantee of heat sealing and conformance with polyethylene bags. The resin then goes even further to provide a strong, 24-hour resistance to alcohol stress cracking.

Their unique design sets these new ports apart from existing solutions. They not only conform with frequently utilized tubing sizes from 1/8" (3.2 mm) to 1" (25.4 mm), but they are also designed to ASME and BPE ferrule specifications, allowing them to work with leading industry fittings, filters and other devices. However, the most notable of the bag ports' specifications are those that are new to the industry – the parabolic lead and the alignment ribs. These two features, respectively, reduce the amount of time it takes to drain a bag by 24 percent and improve flow dynamics through the port.

Compliant to ASME BPE ferrule specification

- Works with leading industry single-use bags

Barb sizes consist of range from 1/8" (3.2 mm) to 1" (25.4 mm) and ferrule TC style

- Works with the frequently utilized tubing sizes found in the pharmaceutical industry

Parabolic lead

- Reduces the time it takes to drain a bag by 18 to 24%
- Similar results for both fluid and powder applications

Alignment ribs

- Improves fluid dynamics of flow through the port

Value Pharma™ resin

- Ensures heat sealing with polyethylene bags
- Includes a USP Class VI certification
- Animal Derivative Free
- Resistant to alcohol stress cracking

SFBP630 (-VP1) Value Pharma™ Resin
Bag Port with 600 Series Barb, 1/8" (3.2 mm) Tubing ID

SFBP655 (-VP1) Value Pharma™ Resin
Bag Port with 600 Series Barb, 1/4" (6.4 mm) Tubing ID

SFBP670 (-VP1) Value Pharma™ Resin
Bag Port with 600 Series Barb, 3/8" (9.5 mm) Tubing ID

Need more details?

Check out all of our Bag Ports at **www.bagports.com** or contact Sales at **bagports@valueplastics.com**

SFBP680 (-VP1) Value Pharma™ Resin
Bag Port with 600 Series Barb, 1/2" (12.7 mm) Tubing ID

SFBP6100 (-VP1) Value Pharma™ Resin
Bag Port with 600 Series Barb, 3/4" (19.0 mm) Tubing ID

SFBP6110 (-VP1) Value Pharma™ Resin
Bag Port with 600 Series Barb, 1" (25.4 mm) Tubing ID

SFBPF1 (-VP1) Value Pharma™ Resin
Bag Port with Ferrule Fitting to 1-1/2" TC Connection

Innovative parabolic lead & alignment ribs

Need it fast?
You can order any of our 4,000+ parts online now with no order $ minimums, 24 hours a day, 7 days a week!
www.valueplastics.com

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-1006 Natural Acetal
-1007 Black Acetal
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-CM030 Dark Blue Nylon
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-EP EPDM O-ring
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-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
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Pg 84 Sterilization Stability
Pg 85 Typical Properties

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Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

BIOPROCESS FITTINGS

SF Series

The SF Series sanitary fittings are based on design concepts calling for a heavy-duty part with superior side load strength, while providing superior flow-through characteristics, making them the connectors of choice for single-use bioprocesses. Pharmaceutical professionals find these plastic fittings offer all the benefits of disposable parts while offering performance capabilities not found in earlier versions of flanged fittings.

Features & Benefits

- **Animal-free materials:** No BSE documentation required
- **Radiused flow surfaces:** Smooth uninterrupted flow
- **"Mini" & "Maxi" sizes:** Easy to retrofit current operations, works with commercially available biopharm clamps
- **No Particulate build-up:** Interior surface controlled to 15 Ra microinch

Specifications

Materials: Animal-Free Polypropylene, Natural PVDF

Tubing Sizes: 1/4", 3/8", 1/2", 3/4", 1"

Leak Resistance: Tested at 80 psi air under water for 90 seconds with no leaks

Tubing Removal Force:

- 1/4" PP with C-Flex® shore A tubing: 21 lbs.
- 1/2" PP with C-Flex® shore A tubing: 89 lbs.
- 1" PP with C-Flex® shore A tubing: 121 lbs.

Interior Surface Finish: 15 Ra Microinch

SFMN655 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 1/4" (6.4 mm) Tubing ID

SFMN670 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 3/8" (9.5 mm) Tubing ID

SFMN680 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 1/2" (12.7 mm) Tubing ID

SFMN6100 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 3/4" (19.0 mm) Tubing ID

SFMNC (-6005 -J1A)
Sanitary Fitting Mini Cap 3/4"

Did you know?

You can find large bore 3/8" to 1" Tube-To-Tube fittings for your BioProcess needs starting on **Pg-44.**

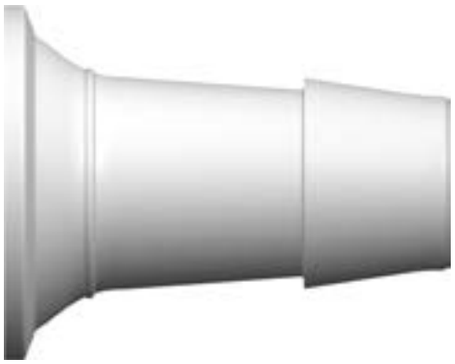
SFMX655 (-6005 -J1A)
Sanitary Fitting, Maxi Flange 1-1/2" to 600 Series Barb, 1/4" (6.4 mm) Tubing ID

SFMX670 (-6005 -J1A)
Sanitary Fitting, Maxi Flange 1-1/2" to 600 Series Barb, 3/8" (9.5 mm) Tubing ID

SFMX680 (-6005 -J1A)
Sanitary Fitting, Maxi Flange 1-1/2" to 600 Series Barb, 1/2" (12.7 mm) Tubing ID

SFMX6100 (-6005 -J1A)
Sanitary Fitting, Maxi Flange 1-1/2" to 600 Series Barb, 3/4" (19.0 mm) Tubing ID

SFMX6110 (-6005 -J1A)
Sanitary Fitting, Maxi Flange 1-1/2" to 600 Series Barb, 1.0" (25.4 mm) Tubing ID



SFMXC (-6005 -J1A)
Sanitary Fitting Maxi Cap 1-1/2"

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Need it fast?
You can order any of our 4,000+ parts online now with no order $ minimums, 24 hours a day, 7 days a week!
www.valueplastics.com

Material Reference

-001 (various, see part description)
-06 Orange Nylon
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-0 Natural Nylon
-1 White Nylon
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-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
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-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
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-1007 Black Acetal
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-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

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-PX Platinum-Cured Silicone
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-VP1 Animal-free Polyethylene
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Tubing Sizes: 1/4", 3/8", 1/2", 3/4", 1"

Leak Resistance: Tested at 80 psi air under water for 90 seconds with no leaks

Tubing Removal Force:

- 1/4" PP with C-Flex® shore A tubing: 21 lbs.
- 1/2" PP with C-Flex® shore A tubing: 89 lbs.
- 1" PP with C-Flex® shore A tubing: 121 lbs.

Interior Surface Finish: 15 Ra Microinch

SFMN655 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 1/4" (6.4 mm) Tubing ID

SFMN670 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 3/8" (9.5 mm) Tubing ID

SFMN680 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 1/2" (12.7 mm) Tubing ID

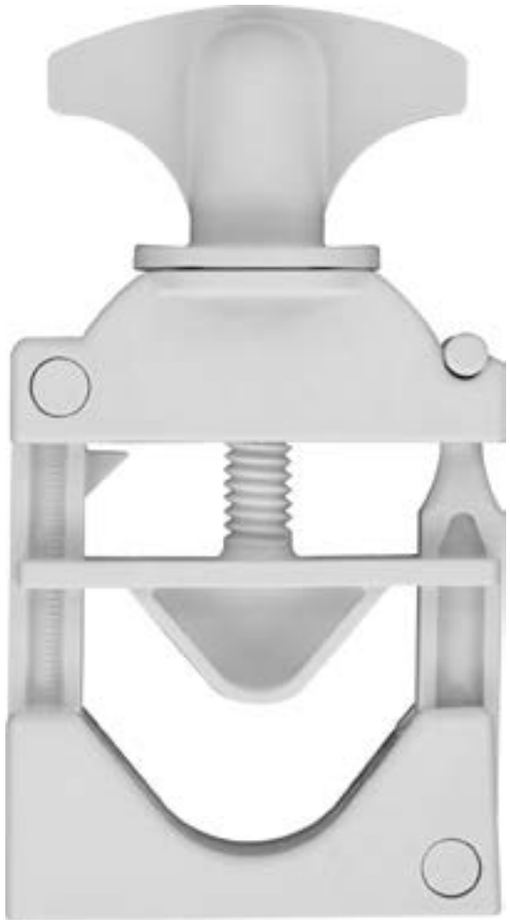
SFMN6100 (-6005 -J1A)
Sanitary Fitting, Mini Flange 3/4" to 600 Series Barb, 3/4" (19.0 mm) Tubing ID

SFMNC (-6005 -J1A)
Sanitary Fitting Mini Cap 3/4"

Did you know?

You can find large bore 3/8" to 1" Tube-To-Tube fittings for your BioProcess needs starting on **Pg-44.**

VBV1000NW (Glass Reinforced White Nylon)
Pinch Valve, Maxi, 1/2" (12.7 mm) to 1" (25.4 mm)



VNG150WHT (Glass Reinforced White Nylon)
Clamp, Maxi Flange, 1" (25.4 mm) to 1.5" (38.1 mm)

VNG300WHT (Glass Reinforced White Nylon)
Clamp, Maxi Flange, 3" (76.2 mm)

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

LUER CONNECTORS

Male Luers
PG-27

Female Luers
PG-29

Adapters
PG-31

Couplers
PG-31

Tees
PG-31

Elbows
PG-31

Plugs and Caps
PG-32

Luer to Thread
PG-33

Panel Mounts and Accessories
PG-35

Custom Luer Fittings
PG-10

Our Luer Tapers

Value Plastics' luer tapers are made to the ISO 594-1 and ISO 594-2 standards, and may be connected to other luers meeting these ISO standards. Please test your application to verify the performance of the interconnection.

Value Plastics' luer fittings come in over 100 configurations and several materials for the device designer, joining tubing from 1/16" (1.6 mm) ID to 1/4" (6.4 mm) ID.

Published ISO Design Standard

- Well understood worldwide
- Often assures interconnections without need to retrofit

Rotating Lock Permits Tube Positioning Prior To Tightening

- Minimizes twisting and kinking of tubing

Tapered Cone Seal

- Reliable
- Inexpensive
- Uncomplicated

Available In Many Materials

- Facilitates optimal material selection for your application

Inexpensive

- Facilitates single-use

Easy To Understand

- Ease of use in field

Many Configuration Options

- Adaptable to wide range of applications

Security Options (Fixed Lock, Rotating Lock, No Lock)

- Tailorable to your specific application

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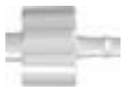
013/+
Website NEW : www.chromalytic.com.au E-mail : info@chromtech.net.au Tel: 03 9762 2034 . . . in AUSTRALIA

MTLL004 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Male Luer Integral Lock Ring to 500 Series Barb, 1/16" (1.6 mm) ID Tubing

MTLL210 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

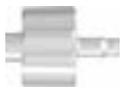
MTLL410 (-1 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

MTLL007 (-1 -2 -3 -4 -5 -6005 -06 -07 -9 -9002)
Male Luer Integral Lock Ring to 500 Series Barb, 3/32" (2.4 mm) ID Tubing



MTLL220 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

MTLL420 (-1 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 400 Series Barb, 3/32" (2.4 mm) ID Tubing



MTLL013 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Male Luer Integral Lock Ring to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

MTLL230 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

MTLL430 (-1 -3 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

MTLL025 (-1 -2 -3 -4 -5 -6005 -06 -07 -9 -9002)
Male Luer Integral Lock Ring to 500 Series Barb, 5/32" (4.0 mm) ID Tubing

MTLL240 (-1 -2 -3 -4 -5 -6005 -06 -07 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

MTLL445 (-1 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 400 Series Barb, .170" (4.3 mm) ID Tubing

MTLL035 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Male Luer Integral Lock Ring to 500 Series Barb, 3/16" (4.8 mm) ID Tubing

MTLL250 (-1 -2 -3 -4 -5 -06 -6005 -07 -8003 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

MTLL450 (-1 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 400 Series Barb, 3/16" (4.8 mm) ID Tubing

MTLL055 (-1 -2 -3 -4 -06 -6005 -07 -9 -9002)
Male Luer Integral Lock Ring to 500 Series Barb, 1/4" (6.4 mm) ID Tubing

MTLL360 (-1 -2 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to 300 Series Barb, 1/4" (6.4 mm) ID Tubing

Part Drawings Online!
Value Plastics provides dimensional drawings available for download for all of its fittings.
www.valueplastics.com

LUER FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

MALE LUER:
Slip, or for use with Lock Ring

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

LUER FITTINGS

FSLLR (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Finger Snap Luer Lock Ring

MLRL004 (-1 -6005 -9)
Male Luer to 500 Series Barb, 1/16" (1.6 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

MLRL007 (-1 -6005 -9)
Male Luer to 500 Series Barb, 3/32" (2.4 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

MLRL013 (-1 -6005 -9)
Male Luer to 500 Series Barb, 1/8" (3.2 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

MLRL025 (-1 -6005 -9)
Male Luer to 500 Series Barb, 5/32" (4.0 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

MLRL035 (-1 -6005 -9 -9002)
Male Luer to 500 Series Barb, 3/16" (4.8 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

MLRL055 (-1 -6005 -9)
Male Luer to 500 Series Barb, 1/4" (6.4 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

MLSL004 (-1 -6005 -9)
Male Luer to 500 Series Barb, 1/16" (1.6 mm) ID Tubing (May be used with separate stationary lock ring; FSLLR)

MLSL007 (-1 -6005 -9)
Male Luer to 500 Series Barb, 3/32" (2.4 mm) ID Tubing (May be used with separate stationary lock ring; FSLLR)

MLSL013 (-1 -6005 -9)
Male Luer to 500 Series Barb, 1/8" (3.2 mm) ID Tubing (May be used with separate stationary lock ring; FSLLR)

MLSL025 (-1 -6005 -9)
Male Luer to 500 Series Barb, 5/32" (4.0 mm) ID Tubing (May be used with separate stationary lock ring; FSLLR)

MLSL035 (-1 -6005 -9)
Male Luer to 500 Series Barb, 3/16" (4.8 mm) ID Tubing (May be used with separate stationary lock ring; FSLLR)

MLSL055 (-1 -6005 -9)
Male Luer to 500 Series Barb, 1/4" (6.4 mm) ID Tubing (May be used with separate stationary lock ring; FSLLR)

It's a lock with Value Plastics!

Our MLRL and MLSL Series of fittings can be used both as a slip luer or as a locking luer with the addition of our FSLLR luer lock ring, which allows color coding without flow path contact. Our MLSL/FSLLR combination results in a stationary lock ring. Use a combination of MLRL and FSLLR to create a color coded rotating lock ring.

MALE LUER:
Slip

MTLS210 (-1 -6005 -9 -J1A)
Male Luer Slip to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

MSL004 (-1 -6005 -9 -9002)
Male Luer Slip to 500 Series Barb, 1/16" (1.6 mm) ID Tubing

MTLS220 (-1 -3 -5 -6005 -81 -9 -J1A)
Male Luer Slip to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

MSL007 (-1 -6005 -9 -9002)
Male Luer Slip to 500 Series Barb, 3/32" (2.4 mm) ID Tubing

MTLS230 (-1 -3 -5 -6005 -81 -9 -9002 -J1A)
Male Luer Slip to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

MSL013 (-1 -6005 -9 -9002)
Male Luer Slip to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

MTLS240 (-1 -2 -5 -6005 -81 -9 -J1A)
Male Luer Slip to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

MSL025 (-1 -6005 -9 -9002)
Male Luer Slip to 500 Series Barb, 5/32" (4.0 mm) ID Tubing

MSL035 (-1 -6005 -9 -9002 -J1A)
Male Luer Slip to 500 Series Barb, 3/16" (4.8 mm) ID Tubing

MSL055 (-1 -6005 -9 -9002)
Male Luer Slip to 500 Series Barb, 1/4" (6.4 mm) ID Tubing

FEMALE LUER:
Thread Style

FTLL004 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002 -J1A)
Female Luer Thread Style to 500 Series Barb, 1/16" (1.6 mm) ID Tubing

FTLL210 (-1 -2 -3 -4 -5 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

FTLL410 (-1 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

FTLL007 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Female Luer Thread Style to 500 Series Barb, 3/32" (2.4 mm) ID Tubing

FTLL220 (-1 -2 -3 -5 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

FTLL420 (-1 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

FTLL013 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Female Luer Thread Style to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

FTLL230 (-1 -2 -3 -5 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

FTLL430 (-1 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

LUER FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

LUER FITTINGS

FEMALE LUER: Thread Style

FTLL025 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Female Luer Thread Style to 500 Series Barb, 5/32" (4.0 mm) ID Tubing

FTLL240 (-1 -2 -3 -5 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

FTLL445 (-1 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 400 Series Barb, .170" (4.3 mm) ID Tubing

FTLL035 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002 -J1A)
Female Luer Thread Style to 500 Series Barb, 3/16" (4.8 mm) ID Tubing

FTLL250 (-1 -3 -5 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

FTLL450 (-1 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 400 Series Barb, 3/16" (4.8 mm) ID Tubing

FTLL055 (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Female Luer Thread Style to 500 Series Barb, 1/4" (6.4 mm) ID Tubing

FTLL360 (-1 -3 -5 -6005 -9 -9002 -J1A)
Female Luer Thread Style to 300 Series Barb, 1/4" (6.4 mm) ID Tubing

FEMALE LUER: Smooth Bore Thread Style

FTLLSB004 (-1 -6005 -9)
Female Luer Thread Style Smooth Bore to 500 Series Barb, 1/16" (1.6 mm) ID Tubing

FTLLSB007 (-1 -4 -6005 -9)
Female Luer Thread Style Smooth Bore to 500 Series Barb, 3/32" (2.4 mm) ID Tubing

FTLLSB013 (-1 -6005 -9)
Female Luer Thread Style Smooth Bore to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

Why choose a smooth bore?

Our Smooth Bore Luers have a smooth inner transition providing for easy insertion of guide wires, probes and other devices.

FEMALE LUER: Lug Style

FTL10 (-1 -6005 -9 -J1A)
Female Luer Lug Style to Classic Series Barb, 1/16" (1.6 mm) ID Tubing

FTL210 (-1 -6005 -9 -J1A)
Female Luer Lug Style to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

FTL20 (-1 -6005 -07 -81 -9 -J1A)
Female Luer Lug Style to Classic Series Barb, 3/32" (2.4 mm) ID Tubing

FTL220 (-1 -3 -5 -6005 -9 -J1A)
Female Luer Lug Style to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

FTL30 (-1 -6005 -9 -J1A)
Female Luer Lug Style to Classic Series Barb, 1/8" (3.2 mm) ID Tubing

FEMALE LUER:
Lug Style

FTL230 (-1 -3 -5 -6005 -9 -J1A)
Female Luer Lug Style to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

FTL240 (-1 -6005 -9 -J1A)
Female Luer Lug Style to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

LUER:
Adapters, Couplers, and Lock Rings

FSLLR (-1 -2 -3 -4 -5 -06 -6005 -07 -9 -9002)
Finger Snap Luer Lock Ring

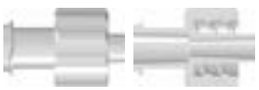
MLRLC (-1 -6005 -9)
Male Luer Coupler (May be used with separate rotating lock rings; FSLLR)

MTLCS (-1 -6005 -9 -J1A)
Male Luer Slip Coupler

FTLLC (-1 -6005 -9 -9002 -J1A)
Female Luer Thread Style Coupler

FTLC (-1 -6005 -9 -9002 -J1A)
Female Luer Lug Style Coupler

LC34 (-1 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to Female Luer Thread Style Coupler



LC78 (-1 -6005 -9 -9002 -J1A)
Male Luer to Female Luer Thread Style Coupler (May be used with separate rotating lock ring; FSLLR)

LT878 (-1 -6005 -9 -9002)
Female Luer Thread Style (2) to Male Luer Tee (May be used with separate rotating lock ring; FSLLR)

LT787 (-1 -6005 -8012 -9 -9002)
Male Luer (2) to Female Luer Thread Style Tee (May be used with separate rotating lock ring; FSLLR)

FTLT (-1 -6005 -9 -J1A)
Female Luer Lug Style Tee

FTLLE (-1 -6005 -9 -J1A)
Female Luer Thread Style Elbow

FTLE (-1 -6005 -9 -J1A)
Female Luer Lug Style Elbow

LE87 (-1 -6005 -8003 -9 -9002)
Male Luer to Female Luer Thread Style Elbow (May be used with separate rotating lock ring; FSLLR)

LE7220 (-1 -2 -9)
Male Luer to 200 Series Barb Elbow, 3/32" (2.4 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

LUER FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

-001 (various, see part description)
-06 Orange Nylon
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-1 White Nylon
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-4 Green Nylon
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-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

LUER: Adapters, Couplers, and Lock Rings

LE7230 (-1 -2 -6005 -9 -9010)
Male Luer to 200 Series Barb Elbow 1/8" (3.2 mm) ID Tubing (May be used with separate rotating lock ring; FSLLR)

CA091 (-001) Gamma Stable Polycarbonate
Male Luer Elbow to 3/16" Classic Series Barb, (CF361-9002) with Rotating Lock Ring (FSLLR-9002)

Need samples for evaluation?
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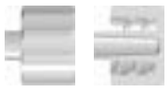
www.valueplastics.com

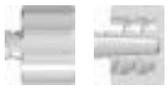
LUER: Plugs and Caps

MTLLP (-1 -2 -3 -6005 -07 -9 -J1A)
Male Luer Integral Lock Ring Plug, Closed at Luer Tip

LP4 (-1 -2 -3 -4 -5 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring Plug, Closed at Grip



VLP4 (-1 -3 -6005 -81 -J1A)
Male Luer Integral Lock Ring Vented Plug, Closed at Grip



MLRLP (-1 -6005 -9)
Male Luer Plug (May be used with separate rotating lock ring; FSLLR)

MLSLP (-1 -6005 -9)
Male Luer Plug (May be used with separate stationary lock ring; FSLLR)

MTLP (-1 -6005 -9 -J1A)
Male Luer Plug, Closed at Tether Loop (May be used with separate stationary lock ring; MLLR)

MTLSP (-1 -6005 -81 -9 -J1A)
Male Luer Slip Plug, Closed at Grip

FTLP (-1 -6005 -9 -J1A)
Female Luer Lug Style Cap with Tether Loop

FTLLP (-1 -2 -3 -5 -6005 -07 -81 -9 -9002 -J1A)
Female Luer Thread Style Cap

LP34 (-1 -3 -5 -6005 -9 -9002 -J1A)
Male Luer Integral Lock Ring to Female Luer Thread Style Plug

ABSML-6005 UNDER (-1 -2 -3 -4 -5 -06 -07)
Male Luer with Rotating Lock Ring and 5/16" Hex to 1/4-28 UNF Bottom Sealing Thread

ABSML-J1A UNDER (-1 -2 -3 -4 -5 -06 -07)
Male Luer with Rotating Lock Ring and 5/16" Hex to 1/4-28 UNF Bottom Sealing Thread

XMTLL (-1 -6005 -9 -J1A)
Male Luer Integral Lock Ring to 10-32 Special Tapered Thread

SMTLL (-1 -6005 -9 -J1A)
Male Luer Integral Lock Ring to 1/4-28 UNF Thread

18MTLL (-1 -2 -6005 -J1A)
Male Luer Integral Lock Ring with 7/16" Hex to 1/8-27 NPT Thread

14MTLL (-1 -2 -6005)
Male Luer Integral Lock Ring with 9/16" Hex to 1/4-18 NPT Thread

XMLRL (-1 -6005 -9 -9002)
Male Luer with 1/4" Hex to 10-32 Special Tapered Thread (May be used with separate rotating lock ring; FSLLR)

SMLRL (-1 -6005 -9 -J1A)
Male Luer with 5/16" Hex to 1/4-28 UNF Thread (May be used with separate rotating lock ring; FSLLR)

BSMLRL (-6005 -J1A)
Male Luer with 5/16" Hex to 1/4-28 Bottom-Sealing Thread (May be used with separate rotating lock ring; FSLLR)

Part Drawings Online!

Value Plastics provides dimensional drawings available for download for all of its fittings.
www.valueplastics.com

Looking for Something Different?

Most of our best product ideas have come from you, our customers. While we pride ourselves on our extensive product offering, we recognize that your needs are ever-changing and that our products, too, must adapt to your needs.

If there's a new product you think Value Plastics should make, drop an email to designcenter@valueplastics.com describing your product concept in as much detail as you desire. We will contact you with any questions, and who knows - the next catalog edition could include products YOU told us to build.

See **page 8** for more information on the Design Center!

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

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-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

LUER FITTINGS

LUER TO THREAD: Female

XFTLL (-1 -6005 -9 -J1A)
Female Luer Thread Style with 1/4" Hex to 10-32 Special Tapered Thread

KFTLL (-1 -6005 -9 -J1A)
Female Luer Thread Style with 1/4" Hex to 10-32 UNF Thread

SFTLL (-1 -2 -4 -06 -6005 -9 -J1A)
Female Luer Thread Style with 5/16" Hex to 1/4-28 UNF Thread

BSFTLL (-1 -6005 -J1A)
Female Luer Thread Style with 5/16" Hex to 1/4-28 UNF Bottom Sealing Thread

XFTL (-1 -6005 -9 -J1A)
Female Luer Lug Style with 1/4" Hex to 10-32 Special Tapered Thread

KFTL (-1 -6005 -9 -J1A)
Female Luer Lug Style with 1/4" Hex to 10-32 UNF Thread

SFTL (-1 -6005 -9)
Female Luer Lug Style with 5/16" Hex to 1/4-28 UNF Thread

18FTLL (-1 -6005 -J1A)
Female Luer Thread Style with 7/16" Hex to 1/8-27 NPT Thread

18LFTLL (-1 -4 -5 -6005 -J1A)
Female Luer Thread Style Elbow with 7/16" Hex to 1/8-27 NPT Thread

PANEL MOUNTS: Female Thread Style

FTLLB210 (-1 -2 -6005 -9 -J1A)
Female Luer Thread Style Panel Mount 1/4-28 UNF to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

FTLLB220 (-1 -2 -6005 -9 -J1A)
Female Luer Thread Style Panel Mount 1/4-28 UNF to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

FTLLB230 (-1 -2 -6005 -9 -J1A)
Female Luer Thread Style Panel Mount 1/4-28 UNF to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

FTLLBMLRL (-1 -6005)
Female Luer Thread Style Panel Mount 1/4-28 UNF to Male Luer (May be used with separate rotating lock ring; FSLLR)

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PANEL MOUNTS:
Female Lug Style and Male Luer

FTLB210 (-1 -6005 -9 -J1A)
Female Luer Lug Style Panel Mount 1/4-28 UNF to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

FTLB220 (-1 -6005 -9 -J1A)
Female Luer Lug Style Panel Mount 1/4-28 UNF to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

FTLB230 (-1 -6005 -9 -J1A)
Female Luer Lug Style Panel Mount 1/4-28 UNF to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

MLRLB210 (-1 -6005)
Male Luer Panel Mount 10-32 UNF to 200 Series Barb, 1/16" (1.6 mm) ID Tubing, (May be used with separate rotating lock ring; FSLLR)

MLRLB220 (-1 -6005)
Male Luer Panel Mount 10-32 UNF to 200 Series Barb, 3/32" (2.4 mm) ID Tubing, (May be used with separate rotating lock ring; FSLLR)

MLRLB230 (-1 -6005)
Male Luer Panel Mount 1/4-28 UNF to 200 Series Barb, 1/8" (3.2 mm) ID Tubing, (May be used with separate rotating lock ring; FSLLR)

PANEL MOUNT ACCESSORIES:
Lock Nuts and Color Coding Rings

CCR (-1 -2 -3 -4 -5 -06 -07)
Color Coded Ring (For use with PMS, PMK, FTLLB or FTLB panel mount fittings)

CCLR (-1 -2 -3 -4 -5 -06 -07)
Color Coded Lock Ring (For use with PMS, PMK, FTLLB or FTLB panel mount fittings)

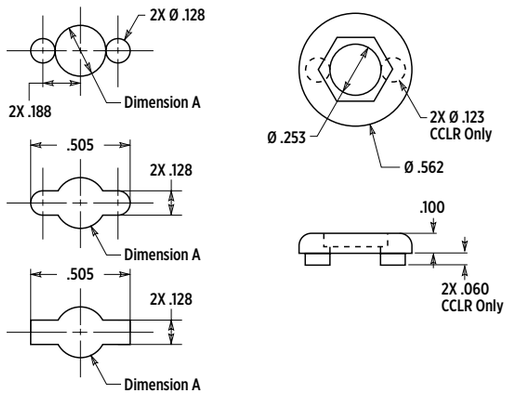
PMKN (-XO)
Panel Mount Nut 10-32 UNF with 3/8" Hex (For use with PMK panel mount fittings)

PMSN (-XO)
Panel Mount Nut 1/4-28 UNF with 7/16" Hex (For use with PMS, FTLB, and FTLLB panel mount fittings)

LNS (-1 -2 -3 -4 -5 -06 -07 -6005 -81 -J1A)
1/4-28 UNF Panel Mount Lock Nut (For use with PMS, FTLLB or FTLB panel mount fittings)

Select the correct lock nut for your panel mount:

PART	Dimension A	Use Lock Nut
FTLLB Series	.255"	PMSN or LNS
FTLB Series	.255"	PMSN or LNS
FTLLBMLRL	.255"	PMSN or LNS
MLRLB210	.193"	PMKN
MLRLB220	.193"	PMKN
MLRLB230	.255"	PMSN or LNS



LUER FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

BLOOD PRESSURE

FITTINGS

BPL Series 1/4 Turn Cuff Connectors
PG-37

BPF Series Female Bayonet Style Quick Connects
PG-37

Bayonet Male Cuff Connectors
PG-38

Bayonet Panel Mount Connectors
PG-38

Dinamap® Monitor Adapters
PG-38

Dinamap® Cuff Connectors
PG-39

BPL
Series

The BPL Series quick connect fittings offers superior ergonomics - a requirement for many designers in their effort to accommodate end users. The BPL's ease-of-use stems largely from a winged male fitting and Value Plastics' patented 10-point grip, making the quarter-turn connection simple and easy to accomplish. A solid snap, that can be both heard and felt, will then reassure the end user that a secure fit has been made.

Another unique characteristic of the BPL Series is the true tube stop on the rotating half of the two connectors. This allows tubing to be fully assembled onto the barb without its edge pushing against the body of the connector.

Ergonomic wing-grip design

- Easier to connect and disconnect than market similars
- 360° of tubing rotation

Quarter-turn design with closure feedback

- Positive reinforcement of secure connection

Sizes to fit 1/8" (3.2 mm) and 5/32" (4.0 mm) ID tubing

- Fits almost all cuffs
- 5/32" hose barb perfectly fits most common cuff tube size

200 Series single barbs

- Ease of assembly
- Enhanced resistance to tube pulloff

Medical grade ABS material (fluid path)

- Withstands bulk sterilization processes
- Holds up under demanding application conditions

Acetal (Wing-grip shroud)

- Added strength

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013/+
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BPL SERIES:
1/4 Turn Cuff Connectors

BPLF230 (-8012)
Quarter-turn Female Blood Pressure Cuff Connector to 200 Series Barb, 1/8" (3.2 mm) Tubing ID

BPLF240 (-8012)
Quarter-turn Female Blood Pressure Cuff Connector to 200 Series Barb, 5/32" (4.0 mm) Tubing ID

BPLM230 (-001) White ABS, White Acetal, Buna-N O-Ring
Quarter-turn Male Blood Pressure Cuff Connector to 200 Series Barb, 1/8" (3.2 mm) Tubing ID

BPLM240 (-001) White ABS, White Acetal, Buna-N O-Ring
Quarter-turn Male Blood Pressure Cuff Connector to 200 Series Barb, 5/32" (4.0 mm) Tubing ID

Part Drawings Online!
Value Plastics provides dimensional drawings available for download for all of its fittings.
www.valueplastics.com

BPF SERIES:
Female Bayonet Style Quick Connect

BPF220 (-001) Black ABS Housing
Bayonet-Style Female Quick Connect Fitting, 200 Series Barb, 3/32" (2.4 mm) ID Tubing

BPF230 (-001) Black ABS Housing
Bayonet-Style Female Quick Connect Fitting, 200 Series Barb, 1/8" (3.2 mm) ID Tubing

BPF240 (-001) Black ABS Housing
Bayonet-Style Female Quick Connect Fitting, 200 Series Barb, 5/32" (4.0 mm) ID Tubing

BPF250 (-001) Black ABS Housing
Bayonet-Style Female Quick Connect Fitting, 200 Series Barb, 3/16" (4.8 mm) ID Tubing

BLOOD PRESSURE

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

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-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

BLOOD PRESSURE

BLOOD PRESSURE: Bayonet Male Cuff Connectors

BPM013 (-1)
Blood Pressure Monitor Bayonet Connector to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

works with...

BPM240 (-1)
Blood Pressure Monitor Bayonet Connector to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

works with...

BPM025 (-1)
Blood Pressure Monitor Bayonet Connector to 500 Series Barb, 5/32" (4.0 mm) ID Tubing

works with...

BPM035 (-1)
Blood Pressure Monitor Bayonet Connector to 500 Series Barb, 3/16" (4.8 mm) ID Tubing

works with...

BPMMTLL (-1 -5)
Blood Pressure Monitor Bayonet Connector to Male Luer Integral Lock Ring

works with...

BLOOD PRESSURE: Bayonet Panel Mount Connectors

BPMB230 (-1)
Blood Pressure Monitor Bayonet Panel Mount Connector to 200 Series Barb, 1/4-28 UNF Thread, 1/8" (3.2 mm) ID Tubing

works with...

BPMB240 (-1)
Blood Pressure Monitor Bayonet Panel Mount Connector to 200 Series Barb, 5/16-24 UNF Thread, 5/32" (4.0 mm) ID Tubing

works with...

BPMB250 (-1)
Blood Pressure Monitor Bayonet Panel Mount Connector to 200 Series Barb, 3/8-24 UNF Thread, 3/16" (4.8 mm) ID Tubing

works with...

BLOOD PRESSURE: Panel Mount Nuts

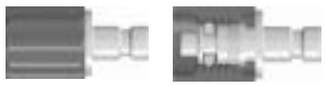
PMSN (-XO)
Panel Mount Nut 1/4-28 UNF with 7/16" Hex (For use with BPMB230)

PM3N (-XO)
Panel Mount Nut 5/16-24 UNF Zinc-Plated Class 2 Steel Nut (For use with BPMB240)

PM2N (-XO)
Panel Mount Nut 3/8-24 UNF Zinc-Plated Class 2 Steel Nut (For Use with BPMB250)

BLOOD PRESSURE: Dinamap® Monitor Adapters

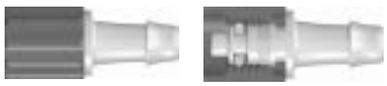
BPAM (-001) Black Nylon over White Nylon
Blood Pressure Monitor Bayonet Connector to Internal 5/16-24 UNF Thread and O-Ring


works with...

BPA013 (-001) Black Nylon over White Nylon
Blood Pressure Adapter with Internal 5/16-24 UNF Thread and O-Ring to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

BPA025 (-001) Black Nylon over White Nylon
Blood Pressure Adapter with Internal 5/16-24 UNF Thread and O-Ring to 500 Series Barb, 5/32" (4.0 mm) ID Tubing

BPA035 (-001) Black Nylon over White Nylon
Blood Pressure Adapter with Internal 5/16-24 UNF Thread and O-Ring to 500 Series Barb, 3/16" (4.8 mm) ID Tubing



BPA055 (-001) Black Nylon over White Nylon
Blood Pressure Adapter with Internal 5/16-24 UNF Thread and O-Ring to 500 Series Barb, 1/4" (6.4 mm) ID Tubing

BPCL220 (-10 -81)
Blood Pressure Adapter with 5/16-24 UNF Thread and 6% Taper to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

BPC220 (-10)
Blood Pressure Adapter with 5/16-24 UNF Thread to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

BPCL230 (-10 -81)
Blood Pressure Adapter with 5/16-24 UNF Thread and 6% Internal Taper to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

BPC230 (-10)
Blood Pressure Adapter with 5/16-24 UNF Thread to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

BPCL025 (-10)
Blood Pressure Adapter with 5/16-24 UNF Thread 6% Internal Taper to 500 Series Barb, 5/32" (4.0 mm) ID Tubing

BPC025 (-10)
Blood Pressure Adapter with 5/16-24 UNF Thread to 500 Series Barb, 5/32" (4.0 mm) ID Tubing

BPCL240 (-10 -81)
Blood Pressure Adapter with 5/16-24 UNF Thread and 6% Internal Taper to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

BPC240 (-10)
Blood Pressure Adapter with 5/16-24 UNF Thread to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

BPCL250 (-10 -81)
Blood Pressure Adapter with 5/16-24 UNF Thread and 6% Internal Taper to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

BPC250 (-10)
Blood Pressure Adapter with 5/16-24 UNF Thread to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

CF229 (-1)
Neonatal Blood Pressure Slip Fit (non luer) with 200 Series Barb, 3/32" (2.4 mm) ID Tubing

CF230 (-1)
Neonatal Blood Pressure Slip Fit (non luer) with 200 Series Barb, 5/32" (4.0 mm) ID Tubing

Did you know?

Value Plastics has an Interactive PDF available online at **www.valueplastics.com**. Access part drawings, reference charts, data sheets, and more from just one location!

BLOOD PRESSURE

Material Reference

-001 (various, see part description)
-06 Orange Nylon
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-0 Natural Nylon
-1 White Nylon
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-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
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-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TAPERED SEAL CONNECTORS

Small Bore
PG-40

Large Bore Male
PG-41

Large Bore Female
PG-41

Plugs and Caps
PG-41

SMALL BORE CONNECTORS:
Male and Female

TSC2M210 (-6005)
Male Taper Seal Non-Luer Connector to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

TSC2M013 (-6005)
Male Taper Seal Non-Luer Connector to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

TSC2M035 (-6005)
Male Taper Seal Non-Luer Connector to 500 Series Barb, 3/16" (4.8 mm) ID Tubing

TSC2F210 (-6005)
Female Taper Seal Non-Luer Connector to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

TSC2F007 (-6005)
Female Taper Seal Non-Luer Connector to 500 Series Barb, 3/32" (2.4 mm) ID Tubing

TSC2F013 (-6005)
Female Taper Seal Non-Luer Connector to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

TSC2F035 (-6005)
Female Taper Seal Non-Luer Connector to 500 Series Barb, 3/16" (4.8 mm) ID Tubing

CHROMalytic +61(0)3 9762 2034 TECHnology Pty Ltd
Australian Distributors Importers & Manufacurers www.chromtech.net.au
013/+
Website NEW : www.chromalytic.com.au E-mail : info@chromtech.net.au Tel: 03 9762 2034 . . . in AUSTRALIA

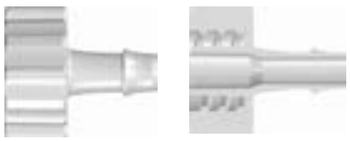
SMALL BORE CONNECTORS: Female and Cap

TSC2FB230 (-6005)
Female Taper Seal Non-Luer with 1/4-28 UNF Panel Mount to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

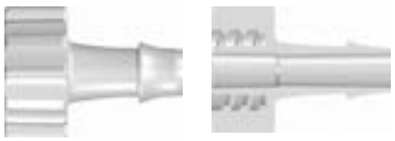
TSC2MP (-6005) 1,000 piece minimum
Male Taper Seal Non-Luer Plug with Tether Recess

LARGE BORE CONNECTORS: Male

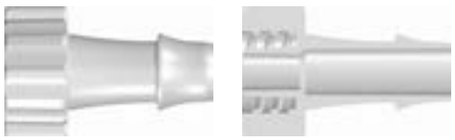
MLB035 (-1 -8012 -9)
Male Large Bore Non-Luer Connector to 500 Series Barb, 3/16" (4.8 mm) ID Tubing



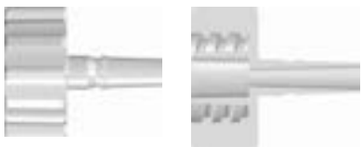
MLB055 (-1 -8012 -9)
Male Large Bore Non-Luer Connector to 500 Series Barb, 1/4" (6.4 mm) ID Tubing



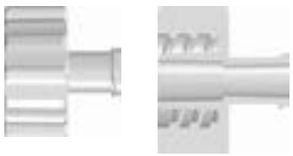
MLB065 (-1 -8012 -9)
Male Large Bore Non-Luer Connector to 500 Series Barb, 5/16" (8.0 mm) ID Tubing



MLBC7 (-9002)
Male Large Bore Non-Luer Connector with Integral Lock Ring to Male Slip Luer (May be Used with Separate Rotating Lock Ring; FSLLR)



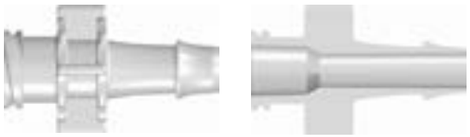
MLBC8 (-9002)
Male Large Bore Non-Luer Connector with Integral Lock Ring to Female Thread-Style Locking Luer



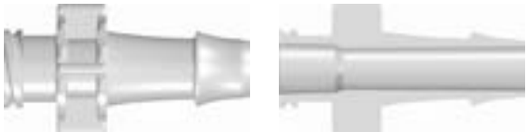
LARGE BORE CONNECTORS: Female

FLB035 (-1 -8012 -9)
Female Large Bore Non-Luer Connector to 500 Series Barb, 3/16" (4.8 mm) ID Tubing

FLB055 (-1 -2 -8012 -9)
Female Large Bore Non-Luer Connector to 500 Series Barb, 1/4" (6.4 mm) ID Tubing



FLB065 (-1 -8012 -9)
Female Large Bore Non-Luer Connector to 500 Series Barb, 5/16" (8.0 mm) ID Tubing



LARGE BORE CONNECTORS: Plugs and Caps

FLBP (-1 -8012 -9)
Female Large Bore Non-Luer Cap

MLBP (-1 -2 -8012 -9 -9002)
Male Large Bore Non-Luer Plug

Need more details?
Part drawings, minimum order quantities, and CAD requests can be found online. Visit **www.valueplastics.com** or contact Sales at **sales@valueplastics.com**

TAPERED SEAL

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE

CONNECTORS

Straight Throughs
PG-43

Straight Through Reducers
PG-45

Elbows
PG-48

Elbow Reducers
PG-49

Tees
PG-50

Tee Reducers
PG-51

Ys
PG-53

Multiports
PG-54

Press-in Plugs
PG-56

Ultrasonically Weldable Barbs
PG-57

Panel Mounts and Accessories
PG-57

Custom Tube-To-Tube Fittings
PG-11

Value Plastics offers barbed tube fittings and tubing connectors in sizes ranging from 1/16" (1.6 mm) to 1" (25.4 mm) tubing ID in over 100 separate configurations in nylon, polypropylene, polycarbonate and PVDF, with other engineering resins available on special order. Available barbed fitting styles include straight tube connectors, elbow fittings, tee fittings, crosses, Y (wye) connectors, multi-port connectors, and multiple straight, elbow and tee reducer combinations.

Several barb styles are offered to provide designers the widest range of assembly forces, pulloff resistance and blowoff resistance – without the need for clamps. Review the descriptions for each of the styles to determine what's best for your application.

Small Bore Barb Styles

Tube ID	Classic	200 Series	400 Series	500 Series
1/16" (1.6 mm)	X	X	X	X
3/32" (2.4 mm)	X	X	X	X
1/8" (3.2 mm)	X	X	X	X
5/32" (4.0 mm)	X	X	X	X
3/16" (4.8 mm)	X	X	X	X
1/4" (6.4 mm)	X	X	X	X
5/16" (8.0 mm)				X

Large Bore Barb Styles

Tube ID	500 Series	600 Series	900 Series
3/8" (9.5 mm)	X	X	X
1/2" (12.7 mm)	X	X	X
5/8" (16.0 mm)	X	X	
3/4" (19.0 mm)	X	X	
1" (25.4 mm)	X	X	

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N004 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with 500 Series Barbs, 1/16" (1.6 mm) ID Tubing

N210 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with 200 Series Barbs, 1/16" (1.6 mm) ID Tubing

N410 (-1 -2 -6005 -J1A)
Straight Through Connector with 400 Series Barbs, 1/16" (1.6 mm) ID Tubing

AA (-1 -2 -6005 -9 -J1A)
Straight Through Connector with Classic Series Barbs, 1/16" (1.6 mm) ID Tubing

N007 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with 500 Series Barbs, 3/32" (2.4 mm) ID Tubing

N220 (-1 -2 -6005 -9 -9002 -J1A)
Straight Through Connector with 200 Series Barbs, 3/32" (2.4 mm) ID Tubing

N420 (-1 -2 -6005 -J1A)
Straight Through Connector with 400 Series Barbs, 3/32" (2.4 mm) ID Tubing

DD (-1 -2 -6005 -9 -J1A)
Straight Through Connector with Classic Series Barbs, 3/32" (2.4 mm) ID Tubing

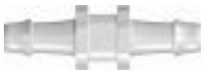
N013 (-1 -2 -6005 -9 -J1A -9002)
Straight Through Connector with 500 Series Barbs, 1/8" (3.2 mm) ID Tubing

N230 (-1 -2 -3 -5 -6005 -9 -J1A)
Straight Through Connector with 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

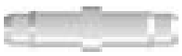
N430 (-1 -2 -6005 -J1A)
Straight Through Connector with 400 Series Barbs, 1/8" (3.2 mm) ID Tubing

CC (-1 -2 -6005 -9 -J1A)
Straight Through Connector with Classic Series Barbs, 1/8" (3.2 mm) ID Tubing

N025 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with 500 Series Barbs, 5/32" (4.0 mm) ID Tubing



N440 (-1 -2 -5 -6005 -9 -J1A)
Straight Through Connector with 400 Series Barbs, 5/32" (4.0 mm) ID Tubing



4040 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with Classic Series Barbs, 5/32" (4.0 mm) ID Tubing

Need samples for evaluation?
You can call to request most of our standard product in quantities of 5, or less, for free **application evaluation.**
+1 (970) 267-5200 Toll Free: (888) 404-5837

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

LARGE TUBE-TO-TUBE:
Straight Through

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

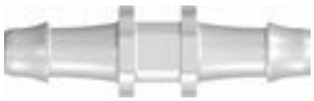
Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE FITTINGS

N035 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with 500 Series Barbs, 3/16" (4.8 mm) ID Tubing

5050 (-1 -2 -6005 -9 -9002 -J1A)
Straight Through Connector with Classic Series Barbs, 3/16" (4.8 mm) ID Tubing

N055 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with 500 Series Barbs, 1/4" (6.4 mm) ID Tubing



6060 (-1 -2 -6005 -9 -9002 -J1A)
Straight Through Connector with Classic Series Barbs, 1/4" (6.4 mm) ID Tubing

N065 (-1 -2 -6005 -9 -J1A)
Straight Through Connector with 500 Series Barbs, 5/16" (8 mm) ID Tubing

Part Drawings Online!
Value Plastics provides dimensional drawings available for download for all of its fittings.
www.valueplastics.com

Reference part shown: N670

Due to size we are not able to display all large Tube-To-Tube connectors. Please see **www.valueplastics.com** for part reference. Minimum package quantities vary by tube IDs, please verify minimum package sizes when placing orders.

N070 (-0 -6005 -9)
Straight Through Connector with 500 Series Barbs, 3/8" (9.5 mm) ID Tubing

N670 (-6005 -9 -J1A)
Straight Through Connector with 600 Series Barbs, 3/8" (9.5 mm) ID Tubing

N970 (-9)
Straight Through Connector with 900 Series Barbs, 3/8" (9.5 mm) ID Tubing

N080 (-0 -6005 -9)
Straight Through Connector with 500 Series Barbs, 1/2" (12.7 mm) ID Tubing

N680 (-6005 -9 -J1A)
Straight Through Connector with 600 Series Barbs, 1/2" (12.7 mm) ID Tubing

N975 (-9)
Straight Through Connector with 900 Series Barbs, 1/2" (12.7 mm) ID Tubing

N090 (-0 -6005 -9)
Straight Through Connector with 500 Series Barbs, 5/8" (16.0 mm) ID Tubing

N690 (-0 -6005 -9)
Straight Through Connector with 600 Series Barbs, 5/8" (16.0 mm) ID Tubing

N100 (-0 -6005)
Straight Through Connector with 500 Series Barbs, 3/4" (19.0 mm) ID Tubing

N110 (-0 -6005)
Straight Through Connector with 500 Series Barbs, 1" (25.4 mm) ID Tubing

N007/004 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

N220/210 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 200 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

N420/410 (-1 -2 -6005 -10 -J1A)
Straight Through Reduction Connector with 400 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

AD (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

N013/004 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

N230/210 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

N430/410 (-1 -2 -6005 -J1A)
Straight Through Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

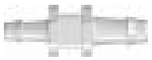
AC (-0 -1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

N025/004 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 5/32" (4.0 mm) and 1/16" (1.6 mm) ID Tubing

1040 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 5/32" (4.0 mm) and 1/16" (1.6 mm) ID Tubing

1050 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 3/16" (4.8 mm) and 1/16" (1.6 mm) ID Tubing

N013/007 (-1 -2 -6005 -9 -9002 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing



N230/220 (-1 -2 -6005 -07 -9 -J1A)
Straight Through Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

N430/420 (-1 -2 -6005 -J1A)
Straight Through Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

DC (-1 -2 -6005 -9)
Straight Through Reduction Connector with Classic Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE:
Straight Through Reducer

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE FITTINGS

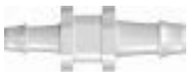
N025/007 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 5/32" (4.0 mm) and 3/32" (2.4 mm) ID Tubing

2040 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 5/32" (4.0 mm) and 3/32" (2.4 mm) ID Tubing

N035/007 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 3/16" (4.8 mm) and 3/32" (2.4 mm) ID Tubing

2050 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 3/16" (4.8 mm) and 3/32" (2.4 mm) ID Tubing

N025/013 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 5/32" (4.0 mm) and 1/8" (3.2 mm) ID Tubing



3040 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 5/32" (4.0 mm) and 1/8" (3.2 mm) ID Tubing

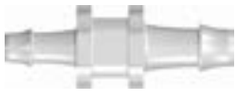
N035/013 (-1 -2 -6005 -81 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 3/16" (4.8 mm) and 1/8" (3.2 mm) ID Tubing

3050 (-1 -2 -5 -6005 -81 -9 -9002 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 3/16" (4.8 mm) and 1/8" (3.2 mm) ID Tubing

N055/013 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 1/4" (6.4 mm) and 1/8" (3.2 mm) ID Tubing

3060 (-1 -2 -6005 -9 -J1A -J1A2)
Straight Through Reduction Connector with Classic Series Barbs, 1/4" (6.4 mm) and 1/8" (3.2 mm) ID Tubing

N035/025 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 3/16" (4.8 mm) and 5/32" (4.0 mm) ID Tubing



4050 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 3/16" (4.8 mm) and 5/32" (4.0 mm) ID Tubing

N055/025 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 1/4" (6.4 mm) and 5/32" (4.0 mm) ID Tubing

Did you know?

Value Plastics has an Interactive PDF available online at **www.valueplastics.com**. Access part drawings, reference charts, data sheets, and more from just one location!

4060 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 1/4" (6.4 mm) and 5/32" (4.0 mm) ID Tubing

N065/025 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 5/16" (8.0 mm) and 5/32" (4.0 mm) ID Tubing

N055/035 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 1/4" (6.4 mm) and 3/16" (4.8 mm) ID Tubing

5060 (-1 -2 -6005 -9 -9002 -J1A)
Straight Through Reduction Connector with Classic Series Barbs, 1/4" (6.4 mm) and 3/16" (4.8 mm) ID Tubing

N065/035 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 5/16" (8.0 mm) and 3/16" (4.8 mm) ID Tubing

N065/055 (-1 -2 -6005 -9 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 5/16" (8.0 mm) and 1/4" (6.4 mm) ID Tubing

Reference part shown: N070/013

Due to size we are not able to display all large Tube-To-Tube connectors. Please see **www.valueplastics.com** for part reference. Minimum package quantities vary by tube IDs, please verify minimum package sizes when placing orders.

N070/013 (-0 -6005 -9 -9002 -J1A)
Straight Through Reduction Connector with 500 Series Barbs, 3/8" (9.5 mm) and 1/8" (3.2 mm) ID Tubing

N670/655 (-6005 -9 -J1A)
Straight Through Reduction Connector with 600 Series Barbs, 3/8" (9.5 mm) and 1/4" (6.4 mm) ID Tubing

N680/655 (-6005 -9 -J1A)
Straight Through Reduction Connector with 600 Series Barbs, 1/2" (12.7 mm) and 1/4" (6.4 mm) ID Tubing

N680/670 (-6005 -9)
Straight Through Reduction Connector with 600 Series Barbs, 1/2" (12.7 mm) and 3/8" (9.5 mm) ID Tubing

N690/655 (-6005 -9)
Straight Through Reduction Connector with 600 Series Barbs, 5/8" (16.0 mm) and 1/4" (6.4 mm) ID Tubing

N690/670 (-6005 -9)
Straight Through Reduction Connector with 600 Series Barbs, 5/8" (16.0 mm) and 3/8" (9.5 mm) ID Tubing

N6110/6100 (-6005 -9)
Straight Through Reduction Connector with 600 Series Barbs, 1" (25.4 mm) and 3/4" (19.0 mm) ID Tubing

N070/055 (-0 -6005 -9)
Straight Through Reduction Connector with 500 Series Barbs, 3/8" (9.5 mm) and 1/4" (6.4 mm) ID Tubing

N080/055 (-0 -6005 -9)
Straight Through Reduction Connector with 500 Series Barbs, 1/2" (12.7 mm) and 1/4" (6.4 mm) ID Tubing

N090/055 (-0 -6005)
Straight Through Reduction Connector with 500 Series Barbs, 5/8" (16.0 mm) and 1/4" (6.4 mm) ID Tubing

N080/070 (-0 -6005 -9)
Straight Through Reduction Connector with 500 Series Barbs, 1/2" (12.7 mm) and 3/8" (9.5 mm) ID Tubing

N090/070 (-0 -6005)
Straight Through Reduction Connector with 500 Series Barbs, 5/8" (16.0 mm) and 3/8" (9.5 mm) ID Tubing

N100/080 (-0 -6005)
Straight Through Reduction Connector with 500 Series Barbs, 3/4" (19.0 mm) and 1/2" (12.7 mm) ID Tubing

N110/100 (-0 -6005)
Straight Through Reduction Connector with 500 Series Barbs, 1" (25.4 mm) and 3/4" (19.0 mm) ID Tubing

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE:
Elbow

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE FITTINGS

L210 (-1 -2 -6005 -9 -J1A)
Elbow Connector with 200 Series Barbs, 1/16" (1.6 mm) ID Tubing

L410 (-1 -2 -6005 -J1A)
Elbow Connector with 400 Series Barbs, 1/16" (1.6 mm) ID Tubing

L10 (-1 -2 -6005 -J1A)
Elbow Connector with Classic Series Barbs, 1/16" (1.6 mm) ID Tubing

L220 (-1 -2 -6005 -9 -9002 -J1A)
Elbow Connector with 200 Series Barbs, 3/32" (2.4 mm) ID Tubing

L420 (-1 -2 -6005 -J1A)
Elbow Connector with 400 Series Barbs, 3/32" (2.4 mm) ID Tubing

L20 (-1 -2 -6005 -J1A)
Elbow Connector with Classic Series Barbs, 3/32" (2.4 mm) ID Tubing

L230 (-1 -2 -6005 -9 -J1A)
Elbow Connector with 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

L430 (-1 -2 -6005 -J1A)
Elbow Connector with 400 Series Barbs, 1/8" (3.2 mm) ID Tubing

L30 (-1 -2 -6005 -J1A)
Elbow Connector with Classic Series Barbs, 1/8" (3.2 mm) ID Tubing

L440 (-2)
Elbow Connector with 400 Series Barbs, 5/32" (4.0 mm) ID Tubing

L40 (-1 -2 -6005 -J1A)
Elbow Connector with Classic Series Barbs, 5/32" (4.0 mm) ID Tubing

L50 (-1 -2 -6005 -J1A)
Elbow Connector with Classic Series Barbs, 3/16" (4.8 mm) ID Tubing

L60 (-1 -2 -6005 -J1A)
Elbow Connector with Classic Series Barbs, 1/4" (6.4 mm) ID Tubing

Need more details?
Part drawings, minimum order quantities, and CAD requests can be found online. Visit **www.valueplastics.com** or contact Sales at **sales@valueplastics.com**

LARGE TUBE-TO-TUBE:
Elbow

Reference part shown: L070

Due to size we are not able to display all large Tube-To-Tube connectors. Please see **www.valueplastics.com** for part reference. Minimum package quantities vary by tube IDs, please verify minimum package sizes when placing orders.

L070 (-0 -6005)
Elbow Connector with 500 Series Barbs, 3/8" (9.5 mm) ID Tubing

L970 (-9)
Elbow Connector with 900 Series Barbs, 3/8" (9.5 mm) ID Tubing

L080 (-0 -6005)
Elbow Connector with 500 Series Barbs, 1/2" (12.7 mm) ID Tubing

L975 (-9)
Elbow Connector with 900 Series Barbs, 1/2" (12.7 mm) ID Tubing

L090 (-0 -6005)
Elbow Connector with 500 Series Barbs, 5/8" (16.0 mm) ID Tubing

L100 (-0 -6005)
Elbow Connector with 500 Series Barbs, 3/4" (19.0 mm) ID Tubing

L110 (-0 -6005)
Elbow Connector with 500 Series Barbs, 1" (25.4 mm) ID Tubing

L6110 (-6005)
Elbow Connector with 600 Series Barbs, 1" (25.4 mm) ID Tubing

CF494 (-6 -6005)
Low-profile Elbow Connector with Custom 600 Series Barbs, 1" (25.4 mm) ID Tubing

TUBE-TO-TUBE:
Elbow Reducer

L220/210 (-1 -2 -6005 -9 -J1A)
Elbow Reduction Connector with 200 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

L420/410 (-1 -2 -6005 -J1A)
Elbow Reduction Connector with 400 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

L230/210 (-1 -2 -6005 -9 -J1A)
Elbow Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

L430/410 (-1 -2 -6005 -J1A)
Elbow Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

L230/220 (-1 -2 -6005 -9 -J1A)
Elbow Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

L430/420 (-1 -2 -6005 -J1A)
Elbow Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

L430/220 (-9002)
Elbow Reduction Connector with a 400 Series Barb, 1/8" (3.2 mm) and a 200 Series Barb, 3/32" (2.4 mm) ID Tubing

TUBE-TO-TUBE FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

LARGE TUBE-TO-TUBE: Elbow Reducer

Reference part shown: L070/055

Due to size we are not able to display all large Tube-To-Tube connectors. Please see **www.valueplastics.com** for part reference. Minimum package quantities vary by tube IDs, please verify minimum package sizes when placing orders.

L070/055 (-0 -6005)
Elbow Reduction Connector with 500 Series Barbs, 3/8" (9.5 mm) and 1/4" (6.4 mm) ID Tubing

L080/070 (-0 -6005)
Elbow Reduction Connector with 500 Series Barbs, 1/2" (12.7 mm) and 3/8" (9.5 mm) ID Tubing

L100/080 (-0 -6005)
Elbow Reduction Connector with 500 Series Barbs, 3/4" (19.0 mm) and 1/2" (12.7 mm) ID Tubing

L110/100 (-0 -6005)
Elbow Reduction Connector with 500 Series Barbs, 1" (25.4 mm) and 3/4" (19.0 mm) ID Tubing

TUBE-TO-TUBE: Tee

T210 (-1 -2 -6005 -9 -J1A)
Tee Connector with 200 Series Barbs, 1/16" (1.6 mm) ID Tubing

T410 (-1 -2 -6005 -J1A)
Tee Connector with 400 Series Barbs, 1/16" (1.6 mm) ID Tubing

T10 (-1 -2 -6005 -J1A)
Tee Connector with Classic Series Barbs, 1/16" (1.6 mm) ID Tubing

T220 (-1 -2 -6005 -9 -J1A)
Tee Connector with 200 Series Barbs, 3/32" (2.4 mm) ID Tubing

T420 (-1 -2 -6005 -J1A)
Tee Connector with 400 Series Barbs, 3/32" (2.4 mm) ID Tubing

TUBE-TO-TUBE FITTINGS

TUBE-TO-TUBE: Tee

T20 (-1 -2 -6005 -J1A)
Tee Connector with Classic Series Barbs, 3/32" (2.4 mm) ID Tubing

T230 (-1 -2 -5 -6005 -9 -J1A)
Tee Connector with 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

T250 (-1 -2 -6005 -9 -J1A)
Tee Connector with 200 Series Barbs, 3/16" (4.8 mm) ID Tubing

T430 (-1 -2 -6005 -9002 -J1A)
Tee Connector with 400 Series Barbs, 1/8" (3.2 mm) ID Tubing

T013 (-6005)
Tee Connector with 500 Series Barbs, 1/8" (3.2 mm) ID Tubing

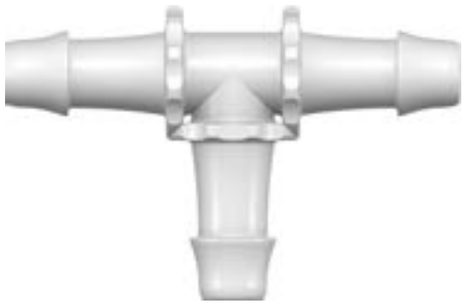
T30 (-1 -2 -6005 -9 -J1A)
Tee Connector with Classic Series Barbs, 1/8" (3.2 mm) ID Tubing

T40 (-1 -2 -6005 -J1A)
Tee Connector with Classic Series Barbs, 5/32" (4 mm) ID Tubing

T055 (-6005)
Tee Connector with 500 Series Barbs, 1/4" (6.4 mm) ID Tubing

T60 (-1 -2 -6005 -9 -J1A)
Tee Connector with Classic Series Barbs, 1/4" (6.4 mm) ID Tubing

LARGE TUBE-TO-TUBE:
Tee



Reference part shown: T070

Due to size we are not able to display all large Tube-To-Tube connectors. Please see **www.valueplastics.com** for part reference. Minimum package quantities vary by tube IDs, please verify minimum package sizes when placing orders.

T070 (-0 -6005 -9)
Tee Connector with 500 Series Barbs, 3/8" (9.5 mm) ID Tubing

T670 (-1 -6005 -9 -J1A)
Tee Connector with 600 Series Barbs, 3/8" (9.5 mm) ID Tubing

T970 (-9)
Tee Connector with 900 Series Barbs, 3/8" (9.5 mm) ID Tubing

T080 (-0 -6005 -9)
Tee Connector with 500 Series Barbs, 1/2" (12.7 mm) ID Tubing

T680 (-6005 -9 -J1A)
Tee Connector with 600 Series Barbs, 1/2" (12.7 mm) ID Tubing

T975 (-9)
Tee Connector with 900 Series Barbs, 1/2" (12.7 mm) ID Tubing

T690 (-6005 -9)
Tee Connector with 600 Series Barbs, 5/8" (16.0 mm) ID Tubing

T100 (-0 -6005 -9)
Tee Connector with 500 Series Barbs, 3/4" (19.0 mm) ID Tubing

T110 (-0 -6005)
Tee Connector with 500 Series Barbs, 1" (25.4 mm) ID Tubing

T210/220 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 400 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

T410/420 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 1/16" (1.6 mm) and 3/32" (2.4 mm) ID Tubing

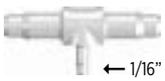
T420/410 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

T220/210 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

T220R210 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

T420R410 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

T430/410 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing



T230/210 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

T210/230 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 1/16" (1.6 mm) and 1/8" (3.2 mm) ID Tubing

T410/430 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 1/16" (1.6 mm) and 1/8" (3.2 mm) ID Tubing

TUBE-TO-TUBE FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE:
Tee Reducer

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

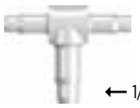
TUBE-TO-TUBE FITTINGS

T230R210 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

T430R410 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

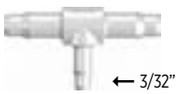
T220/230 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 3/32" (2.4 mm) and 1/8" (3.2 mm) ID Tubing

T420/430 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 3/32" (2.4 mm) and 1/8" (3.2 mm) ID Tubing



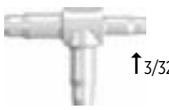
T230/220 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

T430/420 (-1 -2 -3 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

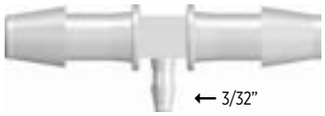


T230R220 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

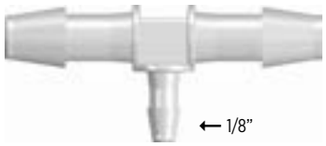
T430R420 (-1 -2 -6005 -J1A)
Tee Reduction Connector with 400 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing



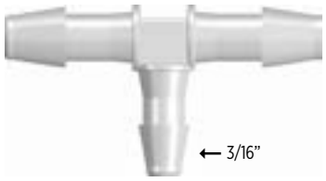
T360/220 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 and 300 Series Barbs, 1/4" (6.4 mm) and 3/32" (2.4 mm) ID Tubing



T360/230 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 and 300 Series Barbs, 1/4" (6.4 mm) and 1/8" (3.2 mm) ID Tubing



T360/250 (-1 -2 -6005 -9 -J1A)
Tee Reduction Connector with 200 and 300 Series Barbs, 1/4" (6.4 mm) and 3/16" (4.8 mm) ID Tubing



LARGE TUBE-TO-TUBE:
Tee

Reference part shown: T070/055

Due to size we are not able to display all large Tube-To-Tube connectors. Please see **www.valueplastics.com** for part reference. Minimum package quantities vary by tube IDs, please verify minimum package sizes when placing orders.

T070/055 (-0 -6005 -9)
Tee Reduction Connector with 500 Series Barbs, 3/8" (9.5 mm) and 1/4" (6.4 mm) ID Tubing

T080/055 (-0 -6005 -9)
Tee Reduction Connector with 500 Series Barbs, 1/2" (12.7 mm) and 1/4" (6.4 mm) ID Tubing

T080/070 (-0 -6005 -9)
Tee Reduction Connector with 500 Series Barbs, 1/2" (12.7 mm) and 3/8" (9.5 mm) ID Tubing

T100/080 (-0 -6005 -9)
Tee Reduction Connector with 500 Series Barbs, 3/4" (19.0 mm) and 1/2" (12.7 mm) ID Tubing

T110/100 (-0 -6005)
Tee Reduction Connector with 500 Series Barbs, 1" (25.4 mm) and 3/4" (19.0 mm) ID Tubing

Y210 (-1 -2 -6005 -9 -J1A)
Y Connector with 200 Series Barbs, 1/16" (1.6 mm) ID Tubing

Y410 (-1 -2 -6005 -J1A)
Y Connector with 400 Series Barbs, 1/16" (1.6 mm) ID Tubing

Y220 (-1 -2 -6005 -9 -J1A)
Y Connector with 200 Series Barbs, 3/32" (2.4 mm) ID Tubing

Y420 (-1 -2 -6005 -J1A)
Y Connector with 400 Series Barbs, 3/32" (2.4 mm) ID Tubing

Y230 (-1 -2 -3 -6005 -9 -9002 -9010 -J1A)
Y Connector with 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

Y430 (-1 -2 -6005 -J1A)
Y Connector with 400 Series Barbs, 1/8" (3.2 mm) ID Tubing

Y013 (-6005)
Y Connector with 500 Series Barbs, 1/8" (3.2 mm) ID Tubing

Y240 (-1 -2 -6005 -9 -J1A)
Y Connector with 200 Series Barbs, 5/32" (4.0 mm) ID Tubing

Y250 (-1 -2 -6005 -9 -9002 -J1A)
Y Connector with 200 Series Barbs, 3/16" (4.8 mm) ID Tubing

Y450 (-1 -2 -6005 -J1A)
Y Connector with 400 Series Barbs, 3/16" (4.8 mm) ID Tubing

Y260 (-1 -2 -6005 -9 -9002 -J1A)
Y Connector with 200 Series Barbs, 1/4" (6.4 mm) ID Tubing

Y460 (-1 -2 -6005 -9 -J1A)
Y Connector with 400 Series Barbs, 1/4" (6.4 mm) ID Tubing

TUBE-TO-TUBE FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE: Y

Y055 (-6005)
Y Connector with 500 Series Barbs, 1/4" (6.4 mm) ID Tubing

LARGE TUBE-TO-TUBE: Y

Reference part shown: Y070

TUBE-TO-TUBE FITTINGS

Due to size we are not able to display all large Tube-To-Tube connectors. Please see **www.valueplastics.com** for part reference. Minimum package quantities vary by tube IDs, please verify minimum package sizes when placing orders.

Y070 (-0 -6005 -9)
Y Connector with 500 Series Barbs, 3/8" (9.5 mm) ID Tubing

Y670 (-6005 -9 -J1A)
Y Connector with 600 Series Barbs, 3/8" (9.5 mm) ID Tubing

Y080 (-0 -6005 -9)
Y Connector with 500 Series Barbs, 1/2" (12.7 mm) ID Tubing

Y680 (-6005 -9 -J1A)
Y Connector with 600 Series Barbs, 1/2" (12.7 mm) ID Tubing

Y090 (-0 -6005 -J1A)
Y Connector with 500 Series Barbs, 5/8" (16.0 mm) ID Tubing

Y100 (-0 -6005 -J1A)
Y Connector with 500 Series Barbs, 3/4" (19.0 mm) ID Tubing

Y110 (-0 -6005)
Y Connector with 500 Series Barbs, 1" (25.4 mm) ID Tubing

TUBE-TO-TUBE: Multiport

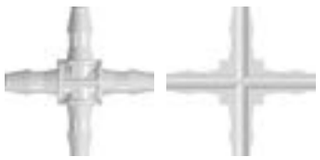
3PF210 (-1 -6005)
Three-port F Style Manifold with 200 Series Barbs for 1/16" (1.6 mm) ID Tubing

3PF220 (-1 -6005)
Three-port F Style Manifold with 200 Series Barbs for 3/32" (2.4 mm) ID Tubing

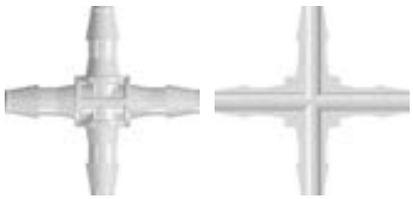
3PF230 (-1 -6005)
Three-port F Style Manifold with 200 Series Barbs for 1/8" (3.2 mm) ID Tubing

4PX210 (-1 -6005)
Four-port Cross Style Manifold with 200 Series Barbs for 1/16" (1.6 mm) ID Tubing

4PX220 (-1 -6005)
Four-port Cross Style Manifold with 200 Series Barbs for 3/32" (2.4 mm) ID Tubing



4PX230 (-1 -6005)
Four-port Cross Style Manifold with 200 Series Barbs for 1/8" (3.2 mm) ID Tubing



4PDL210 (-1 -6005)
Four-port Double Elbow Style Manifold with 200 Series Barbs, 1/16" (1.6 mm) ID Tubing

4PDL220 (-1 -6005)
Four-port Double Elbow Style Manifold with 200 Series Barbs, 3/32" (2.4 mm) ID Tubing

4PDL230 (-1 -6005)
Four-port Double Elbow Style Manifold with 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

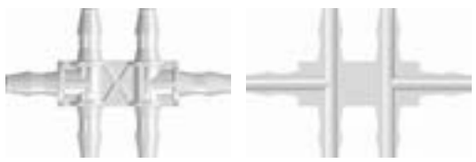
4PLL210 (-1 -6005)
Four-port Thru Flow Double Elbow Style Manifold with 200 Series Barbs, 1/16" (1.6 mm) ID Tubing

4PLL220 (-1 -6005 -9)
Four-port Thru Flow Double Elbow Style Manifold with 200 Series Barbs, 3/32" (2.4 mm) ID Tubing

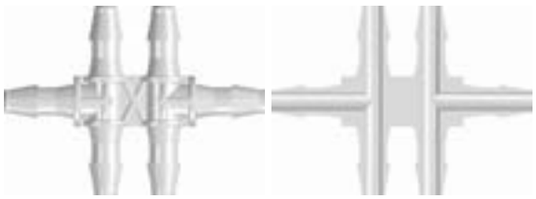
4PLL230 (-1 -2 -6005)
Four-port Thru Flow Double Elbow Style Manifold with 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

6PDT210 (-1 -6005)
Six-port Double T Style Manifold with 200 Series Barbs for 1/16" (1.6 mm) ID Tubing

6PDT220 (-1 -6005)
Six-port Double T Style Manifold with 200 Series Barbs for 3/32" (2.4 mm) ID Tubing



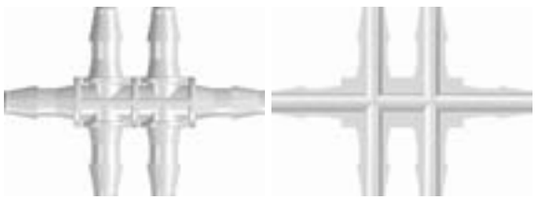
6PDT230 (-1 -6005)
Six-port Double T Style Manifold with 200 Series Barbs for 1/8" (3.2 mm) ID Tubing



6PTT210 (-1 -6005)
Six-port Thru Flow Double T Style Manifold with 200 Series Barbs for 1/16" (1.6 mm) ID Tubing

6PTT220 (-1 -6005)
Six-port Thru Flow Double T Style Manifold with 200 Series Barbs for 3/32" (2.4 mm) ID Tubing

6PTT230 (-1 -6005)
Six-port Thru Flow Double T Style Manifold with 200 Series Barbs for 1/8" (3.2 mm) ID Tubing



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www.valueplastics.com

TUBE-TO-TUBE FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE:
Press-In Plugs

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

TUBE-TO-TUBE FITTINGS

PIP210 (-1 -2 -6005 -J1A)
Press-In Plug with 200 Series Barb, 1/16" (1.6 mm) ID Tubing

PIP10 (-1 -2 -6005 -J1A)
Press-In Plug with Classic Series Barb, 1/16" (1.6 mm) ID Tubing

PIP220 (-1 -2 -6005 -J1A)
Press-In Plug with 200 Series Barb, 3/32" (2.4 mm) ID Tubing

PIP20 (-1 -2 -6005 -J1A)
Press-In Plug with Classic Series Barb, 3/32" (2.4 mm) ID Tubing

PIP230 (-1 -2 -6005 -J1A)
Press-In Plug with 200 Series Barb, 1/8" (3.2 mm) ID Tubing

PIP30 (-1 -2 -6005 -J1A)
Press-In Plug with Classic Series Barb, 1/8" (3.2 mm) ID Tubing

PIP240 (-1 -2 -6005 -J1A)
Press-In Plug with 200 Series Barb, 5/32" (4.0 mm) ID Tubing

PIP40 (-1 -2 -6005 -J1A)
Press-In Plug with Classic Series Barb, 5/32" (4.0 mm) ID Tubing

PIP50 (-1 -2 -6005 -J1A)
Press-In Plug with Classic Series Barb, 3/16" (4.8 mm) ID Tubing

PIP60 (-1 -2 -6005 -J1A)
Press-In Plug with Classic Series Barb, 1/4" (6.4 mm) ID Tubing

PIP070 (-0 -6005)
Press-In Plug with 500 Series Barb, 3/8" (9.5 mm) ID Tubing

PIP670 (-6005)
Press-In Plug with 600 Series Barb, 3/8" (9.5 mm) ID Tubing

PIP080 (-6005)
Press-In Plug with 500 Series Barb, 1/2" (12.7 mm) ID tubing

PIP680 (-6005)
Press-In Plug with 600 Series Barb, 1/2" (12.7 mm) ID Tubing

PIP090 (-6005)
Press-In Plug with 500 Series Barb, 5/8" (16.0 mm) ID Tubing

U10 (-1 -2 -7 -9)
Ultrasonically Weldable Fitting to Classic Series Barb, 1/16" (1.6 mm) ID Tubing

U20 (-1 -2 -7)
Ultrasonically Weldable Fitting to Classic Series Barb, 3/32" (2.4 mm) ID Tubing

U30 (-1 -2 -7)
Ultrasonically Weldable Fitting to Classic Series Barb, 1/8" (3.2 mm) ID Tubing

TUBE-TO-TUBE PANEL MOUNTS:
Straight Through and Reducer

PMK210 (-1 -6005)
Panel Mount Connector 10-32 UNF to 200 Series Barbs, 1/16" (1.6 mm) ID Tubing

PMK220 (-1 -6005)
Panel Mount Connector 10-32 UNF to 200 Series Barbs, 3/32" (2.4 mm) ID Tubing

PMS230 (-1 -6005)
Panel Mount Connector 1/4-28 UNF to 200 Series Barbs, 1/8" (3.2 mm) ID Tubing

PMK220-210 (-1 -6005)
Panel Mount Reduction Connector 10-32 UNF to 200 Series Barbs, 3/32" (2.4 mm) and 1/16" (1.6 mm) ID Tubing

PMS230-210 (-1 -6005 -J1A)
Panel Mount Reduction Connector 1/4-28 UNF to 200 Series Barbs, 1/8" (3.2 mm) and 1/16" (1.6 mm) ID Tubing

PMS230-220 (-1 -6005)
Panel Mount Reduction Connector 1/4-28 UNF to 200 Series Barbs, 1/8" (3.2 mm) and 3/32" (2.4 mm) ID Tubing

CCR (-1 -2 -3 -4 -5 -06 -07)
Color Coded Ring (For use with PMS, PMK, FTLLB or FTLB panel mount fittings)

CCLR (-1 -2 -3 -4 -5 -06 -07)
Color Coded Lock Ring (For use with PMS, PMK, FTLLB or FTLB panel mount fittings)

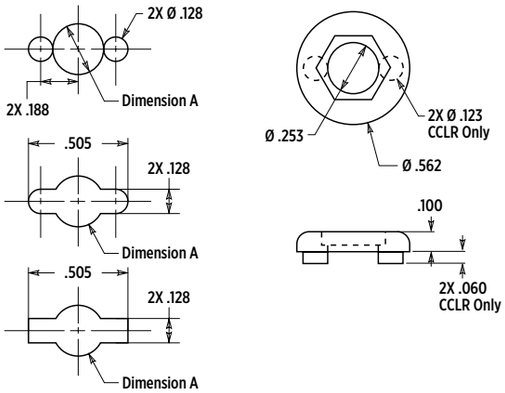
PMKN (-XO)
Panel Mount Nut 10-32 UNF with 3/8" Hex (For use with PMK panel mount fittings)

PMSN (-XO)
Panel Mount Nut 1/4-28 UNF with 7/16" Hex (For use with PMS, FTLB, and FTLLB panel mount fittings)

LNS (-1 -2 -3 -4 -5 -06 -6005 -07 -81 -J1A)
1/4-28 UNF Panel Mount Lock Nut (For use with PMS, FTLLB or FTLB panel mount fittings)

Select the correct lock nut for your panel mount:

PART	Dimension A	Use Lock Nut
PMK Series	.193"	PMKN
PMS Series	.255"	PMSN or LNS



TUBE-TO-TUBE FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

THREADED FITTINGS

10-32 UNF Special Tapered Thread
PG-59

1/4-28 UNF
PG-62

1/4-28 UNF Bottom Sealing
PG-63

Metric - M6x1
PG-64

Metric - M5x.8
PG-64

1/16-27 NPT
PG-65

1/8-27 NPT
PG-66

1/4-18 NPT Reducers
PG-67

Custom Threaded Fittings
PG-11

The X Thread

Value Plastics X Series components have a tapered 10-32 thread that functions like a pipe thread. In comparison to standard 10-32 UNF threaded fittings, the tapered design works better with oversized ports and ports which are not perpendicular to the face of the component.

The 120 degree chamfer under the hex provides a seal when the fitting is tightened into a port with a countersink as shown below. It also seals on the thread due to interference on the pitch diameter. When using an elbow or tee, the tapered thread tightens radially and facilitates directional alignment of the barb.

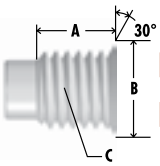
Other Thread Series

K, B, C and D Series fittings, designed for use with 10-32 UNF ports, are straight-threaded components. These fittings seal against the 120 degree chamfer under the hex on the fitting and do not tighten radially as they are assembled. S Series fittings are straight threaded components for 1/4-28 UNF ports, M5 Series are for M5 x .8 ports and M6 Series are for M6 x 1 ports.

Part numbers for fittings with pipe threads are noted below. Those for use with 1/16-27 NPT ports have part numbers prefixed with 16; those for 1/8-27 NPT ports have part numbers prefixed with 18; and those for 1/4-18 NPT ports have part numbers prefixed with 14.

The features shown below must be incorporated into the port when using our B, C, D, X, K, S, M5 and M6 Series fittings. Failure to do so will jeopardize the performance of the seal between the fitting and port. For applications in which this seal is highly critical, we recommend that you contact a sealant specialist.

When working with threaded parts, Value Plastics strongly recommends that you test sample parts in your application.



Value Plastics' Thread Series	Dimension A Thread Length	Clearance Needed to Achieve Chamfer Seal	Dimension B Countersink Diameter	Feature C Internal Screw Thread Series
X	.200"	.250"	.210"-.230"	10-32 UNF 2B
K, B, C, D	.156"	.200"	.210"-.230"	10-32 UNF 2B
S	.204"	.250"	.270"-.290"	1/4-28 UNF 2B
M5	.192"	.250"	.210"-.230"	M5 X .8
M6	.235"	.375"	.270"-.290"	M6 X 1

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X210 (-1 -2 -3 -5 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

K210 (-1 -2 -3 -5 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

X410 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

K410 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

X10 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to Classic Series Barb, 1/16" (1.6 mm) ID Tubing

K10 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to Classic Series Barb, 1/16" (1.6 mm) ID Tubing

X220 (-1 -2 -3 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

K220 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

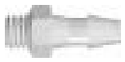
X420 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

K420 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

D (-1 -2 -3 -4 -5 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to Classic Series Barb, 3/32" (2.4 mm) ID Tubing

X230 (-1 -2 -3 -5 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

K230 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

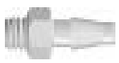


X430 (-1 -2 -3 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

K430 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

B (-1 -2 -3 -4 -5 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to Classic Series Barb, 1/8" (3.2 mm) ID Tubing

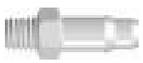
C (-1 -2 -3 -4 -5 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to Classic Series Barb, Short Neck, 1/8" (3.2 mm) ID Tubing



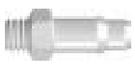
K240 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

X240 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

X445 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread with 1/4" Hex to 400 Series Barb, .170" (4.3 mm) ID Tubing



K445 (-1 -2 -6005 -J1A)
10-32 UNF Thread with 1/4" Hex to 400 Series Barb, .170" (4.3 mm) ID Tubing



Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

THREAD:
10-32 UNF, Special Tapered Thread Elbow

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

XL210 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Elbow with 1/4" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

KL210 (-1 -2 -6005 -J1A)
10-32 UNF Thread Elbow with 1/4" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

XL410 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Elbow with 1/4" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

KL410 (-1 -2 -6005 -J1A)
10-32 UNF Thread Elbow with 1/4" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

XL220 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Elbow with 1/4" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

KL220 (-1 -2 -6005 -J1A)
10-32 UNF Thread Elbow with 1/4" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

XL420 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Elbow with 1/4" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

KL420 (-1 -2 -6005 -J1A)
10-32 UNF Thread Elbow with 1/4" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

XL230 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Elbow with 1/4" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

KL230 (-1 -2 -6005 -J1A)
10-32 UNF Thread Elbow with 1/4" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

XL430 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Elbow with 1/4" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

KL430 (-1 -2 -6005 -J1A)
10-32 UNF Thread Elbow with 1/4" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

THREADED FITTINGS

Technical Assistance

Trying to choose the correct part? Need more material information than is published in this catalog? Call Value Plastics Technical support **(970) 267-5200**

XT210 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Tee with 1/4" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

KT210 (-1 -2 -6005 -J1A)
10-32 UNF Thread Tee with 1/4" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

XT410 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Tee with 1/4" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

KT410 (-1 -2 -6005 -J1A)
10-32 UNF Thread Tee with 1/4" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

XT220 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Tee with 1/4" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

KT220 (-1 -2 -6005 -J1A)
10-32 UNF Thread Tee with 1/4" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

Part Drawings Online!
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www.valueplastics.com

XT420 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Tee with 1/4" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

KT420 (-1 -2 -6005 -J1A)
10-32 UNF Thread Tee with 1/4" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

XT230 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Tee with 1/4" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

KT230 (-1 -2 -6005 -J1A)
10-32 UNF Thread Tee with 1/4" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

XT430 (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Tee with 1/4" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

KT430 (-1 -2 -6005 -J1A)
10-32 UNF Thread Tee with 1/4" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

THREADED FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

THREAD: 10-32 UNF, Special Tapered Thread Couplers and Plugs

XN (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Coupler with 1/4" Hex

KN (-1 -2 -6005 -J1A)
10-32 UNF Thread Coupler with 1/4" Hex

XP (-1 -2 -6005 -J1A)
10-32 Special Tapered Thread Plug with 1/4" Hex

KP (-1 -2 -6005 -J1A)
10-32 UNF Thread Plug with 1/4" Hex

Looking for Something Different?

Most of our best product ideas have come from you, our customers. While we pride ourselves on our extensive product offering, we recognize that your needs are ever-changing and that our products, too, must adapt to your needs.

If there's a new product you think Value Plastics should make, drop an email to designcenter@valueplastics.com describing your product concept in as much detail as you desire. We will contact you with any questions, and who knows - the next catalog edition could include products YOU told us to build.

See **page 8** for more information on the Design Center!

THREAD: 1/4-28 UNF

S210 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

S410 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

S10 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to Classic Series Barb, 1/16" (1.6 mm) ID Tubing

S220 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

S420 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

S20 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to Classic Series Barb, 3/32" (2.4 mm) ID Tubing

S230 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

S430 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

THREAD: 1/4-28 UNF

S30 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to Classic Series Barb, 1/8" (3.2 mm) ID Tubing

S240 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

S40 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to Classic Series Barb, 5/32" (4.0 mm) ID Tubing

S445 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 400 Series Barb, .170" (4.3 mm) ID Tubing

S250 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

S450 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to 400 Series Barb, 3/16" (4.8 mm) ID Tubing

S50 (-1 -2 -6005 -J1A)
1/4-28 UNF Thread with 5/16" Hex to Classic Series Barb, 3/16" (4.8 mm) ID Tubing

SP (-1 -2 -6005 -J1A)
1/4-28 UNF Thread Plug with 5/16" Hex

THREAD: 1/4-28 UNF Bottom Sealing

ABR004-6005 UNDER (-1 -2 -3 -4 -5)
1/4-28 UNF Bottom Sealing Rotating Thread with 5/16" Hex to 500 Series Barb, 1/16" (1.6 mm) ID Tubing

Recommended torque:
Polypropylene - 1.5-2 in. lbs.
Kynar® - 2-4 in. lbs.

ABR004-J1A UNDER (-1 -2 -3 -4 -5 -J1A)
1/4-28 UNF Bottom Sealing Rotating Thread with 5/16" Hex to 500 Series Barb, 1/16" (1.6 mm) ID Tubing

Recommended torque:
Polypropylene - 1.5-2 in. lbs.
Kynar® - 2-4 in. lbs.

ABR007-6005 UNDER (-1 -2 -3 -4 -5)
1/4-28 UNF Bottom Sealing Rotating Thread with 5/16" Hex to 500 Series Barb, 3/32" (2.4 mm) ID Tubing

Recommended torque:
Polypropylene - 1.5-2 in. lbs.
Kynar® - 2-4 in. lbs.

ABR007-J1A UNDER (-1 -2 -3 -4 -5 -J1A)
1/4-28 UNF Bottom Sealing Rotating Thread with 5/16" Hex to 500 Series Barb, 3/32" (2.4 mm) ID Tubing

Recommended torque:
Polypropylene - 1.5-2 in. lbs.
Kynar® - 2-4 in. lbs.

ABR013-6005 UNDER (-1 -2 -3 -4 -5)
1/4-28 UNF Bottom Sealing Rotating Thread with 5/16" Hex to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

Recommended torque:
Polypropylene - 1.5-2 in. lbs.
Kynar® - 2-4 in. lbs.

ABR013-J1A UNDER (-1 -2 -3 -4 -5 -J1A)
1/4-28 UNF Bottom Sealing Rotating Thread with 5/16" Hex to 500 Series Barb, 1/8" (3.2 mm) ID Tubing

Recommended torque:
Polypropylene - 1.5-2 in. lbs.
Kynar® - 2-4 in. lbs.

TECS116 (-6005 -J1A)
1/4-28 UNF Bottom Sealing Thread Tube End Coupler with 5/16" Hex, 1/16" (1.6 mm) OD Tubing

TECS118 (-6005 -J1A)
1/4-28 UNF Bottom Sealing Thread Tube End Coupler with 5/16" Hex, 1/8" (3.2 mm) OD Tubing

THREADED FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

THREADED FITTINGS

THREAD: M6x1

M6210 (-1 -2 -6005)
M6x1 Thread with 5/16" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

M6410 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

M6220 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

M6420 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

M6230 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

M6430 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

M6240 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

M6445 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 400 Series Barb, .170" (4.3 mm) ID Tubing

THREAD: M6x1

M6250 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

M6450 (-1 -2 -6005 -J1A)
M6x1 Thread with 5/16" Hex to 400 Series Barb, 3/16" (4.8 mm) ID Tubing

M6P (-1 -2 -6005 -J1A)
M6x1 Thread Plug with 5/16" Hex

THREAD: M5x.8

M5210 (-1 -2 -6005)
M5x.8 Thread with 1/4" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

M5220 (-1 -2 -6005)
M5x.8 Thread with 1/4" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

M5230 (-1 -2 -6005)
M5x.8 Thread with 1/4" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

M5240 (-1 -2 -6005)
M5x.8 Thread with 1/4" Hex to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

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www.valueplastics.com

Technical Assistance

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16210 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

16410 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

1610 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to Classic Series Barb, 1/16" (1.6 mm) ID Tubing

16220 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

16420 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

1620 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to Classic Series Barb, 3/32" (2.4 mm) ID Tubing

16230 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

16430 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

1630 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to Classic Series Barb, 1/8" (3.2 mm) ID Tubing

16240 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

1640 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to Classic Series Barb, 5/32" (4.0 mm) ID Tubing

16445 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 400 Series Barb, .170" (4.3 mm) ID Tubing

16250 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

16450 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to 400 Series Barb, 3/16" (4.8 mm) ID Tubing

1650 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread with 5/16" Hex to Classic Series Barb, 3/16" (4.8 mm) ID Tubing

1600 (-1 -2 -6005 -J1A)
1/16-27 NPT Thread Plug with 5/16" Hex

THREADED FITTINGS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

THREAD: 1/8-27 NPT

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

THREADED FITTINGS

18210 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 200 Series Barb, 1/16" (1.6 mm) ID Tubing

18410 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 400 Series Barb, 1/16" (1.6 mm) ID Tubing

1810 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to Classic Series Barb, 1/16" (1.6 mm) ID Tubing

18220 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 200 Series Barb, 3/32" (2.4 mm) ID Tubing

18420 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 400 Series Barb, 3/32" (2.4 mm) ID Tubing

1820 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to Classic Series Barb, 3/32" (2.4 mm) ID Tubing

18230 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

18430 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 400 Series Barb, 1/8" (3.2 mm) ID Tubing

1830 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to Classic Series Barb, 1/8" (3.2 mm) ID Tubing

18240 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 200 Series Barb, 5/32" (4.0 mm) ID Tubing

1840 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to Classic Series Barb, 5/32" (4.0 mm) ID Tubing

18445 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to 400 Series Barb, .170" (4.3 mm) ID Tubing

1850 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to Classic Series Barb, 3/16" (4.8 mm) ID Tubing

1860 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread with 7/16" Hex to Classic Series Barb, 1/4" (6.4 mm) ID Tubing

18L230 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread Elbow with 7/16" Hex to 200 Series Barb, 1/8" (3.2 mm) ID Tubing

18L250 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread Elbow with 7/16" Hex to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

18L260 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread Elbow with 7/16" Hex to 200 Series Barb, 1/4" (6.4 mm) ID Tubing

THREAD:
1/8-27 NPT Tees

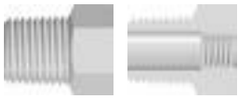
18T250 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread Tee with 7/16" Hex to 200 Series Barb, 3/16" (4.8 mm) ID Tubing

18T260 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread Tee with 7/16" Hex to 200 Series Barb, 1/4" (6.4 mm) ID Tubing

1800 (-1 -2 -6005 -J1A)
1/8-27 NPT Thread Plug with 7/16" Hex

THREAD:
1/8-27 NPT Reducers

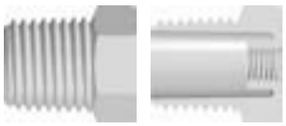
1801 (-1 -2 -6005 -J1A)
Reducer with 1/8-27 NPT Male Thread and 7/16" Hex to 10-32 UNF Female Thread



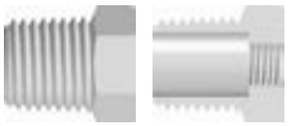
1802 (-1 -2 -6005 -J1A)
Reducer with 1/8-27 NPT Male Thread and 7/16" Hex to 1/4-28 UNF Female Thread

THREAD:
1/4-18 NPT Reducers

1401 (-1 -2 -6005 -J1A)
Reducer with 1/4-18 NPT Male Thread and 9/16" Hex to 10-32 UNF Female Thread



1402 (-1 -2 -6005 -J1A)
Reducer with 1/4-18 NPT Male Thread and 9/16" Hex to 1/4-28 UNF Female Thread



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Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

BUILD-A-PART

FITTINGS

Junction Blocks
PG-69

Accessories
PG-70

Barbs
PG-70

Threads
PG-71

Bonding Suggestions

Prior to actually bonding, press together a model of the manifold to use as a reference.

Do not mix plastic resins. Consult your adhesive specialist if you need to bond dissimilar materials.

These components are designed for bonding with any one of a number of solvents, but other adhesive systems may be used. When solvent bonding, use a very small gauge needle (typically 27 or 30) for best solvent control. Consult your adhesive specialist for guidance on other systems.

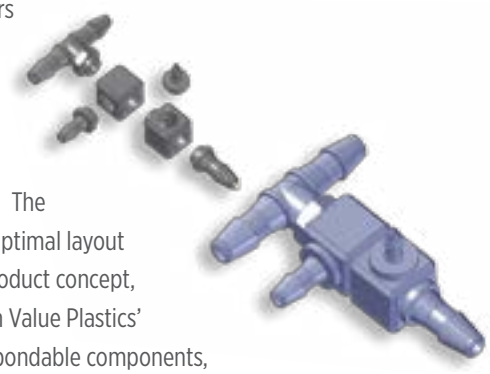
Apply solvent sparingly. Most solvents are low viscosity and readily wick into the bondline. Excessive solvent may compromise the aesthetics and the function of the assembly.

Press the mating components together leaving a .01-.03" gap between them for the solvent. Place the components in an orientation such that they may be rotated ¼ turn to their final position after applying the solvent.

After applying solvent, wait a few seconds, then rotate the components to their final position. When making a long manifold with bondable junction blocks it may be helpful to push the assembly against a flat surface to align the blocks before the solvent has set.

Affordable Unique Solutions:

Design Your New Component with Build-A-Part® bondable components!



Component designers no longer need be constrained by the limitations of injection molding tool design. The exact fitting, in the optimal layout for the process or product concept, is now available with Value Plastics' line of Build-a-Part bondable components, designed for use with gases or liquids.

The Build-a-Part system is based on combining interchangeable components, joining junction blocks and luer, hose barb or threaded features to create the desired configuration. The features are bonded to the junction blocks using commonly available adhesives. Junction blocks and features may be bonded together to create multi-port, multi-axis products that receive and redirect fluid flow in whatever direction the designer desires. The only limitation is the designer's imagination.

114 component options are available from stock in two primary materials. Options include ISO 594-1 compliant male and female luers and hose barbs in 1/16" (1.6 mm), 3/32" (2.4 mm) and 1/8" (3.2 mm) in straight, elbow and branch tee configurations. Also available are male threads including 10-32 UNF, 1/16-27 NPT, 1/8-27 NPT, 1/4-28 UNF and M6x1 versions, and mounting devices.

The complete range is available in two primary resins: white ABS or translucent polysulfone. For ease of testing concepts, Value Plastics offers designer kits in both resins. Each kit contains hundreds of components for prototype purposes, enabling designs to be created and modified prior to production commitment.

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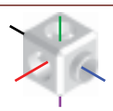
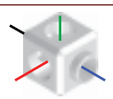
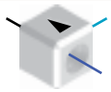
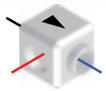
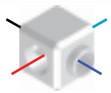
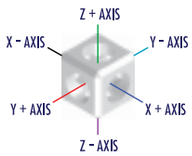
BLOCK	NUMBER	MATERIAL
Build-A-Part Junction Blocks. See Configuration Table for specifications.		
	BDJ01-40	Polysulfone
	BDJ01-81	Lace White ABS
	BDJ02-40	Polysulfone
	BDJ02-81	Lace White ABS
	BDJ03-40	Polysulfone
	BDJ03-81	Lace White ABS
	BDJ04-40	Polysulfone
	BDJ04-81	Lace White ABS
	BDJ05-40	Polysulfone
	BDJ05-81	Lace White ABS
	BDJ06-40	Polysulfone
	BDJ06-81	Lace White ABS
	BDJ07-40	Polysulfone
	BDJ07-81	Lace White ABS
	BDJ08-40	Polysulfone
	BDJ08-81	Lace White ABS
	BDJ09-40	Polysulfone
	BDJ09-81	Lace White ABS
	BDJ10-40	Polysulfone
	BDJ10-81	Lace White ABS
	BDJ11-40	Polysulfone
	BDJ11-81	Lace White ABS
	BDJ12-40	Polysulfone
	BDJ12-81	Lace White ABS
	BDJ13-40	Polysulfone
	BDJ13-81	Lace White ABS
	BDJ14-40*	Polysulfone
	BDJ14-81*	Lace White ABS
	BDJ15-40*	Polysulfone
	BDJ15-81*	Lace White ABS

*Check valve junction block. For use with RB01 and SB01

BLOCK	NUMBER	MATERIAL
Build-A-Part Junction Blocks with Mounting Port. See Config. Table below for specifications.		
	BDJ16-40*	Polysulfone
	BDJ16-81*	Lace White ABS
	BDJ17-40*	Polysulfone
	BDJ17-81*	Lace White ABS
	BDJ18-40	Polysulfone
	BDJ18-81	Lace White ABS
	BDJ19-40	Polysulfone
	BDJ19-81	Lace White ABS
	BDJ20-40	Polysulfone
	BDJ20-81	Lace White ABS
	BDJ21-40	Polysulfone
	BDJ21-81	Lace White ABS
	BDJ22-40	Polysulfone
	BDJ22-81	Lace White ABS



BLOCK	X+ AXIS	X- AXIS	Y+ AXIS	Y- AXIS	Z+ AXIS	Z- AXIS
BDJ01	Female	Female				
BDJ02			Female		Female	
BDJ03			Female		Female	Female
BDJ04	Female	Female	Female	Female		
BDJ05	Female		Female		Female	
BDJ06	Female		Female		Female	Female
BDJ07	Female	Female	Female	Female	Female	
BDJ08	Female	Female	Female	Female	Female	Female
BDJ09	Male	Female	Female		Female	Female
BDJ10	Male	Female	Female	Female	Female	Female
BDJ11	Male	Female	Female	Female		
BDJ12	Male	Female	Female			
BDJ13	Male	Female	Female		Female	
BDJ14	Male	Female				
BDJ15	Female	Female				
BDJ16	Female	Female		Female[a]		
BDJ17	Male	Female	Female[a]			
BDJ18	Male[b]	Female	Female		Female	Female
BDJ19	Male[b]	Female	Female	Female	Female	Female
BDJ20	Male[b]	Female	Female	Female		
BDJ21	Male[b]	Female	Female			
BDJ22	Male[b]	Female	Female		Female	

[a]For non-flow manifolding [b]For use with BDMD

BUILD-A PART

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

BUILD-A-PART:
Accessories, Barbs and Elbows

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

RB01 (-X2) SB01 (-X0)
Check Valve Ball 5/32" Diameter

BDMRP (-40 -81)
Bondable Plug

BDMD (-40 -81)
Bondable Mounting Device

BDMFTLL (-40 -81 -9)
Bondable Female Luer Thread Style

BDMMTL (-40 -81)
Bondable Male Luer (May be used with separate rotating lock ring; RMLLR)

RMLLR (-1 -2 -3 -4 -5 -06 -07 -6005 -9 -9002 -J1A)
Rotating Male Luer Lock Ring (For use with BDMMTL)

BDMR210 (-40 -81 -9 -9002)
Bondable 200 Series Barb, 1/16" (1.6 mm) ID Tubing

BDMR410 (-40 -81)
Bondable 400 Series Barb, 1/16" (1.6 mm) ID Tubing

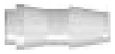
BDMR220 (-40 -81)
Bondable 200 Series Barb, 3/32" (2.4 mm) ID Tubing

BDMR420 (-40 -81)
Bondable 400 Series Barb, 3/32" (2.4 mm) ID Tubing

BDMR230 (-40 -81)
Bondable 200 Series Barb, 1/8" (3.2 mm) ID Tubing

BDMR430 (-40 -81)
Bondable 400 Series Barb, 1/8" (3.2 mm) ID Tubing

BDMR240 (-40 -6005 -81)
Bondable 200 Series Barb, 5/32" (4.0 mm) ID Tubing



BDMR445 (-40 -81)
Bondable 400 Series Barb, .170" (4.3 mm) ID Tubing

BDML210 (-40 -81 -9)
Bondable Elbow 200 Series Barb, 1/16" (1.6 mm) ID Tubing

BDML410 (-40 -81)
Bondable Elbow 400 Series Barb, 1/16" (1.6 mm) ID Tubing

BDML220 (-40 -81 -9)
Bondable Elbow 200 Series Barb, 3/32" (2.4 mm) ID Tubing

BDML420 (-40 -81)
Bondable Elbow 400 Series Barb, 3/32" (2.4 mm) ID Tubing

BDML230 (-40 -81)
Bondable Elbow 200 Series Barb, 1/8" (3.2 mm) ID Tubing

BDML430 (-40 -81)
Bondable Elbow 400 Series Barb, 1/8" (3.2 mm) ID Tubing

BDMT210 (-40 -81)
Bondable Tee 200 Series Barb, 1/16" (1.6 mm) ID Tubing

BDMT410 (-40 -81)
Bondable Tee 400 Series Barb, 1/16" (1.6 mm) ID Tubing

BDMT220 (-40 -81)
Bondable Tee 200 Series Barb, 3/32" (2.4 mm) ID Tubing

BDMT420 (-40 -81)
Bondable Tee 400 Series Barb, 3/32" (2.4 mm) ID Tubing

BDMT230 (-40 -81)
Bondable Tee 200 Series Barb, 1/8" (3.2 mm) ID Tubing

BDMT430 (-40 -81)
Bondable Tee 400 Series Barb, 1/8" (3.2 mm) ID Tubing

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BDMX (-40 -81)
Bondable 10-32 Special Tapered Thread with 1/4" Hex

BDMK (-40 -81)
Bondable 10-32 UNF Thread with 1/4" Hex

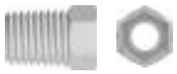
BDMS (-81)
Bondable 1/4-28 UNF Thread with 5/16" Hex

BDMM6 (-40 -81)
Bondable M6x1 Thread with 5/16" Hex

BDM16 (-40 -81)
Bondable 1/16-27 NPT Thread with 5/16" Hex

BDM18 (-40 -81)
Bondable 1/8-27 NPT Thread with 7/16" Hex

BDF16 (-40 -81)
Bondable 1/16-27 NPT Thread with 5/16" Hex



BDF18 (-40 -81)
Bondable 1/8-27 NPT Thread with 7/16" Hex

BDFM6 (-40 -81)
Bondable M6x1 Thread with 5/16" Hex

BDFS (-40 -81)
Bondable 1/4-28 UNF Thread with 5/16" Hex

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

OTHER COMPONENTS

Check Valves
PG-72

Clamps
PG-72

Injection Sites
PG-73

Stopcocks
PG-73

Spikes
PG-73

Tubing
PG-74

Designer Kits
PG-75

Tubesetter Assembly Tool
PG-77

OTHER COMPONENTS:
Components

VPS5401068N (Polycarbonate with Silicone Disk)
Check Valve, Male/Female Luer, 420 mL/min flow rate at 1 M head 30 psi back pressure, 1/4 psi inlet cracking pressure

VPS5401020N (Polycarbonate with Silicone Disk)
Check Valve, Male/Female Luer, 129 mL/min flow rate at 100mmHg, 45 psi back pressure, 1-5 psi inlet cracking pressure

VPS5401036SN (Polycarbonate with Silicone Disk)
Reflux Check Valve, Male/Female Luer, 350mL/min flow Rate at 1 M head, 45 psi back pressure, opens at 284 mmHg

VPS5401001N (ABS Housing with Silicone Disk)
Check Valve, Male Slip Luer, 420 mL/min flow rate at 1M head, 30 psi back pressure, 1/4 psi inlet cracking pressure

VPM2930601N (White ABS)
Tube Clamp with split, 1/8" (3.2 mm) OD Tubing

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VPS3901074N (Polyisoprene with ABS Acrylic Body)
IN-4000 Intermittent Injection Site to Male Luer Lock

VPM1060200N (Clear Low Density Polyethylene)
Long Spike Guard Closed at Tip

VPM0480201N (White Polyethylene)
Luer Tip Syringe Cap

VPB0850400N (Clear ABS)
Female Luer Thread Style Coupler

VPM1080303N (Blue Polyethylene)
Male Luer Integral Lock Ring Plug

VPB1000050N (Polycarbonate Body with Polyethylene Handle)
One Way Stopcock, Capped Male Luer Lock to Capped Female Luer Thread Style

VPB1000055N (Polycarbonate Body with Polyethylene Handle)
One way Stopcock, Male Slip Luer to Capped Female Luer Thread Style

VPB1000079N (Polycarbonate Body with Polyethylene Handle)
Three Way Stopcock, (2) Capped Female Luer Thread Style and Capped Male Luer Lock

VPB1000062N (Polycarbonate Body with Polyethylene Handle)
Three Way Stopcock, (2) Female Luer Thread Style and Male Slip Luer

VPB1000099N (Polycarbonate Body with Polyethylene Handle)
Four Way Stopcock, (2) Capped Female Luer Thread Style and Male Slip Luer

VPB1000110N (Polycarbonate Body with Polyethylene Handle)
Four Way Stopcock, (2) Capped Female Luer Thread Style & Capped Male Luer Lock

VPS5069200N (White ABS Spike with Clear LDPE Guard)
Bag Spike with vented guard (replaces VPS5069700N)

OTHER COMPONENTS

Material Reference

-001 (various, see part description)
-06 Orange Nylon
-07 Yellow Nylon
-0 Natural Nylon
-1 White Nylon
-2 Black Nylon
-3 Red Nylon
-4 Green Nylon
-5 Blue Nylon
-7 Glass Filled Natural Nylon
-8 Gray Nylon
-8B Gray Nylon
-9 Clear Polycarbonate
-10 Acetal
-40 Polysulfone
-81 Lace White ABS
-91 White Polycarbonate
-1006 Natural Acetal
-1007 Black Acetal
-6005 Animal-Free Polypropylene
-6006 White Polypropylene
-8003 Natural ABS
-8012 White ABS
-9002 Rad. Stable Polycarbonate
-9010 Rad. Stable Polycarbonate
-B Buna-N O-ring
-CM030 Dark Blue Nylon
-E PTEE/EPDM
-EP EPDM O-ring
-J1A Natural Kynar PVDF
-J1A2 Black Kynar PVDF
-PX Platinum-Cured Silicone
-U71 White Class VI Glass Filled Nylon
-U75 Blue Class VI Glass Filled Nylon
-VP1 Animal-free Polyethylene
-X2 Buna-N Rubber
-XO Stainless Steel

Resin Reference

Pg 82 Chemical Resistance
Pg 83 Regulatory Status
Pg 84 Sterilization Stability
Pg 85 Typical Properties

POLYVINYL CHLORIDE (PVC) TUBING

75 Durometer

Our PVC tubing is a very cost effective product that can satisfy a broad array of end use applications. It is flexible in nature, optically clear, and easily sterilized.

Resin Grade & Technical Information:

This tubing is extruded from Unichem® 7511 G-015 resin, which is in compliance with all US Food & Drug Administration regulations for food grade use under Title 21 CFR. It is also certified USP Class VI. It can be sterilized by gamma radiation or Ethylene Oxide (EtO) gas. This tubing is not autoclavable.

DIMENSION (ID X OD X LGTH)	NUMBER
1/16" X 1/8" X 100'	PV00-1031C
1/16" X 1/8" X 1000'	PV00-1031M
3/32" X 3/16" X 100'	PV00-2047C
1/8" X 1/4" X 100'	PV00-3062C
1/8" X 1/4" X 1000'	PV00-3062M
3/16" X 5/16" X 100'	PV00-5062C
1/4" X 3/8" X 100'	PV00-6062C

POLYURETHANE TUBING

80 Durometer

Our polyurethane tubing is extremely kink resistant. It is also highly resistant to abrasion and scuffing. It is widely accepted as a premium material for medical device use because of its flexible nature and easy sterilizability.

Resin Grade & Technical Information:

This tubing is extruded from Dow's® compound Pellethane 2363-80AE, which has passed USP Class VI testing. It can be sterilized by gamma radiation or Ethylene Oxide (EtO) gas. Please do not autoclave this tubing, as it may alter the chemical nature of the resin.

DIMENSION (ID X OD X LGTH)	NUMBER
1/16" X 1/8" X 100'	UR00-1031C
1/16" X 1/8" X 1000'	UR00-1031M
3/32" X 3/16" X 100'	UR00-2047C
3/32" X 3/16" X 1000'	UR00-2047M
1/8" X 1/4" X 100'	UR00-3062C

LOW DENSITY POLYETHYLENE TUBING

92 Durometer

Our polyethylene tubing has excellent mechanical and chemical resistance properties. However, please use caution if your application involves possible bending or kinking the tubing. It is a semi-rigid material and will be permanently deformed if kinked or bent too tight.

Resin Grade & Technical Information:

This tubing is extruded from DuPont® 2020T, which is in compliance with all U.S. Food & Drug Administration regulations for food grade use under Title 21 CRF. It can be sterilized by gamma radiation or Ethylene Oxide (EtO) gas. Autoclaving is not recommended.

DIMENSION (ID X OD X LGTH)	NUMBER
1/16" X 1/10" X 100'	LDPE01-1019C
1/16" X 1/10" X 1000'	LDPE01-1019M
1/16" X 1/8" X 100'	LDPE01-1031C
1/16" X 1/8" X 1000'	LDPE01-1031M
3/32" X 5/32" X 100'	LDPE01-2031C
3/32" X 5/32" X 1000'	LDPE01-2031M
1/8" X 3/16" X 100'	LDPE01-3031C
1/8" X 3/16" X 1000'	LDPE01-3031M

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ASSORTED DESIGNER KIT (Part number - ASSORTED KIT-001)
Our Assorted Kit provides a cross section of many components designed and manufactured by Value Plastics. This kit contains a variety of our popular components, including luers, tube-to-tube and threaded fittings. Please see www.valueplastics.com for a complete list of all included parts.

LUER DESIGNER KIT (Part Number - LUER KIT-001)
Our Luer Kit contains male and female luers, luer plugs, couplers, tees, elbows as well as blood pressure cuff and monitor fittings. Luer tapers are made to ISO standards. Please see www.valueplastics.com for a complete list of all included parts.

Note: Due to our ever increasing product line, Kit contents are subject to change without notice. Kits may include one or more of each component in a variety of materials.

TUBE-TO-TUBE DESIGNER KIT (Part Number - TUBE-TO-TUBE KIT-001)
Our Tube-to-Tube Kit contains a variety of fittings in different configurations - and one that is sure to work for your application. Some of the fittings contained in this kit include straight-thru connectors, tees, elbows, Ys, and press-in plugs. Please see www.valueplastics.com for a complete list of all included parts.

Note: Due to our ever increasing product line, Kit contents are subject to change without notice. Kits may include one or more of each component in a variety of materials.

XQ DESIGNER KIT (Part Number - XQ KIT-001)
Our XQ Kit contains an assortment of XQ Series Quick Connect Fittings (Quick Disconnect Couplings). Please see www.valueplastics.com for a complete list of all included parts.

Note: Due to our ever increasing product line, Kit contents are subject to change without notice. Kits may include one or more of each component in a variety of materials.

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BLOOD PRESSURE DESIGNER KIT (Part Number - BP KIT-001)
Our Blood Pressure Kit contains a variety of blood pressure fittings that are manufactured by Value Plastics. Some of the fittings contained in this kit include quick connect fittings, connectors, panel mounts and adaptors. Includes 30 different parts and 138 pieces, please see www.valueplastics.com for a complete list of all included parts.

Note: Due to our ever increasing product line, Kit contents are subject to change without notice. Kits may include one or more of each component in a variety of materials.

BIOPHARM DESIGNER KIT (Part Number - BIOPHARM KIT-001)
Our Biopharm Designer Kit contains a variety of fittings that are commonly found within the BioPharm market. Some of the fittings contained in this kit include our larger fittings of Y's, T's, elbows, straight through and reducing connectors ranging from 3/8" to 1", sanitary fittings and gaskets. Please see www.valueplastics.com for a complete list of all included parts.

Note: Due to our ever increasing product line, Kit contents are subject to change without notice. Kits may include one or more of each component in a variety of materials.

BUILD-A-PART DESIGNER KIT (Part Number - KIT01-81 -KIT01-40)
Our Build-A-Part Kits are available in two different materials: White ABS or Polysulfone. Contained in these kits are luers, elbows, tees, and junction blocks. Please see www.valueplastics.com for a complete list of all included parts.

Note: Due to our ever increasing product line, Kit contents are subject to change without notice. Kits may include one or more of each component in a variety of materials.

INK JET DESIGNER KIT (Part Number - INK JET KIT-001)
A cross section of many components designed and manufactured by Value Plastics. Includes luers, tube-to-tube and threaded fittings commonly used by Ink Jet Printer Manufacturers. Please see www.valueplastics.com for a complete list of all included parts.

Note: Due to our ever increasing product line, Kit contents are subject to change without notice. Kits may include one or more of each component in a variety of materials.

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MANUAL TUBESETTER
Designed for rapid assembly of barb to tube connections, the Tubesetter assembly tool joins flexible tubing and Value Plastics' barbed fitting, applying the force necessary to push the tube over the barb. No external power source is needed. Made almost entirely of acetal plastic, the device is easy to clean and suitable for operation in most environments. Consider the Manual Small Fitting Tubesetter assembly tool for prototype assembly or lower-volume manufacturing needs.

Value Plastics' Tubesetter® assembly tool sets the standard for effortless tube set production. The Tubesetter product joins flexible tubing and Value Plastics' barbed fitting, applying the force necessary to push the tube over the barb, providing efficiency, economy and ease of use over other connection alternatives without adhesives or solvents!

Manual Tubesetter

- Easy to use
- Excellent for volumes up to 1,000 assemblies per month
- Accommodates tubing from 3/32" to 3/8" OD
- Configurable for: Luers - Straights - Ys - Tees - Elbows
- Requires no electricity or pneumatic power
- Long-life acetal construction

PART	DESCRIPTION
930B1A	Manual TUBESETTER® Base
930JS*	Standard Jaw Set
930AS*	Standard Flip Top Anvil
920PS*	Standard Pin Set Assembly

*The base manual TUBESETTER® unit requires a jaw set, anvil assembly and pin set assembly. An additional engineering fee may be required for a custom application.

Need more details?
Part drawings, minimum order quantities, and CAD requests can be found online. Visit **www.valueplastics.com** or contact Sales at **sales@valueplastics.com**

Technical Assistance
Trying to choose the correct part? Need more material information than is published in this catalog? Call Value Plastics Technical support **(970) 267-5200**

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TECHNICAL INFORMATION

Barb Dimensions **PG-79**

Barb Performance **PG-80**

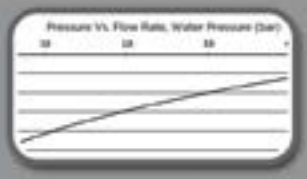
BPF Series Performance **PG-81**

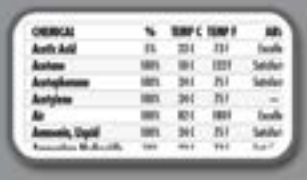
Panel Mount Instructions **PG-81**

Resin Information **PG-82**

Trademarks **PG-85**

Index **PG-86**





The **CLASSIC SERIES** is characterized by a longer barb that extends the sealing surface of the fitting. Tubing is expanded from 42% to 69% above its nominal ID.

The **200 SERIES** offers outstanding performance characteristics when used with flexible tubing. Tubing is expanded by 50% above its nominal ID, permitting high-pressure capabilities.

The **300 SERIES** offers outstanding performance characteristics when used with flexible tubing. Tubing is expanded by 35% above its nominal ID, permitting high-pressure capabilities in the larger tube sizes.

The **400 Series** provides easy assembly while maintaining excellent pressure and tensile capabilities. Originally created for semi-rigid tubing, this series is preferred for applications where tensile/pressure properties are not highly critical, or when ease of assembly is desired. The 400 Series expands the tubing 25% above its nominal ID.

The **500 SERIES** profile is composed of blended radii, giving it the distinct look. Each barb is designed to accommodate a range of tube sizes and tube types. Consideration should be given to flow restriction, pressure capability, and the force required for assembly of the tube.

The **600 SERIES** barbs are designed for use with silicone, C-Flex® and PVC tubing sizes commonly used in biopharm and other applications. Tubing is expanded from 18% to 34% above its nominal ID to maintain a low profile and ease of assembly, and the straight barb stem facilitates use of recommended cable tie retainers or hose clamps.

The **700 SERIES** barb is designed for use with Value Plastics' XQ Series quick connect fittings. This unique single barb is available in sizes to fit the 1/4" (6.4 mm), 5/16" (7.9 mm) and 3/8" (9.5 mm) ID tubing sizes and materials commonly used in disposable and reusable medical equipment. Reinforced PVC, unreinforced PVC and polyurethane tubing materials work well with this barb style.

The **900 SERIES** offers outstanding performance characteristics when used with flexible tubing. Tubing is expanded from 8% to 17% above its nominal ID. This barb provides high flow efficiency and excellent tensile strength. A hose clamp is recommended for this series.

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CLASSIC SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
10	0.105	0.046	0.063	1/16”	1.6 mm
20	0.145	0.060	0.094	3/32”	2.4 mm
30	0.187	0.078	0.125	1/8”	3.2 mm
40	0.234	0.100	0.156	5/32”	4.0 mm
50	0.280	0.130	0.188	3/16”	4.8 mm
60	0.355	0.187	0.250	1/4”	6.4 mm

200 SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
210	0.094	0.047	0.063	1/16”	1.6 mm
220	0.141	0.070	0.094	3/32”	2.4 mm
230	0.188	0.094	0.125	1/8”	3.2 mm
240	0.234	0.117	0.156	5/32”	4.0 mm
250	0.282	0.141	0.188	3/16”	4.8 mm
260	0.375	0.188	0.250	1/4”	6.4 mm

300 SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
360	0.338	0.192	0.250	1/4”	6.4 mm

400 SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
410	0.078	0.046	0.063	1/16”	1.6 mm
420	0.117	0.068	0.094	3/32”	2.4 mm
430	0.156	0.092	0.125	1/8”	3.2 mm
440	0.206	0.125	0.156	5/32”	4.0 mm
445	0.213	0.125	0.170	-	4.3 mm
450	0.234	0.137	0.188	3/16”	4.8 mm
460	0.313	0.184	0.250	1/4”	6.4 mm

600 SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
N655	0.335	0.181	0.250	1/4”	6.4 mm
N670	0.490	0.296	0.375	3/8”	9.5 mm
T670	0.490	0.286	0.375	3/8”	9.5 mm
Y670	0.490	0.296	0.375	3/8”	9.5 mm
N680	0.625	0.403	0.500	1/2”	12.7 mm
T680	0.625	0.399	0.500	1/2”	12.7 mm
Y680	0.625	0.401	0.500	1/2”	12.7 mm
N690	0.762	0.499	0.625	5/8”	16.0 mm
T690	0.762	0.483	0.625	5/8”	16.0 mm
N6100	0.900	0.615	0.750	3/4”	19.0 mm
L6110	1.180	0.799	1.000	1”	25.4 mm
N6110	1.180	0.804	1.000	1”	25.4 mm

500 SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
004	0.102	0.060	0.063	1/16”	1.6 mm
007	0.129	0.076	0.094	3/32”	2.4 mm
013	0.164	0.096	0.125	1/8”	3.2 mm
025	0.208	0.122	0.156	5/32”	4.0 mm
035	0.264	0.155	0.188	3/16”	4.8 mm
055	0.335	0.197	0.250	1/4”	6.4 mm
065	0.425	0.250	0.312	5/16”	8.0 mm
N070	0.483	0.262	0.375	3/8″	9.5 mm
L070	0.483	0.251	0.375	3/8″	9.5 mm
T070	0.483	0.290	0.375	3/8″	9.5 mm
Y070	0.483	0.290	0.375	3/8”	9.5 mm
N080	0.613	0.333	0.500	1/2″	12.7 mm
L080	0.613	0.319	0.500	1/2″	12.7 mm
T080	0.613	0.356	0.500	1/2″	12.7 mm
Y080	0.613	0.362	0.500	1/2”	12.7 mm
N090	0.718	0.390	0.625	5/8″	16.0 mm
L090	0.718	0.374	0.625	5/8″	16.0 mm
T090	0.718	0.374	0.625	5/8″	16.0 mm
Y090	0.718	0.390	0.625	5/8”	16.0 mm
N100	0.853	0.465	0.750	3/4″	19.0 mm
L100	0.853	0.443	0.750	3/4″	19.0 mm
T100	0.853	0.447	0.750	3/4″	19.0 mm
Y100	0.853	0.492	0.750	3/4”	19.0 mm
N110	1.125	0.623	1.000	1″	25.4 mm
L110	1.125	0.600	1.000	1″	25.4 mm
T110	1.125	0.600	1.000	1″	25.4 mm
Y110	1.125	0.623	1.000	1”	25.4 mm

700 SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
755	0.329	0.204	0.250	1/4”	6.4 mm
765	0.398	0.245	0.312	5/16”	7.9 mm
770	0.455	0.302	.375	3/8”	9.5 mm

900 SERIES

Barb Size	Barb OD	Barb ID	Tube Internal Diameter		
			Dec.	Frac.	Metric
970	0.437	0.269	0.375	3/8”	9.5 mm
975	0.573	0.358	0.500	1/2”	12.7 mm

The data presented here is for reference only. It was compiled to provide our customers with a means of comparing the characteristics of components at the time of publication. The particular conditions of your use and application of our products are beyond our control. Thus, it is imperative that you test our products in your specific application to determine their suitability. All information is provided without implied or express warranty or guarantee by Value Plastics® or other manufacturers. None of the information provided constitutes a recommendation or endorsement of any kind by Value Plastics®.

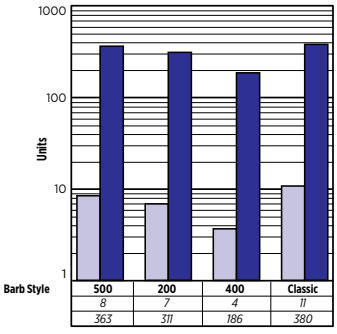
Tensile pull and burst tests were performed by an independent laboratory under controlled conditions to provide comparative performance data for the various barb styles and sizes offered by Value Plastics. Graph numbers 1 through 8 present the data from each of the tests for each barb size and each barb style connected to PVC tube.

The values shown are the means of a statistically significant sample quantity of each configuration. Value Plastics barbed fittings specifically designed for use with the tubing size indicated were used in these tests. No oversized barbs, solvents, adhesives, or secondary fasteners of any kind were used.

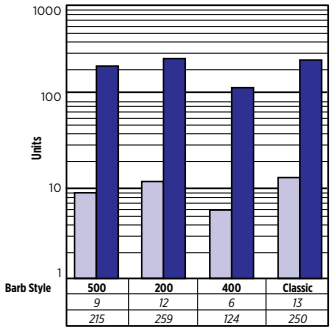
Tensile Pull Test: Tensile properties were measured to determine the force required to remove the barbed fitting from the tubing. Tensile specimens were mounted axially in a holding fixture and tested at a rate of 20 inches per minute. Failure mode was tubing separating from the barb.

Hydrostatic Burst Test: Hydrostatic burst testing was performed in general accordance with ASTM D1599. Failure mode was either tubing separating from the barb, the tubing bursting, or a combination of the two.

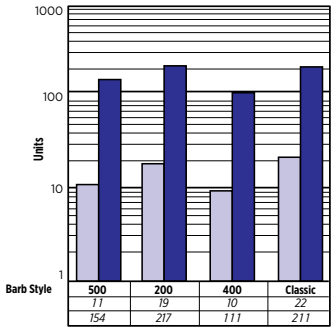
Performance of Barb to Tube Connections - ☐ Tensile Pull Test (lbs) - ■ Hydrostatic Burst Test (psi)



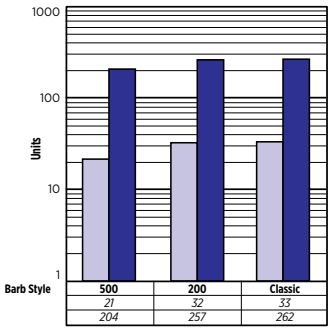
Graph 1: 1/16" Barb Performance



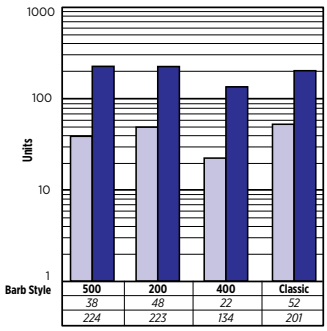
Graph 2: 3/32" Barb Performance



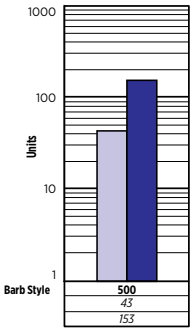
Graph 3: 1/8" Barb Performance



Graph 4: 5/32" Barb Performance

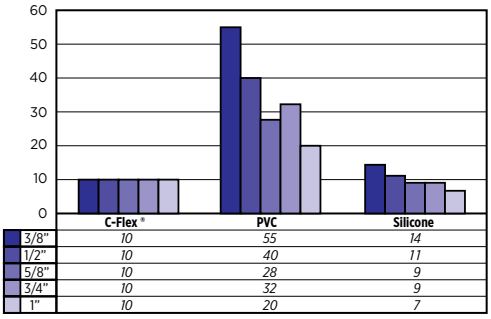


Graph 5: 3/16" Barb Performance

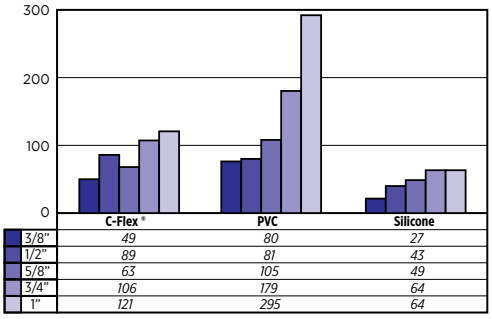


Graph 6: 1/4" Barb Performance

600 Series Leak Tests



600 Series Tensile Pull Tests



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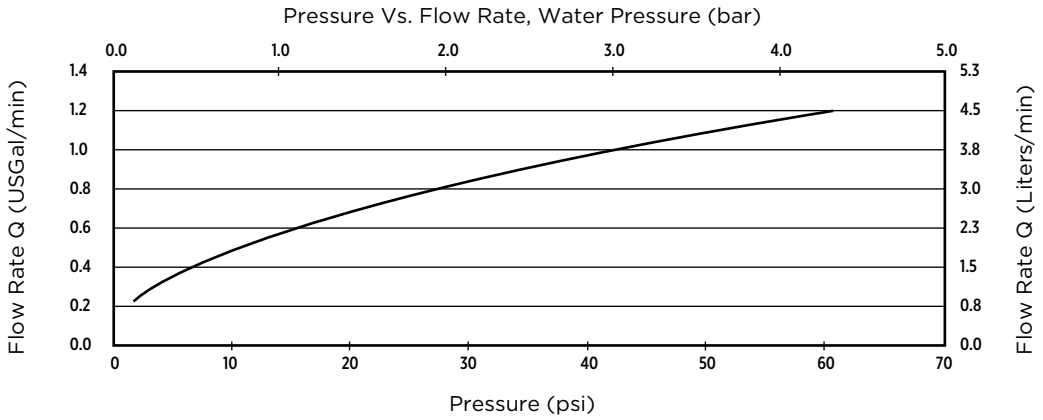
TECHNICAL:
BPF Series Properties & Performance

Maximum cycles	50,000 connect-disconnect cycles
Maximum axial tensile resistance	20 lbf.
Maximum working pressure	60 psi, 4.14 bar
Maximum leak resistance	< .007 psi / 0.05 kPa / sec.
Minimum Fitting ID	.113" / 2.9 mm
Minimum Cv	.39



TECHNICAL:
Panel Mount Instructions

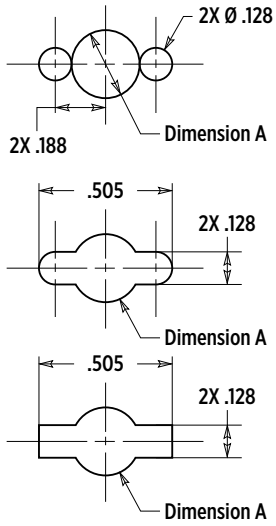
Panel-mounted female luers, in both FTLLB (thread style) and FTLB (lug style) series, are shown beginning on page 32. When used with our CCLR lock rings or CCR color coding rings and LNS lock nuts (see pages 33, 55), color coding of connections is easy.

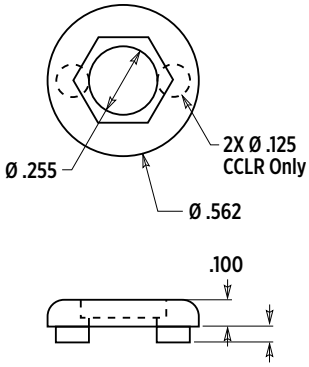
The information provided here will help you mount the panel mount luers. Please note that they are intended for panel thickness of 1/16" to 1/8" (1.5 to 3 mm).

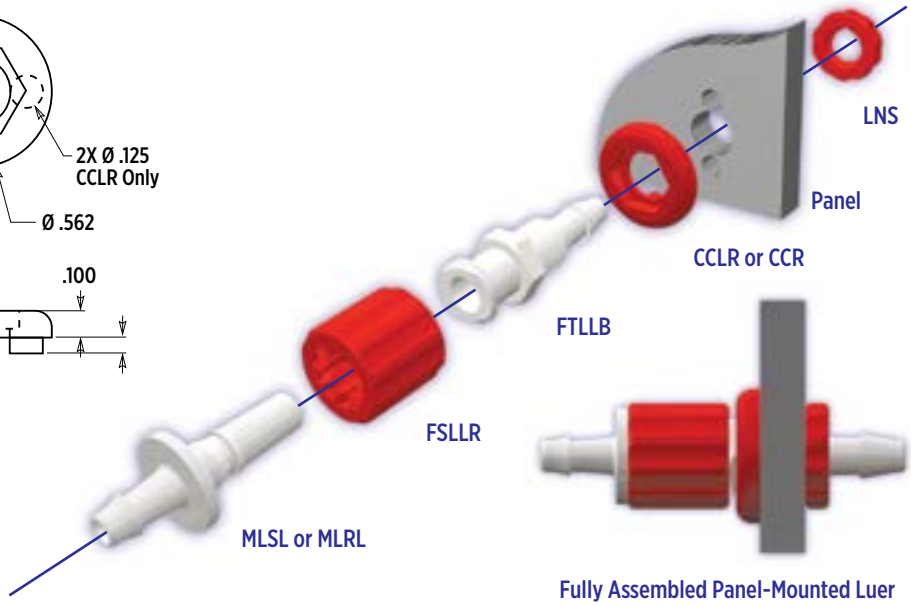
FTLLB series shown with MLSL luer, FSLLR lock ring, CCLR color coding lock ring, and LNS lock nut.

Threaded Panel Openings: Tap the panel with threads from tube fittings, panel mounts or BPMBs and use a CCR color coded ring. In this case, the fitting tightened into the panel prevents fitting rotation. Use an LNS lock nut for additional security; tighten snug plus 1/4 turn only.

Non-Threaded Panel Openings: Use any one of the three panel patterns shown below with a CCLR lock ring and LNS lock nut. Together, the panel opening and CCLR prevent the panel mount fitting from rotating. Tighten LNS snug plus 1/4 turn only.







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TECHNICAL:
Chemical Resistance of Resin

CHEMICAL	%	TEMP C	TEMP F	ABS	ACETAL	PVDF	NYLON	POLYCARBONATE	POLYPROPYLENE	POLYSULFONE
Acetic Acid	5%	23 C	73 F	Excellent	Unsatisfactory	Excellent	Satisfactory	Satisfactory	Excellent	Excellent
Acetone	100%	50 C	122 F	Unsatisfactory	Unsatisfactory	Unsatisfactory	Satisfactory	Unsatisfactory	Excellent	Unsatisfactory
Acetophenone	100%	24 C	75 F	Satisfactory	—	Unsatisfactory	Excellent	—	Satisfactory	—
Acetylene	100%	24 C	75 F	—	—	Excellent	Excellent	—	—	—
Air	100%	82 C	180 F	Excellent	Excellent	Excellent	Excellent	—	—	Excellent
Ammonia, Liquid	100%	24 C	75 F	Satisfactory	—	Unsatisfactory	Satisfactory	Unsatisfactory	Excellent	Excellent
Ammonium Hydroxide	10%	23 C	73 F	Satisfactory	—	Excellent	Excellent	Unsatisfactory	Excellent	Excellent
Ammonium Hydroxide	10%	70 C	158 F	Unsatisfactory	—	Excellent	Unsatisfactory	Unsatisfactory	Excellent	Excellent
Barium Sulfide	100%	24 C	75 F	Excellent	Excellent	Excellent	Satisfactory		Excellent	—
Benzene	100%	23 C	73 F	Satisfactory	Excellent	Excellent	Excellent	Unsatisfactory	Satisfactory	Unsatisfactory
Bleach	100%	23 C	73 F	—	Unsatisfactory	Excellent	Satisfactory	Unsatisfactory	Satisfactory	Excellent
Boric Acid	7%	35 C	95 F	Excellent	Excellent	Excellent	Unsatisfactory	Excellent	Excellent	—
Calcium Carbonate	Sat. sol.	24 C	75 F	Excellent	—	Excellent	—	—	Excellent	
Carbon Dioxide	100%	50 C	122 F	Satisfactory	Excellent	Excellent	Excellent	—	Excellent	—
Carbon Monoxide	100%	50 C	122 F	Satisfactory	—	Excellent	Excellent	—	Excellent	—
Carbon Tetrachloride	100%	50 C	122 F	Unsatisfactory	—	Excellent	Excellent	Unsatisfactory	Unsatisfactory	Unsatisfactory
Chlorine Water	Dilute	23 C	73 F	Unsatisfactory	—	Excellent	Satisfactory	Unsatisfactory	Unsatisfactory	Satisfactory
Chlorine Water	Concen.	23 C	73 F	Unsatisfactory	—	Excellent	Unsatisfactory	Unsatisfactory	Unsatisfactory	Unsatisfatory
Chlorobenzene	100%	23 C	73 F	Satisfactory	—	Excellent	Excellent	Unsatisfactory	Unsatisfactory	Unsatisfactory
Chlorofluorocarbon 11	100%	24 C	75 F	—	—	Excellent	Excellent	Satisfactory		Excellent
Chloroform	100%	23 C	73 F	Unsatisfactory	Satisfactory	Excellent	Satisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory
Cyclohexanone	100%	24 C	75 F	Unsatisfactory	—	Excellent	Excellent	Unsatisfactory	Satisfactory	Unsatisfactory
Dichlorethylene	100%	23 C	73 F	—	—	Excellent	Satisfactory		Excellent	Unsatisfactory
Ethanol	95%	50 C	122 F	Satisfactory	—	Excellent	Excellent	Satisfactory	Excellent	Satisfactory
Ethyl Acetate	95%	50 C	122 F	Satisfactory	—	Unsatisfactory	Excellent	Unsatisfactory	Satisfactory	Unsatisfactory
Ethylene Glycol	100%	23 C	73 F	Excellent	Satisfactory	Excellent	Excellent	Satisfactory	Excellent	Excellent
Ethylene Oxide	100%	24 C	75 F	Unsatisfactory	—	Excellent	Satisfactory	Satisfactory	Satisfactory	Excellent
Ethylene Oxide	100%	79 C	175 F	Unsatisfactory	—	Excellent	Unsatisfactory	Satisfactory	Unsatisfactory	Excellent
Fatty Acids	—	—	—	—	Excellent	Excellent	—	Satisfactory	Excellent	—
Fluorine	100%	23 C	73 F	Unsatisfactory	—	Excellent	Unsatisfactory	—	—	—
Formaldehyde	37%	24 C	75 F	Unsatisfactory	Excellent	Excellent	—	Unsatisfactory	Excellent	Unsatisfactory
Gasoline	100%	85 C	185 F	Excellent	Satisfactory	Excellent	Excellent	Unsatisfactory	Satisfactory	Satisfactory
Glucose	Concen.	24 C	75 F	Excellent	—	Excellent	—	—	Excellent	—
Glycerin	100%	24 C	75 F	Excellent	—	Excellent	—	Excellent	Excellent	Excellent
Hydrochloric Acid	2%	23 C	73 F	Excellent	Satisfactory	Excellent	Excellent	Excellent	Excellent	Excellent
Hydrochloric Acid	10%	25 C	77 F	Excellent	Satisfactory	Excellent	Unsatisfactory	Excellent	Excellent	Excellent
Hydrofluoric Acid	10%	23 C	73 F	Satisfactory	—	Excellent	Unsatisfactory		Excellent	Excellent
Hydrogen Peroxide	1%	24 C	75 F	Excellent	Unsatisfactory	Excellent	Satisfactory	Excellent	Excellent	Excellent
Hydrogen Peroxide	5%	43 C	110 F	Satisfactory	Unsatisfactory	Excellent	Unsatisfactory	Excellent	Satisfactory	Excellent
Isopropanol	70%	23 C	73 F	—	Excellent	Excellent	Excellent	Call*	Excellent	Satisfactory
Kerosene	100%	85 C	185 F	Satisfactory	—	Excellent	Excellent	Satisfactory	Satisfactory	Satisfactory
Methyl Ethyl Ketone	100%	50 C	122 F	Unsatisfactory	—	Unsatisfactory	Excellent	Unsatisfactory	Satisfactory	Unsatisfactory
Methylene Chloride	100%	23 C	73 F	Unsatisfactory	—	Excellent	Satisfactory	Unsatisfactory	Excellent	Unsatisfactory
Methanol	100%	23 C	73 F	Unsatisfactory	—	Excellent	Excellent	Satisfactory	Excellent	Satisfactory
Nitric Acid	10%	23 C	73 F	Satisfactory	—	Excellent	Unsatisfactory	Unsatisfactory	Excellent	Satisfactory
Oxygen	100%	24 C	75 F	—	—	Excellent	Satisfactory	—	—	—
Ozone	100%	43 C	110 F	Satisfactory	—	Satisfactory	Unsatisfactory	Unsatisfactory	—	—
Phenol	90%	23 C	73 F	Unsatisfactory	Unsatisfactory	Excellent	Unsatisfactory	—	Excellent	—
Phosphoric Acid	5%	98 C	208 F	Satisfactory	Unsatisfactory	Excellent	Unsatisfactory	Unsatisfactory	Excellent	Excellent
Propane	100%	23 C	73 F	Satisfactory	—	Excellent	Excellent	—	—	—
Sodium Bicarbonate	Concen.	24 C	75 F	Excellent	Excellent	Excellent	Excellent	—	Excellent	Excellent
Sodium Chloride	10%	23 C	73 F	Excellent	—	Excellent	Excellent	—	Excellent	Excellent
Sodium Chloride	Sat. sol.	24 C	75 F	Excellent	—	Excellent	Excellent	—	Excellent	Excellent
Sodium Hydroxide	10%	70 C	158 F	Satisfactory	—	Excellent	Satisfactory	—	Excellent	Excellent
Steam	—	120 C	248 F	Unsatisfactory	—	Excellent	Unsatisfactory	Unsatisfactory	Satisfactory	Excellent
Sulfuric Acid	30%	23 C	73 F	Satisfactory	Unsatisfactory	Excellent	Unsatisfactory	Excellent	Excellent	Excellent
Tetrahydrofuran	100%	23 C	73 F	Satisfactory	—	Unsatisfactory	Excellent	—	Unsatisfactory	—
Toluene	100%	50 C	122 F	Satisfactory	Unsatisfactory	Excellent	Excellent	Unsatisfactory	Unsatisfactory	Unsatisfactory
Trichloroethylene	100%	23 C	73 F	Satisfactory	—	Excellent	Satisfactory	Unsatisfactory	Unsatisfactory	Unsatisfactory
Water	100%	79 C	175 F	Excellent	—	Excellent	Excellent	Unsatisfactory	Excellent	Excellent

* Call Value Plastics technical support to review your application and the concentration of Isopropanol that will be used.

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Material - Manufacturer & Grade	**VP Code**	**Regulatory Compliance of Base Resin***	**RoHS Compliant**	**BPA Free**	**DEHP Free**	**Animal Derivative Free***
ABS (Lace White) - INEOS Lustran 348-000000	**-81**	USP Class VI Certified; ISO 10993 Part I Compliant	Yes	Yes	Yes	No
ABS, MABS (Methyl Methacrylate) - BASF Terlux 2802 TR	**-8003, SCV Series**	USP Class VI Certified	Yes	Yes	Yes	Yes
ABS (Sno White) - INEOS Lustran 348-012002	**-8012**	USP Class VI Certified; ISO 10993 Part I Compliant	Yes	Yes	Yes	No
Acetal - DuPont Delrin 500P	**-10**	21 CFR 177.2480 FDA Approved	Yes	Yes	Yes	No
l Copolymer - BASF Ultraform N 23020 003	**-1006, -1007**	21 CFR 177.2470 FDA Approved	Yes	Yes	Yes	No
ic - Cyro Cyrolite Med 2	**-50**	USP Class VI Certified; ISO 10993 Compliant; 21 CFR 177.1010 FDA Approved	Yes	Yes	Yes	Yes
(PA 66) - DuPont Zytel 101F	**-0, -1, -2, -3, -4, -5, -06, -07, -08B, -8, -8B, -CM030**	21 CFR 177.1500 FDA Approved	Yes	Yes	Yes	No
(PA 66) - DuPont Zytel SC310 NC010	**-U1, -U5, -U01, -U05**	USP Class VI Certified; ISO 10993 Compliant; 21 CFR 177.1500 FDA Approved	Yes	Yes	Yes	No
(Glass Reinforced) - DuPont Zytel FGFE5171	**-U71, -U75**	USP Class VI Certified; ISO 10993 Compliant; 21 CFR 177.1500 FDA Approved	Yes	Yes	Yes	No
(Glass Reinforced) - DuPont Zytel 70G33L	**-7, -72**	21 CFR 177.1500 FDA Approved	Yes	Yes	Yes	No
arbonate (Clear) - Bayer Makrolon 2558 550115	**-9**	USP Class VI Certified; ISO 10993 Compliant; 21 CFR 177.1580 FDA Approved	Yes	No	Yes	No
arbonate (Clear) - Bayer Makrolon Rx 1805 451118	**-9010, SCV Series**	USP Class VI Certified; ISO 10993 Compliant	Yes	No	Yes	Yes
arbonate (Tinted) - Styron Calibre Megarad 2081-15	**-9002, DCV Series**	ISO 10993 Compliant	Yes	No	Yes	No
thylene - LyondellBasell Purell PE 1840 H	**SCV Series**	Please call for details	Yes	Yes	Yes	Yes
ropylene - Flint Hills P5M6K-080	**-6005, -6006**	USP Class VI Certified; 21 CFR 177.1520 FDA Approved	Yes	Yes	Yes	Yes
Polysulfone - Solvay Udel P1700 CL2611	**-40**	USP Class VI Certified; ISO 10993 Compliant; 21 CFR 177.1655 FDA Approved	Yes	Yes	Yes	Yes
PVDF - Arkema Kynar 1000 HD	**-J1A**	USP Class VI Certified; 21 CFR 177.2510 FDA Approved	Yes	Yes	Yes	Yes
SAN - BASF 388S TR 77770	**SCV Series**	ISO 10993 Compliant	Yes	Yes	Yes	No
Silicone - Wacker Elastosil LR 3003	**SCV Series**	USP Class VI Certified	Yes	Yes	Yes	Yes

***As determined by resin manufacturer**

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Material - Manufacturer & Grade	**VP Code**	**Gamma Radiation Sterilization***	**Ethylene Oxide Sterilization**	**Autoclave Sterilization**
ABS (Lace White) - INEOS Lustran 348-000000	**-81**	Compatible up to 5 Mrads	Good	Not suitable due to low heat deflection temperatures
ABS, MABS (Methyl Methacrylate) - BASF Terlux 2802 TR	**-8003, SCV Series**	Withstands up to 5 Mrad doses without yellowing	Good	Poor; components may distort due to low heat deflection temperatures
ABS (Sno White) - INEOS Lustran 348-012002	**-8012**	Compatible up to 5 Mrads	Good	Not suitable due to low heat deflection temperatures
Acetal - DuPont Delrin 500P	**-10**	Compatible up to 1 Mrad	Excellent	Very Good
Acetal Copolymer - BASF Ultraform N 2320 003	**-1006, -1007**	Compatible up to 1.5 Mrads	Excellent	Very Good
Acrylic - Cyro Cyrolite Med 2	**-50**	Very good up to commonly used doses (6 Mrads)	Excellent	Not Recommended
Nylon (PA 66) - DuPont Zytel 101F	**-0, -1, -2, -3, -4, -5, -06, -07**	Very good; may discolor to brownish hue	Very good; some suceptibility to oxidizing agents	Very good; product may swell sligh due to water absorption
Nylon (PA 66) - DuPont Zytel SC310 NC010	**-U1, U5, -U01, -U05**	Very good; may discolor to brownish hue	Very good; some suceptibility to oxidizing agents	Very good; product may swell sligh due to water absorption
Nylon (Glass Reinforced) - DuPont Zytel 70G30L	**-U71, -U75**	Very good; may discolor to brownish hue	Very good; some suceptibility to oxidizing agents	Excellent
Nylon (Glass Reinforced) - DuPont Zytel 70G33L	**-72**	Very good; may discolor to brownish hue	Very good; some suceptibility to oxidizing agents	Excellent
Polycarbonate (Clear) - Bayer Makrolon 2558 550115	**-9**	Compatible up to 10 Mrads with minor loss of physical properties; will discolor to yellow-green hue	Highly compatible	Poor; may craze or stress crack due molding stresses
Polycarbonate (Clear) - Bayer Makrolon Rx 1805 451118	**-9010, SCV Series**	Compatible up to 10 Mrads with minor loss of physical properties; may discolor slightly dependent upon dose/number of cycles	Highly compatible	Poor; may craze or stress crack due molding stresses
Polycarbonate (Tinted) - Styron Calibre Megarad 2081-15	**-9002, DCV Series**	Excellent up to 10 Mrads with minor loss of physical properties; light violet hue turns clear upon sterilization	Highly compatible	Not Recommended
Polyethylene - LyondellBasell Purell PE 1840 H	**SCV Series**	Compatible up to 5 Mrads	Highly compatible	Not Recommended
Polypropylene - Flint Hills P5M6K-080	**-6005, -6006**	Very good to commonly used sterilization doses (6 Mrads)	Highly compatible	Poor; components may distort due low heat deflection temperatures
Polysulfone - Solvay Udel P1700 CL2611	**-40**	Highly compatible; will discolor to brownish hue	Excellent	Excellent
PVDF - Arkema Kynar 1000 HD	**-J1A**	Highly compatible; will discolor to brownish hue	Excellent	Highly Compatible
SAN - BASF 388S TR 77770	**SCV Series**	Compatible up to 5 Mrads	Good	Not suitable due to low heat deflection temperatures
Silicone - Wacker Elastosil LR 3003	**SCV Series**	Compatible up to 5 Mrads	Highly compatible	Very good

***1 Megarad (Mrad) = 10 kiloGrays (kGy)**

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TECHNICAL:
Typical Resin Properties

Property	ASTM Test Method	PVDF	Polycarb	Radiation Stable PC	Polypro	Nylon[a]	GF Nylon[a]	ABS	MABS	Polysulfone	Acetal
Tensile Strength	D638	5,400	10,000	9,800	—	12,000	27,000	4,800	—	—	—
Elongation at Break, %	D638	100-400	120	150	375	300	3	50	12	50-100	40
Tensile Yield Strength, psi	D638	6,500	9,200	9,800	4,400	12,000	—	5,700	6,960	10,200	9,900
Flexural Modulus, kpsi	D790	360	330	350	170	410	1,300	330	—	390	450
Rockwell Hardness D	D785	—	R118	R118	R80-102	R121	—	R107	—	—	R122
Rockwell Hardness M	—	—	M75	M72	—	M79	M101	—	—	M69	M89
Shore Hardness D	D2240	D76-80	—	—	—	—	—	—	—	—	—
Coef. of Linear 10-5 in/in/°F	D696	7.6	3.9	3.8	—	4	1.3	5.5	—	3.1	—
Deflection Temp°F @264psi	D648	244	266	252	—	194	480	173	194	345	216
Deflection Temp°F @66psi	D648	—	273	—	190	455	—	—	201	358	332
Water Absorption, %, 24 h	D570	0.015	0.15	0.15	0	1.2	0.7	0.25- 0.40	0.7	0.3	0.4
Izod Impact, (Notched) ft-lb/in	D256	3.1	16.0	14.0	0.5	1.0	2.2	6.0	1.31	1.3	—

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OTHER TRADEMARKS

1,827,467
1,817,921
1,817,922
2,655,263
2,616,170
2,535,232
2,535,234

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Unichem® is a registered trademark of the Colorite Plastics Company

One or more components contained in this catalog may be covered by B. Braun OEM Division patents and trademarks. Patent numbers: 4,246,932; 4,535,820; 4,683,916.

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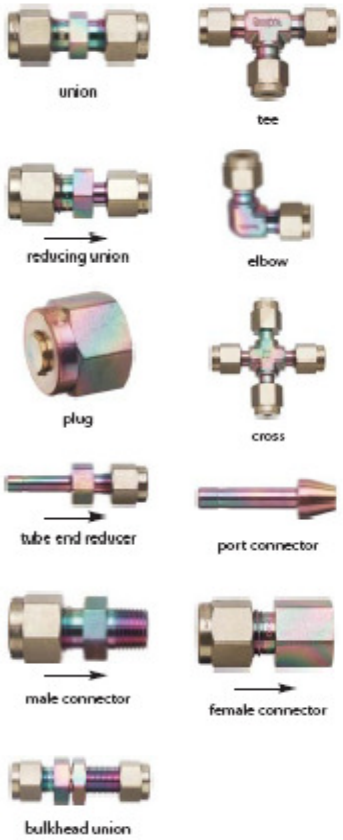

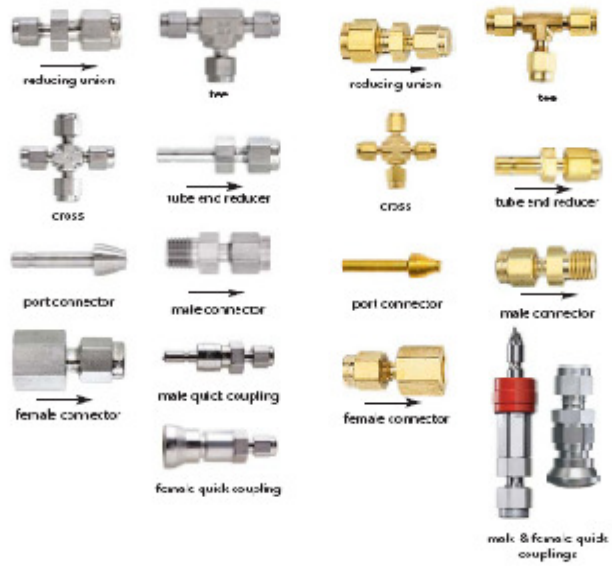

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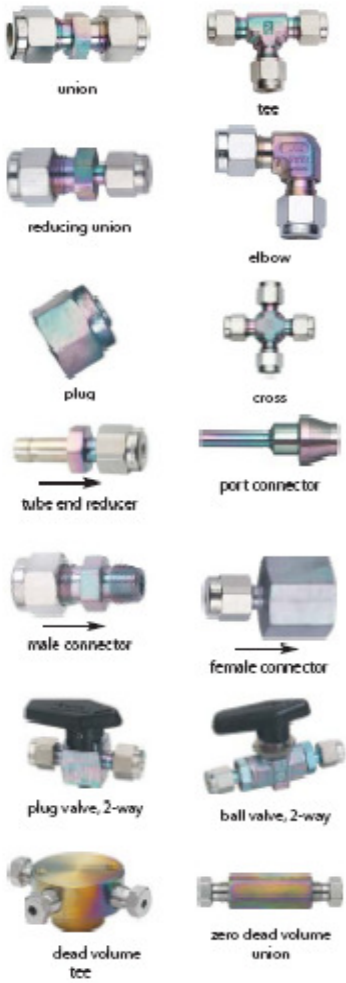

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- Silcosteel®-CR treatment enhances corrosion resistance by 10x, or more.
- Custom treatment available for any Swagelok® fitting, or other system parts not listed here (call for details).
- Description of custom Restek coatings listed below.

			Siltek/Sulfinert Treated			Silcosteel-CR Treated		
Fitting Type	Size	Swagelok #	qty.	cat.#	price	qty.	cat.#	price
Union	1/16"	SS-100-6	ea.	22540		ea.	22575	
	1/8"	SS-200-6	ea.	22541		ea.	22576	
	1/4"	SS-400-6	ea.	22542		ea.	22577	
	3/8"	SS-600-6	ea.	22909		ea.	22904	
Tee	1/16"	SS-100-3	ea.	22543		ea.	22578	
	1/8"	SS-200-3	ea.	22544		ea.	22579	
	1/4"	SS-400-3	ea.	22545		ea.	22580	
	3/8"	SS-600-3	ea.	22910		ea.	22905	
Reducing Union	1/8" to 1/16"	SS-200-6-1	ea.	22546		ea.	22581	
	1/4" to 1/16"	SS-400-6-1	ea.	22547		ea.	22582	
	1/4" to 1/8"	SS-400-6-2	ea.	22548		ea.	22583	
	3/8" to 1/4"	SS-600-6-4	ea.	22911		ea.	22906	
Elbow	1/8"	SS-200-9	ea.	22549		ea.	22584	
	1/4"	SS-400-9	ea.	22550		ea.	22585	
Plug	1/8"	SS-200-P	ea.	22573		ea.	22620	
	1/4"	SS-400-P	ea.	22574		ea.	22597	
Cross	1/8"	SS-200-4	ea.	22551		ea.	22586	
	1/4"	SS-400-4	ea.	22552		ea.	22587	
Tube End Reducer	1/8" tube to 1/16"	SS-100-R-2	ea.	22553		ea.	22588	
	1/4" tube to 1/16"	SS-100-R-4	ea.	22554		ea.	22589	
	1/8" tube to 1/4"	SS-400-R-2	ea.	22555		ea.	22590	
	1/4" tube to 1/8"	SS-200-R-4	ea.	22556		ea.	22591	
Port Connector	1/8"	SS-201-PC	ea.	22557		ea.	22592	
	1/4"	SS-401-PC	ea.	22558		ea.	22593	
	1/8" tube to 1/4"	SS-401-PC-2	ea.	22559		ea.	22594	
Male Connector	1/8" to 1/8" NPT	SS-200-1-2	ea.	22561		ea.	22595	
	1/4" to 1/4" NPT	SS-400-1-4	ea.	22562		ea.	22596	
	1/16" to 1/8" NPT	SS-100-1-2	ea.	22563		ea.	22610	
	1/8" to 1/4" NPT	SS-200-1-4	ea.	22564		ea.	22611	
	1/4" to 1/8" NPT	SS-400-1-2	ea.	22565		ea.	22612	
	3/8" to 3/8" NPT	SS-600-1-6	ea.	22912		ea.	22907	
Female Connector	1/8" to 1/8" NPT	SS-200-7-2	ea.	22566		ea.	22613	
	1/4" to 1/4" NPT	SS-400-7-4	ea.	22567		ea.	22614	
	1/4" to 1/8" NPT	SS-400-7-2	ea.	22568		ea.	22615	
	1/8" to 1/4" NPT	SS-200-7-4	ea.	22569		ea.	22616	
Bulkhead Union	1/8"	SS-200-61	ea.	22570		ea.	22617	
	1/4"	SS-400-61	ea.	22571		ea.	22618	

union

tee

reducing union

elbow

plug

cross

tube end reducer

port connector

male connector

female connector

bulkhead union

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nut

front ferrule

back ferrule

nut & ferrule set

plug

union

reducing union

tee

cross

tube end reducer

port connector

male connector

female connector

male quick coupling

female quick coupling

Fitting Type	Size	Swagelok #	Brass qty.	Brass cat.#	Brass price	316 Grade Stainless Steel qty.	316 Grade Stainless Steel cat.#	316 Grade Stainless Steel price
Nut	1/16"	102-1	20-pk.	23100		5-pk.	23150	
	1/8"	202-1	40-pk.	23101		10-pk.	23151	
	1/4"	402-1	40-pk.	23102		10-pk.	23152	
Front Ferrule	1/16"	103-1	20-pk.	23103		10-pk.	23153	
	1/8"	203-1	40-pk.	23104		20-pk.	23154	
	1/4"	403-1	40-pk.	23105		20-pk.	23155	
Back Ferrule	1/16"	104-1	20-pk.	23106		10-pk.	23156	
	1/8"	204-1	40-pk.	23107		20-pk.	23157	
	1/4"	404-1	40-pk.	23108		20-pk.	23158	
Nut & Ferrule Set	1/16"	—	10-pk.	23109		2-pk.	23159	
	1/8"	—	20-pk.	23110		5-pk.	23160	
	1/4"	—	20-pk.	23111		5-pk.	23161	
Plug	1/16"	100-P	5-pk.	23112		2-pk.	23162	
	1/8"	200-P	10-pk.	23113		4-pk.	23163	
	1/4"	400-P	10-pk.	23114		4-pk.	23164	
Union	1/16"	100-6	3-pk.	23115		ea.	23165	
	1/8"	200-6	5-pk.	23116		2-pk.	23166	
	1/4"	400-6	5-pk.	23117		2-pk.	23167	
Reducing Union	1/8" to 1/16"	200-6-1	5-pk.	23118		ea.	23168	
	1/4" to 1/16"	400-6-1	5-pk.	23119		2-pk.	23169	
	1/4" to 1/8"	400-6-2	5-pk.	23120		2-pk.	23170	
Tee	1/16"	100-3	2-pk.	23121		ea.	23171	
	1/8"	200-3	2-pk.	23122		ea.	23172	
	1/4"	400-3	2-pk.	23123		ea.	23173	
Cross	1/8"	200-4	2-pk.	23124		ea.	23174	
	1/4"	400-4	2-pk.	23125		ea.	23175	
Tube End Reducer	1/8" to 1/16"	100-R-2	5-pk.	23126		2-pk.	23176	
	1/4" to 1/16"	100-R-4	5-pk.	23127		2-pk.	23177	
	1/8" to 1/4"	400-R-2	5-pk.	23128		2-pk.	23178	
	1/4" to 1/8"	200-R-4	5-pk.	23129		2-pk.	23179	
Port Connector	1/8"	201-PC	5-pk.	23130		2-pk.	23180	
	1/4"	401-PC	10-pk.	23131		2-pk.	23181	
	1/8" to 1/4"	401-PC-2	5-pk.	23132		2-pk.	23182	
Male Connector	1/8" to 1/8" NPT	200-1-2	10-pk.	23133		2-pk.	23183	
	1/4" to 1/4" NPT	400-1-4	10-pk.	23134		2-pk.	23184	
	1/16" to 1/8" NPT	100-1-2	5-pk.	23135		2-pk.	23185	
	1/8" to 1/4" NPT	200-1-4	10-pk.	23136		2-pk.	23186	
	1/4" to 1/8" NPT	400-1-2	10-pk.	23137		2-pk.	23187	
Female Connector	1/8" to 1/8" NPT	200-7-2	5-pk.	23138		2-pk.	23188	
	1/4" to 1/4" NPT	400-7-4	5-pk.	23139		2-pk.	23189	
	1/4" to 1/8" NPT	400-7-2	5-pk.	23140		2-pk.	23190	
Male & Female Quick Couplings	1/8" male*	QC4D-200	—	—	—	ea.	23191	
	1/8" male	QC4S-200	—	—	—	ea.	23192	
	1/8" female*	QC4B-200	—	—	—	ea.	23193	
	1/4" male*	QC4D-400	—	—	—	ea.	23194	
	1/4" male	QC4S-400	—	—	—	ea.	23195	
	1/4" female*	QC4B-400	—	—	—	ea.	23196	

*Includes self-sealing shut-off valve.

also **available**

Restek also carries specialized tools for Swagelok® fittings.
See **page 249**.

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Siltek®/Sulfinert® and Silcosteel®-CR Treated Swagelok® Fittings

- Full line of treated 1/16", 1/8", and 1/4" fittings.
- Silcosteel®-CR treatment enhances corrosion resistance by 10x, or more.
- Custom treatment available for any Swagelok® fitting, or other system parts not listed here (call for details).
- Description of custom Restek coatings listed below.

			Siltek/Sulfinert Treated			Silcosteel-CR Treated		
Fitting Type	Size	Swagelok #	qty.	cat.#	price	qty.	cat.#	price
Union	1/16"	SS-100-6	ea.	22540		ea.	22575	
	1/8"	SS-200-6	ea.	22541		ea.	22576	
	1/4"	SS-400-6	ea.	22542		ea.	22577	
	3/8"	SS-600-6	ea.	22909		ea.	22904	
Tee	1/16"	SS-100-3	ea.	22543		ea.	22578	
	1/8"	SS-200-3	ea.	22544		ea.	22579	
	1/4"	SS-400-3	ea.	22545		ea.	22580	
	3/8"	SS-600-3	ea.	22910		ea.	22905	
Reducing Union	1/8" to 1/16"	SS-200-6-1	ea.	22546		ea.	22581	
	1/4" to 1/16"	SS-400-6-1	ea.	22547		ea.	22582	
	1/4" to 1/8"	SS-400-6-2	ea.	22548		ea.	22583	
	3/8" to 1/4"	SS-600-6-4	ea.	22911		ea.	22906	
Elbow	1/8"	SS-200-9	ea.	22549		ea.	22584	
	1/4"	SS-400-9	ea.	22550		ea.	22585	
Plug	1/8"	SS-200-P	ea.	22573		ea.	22620	
	1/4"	SS-400-P	ea.	22574		ea.	22597	
Cross	1/8"	SS-200-4	ea.	22551		ea.	22586	
	1/4"	SS-400-4	ea.	22552		ea.	22587	
Tube End Reducer	1/8" tube to 1/16"	SS-100-R-2	ea.	22553		ea.	22588	
	1/4" tube to 1/16"	SS-100-R-4	ea.	22554		ea.	22589	
	1/8" tube to 1/4"	SS-400-R-2	ea.	22555		ea.	22590	
	1/4" tube to 1/8"	SS-200-R-4	ea.	22556		ea.	22591	
Port Connector	1/8"	SS-201-PC	ea.	22557		ea.	22592	
	1/4"	SS-401-PC	ea.	22558		ea.	22593	
	1/8" tube to 1/4"	SS-401-PC-2	ea.	22559		ea.	22594	
Male Connector	1/8" to 1/8" NPT	SS-200-1-2	ea.	22561		ea.	22595	
	1/4" to 1/4" NPT	SS-400-1-4	ea.	22562		ea.	22596	
	1/16" to 1/8" NPT	SS-100-1-2	ea.	22563		ea.	22610	
	1/8" to 1/4" NPT	SS-200-1-4	ea.	22564		ea.	22611	
	1/4" to 1/8" NPT	SS-400-1-2	ea.	22565		ea.	22612	
	3/8" to 3/8" NPT	SS-600-1-6	ea.	22912		ea.	22907	
Female Connector	1/8" to 1/8" NPT	SS-200-7-2	ea.	22566		ea.	22613	
	1/4" to 1/4" NPT	SS-400-7-4	ea.	22567		ea.	22614	
	1/4" to 1/8" NPT	SS-400-7-2	ea.	22568		ea.	22615	
	1/8" to 1/4" NPT	SS-200-7-4	ea.	22569		ea.	22616	
Bulkhead Union	1/8"	SS-200-61	ea.	22570		ea.	22617	
	1/4"	SS-400-61	ea.	22571		ea.	22618	

union

tee

reducing union

elbow

plug

cross

tube end reducer

port connector

male connector

female connector

bulkhead union

Custom Restek Coatings

- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel; ideal for sulfurs, automotive exhaust testing, or stack gas sampling.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater.

For more information on our custom coatings, see page 242.

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nut

front ferrule

back ferrule

nut & ferrule set

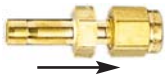
plug

union

reducing union

tee

cross


tube end reducer

port connector

male connector

female connector

male & female quick couplings

Parker Fittings

Parker's (A-Lok) two-piece ferrules and NPT fittings are ideal for installing new equipment, modifying existing instrumentation, or replacing worn connections. Restek offers both brass and stainless steel fittings. If there is a particular Parker fitting that you are looking for and it is not listed here, please contact us to inquire about availability.

			Brass			316 Grade Stainless Steel		
Fitting Type	Size	Parker #	qty.	cat.#	price	qty.	cat.#	price
Nut	1/16"	1 Nu 1	20-pk.	21800		5-pk.	21900	
	1/8"	2 Nu 2	40-pk.	21801		10-pk.	21901	
	1/4"	4 Nu 4	40-pk.	21802		10-pk.	21902	
Front Ferrule	1/16"	1 FF 1	20-pk.	21803		10-pk.	21903	
	1/8"	2 FF 2	40-pk.	21804		20-pk.	21904	
	1/4"	4 FF 4	40-pk.	21805		20-pk.	21905	
Back Ferrule	1/16"	1 BF 1	20-pk.	21806		10-pk.	21906	
	1/8"	2 BF 2	40-pk.	21807		20-pk.	21907	
	1/4"	4 BF 4	40-pk.	21808		20-pk.	21908	
Nut & Ferrule Set	1/16"	—	10-pk.	21809		2-pk.	21909	
	1/8"	—	20-pk.	21810		5-pk.	21910	
	1/4"	—	20-pk.	21811		5-pk.	21911	
Plug	1/16"	1 BLP 1	5-pk.	21815		2-pk.	21915	
	1/8"	2 BLP 2	10-pk.	21816		4-pk.	21916	
	1/4"	4 BLP 4	10-pk.	21817		4-pk.	21917	
Union	1/16"	1 SC 1	3-pk.	21818		ea.	21918	
	1/8"	2 SC 2	5-pk.	21819		2-pk.	21919	
	1/4"	4 SC 4	5-pk.	21820		2-pk.	21920	
Reducing Union	1/8" to 1/16"	2 RU 1	5-pk.	21823		ea.	21923	
	1/4" to 1/16"	4 RU 1	5-pk.	21824		2-pk.	21924	
	1/4" to 1/8"	4 RU 2	5-pk.	21825		2-pk.	21925	
Tee	1/16"	1 ET 1	2-pk.	21826		ea.	21926	
	1/8"	2 ET 2	2-pk.	21827		ea.	21927	
	1/4"	4 ET 4	2-pk.	21828		ea.	21928	
Cross	1/8"	2 ECR 2	2-pk.	21829		ea.	21929	
	1/4"	4 ECR 4	2-pk.	21830		ea.	21930	
Tube End Reducer	1/8" tube to 1/16"	2 TUR 1	5-pk.	21831		2-pk.	21931	
	1/4" tube to 1/16"	4 TUR 1	5-pk.	21832		2-pk.	21932	
	1/8" tube to 1/4"	2 TUR 4	5-pk.	21833		2-pk.	21933	
	1/4" tube to 1/8"	4 TUR 2	5-pk.	21834		2-pk.	21934	
Port Connector	1/8"	2 PC 2	5-pk.	21835		2-pk.	21935	
	1/4"	4 PC 4	10-pk.	21836		2-pk.	21936	
	1/8" tube to 1/4"	2 PC 4	5-pk.	21837		2-pk.	21937	
Male Connector	1/8" to 1/8" NPT	2 MSC 2N	10-pk.	21841		2-pk.	21941	
	1/4" to 1/4" NPT	4 MSC 4N	10-pk.	21842		2-pk.	21942	
	1/16" to 1/8" NPT	1 MSC 2N	5-pk.	21843		2-pk.	21943	
	1/8" to 1/4" NPT	2 MSC 4N	10-pk.	21844		2-pk.	21944	
	1/4" to 1/8" NPT	4 MSC 2N	10-pk.	21845		2-pk.	21945	
Female Connector	1/8" to 1/8" NPT	2 FSC 2N	5-pk.	21846		2-pk.	21946	
	1/4" to 1/4" NPT	4 FSC 4N	5-pk.	21847		2-pk.	21947	
	1/4" to 1/8" NPT	4 FSC 2N	5-pk.	21848		2-pk.	21948	
Male & Female Quick Couplings	1/8" male*	2A-Q4VN	—	—	—	ea.	21957	
	1/8" male	2A-Q4P	—	—	—	ea.	21958	
	1/8" female*	2A-Q4CN	—	—	—	ea.	21959	
	1/4" male*	4A-Q4VN	—	—	—	ea.	21960	
	1/4" male	4A-Q4P	—	—	—	ea.	21961	
	1/4" female*	4A-Q4CN	—	—	—	ea.	21962	

*Includes self-sealing shut-off valve.

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Siltek®/Sulfinert® Treated and Silcosteel®-CR Treated Parker Fittings

A broad line of 1/16", 1/8" and 1/4" fittings are available with Siltek®/Sulfinert® or Silcosteel®-CR treatment. Because of expanding applications for these coatings, we have received many requests for a broader product offering. If you do not see everything you need, contact us for information on custom coating services.

			Siltek/Sulfinert Treated			Silcosteel-CR Treated		
Fitting Type	Size	Parker #	qty.	cat.#	price	qty.	cat.#	price
Union	1/16"	1 SC 1	ea.	22520		ea.	22863	
	1/8"	2 SC 2	ea.	22521		ea.	22864	
	1/4"	4 SC 4	ea.	22522		ea.	22865	
Tee	1/16"	1 ET 1	ea.	22526		ea.	22866	
	1/8"	2 ET 2	ea.	22527		ea.	22867	
	1/4"	4 ET 4	ea.	22528		ea.	22868	
Reducing Union	1/8" to 1/16"	2 RU 1	ea.	22523		ea.	22869	
	1/4" to 1/16"	4 RU 1	ea.	22524		ea.	22870	
	1/4" to 1/8"	4 RU 2	ea.	22525		ea.	22871	
Elbow	1/16"	1 EE 1	—	—	—	ea.	22874	
	1/8"	1 EE 2	ea.	22530		ea.	22875	
	1/4"	1 EE 4	ea.	22531		ea.	22876	
Plug	1/16"	1 BLP 1	ea.	21539		ea.	22877	
	1/8"	2 BLP 2	ea.	21540		ea.	22878	
	1/4"	4 BLP 4	ea.	21541		ea.	22879	
Cross	1/8"	2 ECR 2	ea.	21542		ea.	22872	
	1/4"	4 ECR 4	ea.	21543		ea.	22873	
Tube End Reducer	1/8" tube to 1/16"	2 TUR 1	ea.	21544		ea.	22880	
	1/4" tube to 1/16"	4 TUR 1	ea.	21545		ea.	22881	
	1/8" tube to 1/4"	2 TUR 4	ea.	21546		ea.	22882	
	1/4" tube to 1/8"	4 TUR 2	ea.	21547		ea.	22883	
Port Connector	1/8"	2 PC 2	ea.	21548		ea.	22884	
	1/4"	4 PC 4	ea.	21549		ea.	22885	
	1/8" tube to 1/4"	2 PC 4	ea.	21550		ea.	22886	
Male Connector	1/8" to 1/8" NPT	2 MSC 2N	ea.	21551		ea.	22887	
	1/4" to 1/4" NPT	4 MSC 4N	ea.	21552		ea.	22888	
	1/16" to 1/8" NPT	1 MSC 2N	ea.	21553		ea.	22889	
	1/8" to 1/4" NPT	2 MSC 4N	ea.	21554		ea.	22890	
	1/4" to 1/8" NPT	4 MSC 2N	ea.	21555		ea.	22891	
Female Connector	1/8" to 1/8" NPT	2 FSC 2N	ea.	21556		ea.	22892	
	1/4" to 1/4" NPT	4 FSC 4N	ea.	21557		ea.	22893	
	1/4" to 1/8" NPT	4 FSC 2N	ea.	21558		ea.	22894	
	1/8" to 1/4" NPT	2 FSC 4N	ea.	21559		ea.	22895	
Plug Valve, 2-Way	1/8"	2A PR4 VT SS	ea.	21586		—	—	—
	1/4"	4A PR4 VT SS	ea.	21587		—	—	—
Ball Valve, 2-Way	1/8"	2A B2LJ2 SSP	ea.	21588		—	—	—
	1/4"	4A B2LJ2 SSP	ea.	21589		—	—	—

Please note: Nuts and ferrules are not treated unless requested (custom parts). Nuts and ferrules normally are not in contact with sample pathway, and thus do not require coating.

union

tee

reducing union

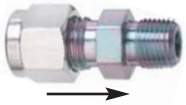
elbow

plug

cross

tube end reducer

port connector


male connector

female connector

plug valve, 2-way

ball valve, 2-way

Siltek®/Sulfinert® Treated Treated Valco® Fittings

		Siltek/Sulfinert Treated		
Fitting Type	Size	qty.	cat.#	price
Valco Zero Dead Volume Tee	1/16"	ea.	22534	
	1/8"	ea.	22535	
Valco Zero Dead Volume Union	1/16"	ea.	22532	
	1/8"	ea.	22533	

zero dead volume tee

zero dead volume union

Swagelok® Brass & Stainless Steel Fitting Kits

Save more than 40% by purchasing a new Restek Swagelok® Fittings Kit, compared to prices for the individual parts!

NEW!

- Includes the most common assortment of 1/8" and 1/4" brass or stainless steel fittings.
- Parts list makes reordering easy.
- Parts come in sturdy tool box for easy and convenient storage.

40% savings

Swagelok Brass Fitting Kit Includes:

Swagelok #	Description, qty included in kit
B-202-1	1/8" brass nut (20)
B-402-1	1/4" brass nut (20)
B-203-1	1/8" brass front ferrule (20)
B-403-1	1/4" brass front ferrule (20)
B-204-1	1/8" brass back ferrule (20)
B-404-1	1/4" brass back ferrule (20)
B-200-C	1/8" brass cap (6)
B-400-C	1/4" brass cap (6)
B-200-P	1/8" brass plug (6)
B-400-P	1/4" brass plug (6)
B-200-6	1/8" brass union (2)
B-400-6	1/4" brass union (2)
B-400-6-2	1/4" to 1/8" brass reducing union (2)
B-200-3	1/8" brass tee (2)
B-400-3	1/4" brass tee (2)
B-400-R-2	1/8" to 1/4" brass tube end reducer (2)
B-200-R-4	1/4" to 1/8" brass tube end reducer (2)
MS-IG-200	1/8" inspection gauge (1)
MS-IG-400	1/4" inspection gauge (1)

Description	qty.	cat.#	price
Swagelok Brass Fitting Kit	kit	23141	

Swagelok Stainless Steel Fitting Kit Includes:

Swagelok #	Description, qty included in kit
SS-202-1	1/8" SS nut (20)
SS-402-1	1/4" SS nut (20)
SS-203-1	1/8" SS front ferrule (20)
SS-403-1	1/4" SS front ferrule (20)
SS-204-1	1/8" SS back ferrule (20)
SS-404-1	1/4" SS back ferrule (20)
SS-200-C	1/8" SS cap (6)
SS-400-C	1/4" SS cap (6)
SS-200-P	1/8" SS plug (6)
SS-400-P	1/4" SS plug (6)
SS-200-6	1/8" SS union (2)
SS-400-6	1/4" SS union (2)
SS-400-6-2	1/4" to 1/8" SS reducing union (2)
SS-200-3	1/8" SS tee (2)
SS-400-3	1/4" SS tee (2)
SS-400-R-2	1/8" to 1/4" SS tube end reducer (2)
SS-200-R-4	1/4" to 1/8" SS tube end reducer (2)
MS-IG-200	1/8" inspection gauge (1)
MS-IG-400	1/4" inspection gauge (1)

Description	qty.	cat.#	price
Swagelok Stainless Steel Fitting Kit	kit	23197	

20147

Zero-Dead-Volume Valco® Internal Union

Ends of tubing seat squarely at bottoms of fitting details. 300 series stainless steel. For 1/16" OD tubing. Stainless steel ferrules included.

Description	Union Bore	Valco #	qty.	cat.#	price
Internal Union	0.15mm	ZU1XC	ea.	20147	
Internal Union	0.25mm	ZU1C	ea.	20148	
Internal Union	0.75mm	ZU1	ea.	20149	
Internal Union	1/16"	ZU1T	ea.	20150	

20151

Zero-Dead-Volume Valco® Internal Reducing Union

Connect two sizes of tubing, using zero-dead-volume fittings on each end. For 1/8" to 1/16" OD tubing. Stainless steel ferrules included.

Description	Union Bore	Valco #	qty.	cat.#	price
Internal Reducing Union	0.25mm	ZRU21C	ea.	20151	
Internal Reducing Union	0.75mm	ZRU21	ea.	20152	
Internal Reducing Union	1/16"	ZRU21T	ea.	20153	

20154

Zero-Dead-Volume Valco® Internal Tee

Connect three lines. 300 series stainless steel; stainless steel ferrules included. For 1/16" OD tubing.

Description	Union Bore	Valco #	qty.	cat.#	price
Internal Tee	0.25mm	ZT1C	ea.	20154	
Internal Tee	0.75mm	ZT1	ea.	20155	

20156

Zero-Dead-Volume Valco® Internal Cross

Connect four lines. 300 series stainless steel; stainless steel ferrules included. For 1/16" OD tubing.

Description	Union Bore	Valco #	qty.	cat.#	price
Internal Cross	0.25mm	ZX1C	ea.	20156	
Internal Cross	0.75mm	ZX1	ea.	20157	

20159
20158

Male Pipe to Valco® Internal Adapter

Makes a minimum volume connection from a female pipe fitting on a pressure gauge or regulator to a Valco® zero-dead-volume fitting. 300 series stainless steel; stainless steel ferrules included.

Description	Fitting Size	Bore	Valco #	qty.	cat.#	price
1/8" NPT Male Internal Adapter	1/16" ZDV	1.0mm	PZA21	ea.	20158	
1/4" NPT Male Internal Adapter	1/16" ZDV	1.0mm	PZA41	ea.	20159	

20286 20287

Nuts & Ferrules for Valco® Connectors

Description	Valco #	qty.	cat.#	price
1/16" Stainless Steel Ferrules	ZF1-10	10-pk.	20286	
1/16" Stainless Steel Nuts	ZN1-10	10-pk.	20287	

1/16-Inch Valco® Adaptor Ferrules

			Valcon Polyimide			Polyimide		
Tubing OD	Tubing ID	Valco #	qty.	cat.#	price	qty.	cat.#	price
0.25–0.4mm	0.1-0.25mm	FS1.4-5	5-pk.	20142		2-pk.	21015	
0.4–0.5mm	0.32mm	FS1.5-5	5-pk.	20143		2-pk.	21016	
0.5–0.8mm	0.53mm	FS1.8-5	5-pk.	20144		—	—	—
0.8mm (1/32")	—	FS1.9-5	5-pk.	20145		—	—	—

also available

Treated Fittings!

See pages 237-241 for our Siltek®/Sulfinert® treated and Silcosteel®-CR treated fittings, as well as many more brass and stainless steel fittings from Swagelok® and Parker.

MXT™-Union Connector Kits for Fused Silica Columns

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 360°C.
- Available in union and "Y" configurations.
- Can also be used for fused silica to metal connections.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

MXT™-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#	price
For 0.25mm ID Fused Silica Columns	kit	21386	
For 0.32mm ID Fused Silica Columns	kit	21385	
For 0.53mm ID Fused Silica Columns	kit	21384	

MXT™ "Y"-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#	price
For 0.25mm ID Fused Silica Columns	kit	21389	
For 0.32mm ID Fused Silica Columns	kit	21388	
For 0.53mm ID Fused Silica Columns	kit	21387	

Adaptor Ferrules

20389

Valco™ Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica

Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

1/32-Inch Adaptor Ferrule (Valcon Polyimide)

Tubing OD	Tubing ID	Valco #	qty.	cat.#	price
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137	
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140	
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141	
1/32" Replacement Nut			5-pk.	20389	

MXT™ Low-Dead-Volume Connector Kits for Metal Columns

These low-dead-volume connectors are Siltek® treated to make them inert to active compounds, just like our MXT® columns. They can be used at temperatures up to 430°C without degrading the deactivated layer. Purchase the appropriate ferrules for connecting 0.28, 0.32 or 0.53mm ID tubing.

MXT™ Low-Dead-Volume Connector Kits for Metal Columns

- Connect a guard column/transfer line to an MXT® stainless steel column.
- Low thermal mass tracks rapid oven temperature programming.
- Stainless steel ferrules and nuts.
- Available in "Y" and union configurations.
- Siltek® treatment ensures ultimate inertness.

Each kit contains the MXT™ union, two 1/32-inch ferrules and nuts.

Description	qty.	cat.#	price
For 0.28mm ID MXT Columns	kit	20397	
For 0.32mm ID MXT Columns — NEW!	kit	20536	
For 0.53mm ID MXT Columns	kit	20394	

MXT™ Low-Dead-Volume "Y" Connector Kits for Metal Columns

- Connect two MXT® columns to one inlet or one MXT® column to two detectors.

Each kit contains the MXT™ union, three 1/32-inch ferrules and nuts.

Description	qty.	cat.#	price
For 0.28mm ID MXT Columns	kit	20396	
For 0.32mm ID MXT Columns — NEW!	kit	20537	
For 0.53mm ID MXT Columns	kit	20395	

1/32-Inch Stainless Steel Replacement Ferrules for MXT™ Connectors

Ferrule ID	Fits Column ID	qty.	cat.#	price
0.59mm	0.28mm	10-pk.	20398	
0.53mm — NEW!	0.32mm	10-pk.	20535	
0.79mm	0.53mm	10-pk.	20399	

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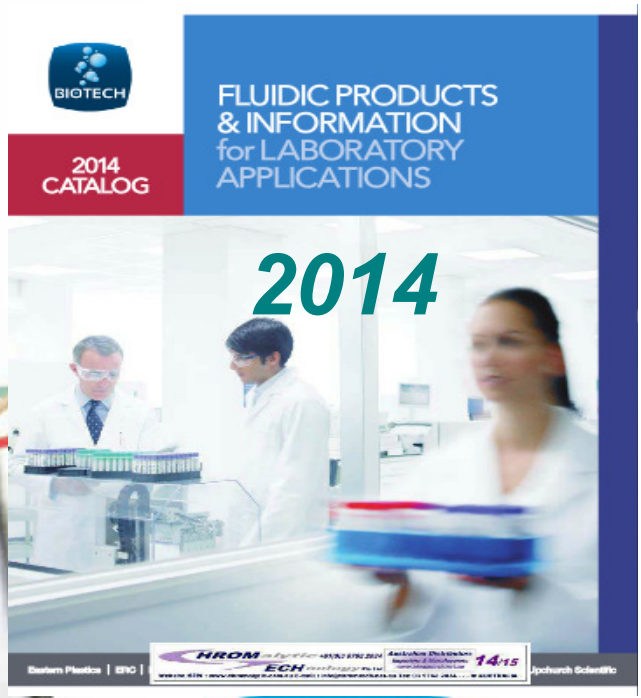

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We provide every part of your fluidic system

BIOTECH – WORLDWIDE

Degassers & Debubblers

Customized Fittings

Tubing

Analytical Injectors

Frits & Filters

Column Hardware

OEM Column Packing

Automatic Valve Solutions

The company

We are supplying innovative laboratory products to instrument manufacturers and distributors around the world. Our mission is to empower you to design a unique product in the field of liquid handling and fluid transfer components for analytical, biotech and life science users.

- The complete solution for degassing and fluidic handling
- From idea to finished product

Biotech is involved in a variety of research projects with renowned European and US companies and institutes. We are an innovative company, benefitting from the synergy of scientific research and applied technology. Ownership and close liaison with network partners results in future opportunities for new exciting products in fluidic handling and chromatography.

Visit our headquarter

You have a standing invitation to visit us at the Onsala peninsula on the Swedish Westcoast in close proximity to the Gothenburg City and Landvetter International Airport.

Today we are selling our products in more than 30 countries around the world. We have subsidiaries in US and India to give you the best service and support. At our facilities in India we provide OEM packing of HPLC columns.

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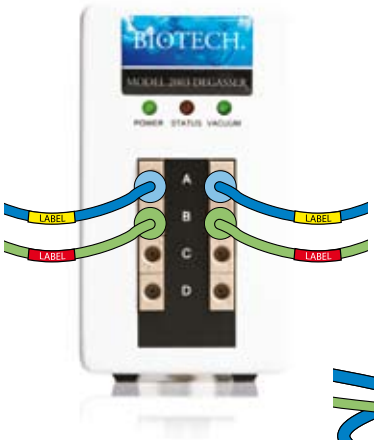
You require – we deliver

OEM TUBING KITS FROM BIOTECH

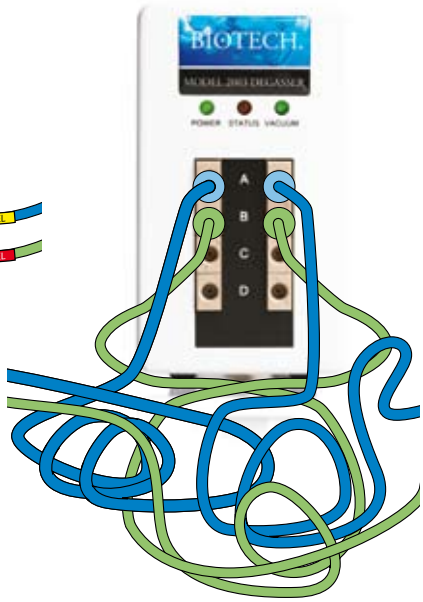
Customization – trouble free usage

Save time and avoid confusion
Avoid delay and confusion when installing a new system for your customer. Let us help you to configure a ready-to-use tubing and fittings kit! We have a very wide range of products and long experience in the field.

Precut and assembled



Without our customization



Starter-Kit with common parts

Why not?
Give away a starter kit labelled with your logo and contact details to every instrument customer or sell the starter-kit to them. Contact us and we will make a suggestion for a suitable starter kit for your needs at an attractive price.

Pick the best combination

- Tubing length
- Desired fittings (size, color, label)
- Your P/N and private labelling
- Filters, tools, tubing markers and accessories
- Labelled with your logo and company details
- Sorted set packed in boxes or plastic bags
- Make a drawing or explain your needs and we present the solution

Customized OEM modules, parts or stand alone units

DEGASSERS & DEBUBBLERS

Biotech on-line degasser

Secure your analysis with our on-line degasser

- Extremely quiet
- Long life expectancy – 5 years continuous running capacity
- Pump head purge eliminates need for purging valve
- Eliminate baseline fluctuations due to the ZHCR® (Zero Hysteresis Constant Run) stepper motor driven vacuum pump
- Short time vacuum pull-down, normally less than 3 minutes
- Closed loop vacuum control means constant vacuum (variable RPM)
- Advanced error and leak checking functions

WITH YOUR LOGO

General specifications

Number of channels:	2, 3, 4, 5 or 8
Internal Channel Volume:	480 microliter
Wetted Parts:	Peek and Systec AF
Height:	5.0 in. (127 mm)
Width:	2.87 in. (73 mm)
Depth:	9.81 in. (249 mm)
Power:	15 to 24 VDC @ 0.85 A max. (0.5 A typical)
Weight:	6 lb (2.7 kg)

Debubblers

Trouble with visible bubbles in your system?

Are you working at high flow-rates and highly aqueous systems?

Then, have a look at our new series of debubblers!

The main advantage of the debubbler compared with our degassers, is that the debubbler has much higher capacity to remove visible bubbles. The debubbler is incredibly efficient in removing bubbles from the liquid.

The in-line debubbler is used in highly aqueous systems where bubbles and dissolved gas must be removed. Aqueous systems may have some alcohol content, and small amounts of surfactant.

Choose from different configurations

- Low volume chambers (Mini chamber design)
- High flow rate configurations (250ml/min)
- With or without bubble trap
- New 100rpm continuously running vacuum pump

Degassing modules

Horizontal, vertical or Z-shaped?
Choose the bracket wanted and configure it with:

- Up to 5 mini degassing chambers (100-925µl)
- ZHCR® control P.C.-board
- ZHCR® vacuum pump

Features with the Systec AF / ZHCR® degassing technology:

- 50 times the degassing efficiency over PTFE design, gives drastically reduced internal volume and faster start-up
- Constant vacuum with closed loop control
- Perfectly clean detector base line due to ZHCR® vacuum pump
- Continuously vented vacuum system

Vacuum degassing chambers and ZHCR vacuum pumps

Choose from several configurations

- Different flow path I.D.
- Standard or GPC compatible
- 100µl – 13.8ml chambers
- Capillary-, analytical- or preparative scale

General specifications

Degassing Channel Tubing:	Systec® AF
Degassing Channel Pressure Rating (priming pressure):	70 PSI
Wetted Materials:	Systec AF, PEEK and Tefzel
Vacuum Housing Materials:	PEEK / PPS and Stainless Steel

Almost every color, material and dimension

TUBING, ADAPTERS & VALVES

Colors

- Natural
- Black
- Red
- Violet
- Yellow
- Blue
- Orange
- Green
- More available upon request

Materials

- Dupont Teflon® Brand Resin FEP, PFA, PFA High Purity, PFA High Purity Plus
- Tefzel (ETFE)
- PEEK
- Stainless Steel
- Custom material/blending upon request

Shapes and custom cut

- Customized thermoformed polymer tubing available for all extruded materials and dimensions
- Endless possibilities for customization

Dimensions

Outer diameter range:	360µm-7.9mm
Inner diameter range:	20µm-6.4mm
Typical ID / OD tolerances for 1.6mm OD tubing:	±25µm
Typical for 3.2mm OD tubing:	±75-100µm

Available custom cut (length range depends on material) with tight tolerances on length

Automatic valve solutions

Choose from several configurations

- Low pressure up to 1000 bar ultra-high pressure
- 2-position or multi-position
- Standard or nano configuration
- Stand alone units
- OEM units
- Now a

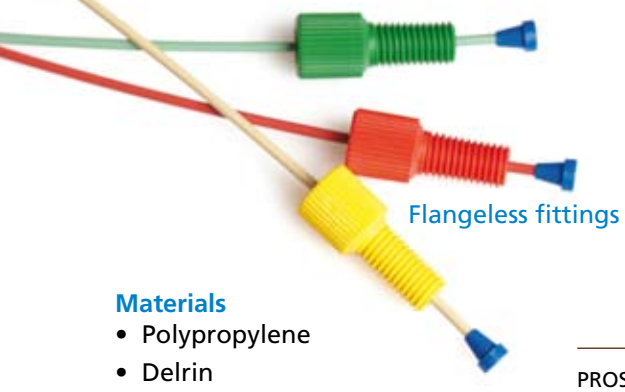
Valves

Control your flow stream with ease

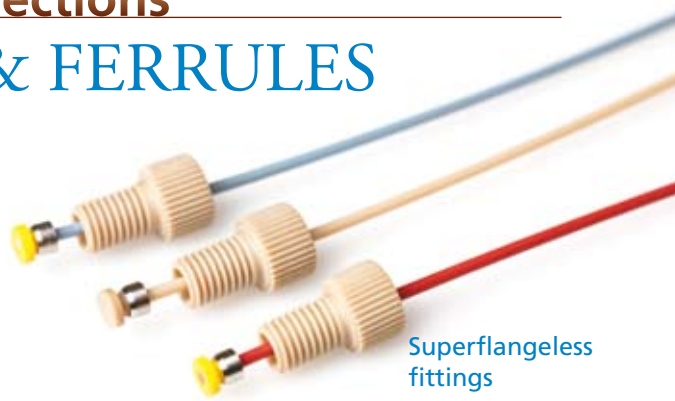
- Shut-Off Valves
- Micro-Splitter Valves
- Micro-Metering Valves Prime/Purge Valves
- Pressure Relief Valves
- Inline Check Valves
- Maximum Pressure 0.3 – 276 Bar

Secure your connections

FITTINGS – NUTS & FERRULES



Flangeless fittings



Superflangeless fittings

Materials

- Polypropylene
- Delrin
- PEEK
- Tefzel (EFTE)
- Teflon (PFA)
- PPS
- Stainless steel
- Polyketone
- KEL-F

Colors

- Natural
- Black
- Red
- Violet
- Yellow
- Blue
- Orange
- Green
- White
- Cream

Dimensions

Standard US and Metric thread specifications for Metric and Imperial tubing diameters: 1/4-28, M6, 10-32, M8, 6-32

Superflangeless fittings

PROS
- Tubing twist is eliminated
- Higher pressure in a flat bottom port configuration
- Ferule stays on the tubing, great for premade assemblies

CONS
- Three components in the assembly makes initial assembly process less user-friendly

Flangeless fittings

PROS
- The ferrule is easy to replace when necessary to fix problematic connections
- Higher pressure holding ability than flanged tubing
- Inexpensive

CONS
- Difficult to use in pre-made assemblies because ferrule is not pre-swaged on the tubing
- Tubing can twist during installation due to the method of compression

Coned fittings

Ultra high performance fittings

Line includes nuts, ferrules, unions, tees, and crosses

High temperature versions

Withstand temperatures up to 200°C

Ultra high pressure versions

Rated to 15,000 psi and 28,800 psi

- Fittings for coned and flat-bottom ports
- For 1/16", 1/32", and 360 µm OD tubing connections
- SealTight™, LiteTouch® and Super Flangeless available

SAPPHIRE ENGINEERING

PVM – Pump & valve module

The PVM can be operated as a stand-alone module or in automated instruments controlled by an external computer or microprocessor.

Protocol features:

- Programmable ramps, cut-offs, backlash compensation, plunger speeds, delays and loops
- Select piston / syringe speed
- Absolute and relative positioning of pistons / syringes
- Start and terminate piston / syringe movement
- Check pump with self-test
- Selective work with up to 15 PVM's

IPV – Integrated Piston/Valve

- 5 – 20 times longer life than typical Glass Barrel/ Teflon® syringes with Kel-F®/Teflon plug valves
- Use with Sapphire Engineering™'s PVM Pump
- Also use for direct, plug-in replacement for existing syringes and valves on Cavro™ XP-3000 and Hamilton PSD4 Syringe Pumps
- Accuracy and precision identical to typical syringes and valves
- Significant lifetime cost savings
- No routine maintenance required
- Optional seal-wash versions available to help extend life with difficult fluids
- Made of durable, chemically resistant materials
- Available valve configurations: 3-way "Y" valve, 3-way "T" valve,
- 3-port distribution valve, 4-way valve
- Optional wetted materials available upon request

VFP17 – Precision Dispense Pump

Value - Flexibility - Performance

With its Zirconia ceramic displacement piston technology, the VFP17 precision displacement and syringe pumps, including:

- High precision and low cost of ownership at a value price to meet the cost constraints of lab automation and diagnostic applications
- Guaranteed pump life of millions of cycles
- Available with total dispense volumes of 25µL to 5mL
- Flexibility to customize for your application

Just hardware or OEM packing

COLUMNS & FRITS

Stainless Steel Columns

Choose amongst different hardware configurations

- Compression, Modular, Quick Seal
- Special Hardware for Ultra-High Pressure or LC/MS

PEEK Columns

Bio-Safe™ columns are biocompatible and precision-machined from virgin PEEK (polyetheretherketone), a strong, inert polymer material.

Why PEEK?

PEEK columns are used when analytes are sensitive to the metals in stainless steel hardware.

Bio-Safe column dimensions

- Internal diameter (mm): 2.1, 4.6
- Length (mm): 33, 50, 75, 100, 150, 250, 300
- Stable to 8 000 psi

Top-of-the-line column hardware manufactured by Isolation Technologies

OEM Column packing

Use our economic packing possibilities in India. Fully equipped laboratory facilities and a well educated staff ensure you packed columns of highest quality.

Frits

PEEK, titanium or stainless steel?

Biotech produces a variety of dimensions of Polyethylene Hydrophilic frits primarily intended for SPE (Solid Phase Extration) applications. Details upon request.

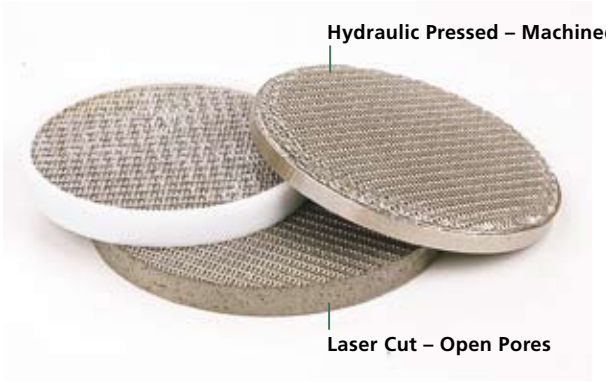
Special Design

Frits can be modified; rings – no rings, PEEK rings – PCTFE rings etc.

Choose from several configurations

- Disc Diameter
- Disc Thickness
- Ring OD

Poro-Frit



Poro-frit™ for prep chromatography

Poro-Frit™ is a woven wire cloth laminate with the different wire cloth layers closely bounded together by a unique sintering process, resulting in a predetermined precise characteristics with regard to pore-size, number of layers, strength, pore distribution and permeability.

Tecnical data

- defined pore size range of 2 microns and upwards
- no “blind holes”
- range from 20 mm - 1 200 mm without welding
- 5-10 layers, including a strong support screen, and a thickness of either 1.7 – 3.0 – 5.0 mm

Biotech provides every part of your fluidic system

PLACE YOUR ORDER TODAY

NAME

COMPANY / INSTITUTE

ADDRESS

ZIP CODE

COUNTRY

TELEPHONE

E-MAIL

Copy this page and fill it out
E-mail or fax your copy of this page to Biotech and explain your interest.

I'M INTERESTED IN:

- ☐ OEM Degassers
- ☐ Stand Alone Degassers
- ☐ Debubblers
- ☐ Tubing- and fittings kits
- ☐ Column hardware
- ☐ Frits & filters
- ☐ OEM column packing
- ☐ HPLC columns
- ☐ Valve solutions
- ☐ Pumps
- ☐ Other

MESSAGE (Please, describe your application and needs briefly)

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View from our office windows

BIOTECH

Biotech Sweden is a company highly specialized in chromatography accessories and consumables. Biotech is located on the Swedish Westcoast – south of Gothenburg – at the beautiful Onsala peninsula, covering 15.000 sq.m. land and 700 sq.m. production and office area.

A SIMPLE PHILOSOPHY...

We at Biotech believe that value is not "the lowest price" – our customers are the reason we exist – our customers always come first. We have not lost sight where we come from and therefore we try harder to be your partner, we're not satisfied unless you are satisfied.

Thank you for your business. I know we'll continue to grow and prosper together.

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SEE WHAT'S NEW!

NEW! Biocompatible

Biocompatible Tubing for UHPLC
PEEK-Lined Stainless Steel (PLS)

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NEW! Biocompatible

Four Independent Channels!
Reglo ICC Peristaltic Pump

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NEW! Biocompatible

High Pressure Manual Injection Valve
Active Flow-Splitter for LC/MS

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Biocompatible

Our Biocompatible logo indicates the use of materials anticipated to maintain the integrity and improve the analysis of biological samples in their intended application.

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VC-360

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FITTINGS

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SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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Fittings Chapter

In this catalog, we've taken a new approach to presenting our extensive line of fittings. In one comprehensive chapter, you will find fittings for several applications — very high pressure (> 15,000 psi/1,034 bar), high pressure (> 1,000 psi/69 bar), and low pressure (< 1,000 psi/69 bar). There is also a separate section for micro and nano-scale applications.

You'll also find information on:

THREADS (10-32, 6-32, M6, etc.)

TUBING SIZE (1/16", 1/32", 360 µm, etc.)

PORT GEOMETRY (Coned, Flat-bottom)

Specification tables at the bottom of each page include:

- Part numbers
- Part description
- Materials of construction
- Standard size packages
- Pressure ratings
- Available colors

Additionally, you will find fitting-related application notes and, if available, special ordering options throughout the chapter.

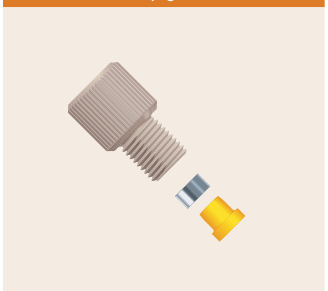
Please Note: in the product descriptions, a "Fitting" refers to a complete product ready to assemble and connect tubing into a part. This could be a one-piece connector or a nut and ferrule packaged together. A "Nut" indicates the male or female threaded product sold separately, and a "Ferrule" is sold separately when indicated in the description. For your convenience we ship most Upchurch Scientific® Fittings and Ferrules in 10-packs, however, you may order individual pieces (an "x" in the product part number designates "10-pk").

You may notice a change in some of our pressure ratings — be assured that the IDEX Health & Science team is dedicated to providing the most reliable, proven products on the market. We have implemented more stringent testing protocols and a generous safety margin to our ratings to ensure your safety.

Please Note: all testing is performed with water at room temperature unless otherwise specified. Results may vary depending on the material of the receiving port and tubing, actual tubing diameters (with stated tolerances), temperature and solvents used. If a pressure range is listed for a product's specification, the pressure rating depends on the tubing material used. The lower end of the range will represent testing performed on softer tubing such as FEP, and the higher end of the range will represent testing performed on harder tubing such as Stainless Steel. For more detail, please see the product specification sheets on our website, www.idex-hs.com, or contact us directly.

FINGERTIGHT FITTINGS
Found on pages 11–15

SUPER FLANGELESS™ FITTINGS
Found on pages 21–23



TUBING SLEEVES
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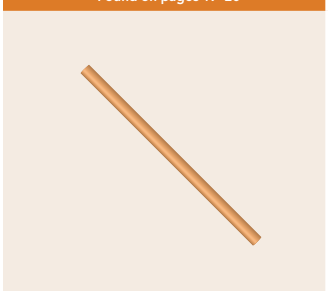
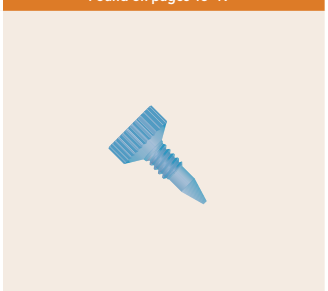
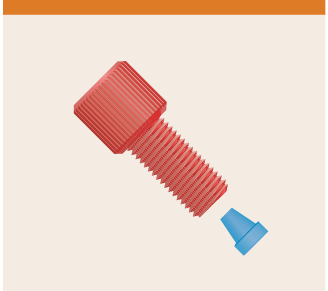


MICROTIGHT® FITTINGS
Found on pages 18–19



FLANGELESS FITTINGS
Found on pages 24–26



FLANGELESS FITTINGS FOR METRIC SIZED TUBING
Found on page 27

FITTINGS FOR 3/16" TO 5/16" OD TUBING
Found on page 30

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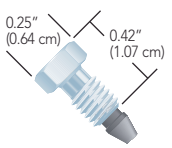
Reusable Very High Pressure (VHP) Fittings

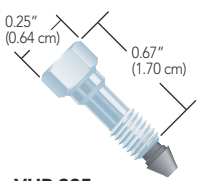
- Pressure rated up to 25,000 psi (1,720 bar)
- Patent pending innovative design
- Capable of up to ten repeat assembly cycles with no impact on pressure holding ability or carry-over
- Available in 10-32 threads for 1/16″ OD tubing and M4 threads for 1/32″ OD tubing
- Materials of construction: stainless steel and proprietary PEEK polymer blend (PK)

IDEX Health & Science introduces an innovative line of Upchurch Scientific® Very High Pressure (VHP) fittings, designed to withstand extreme pressures. This patent-pending line of ground-breaking fitting systems is perfect for use within the increasingly demanding requirements of today's high performance analytical systems.

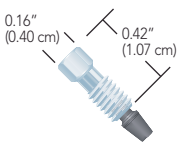
The Reusable VHP fittings can be reused when following the tightening torque specification listed below. With a polymer front ferrule, there is no damage to the tubing or receiving port, also increasing the life of these components.



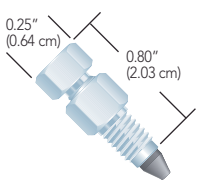
VHP-320
10-32 VHP Fitting
for 1/16″ OD tubing



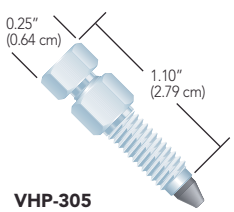
VHP-325
10-32 VHP Fitting, Long
for 1/16″ OD tubing



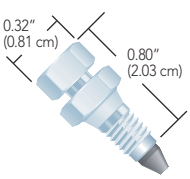
VHP-920
M4 VHP Fitting
for 1/32″ OD tubing



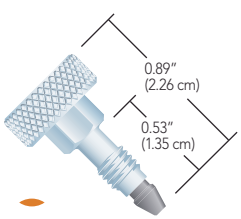
VHP-300
10-32 VHP Fitting
for 1/16″ OD tubing



VHP-305
10-32 VHP Fitting, Long
for 1/16″ OD tubing



VHP-310
10-32 VHP Fitting
for 1/16″ OD tubing



VHP-3200
10-32 VHP Fitting
for 1/16″ OD tubing

VHP-1001
VHP Fingertight
1/4″ Hex Tool

APPLICATION NOTE

Reusability

- Using a reusable fitting eliminates the problems described on stainless steel fitting interchangeability on page 185 of the Technical Resources section. A reusable fitting will allow for quick column, sample loop, inline filter or tubing changes with minimal downtime.
- The VHP-300, VHP-305, and VHP-310 fittings can be used up to 30,000 psi (2,070 bar) if tightened to 14 in-lbs (1.6 N·m). This limits the reusability to 5 cycles. The stacked design of these fittings allows the user to lightly assemble the fitting before tightening into the port. Leaving the tubing extended at least half an inch beyond the end of the ferrule will ensure that the tubing is bottomed out in the port before the fitting is tightened down, avoiding any potential dead volume that could be introduced during fitting installation.

RELATED PRODUCTS

- Find tightening tools on page 8 designed to deliver the torque necessary for these fittings.

	Part No.	Description	Port	Pressure Rating	Required Torque	Head Style	Material	Qty.
	REUSABLE VHP FITTINGS							
	VHP-300x	VHP Fitting for 1/16″ OD	10-32 Coned	20,000 psi (1,380 bar)	10 in-lbs (1.10 N·m)	1/4″ Hex	SST/PK	10-pk
	VHP-305x	VHP Fitting for 1/16″ OD, Long	10-32 Coned	20,000 psi (1,380 bar)	10 in-lbs (1.10 N·m)	1/4″ Hex	SST/PK	10-pk
	VHP-310x	VHP Fitting for 1/16″ OD	10-32 Coned	20,000 psi (1,380 bar)	10 in-lbs (1.10 N·m)	8 mm Hex	SST/PK	10-pk
	VHP-320x	VHP Fitting for 1/16″ OD	10-32 Coned	25,000 psi (1,720 bar)	10 in-lbs (1.10 N·m)	1/4″ Hex	SST/PK	10-pk
	VHP-325x	VHP Fitting for 1/16″ OD, Long	10-32 Coned	25,000 psi (1,720 bar)	10 in-lbs (1.10 N·m)	1/4″ Hex	SST/PK	10-pk
	VHP-920x	VHP Fitting for 1/32″ OD	M4 Coned	25,000 psi (1,720 bar)	8 in-lbs (0.90 N·m)	4 mm Hex	SST/PK	10-pk
NEW!	**VHP-3200**	VHP Fitting for 1/16″ OD	10-32 Coned	11,000 psi (760 bar)	3.5 in-lbs (0.40 N·m)	1/2″ Knurl	SST/PK	10-pk
NEW!	**VHP-1001**	VHP Fingertight 1/4″ Hex Tool	—	—	—	—	PPS	ea.

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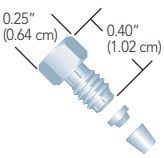
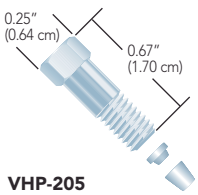
Stainless Steel VHP Fittings

- Pressure rated to 30,000 psi (2,070 bar)
- Double compression ferrule design
- Available with 10-32 threads for 1/16" OD tubing and M4 threads for 1/32" OD tubing

The all Stainless-Steel VHP Fittings include a unique ferrule system with two compression points to provide twice the grip of a standard ferrule. This design also allows the bite on the tubing to be less concentrated and does not restrict the inner diameter, as discussed in the Application Note. The ferrules for 1/16" OD tubing and 10-32 coned ports are two pieces, while the grooved ferrule for 1/32" OD tubing and M4 coned ports is a one-piece design for easier handling, but it will act as two pieces with double compression on the tubing as it is tightened down.

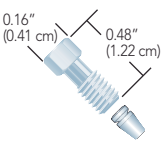


VHP-200
VHP 10-32 Fitting
for 1/16" OD tubing



VHP-205
VHP 10-32 Fitting, Long
for 1/16" OD tubing

VHP-700
VHP 6-40 Fitting
for 1/32" OD tubing

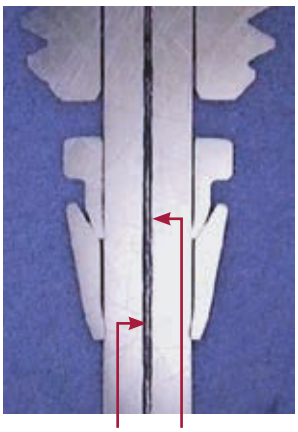


VHP-900
VHP M4 Fitting
for 1/32" OD tubing

APPLICATION NOTE

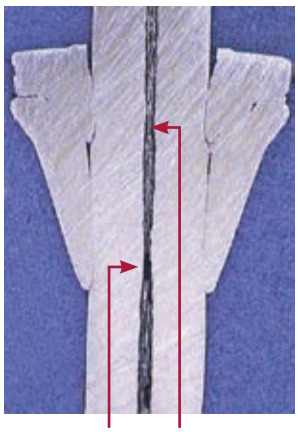
In order to seal up to the stated pressure rating, the VHP-200-01 ferrule requires 20 in-lbs (2.25 N·m) of torque. Similar ferrules on the market require tightening torque of at least 30 in-lbs (3.3 N·m), which can result in a restricted tubing passage, as shown in the picture below. This restriction can increase turbulence and add a 'throttling' effect to the fluid pathway, resulting in mixing and other potential chromatographic problems.

IDEX Health & Science VHP-200



Uniform Tubing Passage

Conventional Two Piece Ferrule Design



Constricted Tubing Passage

Part No.	Description	Port	Pressure Rating	Required Torque	Head Style	Material	Qty.
STAINLESS STEEL VHP FITTINGS (INCLUDES NUT AND FERRULE)							
VHP-200x	VHP Fitting for 1/16" OD	10-32 Coned	30,000 psi (2,070 bar)	20 in-lbs (2.25 N·m)	1/4" Hex	SST	10-pk
VHP-205x	VHP Fitting for 1/16" OD, Long	10-32 Coned	30,000 psi (2,070 bar)	20 in-lbs (2.25 N·m)	1/4" Hex	SST	10-pk
VHP-900x	VHP Fitting for 1/32" OD	M4 Coned	30,000 psi (2,070 bar)	20 in-lbs (2.25 N·m)	4 mm Hex	SST	10-pk
NEW! **VHP-700x**	VHP Fitting for 1/32" OD	6-40 Coned	30,000 psi (2,070 bar)	20 in-lbs (2.25 N·m)	4 mm Hex	SST	10-pk
STAINLESS STEEL VHP FERRULES							
VHP-200-01x	VHP Ferrule for 1/16" OD	10-32 Coned	30,000 psi (2,070 bar)	20 in-lbs (2.25 N·m)	—	SST	10-pk
VHP-900-01x	VHP Ferrule for 1/32" OD	M4 Coned	30,000 psi (2,070 bar)	20 in-lbs (2.25 N·m)	—	SST	10-pk

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Tightening Tools for VHP Fittings

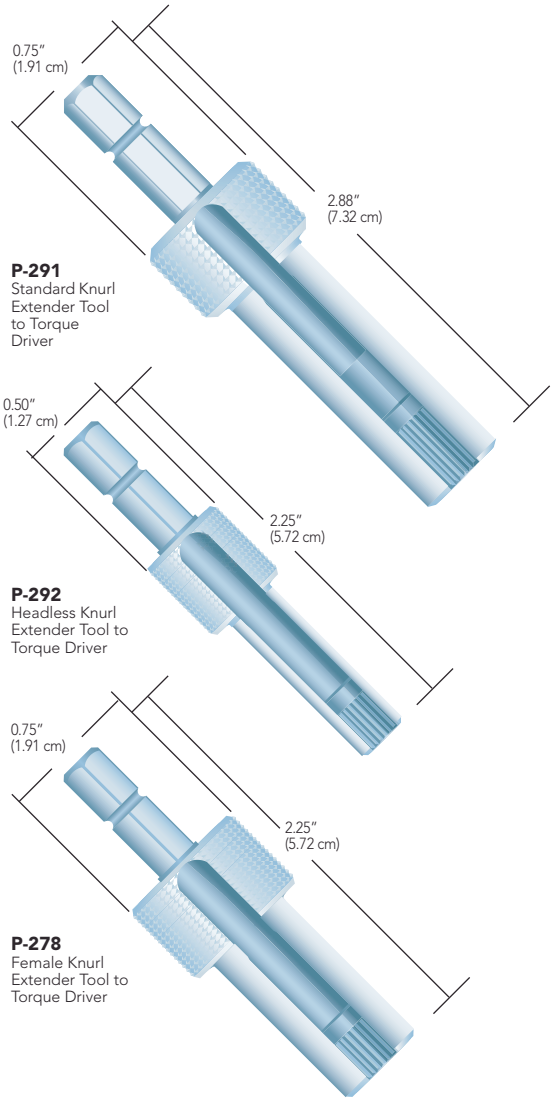
- Configured for the optimum torque to provide assurance of a strong connection
- Prolongs the lifetime of reusable fittings by not overtightening
- Available for multiple fitting head styles

This new line of tightening tools is designed for the VHP fittings and can also be used with any fitting in this chapter described to have a corresponding head style to the tool listed below. There are three styles of tightening tools available for various applications. The Torque Tools (VHP-1000, VHP-2000, and VHP-3000) are breakaway torque wrenches designed to deliver a precise amount of torque to the fitting system. These torque wrenches come calibrated according to ISO 6789:2003 (± 6% of setting) and have been tested extensively with the reusable VHP fittings on page 6. Choose the appropriate torque delivered and the proper head style to work with the VHP fittings, increasing the ease of use with these fittings.

The VHP-4000 Torque Driver couples with the specially designed Extender Tools listed below and provides an externally adjustable torque setting. This tool along with the appropriate Extender Tools will tighten any Upchurch Scientific® knurled polymer fitting in your system. Reference the head style found in the tables at the bottom of each page for information on the proper Extender Tool to select.

Because of the small hex-head on the M4 fittings (VHP-900 and VHP-920), a custom wrench, the VHP-9000, is available below.

VHP-1000
VHP Wrench
1/4 in Hex
10 in-lbs (1.13 N·m)



P-291
Standard Knurl Extender Tool to Torque Driver

P-292
Headless Knurl Extender Tool to Torque Driver

P-278
Female Knurl Extender Tool to Torque Driver

	Part No.	Description	Use With Head Style	Torque Delivered	Qty.
	VHP TIGHTENING TOOLS				
NEW!	F-347	Extender Tool to Torque Driver	FlushNut (1/4-28)	—	ea.
NEW!	N-291	Extender Tool to Torque Driver	Micro Headless	—	ea.
NEW!	P-268	Extender Tool to Torque Driver	1/4" Hex	—	ea.
	P-278	Extender Tool to Torque Driver	Female Nut Knurl	—	ea.
	P-279	Extender Tool to Torque Driver	Micro Nut Knurl	—	ea.
	P-291	Extender Tool to Torque Driver	Standard Nut Knurl	—	ea.
	P-292	Extender Tool to Torque Driver	Headless Nut Knurl	—	ea.
	P-1000	Standard Knurl Torque Tool	Standard Knurl	4 in-lbs (0.45 N·m)	ea.
	VHP-1000	VHP Torque Tool	1/4" Hex	10 in-lbs (1.13 N·m)	ea.
	VHP-2000	VHP Torque Tool	1/4" Hex	14 in-lbs (1.58 N·m)	ea.
	VHP-3000	VHP Torque Tool	8 mm Hex	10 in-lbs (1.13 N·m)	ea.
	VHP-4000	VHP Torque Driver	Extender Tool 1/4" Drive	Adjustable between 2–12 in-lbs (0.23–1.35 N·m)	ea.
	VHP-9000	4 mm Wrench	4 mm Hex	—	ea.

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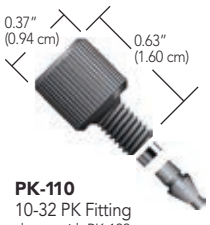
Very High Pressure PK Fittings

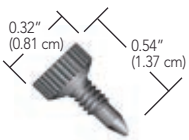
Upchurch Scientific® Ultra High Performance fittings are manufactured from a proprietary PEEK blend (PK) which allow them to be used at higher temperatures (up to 200 °C) and higher pressures.

The VHP PK One-Piece fittings are available for 10-32 coned, 6-32 coned, or M4 coned ports, and Two-Piece fittings are available to connect either 1/16" or 1/32" OD tubing into 10-32 coned ports in multiple styles.

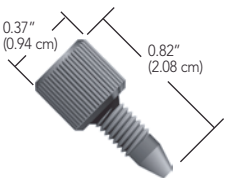
PK-110
10-32 PK Fitting
shown with PK-100
for 1/16" OD tubing



PK-110
10-32 PK Fitting
shown with PK-132
for 1/32" OD tubing

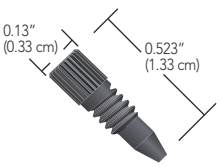


PK-126
6-32 PK MicroTight® Fitting
for 1/32" OD tubing

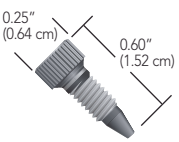


PK-120BLK
10-32 PK Fitting
for 1/16" OD tubing

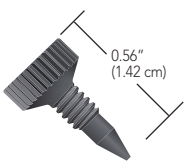
PK-195
10-32 PK Fitting
with PK 192
for 1/16" OD tubing



PK-126H
6-32 PK MicroTight® Fitting
for 1/32" OD tubing



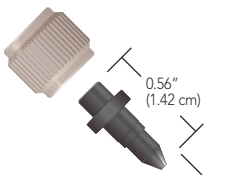
UH-904
M4, 1/32" Fitting
for Rheodyne® MX valves



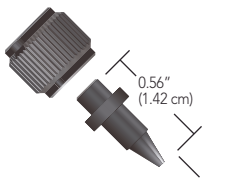
PK-124
6-32 PK MicroTight® Fitting
for 1/32" OD tubing

VHP MicroFerrules

VHP MicroFerrules are made from a proprietary high performance PEEK polymer blend, a material which is unique in its ability to enable the use of capillary tubing in UHPLC environments. The new high pressure MicroFerrules are available for use with 1/32" or 360 µm OD tubing, and they are incorporated into several of our VHP products for capillary tubing.



PK-112
VHP MicroFerrule
shown with P-416
for 1/32" OD tubing



PK-152
VHP MicroFerrule
shown with P-416BLK
for 360 µm OD tubing

APPLICATION NOTE

CAUTION: While the proprietary blend of the PK fittings will allow a fitting to attain a higher pressure and minimal cold flow properties relative to pure PEEK, some fittings molded of PK are known to be conductive. Use caution when employing PK fittings in high voltage applications.

NOTE

MicroTight fittings and MicroFerrules

While the MicroTight Female Nuts may be used with any of the separate MicroFerrules, the MicroFerrules themselves are port-specific and are thus not interchangeable. Additionally, the one-piece MicroTight fittings are also port-specific and should not be exchanged.

RELATED PRODUCTS

▶ Find unions, tees and crosses for VHP applications on pages 36, 37, and 42.

	Part No.	Description	Port	Pressure Rating	Required Torque	Head Style	Material	Qty.
	PK VHP ONE-PIECE FITTINGS							
★	**PK-120BLKx**	PK One-Piece Fitting for 1/16" OD Tubing	10-32 Coned	12,000 psi (827 bar)	8.0 in-lbs (0.90 N·m)	Standard Knurl	PK	10-pk
NEW!	**PK-124x**	PK One-Piece Fitting for 360 µm OD Tubing	6-32 Coned	15,000 psi (1,035 bar)	3.0 in-lbs (0.34 N·m)	Standard Micro Knurl	PK	10-pk
NEW!	**PK-126Hx**	PK One-Piece Headless Fitting for 1/32" OD Tubing	6-32 Coned	15,000 psi (1,035 bar)	3.0 in-lbs (0.34 N·m)	Headless Micro Knurl	PK	10-pk
	PK-126x	PK One-Piece Fitting for 1/32" OD Tubing	6-32 Coned	15,000 psi (1,035 bar)	3.0 in-lbs (0.34 N·m)	Standard Micro Knurl	PK	10-pk
	UH-904x	PK One-Piece Fitting for 1/32" OD Tubing	M4 Coned	15,000 psi (1,035 bar)	4.0 in-lbs (0.45 N·m)	Headless Knurl	PK	10-pk
	PK VHP FITTINGS (SEALTIGHT™ STYLE, FITTINGS INCLUDE PK-192X)							
	PK-192x	PK Ferrule for 1/16" OD Tubing	10-32 Coned	11,000 psi (760 bar)	—	—	PK	10-pk
	PK-195x	PK Fitting for 1/16" OD Tubing	10-32 Coned	11,000 psi (760 bar)	8.0 in-lbs (0.90 N·m)	Standard Knurl	PK	10-pk
	PK VHP FITTINGS (LITETOUCH® STYLE, NUTS AND FERRULES SOLD SEPARATELY)							
★	**PK-100x**	PK Ferrule for 1/16" OD Tubing	10-32 Coned	16,500 psi (1,140 bar)	—	—	PK	10-pk
	PK-110x	PK Nut for 1/16" OD Tubing	10-32 Coned	16,500 psi (1,140 bar)	8.0 in-lbs (0.90 N·m)	Standard Knurl	PK	10-pk
	PK-132x	PK Ferrule for 1/32" OD Tubing	10-32 Coned	16,500 psi (1,140 bar)	—	—	PK	10-pk
	PK MICRO FERRULES AND FEMALE NUTS							
	P-416	Female Nut for Microferrule	5/16-24 Coned	15,000 psi (1,035 bar)	4.0 in-lbs (0.45 N·m)	Female Knurl	PEEK, Natural	ea.
	P-416BLK	Female Nut for Microferrule	5/16-24 Coned	15,000 psi (1,035 bar)	4.0 in-lbs (0.45 N·m)	Female Knurl	PEEK, Black	ea.
★	**PK-112**	VHP MicroFerrule for 1/32" OD Tubing	5/16-24 Coned	15,000 psi (1,035 bar)	—	—	PK	ea.
	PK-152	VHP MicroFerrule for 360 µm OD Tubing	5/16-24 Coned	15,000 psi (1,035 bar)	—	—	PK	ea.

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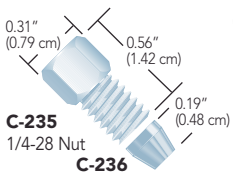
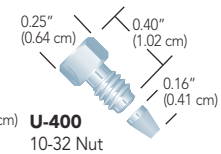
Stainless Steel Fittings

These 316 Stainless Steel Fittings are rated to 20,000 psi (1,380 bar) when wrench tightened. Choose Upchurch Scientific® Standard Fittings, or select from the Rheodyne® or other manufacturer-compatible offerings.

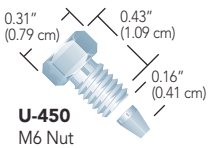
Standard Stainless Steel Fittings



C-235
1/4-28 Nut
C-236
Ferrule

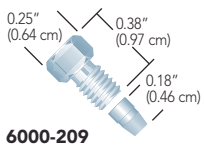


U-400
10-32 Nut
U-401
Ferrule

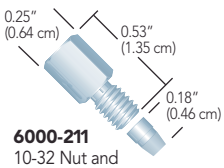


U-450
M6 Nut
U-401
Ferrule

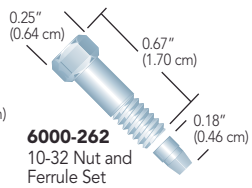
Rheodyne Fittings



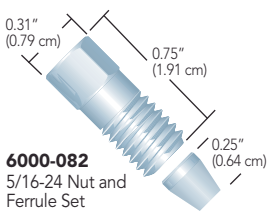
6000-209
10-32 Nut and Ferrule Set



6000-211
10-32 Nut and Ferrule Set

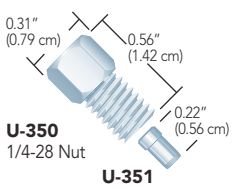


6000-262
10-32 Nut and Ferrule Set



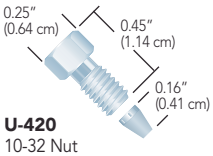
6000-082
5/16-24 Nut and Ferrule Set

SSI Compatible Fittings

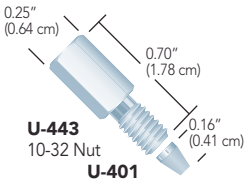


U-350
1/4-28 Nut
U-351
Ferrule

Beckman® Compatible Fittings

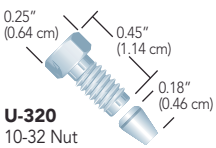


U-420
10-32 Nut
U-401
Ferrule



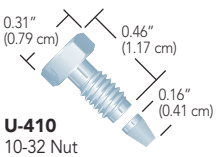
U-443
10-32 Nut
U-401
Ferrule

VICI® (Valco) Compatible Fittings



U-320
10-32 Nut
U-321
Ferrule

Waters® Compatible Fittings



U-410
10-32 Nut
U-401
Ferrule

NOTE

- Do not use metal fittings in plastic ports, as this can damage the port. Please see the "Material Structural Compatibility" chart on page 184 for more information about fittings compatibility with tubing and port materials.
- The recommended torque to tighten these fittings is 20 in-lbs (2.25 N·m).

	Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
	STANDARD STAINLESS STEEL FITTINGS						
	C-235x	Nut for 1/8″ OD Tubing	1/4-28 Coned	20,000 psi (1,380 bar)	5/16″ Hex	SST	10-pk
	C-236x	Ferrule for 1/8″ OD Tubing	1/4-28 Coned	20,000 psi (1,380 bar)	—	SST	10-pk
★	**U-400x**	Nut for 1/16″ OD Tubing	10-32 Coned	20,000 psi (1,380 bar)	1/4″ Hex	SST	10-pk
★	**U-401x**	Ferrule for 1/16″ OD Tubing	10-32 or M6 Coned	20,000 psi (1,380 bar)	—	SST	10-pk
	U-450x	Nut for 1/16″ OD Tubing	M6 Coned	20,000 psi (1,380 bar)	5/16″ Hex	SST	10-pk
	RHEODYNE FITTINGS						
	6000-082	Fitting for 1/8″ OD Tubing	5/16-24 Coned	20,000 psi (1,380 bar)	5/16″ Hex	SST	ea.
	6000-083	Ferrule for 1/8″ OD Tubing	5/16-24 Coned	20,000 psi (1,380 bar)	—	SST	5-pk
	6000-209	Fitting for 1/16″ OD Tubing	10-32 Coned	20,000 psi (1,380 bar)	1/4″ Hex	SST	10-pk
	6000-210	Ferrule for 1/16″ OD Tubing	10-32 Coned	20,000 psi (1,380 bar)	—	SST	10-pk
	6000-211	Fitting for 1/16″ OD Tubing, Long	10-32 Coned	20,000 psi (1,380 bar)	1/4″ Hex	SST	10-pk
	6000-262	Fitting for 1/16″ OD Tubing, Extra Long	10-32 Coned	20,000 psi (1,380 bar)	1/4″ Hex	SST	10-pk
	MANUFACTURER COMPATIBLE FITTINGS						
★	**U-320x**	Nuts for 1/16″ OD Tubing, Valco/VICI Compatible	10-32 Coned	20,000 psi (1,380 bar)	1/4″ Hex	SST	10-pk
★	**U-321x**	Ferrule for 1/16″ OD Tubing, Valco/VICI Compatible	10-32 Coned	20,000 psi (1,380 bar)	—	SST	10-pk
	U-350x	Nuts for 1/16″ OD Tubing, SSI Compatible	10-32 Coned	20,000 psi (1,380 bar)	5/16″ Hex	SST	10-pk
	U-351x	Ferrule for 1/16″ OD Tubing, SSI Compatible	10-32 Coned	20,000 psi (1,380 bar)	—	SST	10-pk
★	**U-410x**	Nuts for 1/16″ OD Tubing, Waters Compatible	10-32 Coned	20,000 psi (1,380 bar)	5/16″ Hex	SST	10-pk
	U-420x	Nuts for 1/16″ OD Tubing, Beckman Compatible	10-32 Coned	20,000 psi (1,380 bar)	1/4″ Hex	SST	10-pk
	U-443x	Nuts for 1/16″ OD Tubing, Beckman Compatible, Long	10-32 Coned	20,000 psi (1,380 bar)	1/4″ Hex	SST	10-pk

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One-Piece Fingertight Fittings

- The original One-Piece Fingertight Fitting
- All polymer construction
- Versions available for 1/16", 1/32" or 1/8" OD tubing

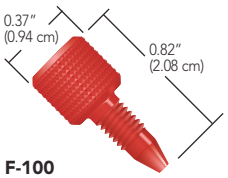
The Upchurch Scientific® One-Piece Fingertight Fittings provide convenience and ease of use because the ferrule will not stick in a receiving port and the fitting is more easily found if dropped. The fittings for 1/16" OD tubing and 10-32 coned ports are available in a variety of colors, materials and lengths to suit virtually every application.

Beyond the standard 10-32 fittings, also featured in this product family are specialty fittings for specific applications. Our M-645 Fitting is a direct replacement for the 6-40 threaded VICI® (Valco) fitting. The P-100 can be used in 1/4-28 coned ports for 1/8" OD tubing including some of the inlet filters starting on page 157.

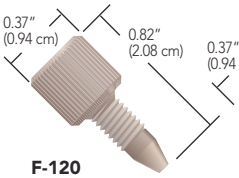
RheFlex® One-Piece Fittings are included in many of the Rheodyne® manual valves, starting on page 132. The One-Piece RheFlex M4 Fittings, for use with Rheodyne MX Nano-Scale Modules, are listed on page 12.

NOTE

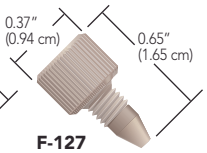
- For your convenience we ship most Upchurch Scientific Fingertight Fittings in 10-packs. However, you may order individual pieces (the letter "x" in the product part number simply designates "10-pk").
- Some of the Upchurch Scientific fittings on this page are available in additional colors. Please contact your distributor or us for more information.
- The F-120FUN PACK includes six F-120 Fittings in the following colors: natural, blue, black, green, red, and yellow.
- Fingertight is generally equal to 3–4 in-lbs (0.34–0.45 N·m).



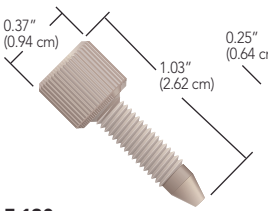
F-100
10-32 PCTFE Fitting



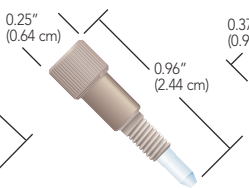
F-120
10-32 PEEK Fitting



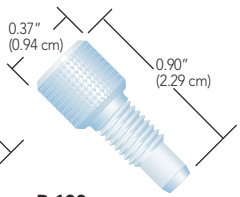
F-127
10-32 PEEK Fitting



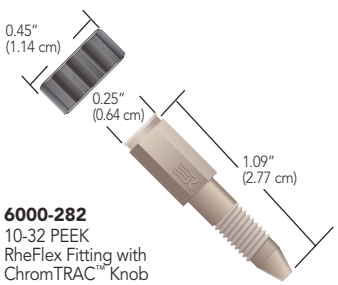
F-130
10-32 PEEK Fitting



M-645
6-40 PEEK/PCTFE Fitting
for 1/32" OD tubing



P-100
1/4-28 PCTFE Fitting
for 1/8" OD tubing



6000-282
10-32 PEEK
RheFlex Fitting with
ChromTRAC™ Knob

Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
ONE-PIECE FINGERTIGHT FITTINGS						
6000-282	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	5,000 psi (345 bar)	ChromTRAC knob	PEEK, Natural	10-pk
F-100x	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	4,000 psi (276 bar)	Diamond Knurl	PCTFE, Red	10-pk
F-100Nx	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	4,000 psi (276 bar)	Diamond Knurl	PCTFE, Natural	10-pk
★ **F-120x**	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	5,000 psi (345 bar)	Standard Knurl	PEEK, Natural	10-pk
F-120FUN PACK	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	5,000 psi (345 bar)	Standard Knurl	PEEK, Natural, Blue, Black, Green, Red, Yellow (one each color)	6-pk
F-127x	Fingertight Fitting for 1/16" OD Tubing, Short	10-32 Coned	5,000 psi (345 bar)	Standard Knurl	PEEK, Natural	10-pk
★ **F-130x**	Fingertight Fitting for 1/16" OD Tubing, Long	10-32 Coned	5,000 psi (345 bar)	Standard Knurl	PEEK, Natural	10-pk
M-645x	Fingertight Fitting for 1/32" OD Tubing	6-40 Coned	1,750–3,250 psi (121–224 bar)	Headless Knurl	PEEK, Natural/PCTFE, Natural	10-pk
P-100	Fingertight Fitting for 1/8" OD Tubing	1/4-28 Coned	1,000 psi (69 bar)	Diamond Knurl	PCTFE, Natural	ea.

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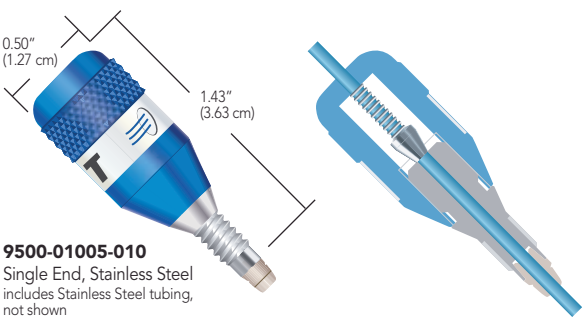
Sure-Fit™ Connector

- Self-adjusting to any port depth regardless of column manufacturer
- Fingertight to 6,000 psi (414 bar)
- Available in PEEK or stainless steel

Eliminating leaks and dead volume is critical to achieving good chromatographic results. The Sure-Fit connector gives you a perfect fit in nearly every 10-32 coned receiving port — every connection, every time. Typically leaks and dead volume are caused by an improperly plumbed system and can occur for many reasons, including switching columns. The problem occurs not only when switching from one manufacturer to another, it can also occur when changing columns from the same manufacturer. This is because internal port depths vary, even within the same manufacturing lot. Unless the connector is universal, eliminating leaks and dead volume cannot be guaranteed. The Sure-Fit connector has a unique internal spring-tensioned mechanism that automatically self-adjusts to virtually any port depth while maintaining constant pressure on the 1/16" OD tubing.

Sure-Fit connectors come with either PEEK tubing or stainless steel tubing, in varying lengths and internal diameters, pre-assembled for ease of use. Choose the 9502-01007-HP — a U-shaped Sure-Fit connector — for use in Agilent® 1100 systems, or select the 9504-01005-050 for micro-scale applications where biocompatibility is desired.



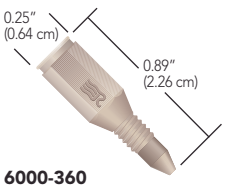
9500-01005-010
Single End, Stainless Steel
includes Stainless Steel tubing, not shown

RheFlex® M4 Fittings

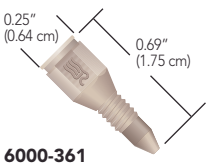
- Incorporates M4 coned threads for 1/32" OD tubing
- Pressure rated to 5,000 psi (345 bar)

The Rheodyne® RheFlex M4 Fitting is designed to connect 1/32" OD tubing in MX Series II™ valves (see Actuated Valves, starting on page 130). This PEEK fitting has a one piece design, which eliminates the need for a separate nut and ferrule. The M4 Fitting design provides dependable zero dead volume connections for micro and nano applications. Due to the unique RheFlex gripping design, the M4 Fitting will hold to 5,000 psi (345 bar) on PEEK or with a PEEK tubing sleeve on fused silica tubing. A PEEK M4 Plug is also available.

Use Rheodyne ChromTRAC™ knobs with the RheFlex M4 Fitting for fingertight convenience and to color-code connections.



6000-360
M4 Fitting
M4 threads
for 1/32" OD tubing



6000-361
M4 Plug
M4 threads

Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
SURE-FIT FITTINGS						
9500-01005-010	Single End Fitting, 1/16" x 0.005" x 10 cm	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	SST	ea.
9500-01007-010	Single End Fitting, 1/16" x 0.007" x 10 cm	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	SST	ea.
9500-01010-010	Single End Fitting, 1/16" x 0.010" x 10 cm	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	SST	ea.
9500-01020-030	Single End Fitting, 1/16" x 0.020" x 30 cm	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	SST	ea.
9502-01007-HP	Single End Fitting, 1/16" x 0.007", U-Shape for Agilent 1100 System	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	SST	ea.
9504-01005-050	Single End Fitting, 1/16" x 0.005" x 50 cm	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	PEEK, Natural	ea.
9504-01007-050	Single End Fitting, 1/16" x 0.007" x 50 cm	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	PEEK, Natural	ea.
9504-01010-050	Single End Fitting, 1/16" x 0.010" x 50 cm	10-32 Coned	6,000 psi (414 bar)	Diamond Knurl	PEEK, Natural	ea.
SURE-FIT FITTINGS REPLACEMENT PARTS						
9500-FP	Replacement Ferrule	10-32 Coned	6,000 psi (414 bar)	—	PEEK, Natural	ea.*
RHEFLEX ONE-PIECE FITTINGS						
6000-360	RheFlex Fitting for 1/32" OD Tubing	M4 Coned	5,000 (345 bar)	1/4" Hex	PEEK, Natural	10-pk
6000-361	RheFlex Plug	M4 Coned	5,000 (345 bar)	1/4" Hex	PEEK, Natural	10-pk

** Minimum order quantity of 100.*

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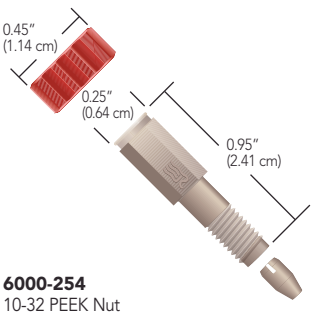
Two-Piece RheFlex® Fingertight Fittings

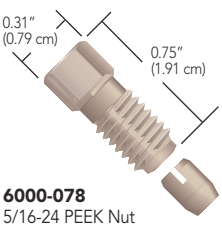
The Rheodyne® RheFlex Precision Two-Piece PEEK Fittings sets provide inert, biocompatible connections for instrumentation. These fittings have a reliable, time-tested design. Each 1/16" fittings set contains a 10-32 threaded nut and a specially-designed PEEK ferrule. Three lengths of the 1/16" nut are available: Standard, Short, and Extra Long. RheFlex Fingertight Fittings are rated for use up to 7,000 psi (483 bar). Also offered in this product line is the 6000-078 fitting, designed to connect 1/8" OD tubing into our manual preparative-scale injection valves. (See pages 128–134 for more information on these valves.)

View the online product bulletin at: www.idex-hs.com.



6000-254
10-32 PEEK Nut
with 6000-251 PEEK Ferrule
(RD ChromTRAC suffix)

6000-255
10-32 PEEK Nut
with 6000-251 PEEK Ferrule



6000-078
5/16-24 PEEK Nut
with 6000-079 PEEK Ferrule

Biocompatible

ChromTRAC™

- Brightly colored knobs to easily track inlets and outlets of valves, columns, and detectors

All ChromTRAC-compatible RheFlex fittings offer the ChromTRAC knob option. Specify the ChromTRAC two letter suffix for the color choice when ordering. Please see the ChromTRAC Suffix Codes table below. For example, to order red ChromTRAC knobs with the RheFlex One-Piece Fitting on this page, specify 6000-282RD. No suffix indicates black knobs.

View the online product bulletin for RheFlex fittings at: www.idex-hs.com.

CHROMTRAC SUFFIX CODES

CODE	COLOR
BL	Blue
GN	Green
GY	Gray
RD	Red
WH	White
YL	Yellow
MC	Multi-color (two each of blue, green, gray, red, and yellow)

Add these letter suffixes to the end of the seven-digit part numbers of the 10-32 and M4 threaded RheFlex Fittings on pages 11, 12, and 13.

RELATED PRODUCTS

- For PEEK tubing sleeves that can be used with these M4 RheFlex fittings, see page 20.
- For reusable fittings that both work in UHPLC applications and can help ensure the tubing is fully inserted into the receiving port, see the VHP-300 fitting shown earlier in this chapter on page 6.

Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
RHEFLEX TWO-PIECE FITTINGS (INCLUDES FERRULES)						
6000-078	RheFlex Fitting for 1/8" OD Tubing	5/16-24 Coned	5,000 psi (345 bar)	5/16" Hex	PEEK, Natural	ea.
6000-254	RheFlex Fitting for 1/16" OD Tubing	10-32 Coned	7,000 psi (483 bar)	ChromTRAC knob	PEEK, Natural	10-pk
6000-255	RheFlex Fitting for 1/16" OD Tubing, Short	10-32 Coned	7,000 psi (483 bar)	1/4" Hex	PEEK, Natural	10-pk
REPLACEMENT FERRULES						
6000-079	RheFlex Ferrule for 1/8" OD Tubing	5/16-24 Coned	7,000 psi (483 bar)	ChromTRAC knob	PEEK, Natural	5-pk
6000-251	RheFlex Ferrule for 1/16" OD Tubing	10-32 Coned	7,000 psi (483 bar)	ChromTRAC knob	PEEK, Natural	10-pk

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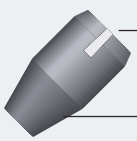
Two-Piece SealTight™ Fingertight Fittings

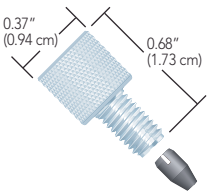
- Several nut lengths and head styles to fit into a variety of applications
- Designed to connect 1/16" OD tubing to 10-32 coned ports
- Hold up to 9,000 psi (620 bar)

The dual compression created by the specially designed nut and ferrule enables the Upchurch Scientific® SealTight Fittings system to outperform standard finger tightened fittings. The forward cone of the SealTight Ferrule provides gripping power and a leak-free seal via conventional compression by the receiving port. The slotted end creates the second compression zone in conjunction with a SealTight Nut. All SealTight Nuts are for use with 1/16" OD tubing and are designed to be used with the F-192 Ferrule. A wide variety of fitting head styles are available for various space constraints. This fittings system is also interchangeable with the Two-Piece RheFlex® Fittings System for 1/16" OD tubing, shown on the previous page.

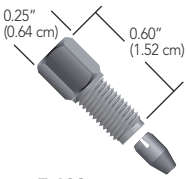


NOTE

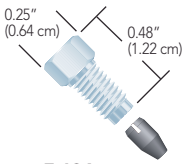
Overtightening these fittings on fluoropolymer (e.g., FEP, PFA, and ETFE) tubing can cause the ID of your tubing to collapse.



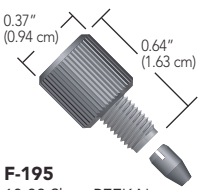
F-190
10-32 Standard Stainless Steel Nut,
with F-192 Ferrule



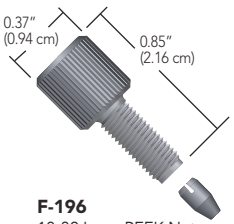
F-193
10-32 Short PEEK Hex Head Nut,
with F-192 Ferrule



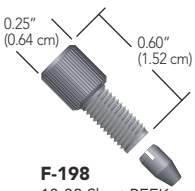
F-194
10-32 Short Stainless Steel Hex Head Nut,
with F-192 Ferrule



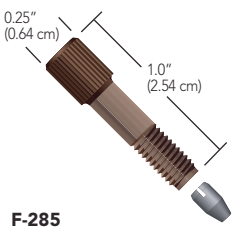
F-195
10-32 Short PEEK Nut,
with F-192 Ferrule



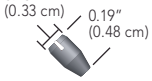
F-196
10-32 Long PEEK Nut,
with F-192 Ferrule



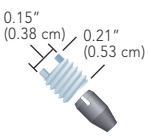
F-198
10-32 Short PEEK Headless Nut,
with F-192 Ferrule



F-285
10-32 Long PPS Headless Nut,
with F-192 Ferrule



F-192
SealTight Ferrule,
for 1/16" OD tubing



F-350
10-32 Stainless Steel FlushNut,
with F-192 Ferrule

RELATED PRODUCTS

- Find tightening tools for these fittings on page 33.
- Try the F-350 FlushNut™ for the ultimate streamline design. For more information on these innovative products, please see page 31.

Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
SEALTIGHT TWO-PIECE FITTINGS (INCLUDES F-192 FERRULES)						
F-190x	SealTight Fitting for 1/16" OD Tubing	10-32 Coned	7,000–9,000 psi (483–620 bar)	Standard Knurl	SST	10-pk
★ **F-193x**	SealTight Fitting for 1/16" OD Tubing, Short	10-32 Coned	7,000–9,000 psi (483–620 bar)	1/4" Hex	PEEK Black	10-pk
F-194x	SealTight Fitting for 1/16" OD Tubing, Short	10-32 Coned	7,000–9,000 psi (483–620 bar)	1/4" Hex	SST	10-pk
F-195x	SealTight Fitting for 1/16" OD Tubing, Short	10-32 Coned	7,000–9,000 psi (483–620 bar)	Standard Knurl	PEEK Black	10-pk
★ **F-196x**	SealTight Fitting for 1/16" OD Tubing, Long	10-32 Coned	7,000–9,000 psi (483–620 bar)	Standard Knurl	PEEK Black	10-pk
F-198x	SealTight Fitting for 1/16" OD Tubing, Short	10-32 Coned	3,000–9,000 psi (207–620 bar)	Headless Knurl	PEEK Black	10-pk
F-284x	SealTight Fitting for 1/16" OD Tubing, Long	10-32 Coned	3,000–9,000 psi (207–620 bar)	Headless Knurl	PEEK Black	10-pk
F-285x	SealTight Fitting for 1/16" OD Tubing, Long	10-32 Coned	3,000–9,000 psi (207–620 bar)	Headless Knurl	PPS Brown	10-pk
F-287x	SealTight Fitting for 1/16" OD Tubing, Long	10-32 Coned	7,000–9,000 psi (483–620 bar)	Knurl-1/4" Hex	PEEK Black	10-pk
F-350x	SealTight Fitting for 1/16" OD Tubing, FlushNut	10-32 Coned	7,000–9,000 psi (483–620 bar)	FlushNut	SST	10-pk
REPLACEMENT FERRULES						
★ **F-192x**	SealTight Ferrule for 1/16" OD Tubing	10-32 or M6 Coned	7,000–9,000 (483–620 bar)	—	PEEK/Black	10-pk

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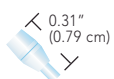
Two-Piece Fingertight Fittings

- Designed to connect tubing to 10-32 coned ports
- Ferrules available for directly connecting 1/16", 1/32", 360 µm, or 190 µm OD tubing

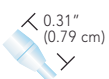
Two-Piece Fingertight Fittings feature a separate ferrule. With a two-piece design, you can replace just the ferrule instead of the entire unit, making these Fingertights more economical than the one-piece version. Use a standard knurled head fitting for traditional fingertight applications, or use a fitting with wings built into the head for extra tightening leverage. A stainless steel hex headed fitting can be used for applications where a wrench may be needed for added tightening torque.

To order the fittings as shown to the right, simply reference the part numbers as indicated. To exchange the ferrule typically packaged with our fittings with one of our specialty ferrules shown below, simply replace the letter "x" in the part number with a "-01", and then specify the ferrule needed on a separate line. For example, to order the F-140 fitting with the M-215 ferrule, specify F-140-01 and M-215 separately. *Please note: all "-01" fittings are packaged individually, not in 10-packs.*

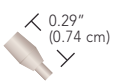
The M-215 Conductive Perfluoroelastomer Ferrule is designed for mass spectrometer electrospray applications. Unlike most graphite ferrules, the elastomeric properties of this ferrule let you use it through many tightening/retightening cycles. It also eliminates any possibility of graphite contamination in your system. Like graphite ferrules, you can apply voltage through a metallic port block or metallic nut, allowing voltage to translate to the flow path through the ferrule.



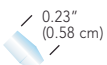
F-148
PCTFE Ferrule
for 190 µm OD tubing



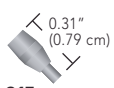
F-151
PCTFE Ferrule
for 360 µm OD tubing



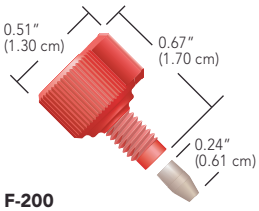
F-113
PEEK Ferrule
for 1/32" OD tubing



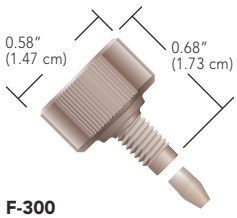
F-142N
ETFE Ferrule
for 1/16" OD tubing



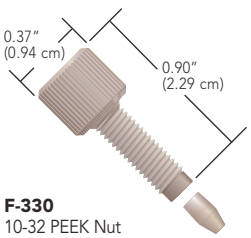
M-215
Conductive Perfluoroelastometer Ferrule
for 360 µm OD tubing



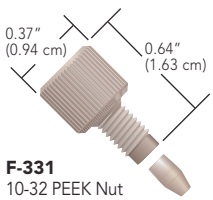
F-200
10-32 Delrin® Winged Nut
with F-142 PEEK Ferrule



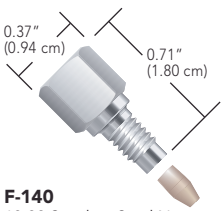
F-300
10-32 PEEK Double-Winged Nut
with F-142 PEEK Ferrule



F-330
10-32 PEEK Nut
with F-142 PEEK Ferrule



F-331
10-32 PEEK Nut
with F-142 PEEK Ferrule



F-140
10-32 Stainless Steel Nut
with F-142 PEEK Ferrule

APPLICATION NOTE

Some Upchurch Scientific® Fingertight Nuts feature wings in addition to a knurled head, which provide more leverage when tightening the fitting into a receiving port. Choose our single or double-winged design.

Please Note: customers can use the standard knurl head fittings with our tightening tools found on page 33.

	Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
	TWO-PIECE FINGERTIGHT FITTINGS (INCLUDES F-142 FERRULES)						
	F-140x	Fitting for 1/16" OD Tubing	10-32 Coned	6,000 psi (414 bar)	5/16" Hex	SST/PEEK Natural	10-pk
	F-200x	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	6,000 psi (414 bar)	Single Wing	Delrin Red/PEEK Natural	10-pk
★	**F-300x**	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	6,000 psi (414 bar)	Double Wing	PEEK Natural	10-pk
★	**F-330x**	Fingertight Fitting for 1/16" OD Tubing, Long	10-32 Coned	6,000 psi (414 bar)	Standard Knurl	PEEK Natural	10-pk
	F-331x	Fingertight Fitting for 1/16" OD Tubing	10-32 Coned	6,000 psi (414 bar)	Standard Knurl	PEEK Natural	10-pk
	REPLACEMENT FERRULES						
★	**F-113**	Ferrule for 1/32" OD Tubing	10-32 Coned	6,000 psi (414 bar)	—	PEEK Natural	ea.
	F-142x	Ferrule for 1/16" OD Tubing	10-32 Coned	6,000 psi (414 bar)	—	PEEK Natural	10-pk
	F-142Nx	Ferrule for 1/16" OD Tubing	10-32 Coned	4,000 psi (276 bar)	—	ETFE Natural	10-pk
	F-148	Ferrule for 190 µm OD tubing	10-32 Coned	6,000 psi (414 bar)	—	PCTFE Natural	ea.
	F-151	Ferrule for 360 µm OD Tubing	10-32 Coned	6,000 psi (414 bar)	—	PCTFE Natural	ea.
★	**M-215**	Conductive Ferrule for 360 µm OD tubing	10-32 Coned	1,500 psi (103 bar)	—	Conductive Perfluoroelastomer	ea.

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LiteTouch® Fittings

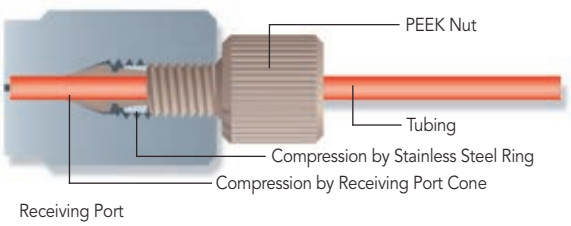
- Helps prevent twisting of polymer tubing
- High pressure with fingertight convenience
- Options available for 1/32", 1/16", or 1/8" OD tubing

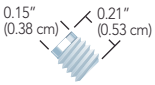
The LiteTouch Fittings System grips tubing at two compression points (see diagram), holding to high pressures with Fingertight convenience. It also prevents polymer tubing from twisting, a potential problem when using standard Fingertight fittings. LiteTouch Fittings are available for use with 1/32", 1/16", or 1/8" OD tubing sizes, and for 10-32 or 1/4-28 coned ports.

For those space-limited applications where nut heads interfere with each other, try the FlushNut™ Fittings. (FlushNut Fittings require a tightening tool. Please see page 31 for more information about these products.)

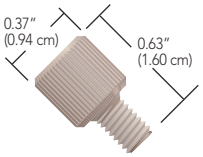
To avoid collapsing the ID of your tubing, the LiteTouch system can be used on hard tubing only, such as stainless steel and PEEK polymer tubing. The LiteTouch Ferrule System is not recommended for repeated use in plastic ports.

LiteTouch Fittings Systems

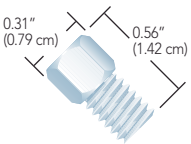




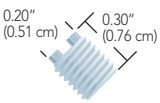
F-354
10-32 Stainless Steel FlushNut
for 1/32" and 1/16" OD tubing



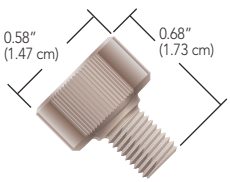
LT-110
10-32 PEEK Nut
for 1/32" and 1/16" OD tubing



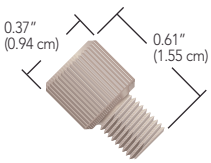
C-235
1/4-28 Stainless Steel Nut
for 1/8" OD tubing



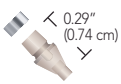
F-364
1/4-28 Stainless Steel FlushNut
for 1/8" OD tubing



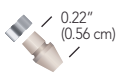
LT-210
1/4-28 PEEK Double-Winged Nut
for 1/8" OD tubing



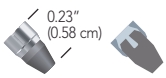
LT-215
1/4-28 PEEK Nut
for 1/8" OD tubing



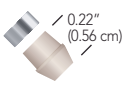
LT-132
PEEK Ferrule with Stainless Steel Lock Ring
for 1/32" OD tubing



LT-100
PEEK Ferrule with Stainless Steel Lock Ring
for 1/16" OD tubing



LT-135
One-Piece LiteTouch SealTight™ Ferrule with Stainless Steel Lock Ring
for 1/16" OD tubing



LT-200
PEEK Ferrule with Stainless Steel Lock Ring
for 1/8" OD tubing

RELATED PRODUCTS

- The stainless steel nuts on page 10 can also be used with the LiteTouch ferrules on this page.

Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
LITETOUCH NUTS						
C-235x	LiteTouch Nut for 1/8" OD Tubing	1/4-28 Coned	4,500 psi (310 bar)	5/16" Hex	SST	10-pk
F-354x	LiteTouch Nut for 1/16" or 1/32" OD Tubing, FlushNut	10-32 Coned	5,000 psi (345 bar)	FlushNut	SST	10-pk
F-364x	LiteTouch Nut for 1/8" OD Tubing, FlushNut	1/4-28 Coned	4,500 psi (310 bar)	FlushNut	SST	10-pk
LT-110x	LiteTouch Nut for 1/16" or 1/32" OD Tubing	10-32 Coned	5,000 psi (345 bar)	Standard Knurl	PEEK Natural	10-pk
LT-210x	LiteTouch Nut for 1/8" OD Tubing	1/4-28 Coned	4,500 psi (310 bar)	Double Wing	PEEK Natural	10-pk
LT-215x	LiteTouch Nut for 1/8" OD Tubing, Short	1/4-28 Coned	4,500 psi (310 bar)	Standard Knurl	PEEK Natural	10-pk
LITETOUCH FERRULES						
★ **LT-100x**	LiteTouch Ferrule for 1/16" OD Tubing	10-32 Coned	5,000 psi (345 bar)	—	PEEK Natural/SST	10-pk
★ **LT-132x**	LiteTouch Ferrule for 1/32" OD Tubing	10-32 Coned	5,000 psi (345 bar)	—	PEEK Natural/SST	10-pk
★ **LT-135x**	LiteTouch Ferrule for 1/16" OD Tubing	10-32 Coned	10,000 psi (690 bar)*	—	PEEK Black/SST	10-pk
LT-200x	LiteTouch Ferrule for 1/8" OD Tubing	1/4-28 Coned	4,500 psi (310 bar)	—	PEEK Natural/SST	10-pk

** When used with a stainless steel 10-32 nut from page 10.*

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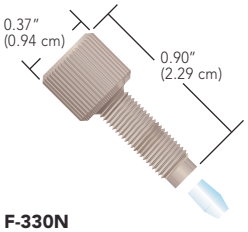
NanoTight™ Fittings & Sleeves

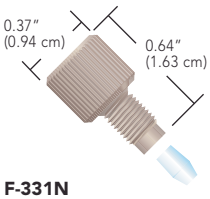
- For connecting 1/16" OD or capillary tubing using tubing sleeves to standard 10-32 coned ports
- Multiple nut styles available
- Nuts manufactured from PEEK polymer, ferrules manufactured from ETFE

Upchurch Scientific® NanoTight Fittings and Sleeves are designed to connect 70 µm–1 mm OD capillary tubing to any standard 10-32 coned port normally intended for 1/16" OD tubing using the NanoTight Tubing Sleeves on page 19. The fittings can also be used to connect any 1/16" OD tubing. The ETFE ferrule material is softer than PEEK, making it a good candidate for connecting thin walled semi-rigid tubing such as FEP and ETFE into 10-32 ports with minimal constricting to the inner diameter.

Select from our expansive line of PEEK NanoTight Fittings, featuring several head style and length options. Each 10-pack of nuts includes ten ETFE F-142N ferrules.



F-330N
Long Standard Head Nut
with F-142N Ferrule



F-331N
Short Standard Head Nut
with F-142N Ferrule

F-333N
Short Headless Nut
with F-142N Ferrule

RELATED PRODUCTS

- Find tightening tools for these head styles on page 33.
- NanoTight Tubing sleeves start on page 19.

	Part No.	Description	Port	Pressure Rating	Head Style	Material (Nut/Ferrule)	Qty.
	NANOTIGHT FITTINGS (INCLUDES F-142N FERRULES)						
★	**F-330Nx**	NanoTight Fitting for 1/16" OD Tubing and NanoTight Sleeves	10-32 Coned	4,000 psi (276 bar)	Standard Knurl	PEEK Natural/ETFE Natural	10-pk
	F-331Nx	NanoTight Fitting for 1/16" OD Tubing and NanoTight Sleeves, Short	10-32 Coned	4,000 psi (276 bar)	Standard Knurl	PEEK Natural/ETFE Natural	10-pk
★	**F-333Nx**	NanoTight Fitting for 1/16" OD Tubing and NanoTight Sleeves, Short	10-32 Coned	4,000 psi (276 bar)	Headless Knurl	PEEK Natural/ETFE Natural	10-pk
	REPLACEMENT FERRULES						
	F-142Nx	NanoTight Ferrule for 1/16" OD Tubing and NanoTight Sleeves	10-32 Coned	4,000 psi (276 bar)	—	ETFE Natural	10-pk

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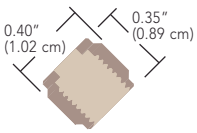
MicroTight® Fittings

- Comprehensive Fitting System for Connecting Capillary Tubing
- Made from PEEK Polymer

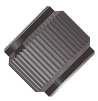
Upchurch Scientific® MicroTight One-Piece Fittings are designed for use with the NanoPort™ and MicroTight Unions, Adapters and Inline MicroFilters. Specifically made for 360 µm OD tubing, 1/32″ OD tubing, or our MicroTight Tubing Sleeves (see page19), these fittings make superior fingertight connections with capillary tubing. MicroTight Fittings withstand temperatures up to 125 °C.

The MicroTight family also includes a female nut matched with one of five dedicated ferrules for connecting specific tubing ODs.

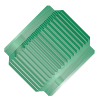
Use the P-277 Extender Tool to tighten standard micro knurl 6-32 fittings in hard-to-reach places. Tighten micro headless 6-32 fittings with our N-290 Tool. See page 33 for more information.



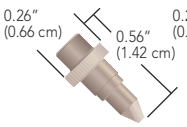
P-416
Female Nut
5/16-24
internal threads



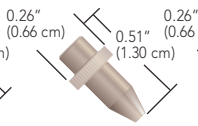
P-416BLK
Female Nut
5/16-24
internal threads



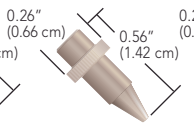
P-416G
Female Nut
5/16-24
internal threads



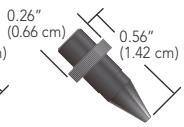
F-112
MicroFerrule
for 1/32″ OD tubing



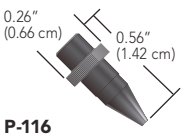
F-132
MicroFerrule
for 1/16″ OD tubing



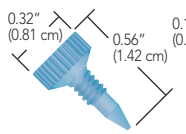
F-152
MicroFerrule
for 360 µm OD tubing



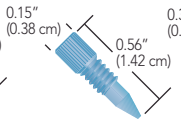
F-172
MicroFerrule
for 0.025″ OD tubing



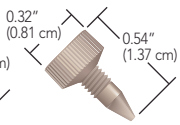
P-116
MicroFerrule Plug



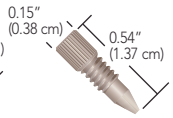
F-124S
Standard Head Fitting
for use with
360 µm OD tubing



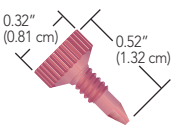
F-124H
Headless Fitting
for use with
360 µm OD tubing



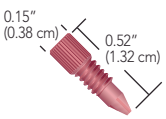
F-125
Standard Head Fitting
for use with
MicroTight Sleeves



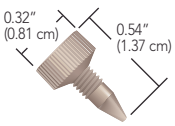
F-125H
Headless Fitting
for use with
MicroTight Sleeves



F-126S
Standard Head Fitting
for use with
1/32″ OD tubing



F-126H
Headless Fitting
for use with
1/32″ OD tubing



P-555
Standard Head Plug

RELATED PRODUCTS

- Connectors for Capillary Tubing can be found on pages 37–45.
- Very High Pressure fittings for capillary tubing can be found on page 9.
- Capillary tubing is featured on pages 67.

NOTE

MicroTight fittings and MicroFerrules

While the MicroTight Female Nuts may be used with any of the separate MicroFerrules, the MicroFerrules themselves are port-specific and are thus not interchangeable. Additionally, the one-piece MicroTight fittings are also port-specific and should not be exchanged.

Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
MICROTIGHT FITTINGS						
F-124Hx	MicroTight Fitting for 360 µm OD Tubing	6-32 Coned	5,000 psi (345 bar)	Micro Headless Knurl	PEEK Blue	10-pk
F-124Sx	MicroTight Fitting for 360 µm OD Tubing	6-32 Coned	5,000 psi (345 bar)	Standard Micro Knurl	PEEK Blue	10-pk
F-125Hx	MicroTight Fitting for MicroTight Tubing Sleeves	6-32 Coned	4,000 psi (276 bar)	Micro Headless Knurl	PEEK Natural	10-pk
F-125x	MicroTight Fitting for MicroTight Tubing Sleeves	6-32 Coned	4,000 psi (276 bar)	Standard Micro Knurl	PEEK Natural	10-pk
★ F-126Hx	MicroTight Fitting for 1/32″ OD Tubing	6-32 Coned	5,000 psi (345 bar)	Micro Headless Knurl	PEEK Red	10-pk
F-126Sx	MicroTight Fitting for 1/32″ OD Tubing	6-32 Coned	5,000 psi (345 bar)	Standard Micro Knurl	PEEK Red	10-pk
P-555	MicroTight Plug	6-32 Coned	5,000 psi (345 bar)	Standard Micro Knurl	PEEK Natural	ea.
MICROFERRULES AND FEMALE NUTS						
F-112	MicroFerrule for 1/32″ OD Tubing	5/16-24 Coned	5,000 psi (345 bar)	—	PEEK Natural	ea.
F-132	MicroFerrule for 1/16″ OD Tubing	5/16-24 Coned	5,000 psi (345 bar)	—	PEEK Natural	ea.
★ F-152	MicroFerrule for 360 µm OD Tubing	5/16-24 Coned	5,000 psi (345 bar)	—	PEEK Natural	ea.
F-152BLK	MicroFerrule for 360 µm OD Tubing	5/16-24 Coned	5,000 psi (345 bar)	—	PEEK Black	ea.
★ F-172	MicroFerrule for MicroTight Tubing Sleeves	5/16-24 Coned	4,000 psi (276 bar)	—	PEEK Black	ea.
P-116	MicroFerrule Plug	5/16-24 Coned	5,000 psi (345 bar)	—	PEEK Black	ea.
★ P-416	MicroTight Female Nut	5/16-24 Coned	4,000–5,000 psi (276–345 bar)	Female Knurl	PEEK Natural	ea.
P-416BLK	MicroTight Female Nut	5/16-24 Coned	4,000–5,000 psi (276–345 bar)	Female Knurl	PEEK Black	ea.
P-416G	MicroTight Female Nut	5/16-24 Coned	4,000–5,000 psi (276–345 bar)	Female Knurl	PEEK Green	ea.

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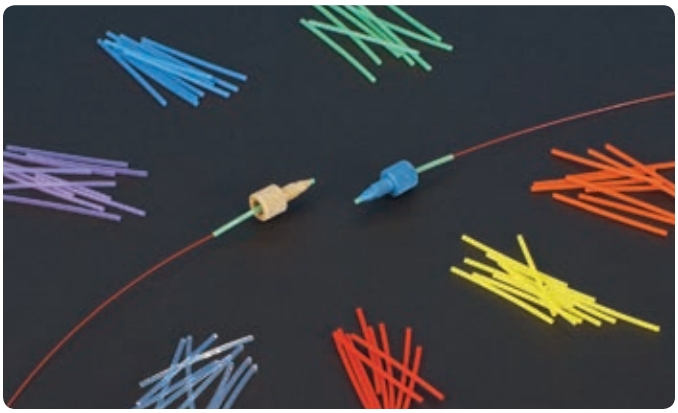
MicroTight® Tubing Sleeves

- Manufactured from PEEK polymer
- Pressure rated to 4,000 psi (276 bar)
- Color-coded for easy inner diameter identification

Upchurch Scientific® MicroTight Tubing Sleeves feature an outer diameter of 0.025" and offer a wide assortment of inner diameters to help facilitate capillary tubing connections with our MicroTight accessories. Because the sleeves are manufactured from PEEK polymer, they carry an upper temperature threshold of 125 °C.

To use these sleeves properly, choose a sleeve with an inner diameter 0.001"–0.002" (25–50 µm) larger than the outer diameter of your capillary tubing. Then, slip the sleeve over your flow path tubing, such that your tubing extends all the way through the sleeve, but not beyond the end of the sleeve. Choose the correct fitting that corresponds with your receiving port, slide it over the sleeved flow path tubing and connect as normal.



NanoTight™ Tubing Sleeves

- Manufactured from FEP fluoropolymer
- Pressure rated to 4,000 psi (276 bar)
- Outer diameter of 1/16" — the most popular size used on most instrumentation

Upchurch Scientific NanoTight Tubing Sleeves are manufactured using FEP fluoropolymer and precisely cut to a 1.6" length. A wide assortment of sleeves is available, ensuring the availability of a NanoTight sleeve for most applications. Many of the sleeves feature a light color tint that can help more easily identify the inner diameter for future orders. Because FEP is the base polymer for these sleeves, there is a maximum recommended continuous operating temperature of 50 °C.

Upchurch Scientific NanoTight sleeves were designed primarily for use with the NanoTight fittings, found on page 17 and also work well with the Super Flangeless™ fittings for 1/16" OD tubing on pages 21. For tubing sleeves that can be used effectively with stainless steel fittings and at higher temperatures, consider using the Upchurch Scientific PEEK Tubing Sleeves, found on the next page.

APPLICATION NOTE

Why use Sleeves?

Because most capillary tubing connections are made into coned receiving ports, where the port is not designed to be used with capillary tubing directly, special care must be used to ensure a good connection. While custom ferrules can help make these connections, they only offer a fixed-length nose — and because most tubing pockets will vary slightly in length, this can lead to leaking or dead volume.

To help save overall expense while maintaining a concentric connection with minimal dead volume, IDEX Health & Science recommends the use of sleeves. Because sleeves are not permanently attached to a ferrule, they can easily adapt to varying tubing pocket depths. Additionally, because they are manufactured using Upchurch Scientific extruded polymer tubing, you are assured of the concentricity of the resultant connection.

Part No.	ID	For Tubing OD Size	Color	Qty.
MICROTIGHT PEEK TUBING SLEEVES AND KITS, 0.025" OD				
	125 µm (0.005")	70–110 µm		
F-180x	180 µm (0.007")	125–165 µm	Red	10-pk
F-181x	230 µm (0.009")	175–215 µm	Yellow	10-pk
F-182x	280 µm (0.011")	225–265 µm	Natural	10-pk
F-183x	330 µm (0.013")	275–315 µm	Blue	10-pk
F-184x	395 µm (0.0155")	340–380 µm	Orange	10-pk
★ **F-185x**	455 µm (0.018")	400–440 µm	Green	10-pk
F-186x	535 µm (0.021")	480–520 µm	Black	10-pk
F-187x	152 µm (0.006")	95–135 µm	Natural	10-pk
F-188x	MicroTight Tubing Sleeve Kit contains (6) each of the sleeve sizes listed above		Purple	10-pk
1328	MicroTight Connector Kit			
1356	Kit contains: a 10-pack of each MicroTight Tubing Sleeve (F-180–F-187); (2) P-770 MicroTight Adapters; and (2) MicroTight P-720 Unions			
NANOTIGHT FEP TUBING SLEEVES, 1/16" OD				
	125 µm (0.005")	70–110 µm		
F-237x	180 µm (0.007")	125–165 µm	Red	10-pk
F-238x	215 µm (0.0085")	160–200 µm	Yellow	10-pk
F-239x	280 µm (0.011")	225–265 µm	Natural	10-pk
F-240x	330 µm (0.013")	275–315 µm	Blue	10-pk
F-241x	395 µm (0.0155")	340–380 µm	Orange	10-pk
★ **F-242x**	455 µm (0.018")	400–440 µm	Green	10-pk
F-243x	535 µm (0.021")	480–520 µm	Black	10-pk
F-244x	610 µm (0.024")	555–595 µm	Natural	10-pk
F-245x	685 µm (0.027")	630–670 µm	Red	10-pk
F-246x	840 µm (0.033")	785–825 µm	Yellow	10-pk
F-247x	1.07 mm (0.042")	1 mm	Green	10-pk
F-252x			Purple	10-pk

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1/16" OD PEEK Tubing Sleeves

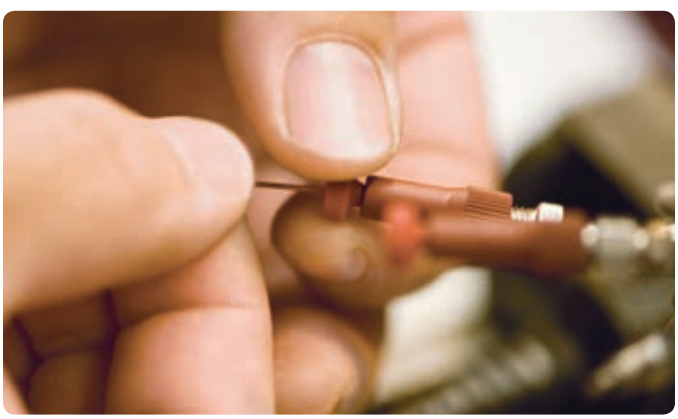
- For connecting capillary tubing to standard 10-32 ports
- Require the use of wrench tightened stainless steel nuts
- Pressure rated to 6,000 psi (414 bar)

Like the NanoTight™ FEP Sleeves on the previous page, these PEEK Tubing Sleeves are designed to be used with 1/16" OD, 10-32 threaded fittings to adapt capillary tubing to standard coned ports. Made of PEEK polymer, these 1.3" long sleeves can be used up to 125 °C.

These sleeves require a wrench tightened nut to achieve proper sealing. We recommend the F-140 Two-Piece Fingertight Fitting (page 15), which includes a PEEK ferrule or the hex-head SealTight™ fittings on page 14. Many researchers also use a stainless steel nut and ferrule with these sleeves, such as our U-400 and U-401 (page 10).

1/32" OD PEEK Tubing Sleeves

These 1.6" long Upchurch Scientific® 1/32" OD PEEK Tubing Sleeves can be used with any fitting designed for 1/32" OD tubing when smaller tubing must be connected. Select the appropriate sleeve from the product listing for your capillary tubing OD size. The 1/32" OD PEEK Tubing Sleeves have a maximum recommended temperature of 125 °C and have a pressure rating of 5,000 psi (345 bar).



1/32" OD FEP Tubing Sleeves

These 1.6" long sleeves facilitate connecting capillary tubing into ports designed for 1/32" OD tubing. Please refer to the product listing below to select the appropriate sleeve for your capillary OD size. These sleeves can be used at up to 50 °C and have a pressure rating of 1,750 psi (121 bar).

Clockwise, starting at top:

- 1/16" OD PEEK Tubing Sleeves, shown with F-140 Fitting
- 1/32" OD PEEK Tubing Sleeves, shown with F-126H Fitting
- 1/32" OD FEP Tubing Sleeves, shown with F-126S Fitting
- Fittings and tubing only shown to highlight how sleeves are designed to be used; they are not included with the sleeves

	Part No.	ID	For Tubing OD Size	Color	Qty.
	PEEK TUBING SLEEVES FOR 1/16" OD FITTINGS				
			70–110 µm		
		125 µm (0.005")	125–165 µm	Red	
		180 µm (0.007")	175–215 µm	Yellow	
	F-225	230 µm (0.009")	225–265 µm	Yellow	ea.
	F-226	250 µm (0.011")	275–315 µm	Blue	ea.
	F-227	330 µm (0.013")	350–390 µm	Natural	ea.
	F-228	405 µm (0.016")	505–545 µm	Orange	ea.
	F-229	560 µm (0.022")	730–770 µm	Natural	ea.
★	**F-230**	785 µm (0.031")	785–825 µm	Natural	ea.
	F-231	865 µm (0.034")	630–670 µm	Blue	ea.
	F-232	685 µm (0.027")		Yellow	ea.
	PEEK TUBING SLEEVES FOR 1/32" OD FITTINGS				
	F-233		125–165 µm		ea.
	F-234	180 µm (0.007")	150–190 µm	Yellow	ea.
		205 µm (0.008")		Natural	
	F-381x	255 µm (0.010")	200–240 µm	Blue	10-pk
	F-382x	380 µm (0.015")	325–365 µm	Natural	10-pk
	F-384x	510 µm (0.020")	455–495 µm	Orange	10-pk
★	**F-385x**	250 µm (0.011")	225–265 µm	Red	10-pk
	F-386x	330 µm (0.013")	275–315 µm	Black	10-pk
	F-387x				10-pk
	F-388x	280 µm (0.011")	225–265 µm	Blue	10-pk
		330 µm (0.013")	275–315 µm	Orange	
	F-374x	395 µm (0.0155")	340–380 µm	Green	10-pk
	F-375x				10-pk
★	**F-376x**				10-pk

RELATED PRODUCTS

1/32" OD PEEK or FEP Sleeves to connect capillary tubing with the following:

- The F-113 Ferrule and Two-Piece Fingertight Fittings for 10-32 ports (page 15).
- The F-112 and P-416BLK MicroTight (page 18) — 1/32" OD PEEK Tubing Sleeves only.
- The 1/32" OD MicroTight Fittings on page 18.
- The Rheodyne® RheFlex M4 Fitting (page 12) for MX Module applications; the M-645 Valve Fitting (page 11) for Valco Nanovolume®-Compatible valve applications.

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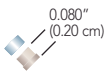
Super Flangeless™ Fittings

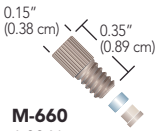
- Highest pressure holding flat-bottom fitting system we offer
- Eliminates loosening of fittings due to tubing twist
- Excellent for Tubing Assemblies
- Holds tight even through vibration

6-40 and 6-32 Options (for 1/16" OD Tubing)



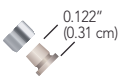
M-650
Super Flangeless Ferrule
for 1/16" OD tubing

M-644-03
6-40 Nut
shown with M-650 Ferrule
(not included)

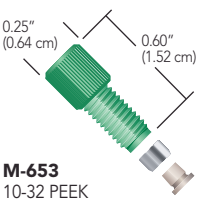


M-660
6-32 Nut
shown with M-650 Ferrule
(not included)

10-32 Options (for 1/16" OD Tubing)

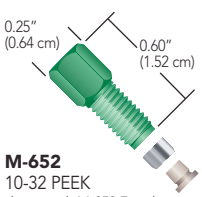


M-250
Super Flangeless Ferrule
for 1/16" OD tubing



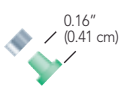
M-653
10-32 PEEK
shown with M-250 Ferrule
(not included)

M-655
10-32 PEEK
shown with M-250 Ferrule
(not included)

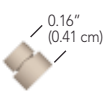


M-652
10-32 PEEK
shown with M-250 Ferrule
(not included)

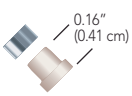
Ferrules for M6x1, 1/4-28, 5/16-24



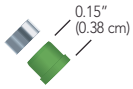
P-248 for 1/32" OD tubing
P-250 for 1/16" OD tubing
P-259 for 1/16" OD tubing



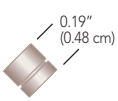
P-260
for 1/16" OD tubing



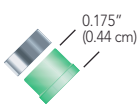
P-350, P-359
for 1/8" OD tubing



P-355 for 1.8 mm OD tubing
P-366 for 2.5 mm OD tubing
P-352 for 1/8" OD tubing

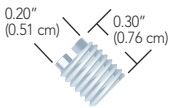


P-360
for 1/8" OD tubing

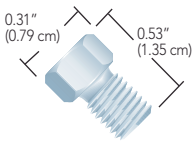


P-140
for 3/16" OD tubing

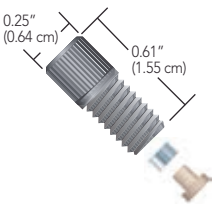
M6x1, 1/4-28, 5/16-24 Options for 1/32"–3/16" OD Tubing



F-356 (1/4-28, ≤ 1/16" OD Tubing)
F-364 (1/4-28, > 1/16" OD Tubing)

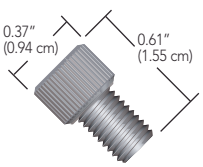


LT-105 (1/4-28, ≤ 1/16" OD Tubing)
C-235 (1/4-28, > 1/16" OD Tubing)

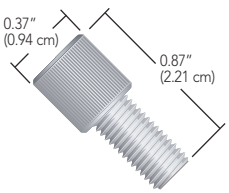


P-213 (M6X1, ≤ 1/16" OD Tubing)
P-337 (M6X1, > 1/16" OD Tubing)
P-232 (1/4-28, ≤ 1/16" OD Tubing)
P-336 (1/4-28, > 1/16" OD Tubing)

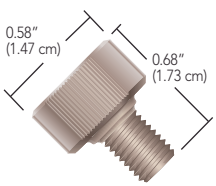
P-287 (1/4-28, ≤ 1/16" OD Tubing)
P-387 (1/4-28, > 1/16" OD Tubing)



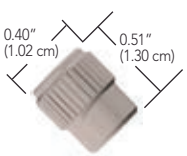
P-219 (M6X1, ≤ 1/16" OD Tubing)
P-319 (M6X1, > 1/16" OD Tubing)
LT-115 (1/4-28, ≤ 1/16" OD Tubing)
LT-215 (1/4-28, > 1/16" OD Tubing)



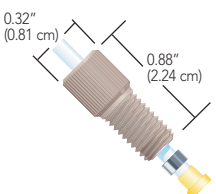
P-217 (M6X1, ≤ 1/16" OD Tubing)
P-317 (M6X1, > 1/16" OD Tubing)
P-246, P-252, P-255, P-281
(1/4-28, ≤ 1/16" OD Tubing)
P-331, P-332, P-381
(1/4-28, > 1/16" OD Tubing)



LT-210 (1/4-28, > 1/16" OD Tubing)



P-420 (1/4-28, ≤ 1/16" OD Tubing)
F-156 (1/4-28, > 1/16" OD Tubing)



P-141 (5/16-24, ≤ 1/16" OD Tubing)
P-131 (5/16-24, >1/16"– ≤ 1/8" OD Tubing)
P-137 (5/16-24, 3/16" OD Tubing)

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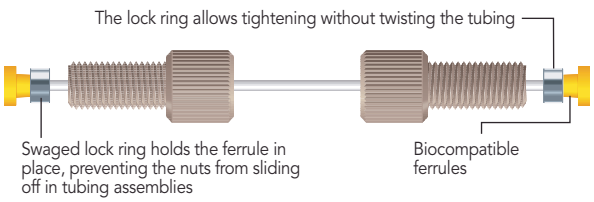
Super Flangeless™ Tubing OD / Thread Comparison

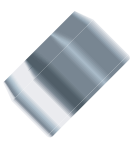
	1/32″	1/16″	1.8 mm	2.5 mm	1/8″	3/16″
6-40		•				
6-32		•				
10-32		•				
M6x1	•	•	•	•	•	
1/4-28	•	•	•	•	•	
5/16-24						•

SUPER FLANGELESS FITTINGS SYSTEM



TIP ASSEMBLY HINT

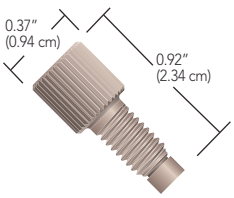
Make sure the locking ring is oriented correctly! The flattened end of the ring should face towards the nut with the narrow end of the ferrule towards the ring.



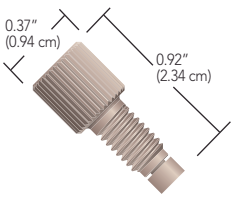
LT-100-02
Enlarged to show detail

New One-Piece Super Flangeless Fittings

- All-PEEK construction
- For 1/16″ OD and 1/8″ OD tubing
- M6x1 and 1/4-28 options
- Finger tight (2–3 in-lbs / 0.23–0.34 N·m)
- Extremely easy to use
- Reusable one piece design that requires no swaging



P-329 M6X1, for 1/8″ OD Tubing
P-249 1/4-28, for 1/16″ OD Tubing
P-349 1/4-28, for 1/8″ OD Tubing



P-229 M6X1, for 1/16″ OD Tubing

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	Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
	SUPER FLANGELESS™ FERRULES FOR 1/32", 1/16", 1/8", 3/16", 1.8MM, 2.0MM, 2.5MM						
	M-250x	Super Flangeless Ferrule for 1/16" OD Tubing	10-32 Flat-Bottom	1,000–5,000 psi (69–345 bar)	—	PEEK Natural/SST	10-pk
★	**M-650x**	Super Flangeless Ferrule for 1/16" OD Tubing	6-32 or 6-40 Flat Bottom	750–3,750 psi (52–259 bar)	—	PEEK Natural/SST	10-pk
	P-248x	Super Flangeless Ferrule for 1/32" OD Tubing	10-32 Flat-Bottom	2,500 psi (172 bar)	—	ETFE Green/SST	10-pk
★	**P-250x**	Super Flangeless Ferrule for 1/16" OD Tubing	1/4-28 or M6 Flat Bottom	2,500 psi (172 bar)	—	PEEK Natural/SST	10-pk
★	**P-259x**	Super Flangeless Ferrule for 1/16" OD Tubing	1/4-28 or M6 Flat Bottom	1,350 psi (93 bar)	—	ETFE Yellow/SST	10-pk
	P-260x	Super Flangeless Ferrule for 1/16" OD Tubing	1/4-28 or M6 Flat Bottom	1,850 psi (128 bar)	—	PEEK Natural/SST	10-pk
★	**P-350x**	Super Flangeless Ferrule for 1/8" OD Tubing	1/4-28 Flat Bottom	2,500 psi (172 bar)	—	PEEK Natural/SST	10-pk
	P-352x	Super Flangeless Ferrule for 1/16" OD Tubing	1/4-28 or M6 Flat Bottom	2,500 psi (172 bar)	—	PEEK Black/SST	10-pk
	P-355x	Super Flangeless Ferrule for 1.8 mm OD Tubing	1/4-28 or M6 Flat Bottom	2,500 psi (172 bar)	—	PCTFE Green/SST	10-pk
	P-357-2x	Super Flangeless Ferrule for 2.0 mm OD Tubing	M6 Flat Bottom	5,000 psi (345 bar)	—	PEEK Natural/SST	10-pk
★	**P-359x**	Super Flangeless Ferrule for 1/8" OD Tubing	1/4-28 Flat Bottom	1,000 psi (69 bar)	—	ETFE Yellow/SST	10-pk
	P-360x	Super Flangeless Ferrule for 1/8" OD Tubing	1/4-28 Flat Bottom	1,500 psi (102 bar)	—	PEEK Natural/SST	10-pk
NEW!	**P-366x**	Super Flangeless Ferrule for 2.5" OD Tubing	1/4-28 Flat Bottom	1,000 psi (69 bar)	—	PEEK Natural/SST	10-pk
	P-140x	Super Flangeless Ferrule for 3/16" OD Tubing	5/16-24 Flat Bottom	500 psi (34 bar)	—	ETFE Green/SST	10-pk
	6-40 AND 6-32 FITTINGS FOR 1/16" OD TUBING						
	M-660x	Super Flangeless Nut for 1/16" OD Tubing	6-32 Flat Bottom	750–3,750 psi (52–259 bar)	Micro Headless	PEEK Natural	10-pk
★	**M-644-03x**	Super Flangeless Nut for 1/16" OD Tubing	6-40 Flat Bottom	750–3,750 psi (52–259 bar)	Micro Headless	PEEK Green	10-pk
	10-32 FITTINGS FOR 1/16" OD TUBING						
	M-652x	Super Flangeless Nut for 1/16" OD Tubing	10-32 Flat Bottom	1,000–5,000 psi (69–345 bar)	1/4" Hex	PEEK Green	10-pk
	M-653x	Super Flangeless Nut for 1/16" OD Tubing	10-32 Flat Bottom	1,000–5,000 psi (69–345 bar)	Headless Knurl	PEEK Green	10-pk
	M-655x	Super Flangeless Nut for 1/16" OD Tubing, Long	10-32 Flat Bottom	1,000–5,000 psi (69–345 bar)	1/4" Hex	PEEK Green	10-pk
	M6X1 FITTINGS FOR 1/16" AND 1/32" OD TUBING						
	P-213	Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short	M6 Flat Bottom	*	Headless Knurl	PEEK Black	ea.
	P-217	Super Flangeless Nut for 1/16" or 1/32" OD Tubing	M6 Flat Bottom	*	Standard Knurl	PPS Black	ea.
	P-219	Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short	M6 Flat Bottom	*	Standard Knurl	PEEK Black	ea.
	M6X1 FITTINGS FOR 1.8 MM, 20. MM, 2.5 MM, 1/8" OD TUBING						
	P-317	Super Flangeless For >1/16"–≤ 1/8" OD Tubing	M6 Flat Bottom	*	Standard Knurl	PPS Black	ea
	P-319	Super Flangeless Nut for 1/8" OD Tubing, Short	M6 Flat Bottom	*	Standard Knurl	PEEK Black	ea.
	P-337x	Super Flangeless For >1/16"–≤ 1/8" OD Tubing, Short	M6 Flat Bottom	*	Headless Knurl	PEEK Black	10-pk
	P-357x	Super Flangeless Fitting for 2.0 mm OD Tubing	M6 Flat Bottom	*	Standard Knurl	PEEK Black, Natural/SST	10-pk
	1/4-28 FITTINGS FOR 1/16" AND 1/32" OD TUBING						
	F-356x	Super Flangeless Nut for 1/16" or 1/32" OD Tubing, FlushNut	1/4-28 Flat Bottom	*	FlushNut	SST	10-pk
	LT-105x	Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short	1/4-28 Flat Bottom	*	1/4" Hex	SST	10-pk
★	**LT-115x**	Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short	1/4-28 Flat Bottom	*	Standard Knurl	PEEK Natural	10-pk
★	**P-232**	Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short	1/4-28 Flat Bottom	*	Headless Knurl	PEEK Natural	ea.
	P-246x	Super Flangeless Nut for 1/16" or 1/32" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	PFA Natural	10-pk
	P-252x	Super Flangeless Nut for 1/16" or 1/32" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	Delrin® Gray	10-pk
★	**P-255x**	Super Flangeless Nut for 1/16" or 1/32" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	PEEK Natural	10-pk
	P-281	Super Flangeless Nut for 1/16" or 1/32" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	PPS Natural	ea.
	P-287	Super Flangeless Nut for 1/16" or 1/32" OD Tubing	1/4-28 Flat Bottom	*	Headless Knurl	PPS Natural	ea.
	P-420	Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Female	1/4-28 Flat Bottom	*	Female Knurl	PEEK Natural	ea.
	1/4-28 FITTINGS FOR 1.8MM, 2.5 MM, 1/8" OD TUBING						
	C-235x	Super Flangeless Nut for 1/8" OD Tubing	1/4-28 Flat Bottom	*	1/4" Hex	SST	10-pk
	F-156	Super Flangeless Nut for 1/8" OD Tubing, Female	1/4-28 Flat Bottom	*	Female Knurl	PEEK Black	ea.
	F-364x	Super Flangeless Nut for 1/8" OD Tubing, FlushNut™	1/4-28 Flat Bottom	*	FlushNut	SST	10-pk
	LT-210x	Super Flangeless Nut for 1/8" OD Tubing	1/4-28 Flat Bottom	*	Double Wings	PEEK Natural	10-pk
	LT-215x	Super Flangeless Nut for 1/8" OD Tubing, Short	1/4-28 Flat Bottom	*	Standard Knurl	PEEK Natural	10-pk
★	**P-331**	Super Flangeless Nut for 1/8" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	PEEK Natural	ea.
	P-332x	Super Flangeless Nut for 1/8" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	Delrin Black	10-pk
★	**P-336**	Super Flangeless Nut for 1/8" OD Tubing, Short	1/4-28 Flat Bottom	*	Headless Knurl	PEEK Natural	ea.
★	**P-381**	Super Flangeless Nut for 1/8" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	PPS Natural	ea.
	P-387	Super Flangeless Nut for 1/8" OD Tubing	1/4-28 Flat Bottom	*	Standard Knurl	PPS Natural	ea.
	5/16-24 FITTINGS FOR 1/16", 1/8", 3/16" OD TUBING						
NEW!	**P-131x**	Super Flangeless Fitting for 1/8" OD Tubing	5/16-24 Flat Bottom	*	Standard Knurl	PEEK Natural	10-pk
NEW!	**P-137x**	Super Flangeless Fitting for 3/16" OD Tubing	5/16-24 Flat Bottom	*	Standard Knurl	PEEK Black	10-pk
NEW!	**P-141x**	Super Flangeless Fitting for 1/16" OD Tubing	5/16-24 Flat Bottom	*	Standard Knurl	PEEK Natural	10-pk
	ONE-PIECE SUPER FLANGELESS FITTINGS FOR 1/16" AND 1/8" OD TUBING						
NEW!	**P-229x**	One Piece Super Flangeless Fitting for 1/16" OD Tubing	M6 Flat Bottom	1,000 psi (69 bar)	Standard Knurl	PEEK	10-pk
NEW!	**P-249x**	One Piece Super Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat Bottom	1,000 psi (69 bar)	Standard Knurl	PEEK	10-pk
NEW!	**P-329x**	One Piece Super Flangeless Fitting for 1/16" OD Tubing	M6 Flat Bottom	1,000 psi (69 bar)	Standard Knurl	PEEK	10-pk
NEW!	**P-349x**	One Piece Super Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat Bottom	1,000 psi (69 bar)	Standard Knurl	PEEK	10-pk

** Pressure rating of nut depends on the ferrule used.*

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Flangeless Fittings

Upchurch Scientific® Flangeless Fittings eliminate the need to flange tubing. This removable and reusable system provides several benefits:

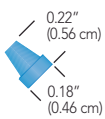
Convenience: Flangeless Fittings are easy to use. Just slip the nut and ferrule over the tubing and finger tighten the assembly into your receiving port. In tests, it is shown that the ideal amount of torque to achieve expected part performance should be approximately 3–4 in-lbs (0.34–0.45 N·m). Check out the line of special tightening tools designed to adapt to many standard torque wrenches, on page 33 and the adjustable torque driver, VHP-4000 on page 8.

Minimal Down-Time: Component replacement is quick, taking only a few seconds — unlike the significant time required to flange tubing.

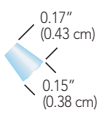
Cost-Effectiveness: Repairing a flanged tubing assembly requires a costly flanging tool or the purchase of a complete replacement assembly, including a new length of tubing and a set of fittings. The Flangeless Fittings system typically requires only one new ferrule at minimal cost when repairing a connection.

The 1/4-28 and M6 Flangeless Fittings for 1/16", 1/8", and metric sized OD tubing are summarized on the following page and listed on pages 25–27.

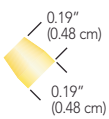
Ferrules



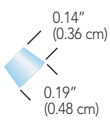
Standard 1/16"
P-200 P-200N



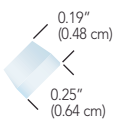
Small Valve 1/16"
P-240



Standard 1/8" and Metric Ferrules
P-300 P-300N P-342
P-353 P-363R P-343



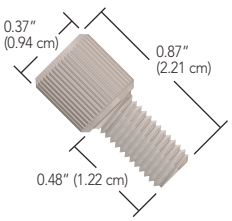
Small Valve 1/8"
P-340



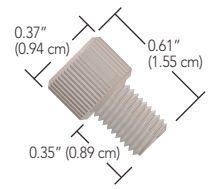
Standard 4.0 mm
P-344

Dimensions for 1/4-28 Flangeless Fittings (pages 24–27)

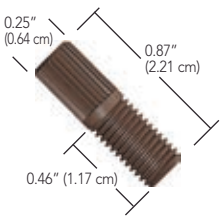
Nuts



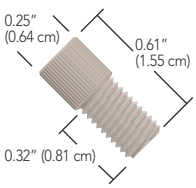
Standard
XP-201 XP-301–XP-305
XP-202 XP-330
XP-220
XP-230
XP-238
XP-245



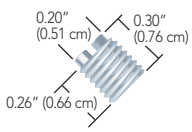
Short
XP-218 P-207S
XP-235 P-247
XP-308 P-307S
XP-335 P-347



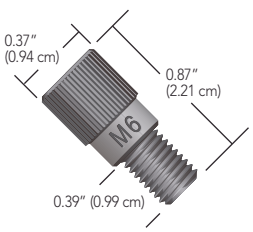
Headless
XP-286 XP-386



Short Headless
XP-283



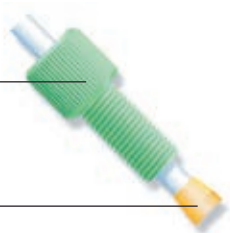
FlushNut™
XF-358 XF-368



Standard Metric
P-207 P-307

TIP THE CONVENIENCE OF FLANGELESS FITTINGS

Our Flangeless Nuts provide fingertight convenience — no wrenches required.



Our Flangeless Ferrules provide a leak-proof seal. There is no need to spend time flanging tubing.

RELATED PRODUCTS

- For the Large Bore Flangeless Fittings, please refer to page 30.

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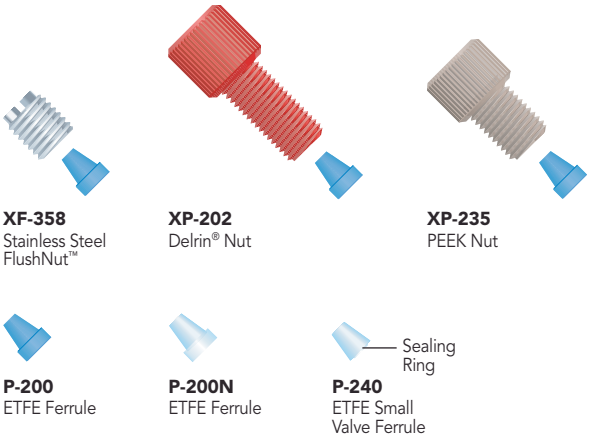
Flangeless Fittings for 1/16" OD Tubing

- Wide variety of materials and geometries to fit most applications
- Fittings and ferrules packaged together for easy ordering convenience

The Upchurch Scientific® Flangeless Fittings are excellent replacements for flanged fittings. Flangeless Fittings are dependable, easy to use and easy to replace.

Additionally, all fittings on this page come pre-packaged with appropriate ferrules (1/4-28 threaded fittings are packaged with P-200 ferrules; however, the XLT-111 — a 10-32 threaded fitting — is packaged with P-240 ferrules). Nuts are available in a wide variety of materials, and replacement ferrules are available in ETFE and polypropylene. The designs of many small, low pressure valves incorporate many shallow ports. The P-240 ferrule is designed to seal tightly in such ports and the special sealing rign on this ferrule helps ensure a minimum dead-volume seal between the tubing, ferrule, and port. (Please refer to our website, www.idex-hs.com for polymer chemical compatibility information.)

For higher pressure and temperature applications where a Flangeless connection is desired, consider the Flangeless SealTight™ Fitting System. Both fitting and ferrule are manufactured from PEEK polymer; additionally, the ferrule has been specially engineered to incorporate the dual-compression mechanism of the F-192 SealTight ferrule in a design that allows its use in a 1/4-28 flat-bottom port.



Please see page 24 for the dimensions of the products on this page.

Please Note: The nuts can be ordered separately — simply remove the preceding "X" from the part number to reference the nut separate from the pre-packaged ferrules.

	Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
	FLANGELESS FITTINGS (INCLUDES P-200 FERRULES)						
	XF-358x	Flangeless Fitting for 1/16" OD Tubing, FlushNut	1/4-28 Flat-Bottom	2,000 psi (138 bar)	FlushNut	SST/ETFE Blue	10-pk
	XLT-111x	Flangeless Fitting for 1/16" OD Tubing	10-32 Flat-Bottom	2,500 psi (172 bar)	Standard Knurl	PEEK Natural/ETFE Natural	10-pk
★	**XP-201x**	Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	Delrin Black/ETFE Blue	10-pk
	XP-202x	Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	Delrin Red/ETFE Blue	10-pk
★	**XP-218x**	Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	ETFE Natural/ETFE Blue	10-pk
	XP-230x	Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	PEEK Natural/ETFE Blue	10-pk
★	**XP-235x**	Flangeless Fitting for 1/16" OD Tubing, Short	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	PEEK Natural/ETFE Blue	10-pk
	XP-238x	Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	Delrin Purple/ETFE Blue	10-pk
	XP-245x	Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	PFA Natural/ETFE Blue	10-pk
★	**XP-286x**	Flangeless Fitting for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	Headless Knurl	PPS Natural/ETFE Blue	10-pk
	REPLACEMENT FERRULES						
★	**P-200x**	Flangeless Ferrule for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	—	ETFE Blue	10-pk
★	**P-200Nx**	Flangeless Ferrule for 1/16" OD Tubing	1/4-28 Flat-Bottom	2,000 psi (138 bar)	—	ETFE Natural	10-pk
	P-240x	Flangeless Ferrule for 1/16" OD Tubing, Small Valve	1/4-28 or 10-32 Flat-Bottom	2,500 psi (172 bar)	—	ETFE Natural	10-pk

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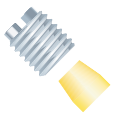
Flangeless Fittings for 1/8" OD Tubing

- Wide variety of materials and geometries to fit most applications
- Fittings and ferrules packaged together for easy ordering convenience

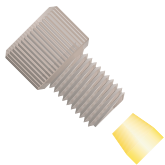
Upchurch Scientific® Flangeless Fittings for 1/8" OD tubing feature a wide assortment of nut geometries and materials from which to choose. Fittings shown on this page come in convenient 10-packs and also include P-300 Flangeless Ferrules. (The nuts can be ordered separately — simply remove the preceding "X" from the part number to reference the nut separate from the pre-packaged ferrules.)

All nuts on this page have 1/4-28 threads.



XF-368
Stainless Steel FlushNut™

XP-305
Delrin® Nut



XP-335
PEEK Nut

XP-386
PPS Nut

P-312
Lock Nut White Delrin

P-300
ETFE Ferrule

P-300N
ETFE Ferrule

Sealing Ring

P-340
ETFE Small Valve Ferrule

Please see page 24 for the dimensions of the products on this page.

Lock Nut

The P-312 Lock Nut is for use with any 1/4-28 male Flangeless Fitting. Use this product in applications where vibrations can loosen fittings.

To Use: Thread the lock nut onto the male fitting. When the male fitting is firmly seated into the receiving port, tighten the lock nut down against the receiving port to securely hold the male fitting in place.

NOTE

- The P-340 ferrule is designed for use with shallow receiving ports, such as those used on some low pressure valves.
- The XF-368 FlushNut is an excellent choice for applications where port-to-port spacing is limited; see page 31 for more information on this innovative product line. As an alternative, consider one of the "headless" fittings shown on this page.

RELATED PRODUCTS

- Nuts for M6 threaded ports are on page 27; nuts for 5/16-24 threaded ports are on page 30.

	Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
	FLANGELESS FITTINGS (INCLUDES P-300 FERRULES)						
	XF-368x	Flangeless Fitting for 1/8" OD Tubing, FlushNut	1/4-28 Flat-Bottom	500 psi (34 bar)	FlushNut	SST/ETFE Yellow	10-pk
★	**XP-301x**	Flangeless Fitting for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	Standard Knurl	Delrin Black/ETFE Yellow	10-pk
	XP-302x	Flangeless Fitting for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	Standard Knurl	Delrin Red/ETFE Yellow	10-pk
	XP-305x	Flangeless Fitting for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	Standard Knurl	Delrin Green/ETFE Yellow	10-pk
★	**XP-308x**	Flangeless Fitting for 1/8" OD Tubing, Short	1/4-28 Flat-Bottom	500 psi (34 bar)	Standard Knurl	Delrin Black/ETFE Yellow	10-pk
	XP-315x	Flangeless Fitting for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	Standard Knurl	ETFE Natural/ETFE Yellow	10-pk
★	**XP-330x**	Flangeless Fitting for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	Standard Knurl	PEEK Natural/ETFE Yellow	10-pk
★	**XP-335x**	Flangeless Fitting for 1/8" OD Tubing, Short	1/4-28 Flat-Bottom	500 psi (34 bar)	Standard Knurl	PEEK Natural/ETFE Yellow	10-pk
★	**XP-386x**	Flangeless Fitting for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	Headless Knurl	PPS Natural/ETFE Yellow	10-pk
	REPLACEMENT FERRULES						
★	**P-300x**	Flangeless Ferrule for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Yellow	10-pk
★	**P-300Nx**	Flangeless Ferrule for 1/8" OD Tubing	1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Natural	10-pk
★	**P-340x**	Flangeless Ferrule for 1/8" OD Tubing, Small Valve	1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Natural	10-pk
	P-312x	Lock Nut for Flangeless Nuts	1/4-28 Flat-Bottom	—	—	Delrin White	10-pk

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Metric Flangeless Fittings

- For 1/16", 1.8 mm, 2.0 mm, 2.5 mm, 3.0 mm, 4.0 mm, or 1/8" OD tubing
- Convenience of flangeless fittings for metric tubing sizes and M6 flat-bottom ports

Upchurch Scientific® Metric Flangeless Ferrules are designed to connect 1.8, 2.0, 2.5, 3.0, or 4.0 mm OD tubing to flat-bottom ports when paired with the appropriate M6, 1/4-28, or 5/16-24 Flangeless Nuts. We also offer M6-threaded nuts to connect 1/16" or 1/8" OD tubing, plus a tubing sleeve to facilitate 1.0 mm OD tubing connections. Please refer to the "Metric Connections" chart on this page for information regarding which nuts and ferrules to use with your tubing.

P-342
ETFE Ferrule
for 1.8 OD tubing

P-363R
ETFE Ferrule
for 2.0 mm OD tubing

P-353
ETFE Ferrule
for 2.5 mm OD tubing

P-343
ETFE Ferrule
for 3.0 mm OD tubing

P-344
ETFE Ferrule
for 4.0 mm OD tubing

P-207
Delrin® Nut
for 1/16" OD tubing

P-347
PEEK Nut
for 1.8, 2.0, 3.0 mm or 1/8" OD tubing

Please see page 24 for the dimensions of the products on this page.

TIP METRIC CONNECTIONS

Use this chart to determine the low pressure fittings needed to connect metric and English-sized tubing into the indicated ports.

Tubing Size	Port	Ferrules	Nuts
1.0 mm	M6 1/4-28	P-200 (w/F-252 sleeve, not included) P-200 (w/F-252 sleeve, not included)	P-207, P-207S, P-247 Any 1/4-28 nut from page 25[1]
1.8 mm	M6 1/4-28	P-342 P-342	P-307, P-307S, P-347 Any nut from page 26[1]
2.0 mm	M6 1/4-28	P-363R P-363R	P-307, P-307S, P-347 Any nut from page 26
2.5 mm	M6 1/4-28	P-353 P-353	P-307, P-307S, P-347 Any nut from page 26[1]
3.0 mm	M6 1/4-28	P-343 P-343	P-307, P-307S, P-347 Any nut from page 26[1]
4.0 mm	5/16-24	P-344	XP-132x from page 30
1/16"	M6 M6	P-200 P-840	P-207, P-207S, P-247, P-931, page 28
1/8"	M6 M6	P-300 P-940	P-307, P-307S, P-347, P-945, page 28

[1] *To order 1/4-28 threaded Flangeless Nuts separately from the Flangeless Ferrules, simply remove the preceding "X" from the appropriate part number — for example, order P-301x instead of XP-301x.*

RELATED PRODUCTS

More Metric–Sized Products

	Page
High Pressure Polymer Fittings	9, 12
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VacuTight™ Fittings	28
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Low Pressure Unions	40
Bulkhead Unions	41
PEEK (1.8 mm OD and Capillary) and Fused Silica Tubing	65
PEEKsil™ Tubing	66
FEP Tubing (1.0–4.0 mm OD) and PFA Capillary Tubing	71
Frit-In-A-Ferrule™	166

In addition, many of our 1/4-28 threaded Filters, Valves and Flow Control Accessories can be converted to accept 1.8, 2.0, 2.5 and 3.0 mm tubing, using the ferrules listed for 1/4-28 ports in the "Metric Connections" table, this page.

	Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
	METRIC FLANGELESS NUTS						
	P-207x	Flangeless Nut for 1/16" OD Tubing	M6 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	Delrin Black	10-pk
	P-207Sx	Flangeless Nut for 1/16" OD Tubing, Short	M6 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	Delrin Black	10-pk
	P-247x	Flangeless Nut for 1/16" OD Tubing, Short	M6 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	PEEK Black	10-pk
	P-307x	Flangeless Nut for 1.8 mm, 2.0 mm, 3.0 mm, 1/8" OD Tubing	M6 Flat-Bottom	500 psi (34 bar)	Standard Knurl	Delrin Black	10-pk
	P-307Sx	Flangeless Nut for 1.8 mm, 2.0 mm, 3.0 mm, 1/8" OD Tubing	M6 Flat-Bottom	500 psi (34 bar)	Standard Knurl	Delrin Black	10-pk
	P-347x	Flangeless Nut for 1.8 mm, 2.0 mm, 3.0 mm, 1/8" OD Tubing	M6 Flat-Bottom	500 psi (34 bar)	Standard Knurl	PEEK Black	10-pk
	FLANGELESS FERRULES						
	F-252x	1/16" OD Tubing Sleeve for 1.0 mm ID Tubing	M6 or 1/4-28 Flat-Bottom	500 psi (34 bar)	—	FEP Purple	10-pk
★	**P-200x**	Flangeless Ferrule for 1/16" OD Tubing	M6 or 1/4-28 Flat-Bottom	2,000 psi (138 bar)	—	ETFE Blue	10-pk
★	**P-300x**	Flangeless Ferrule for 1/8" OD Tubing	M6 or 1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Yellow	10-pk
★	**P-342x**	Flangeless Ferrule for 1.8 mm OD Tubing	M6 or 1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Green	10-pk
	P-343x	Flangeless Ferrule for 3.0 mm OD Tubing	M6 or 1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Orange	10-pk
NEW!	**P-344x**	Flangeless Ferrule for 4.0 mm OD Tubing	5/16-24	250 psi (17 bar)	—	ETFE Natural	10-pk
	P-353x	Flangeless Ferrule for 2.5 mm OD Tubing	M6 or 1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Natural	10-pk
	P-363Rx	Flangeless Ferrule for 2.0 mm OD Tubing	M6 or 1/4-28 Flat-Bottom	500 psi (34 bar)	—	ETFE Red	10-pk

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VacuTight™ Fittings

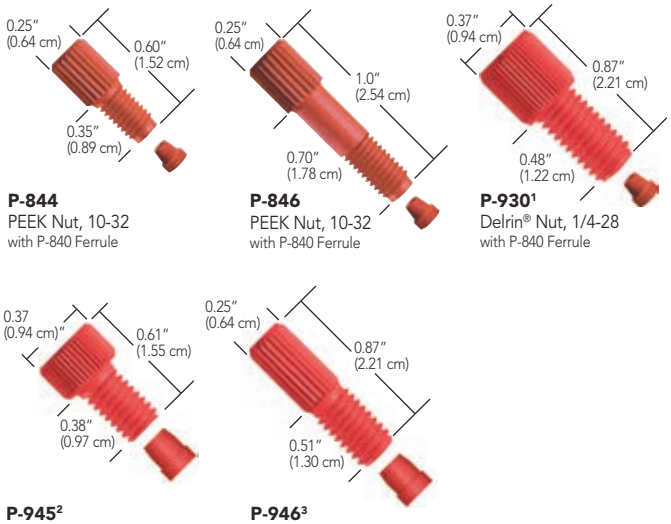
- For 1/16″ or 1/8″ OD tubing connections into 10-32, 1/4-28, or M6 flat-bottom ports
- Vacuum Rated to 25 in-Hg (84 kPa)
- Improve transfer volume consistency

Upchurch Scientific® VacuTight Fittings are designed to provide airtight, dependable connections under vacuum and low pressure conditions. Many of the VacuTight Nuts have streamlined profiles for use in systems requiring a large number of connections in a small area. Furthermore, the VacuTight Ferrule's small size ensures sufficient nut/thread engagement, even in shallow ports. These features make VacuTight Fittings ideal for "combichem" high throughput screening, clinical diagnostic, and other automated liquid handling applications.

The configuration of the VacuTight flat-bottom ferrules prevents overcompression and tubing ID reduction that can occur with many coned fittings. The result is more consistent aspirating and dispensing volumes across all system connections.

The VacuTight fittings can also work well in some positive pressure applications. The pressure range for each fitting is listed below and depends upon the tubing used for the connection. Please contact your distributor or IDEX Health & Science for more information. Additionally, please note that some of the VacuTight fittings have changed in color from red to black; however, this color change does not affect product performance.

All VacuTight Nuts must be used exclusively with VacuTight Ferrules.



P-844
PEEK Nut, 10-32
with P-840 Ferrule

P-846
PEEK Nut, 10-32
with P-840 Ferrule

P-930[1]
Delrin® Nut, 1/4-28
with P-840 Ferrule

P-945[2]
Delrin Nut, M6
with P-940 Ferrule

P-946[3]
Delrin Nut, 1/4-28
with P-940 Ferrule

[1] The dimensions shown apply to P-930, P-931, P-938, P-942, and P-948.
[2] The dimensions shown apply to P-945.
[3] The dimensions shown apply to P-946.

	Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
	VACUTIGHT FITTINGS (INCLUDES P-840 OR P-940 FERRULES)						
★	**P-842x**	VacuTight Fitting for 1/16″ OD Tubing, Short	10-32 Flat-Bottom	400–800 psi (27–55 bar)	1/4″ Hex	PEEK Red	10-pk
★	**P-844x**	VacuTight Fitting for 1/16″ OD Tubing, Short	10-32 Flat-Bottom	400–800 psi (27–55 bar)	Headless Knurl	PEEK Red	10-pk
	P-846x	VacuTight Fitting for 1/16″ OD Tubing, Long	10-32 Flat-Bottom	400–800 psi (27–55 bar)	Headless Knurl	PEEK Red	10-pk
	P-930x	VacuTight Fitting for 1/16″ OD Tubing	1/4-28 Flat-Bottom	400–800 psi (27–55 bar)	Standard Knurl	Delrin Red	10-pk
	P-931x	VacuTight Fitting for 1/16″ OD Tubing	M6 Flat-Bottom	400–800 psi (27–55 bar)	Standard Knurl	Delrin Red	10-pk
	P-938x	VacuTight Fitting for 1/16″ OD Tubing	1/4-28 Flat-Bottom	400–800 psi (27–55 bar)	Standard Knurl	PEEK Natural	10-pk
	P-942x	VacuTight Fitting for 1/8″ OD Tubing	1/4-28 Flat-Bottom	500–1,000 psi (34–69 bar)	Standard Knurl	Delrin Red	10-pk
	P-945x	VacuTight Fitting for 1/8″ OD Tubing, Short	M6 Flat-Bottom	500–1,000 psi (34–69 bar)	Standard Knurl	Delrin Red	10-pk
	P-946x	VacuTight Fitting for 1/8″ OD Tubing	1/4-28 Flat-Bottom	500–1,000 psi (34–69 bar)	Headless Knurl	Delrin Red	10-pk
	P-948x	VacuTight Fitting for 1/8″ OD Tubing	1/4-28 Flat-Bottom	500–1,000 psi (34–69 bar)	Standard Knurl	PEEK Natural	10-pk
	REPLACEMENT FERRULES						
	P-840x	VacuTight Ferrule for 1/16″ OD Tubing	M6 or 1/4-28 Flat-Bottom	400–800 psi (27–55 bar)	—	ETFE Red	10-pk
★	**P-940x**	VacuTight Ferrule for 1/8″ OD Tubing	M6 or 1/4-28 Flat-Bottom	500–1,000 psi (34–69 bar)	—	ETFE Red	10-pk

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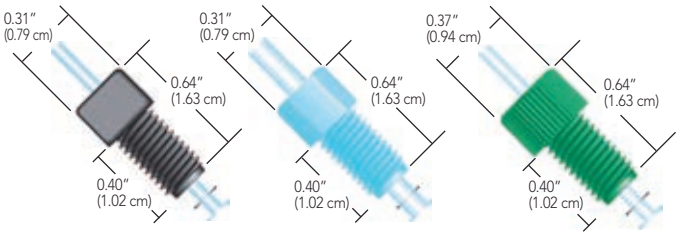
Flanged Fittings

- Fittings for 1/16″ or 1/8″ OD tubing, supplied with nut and 316 stainless steel washer
- Multiple head styles and materials available
- For 1/4-28 and M6 flat-bottom ports
- All head styles, square, hex, and knurl are available in the following colors: black, red, white, green, and blue

Upchurch Scientific® Flanged Fittings are compatible with most standard 1/4-28 or M6 Flat-Bottom flanged fittings. The hard, inert Delrin® (acetal resin) nut resists cross threading or loosening during use, while the ETFE nuts work well in chemically aggressive environments.



P-401[1]
Flanged Fitting
for 1/16″ OD tubing*

P-580B[2]
Flanged Fitting
for 1/8″ OD tubing*

P-482G[3]
Flanged Fitting
for 1/16″ OD tubing*

1 The dimensions shown apply to all square-head Flanged Fittings
2 The dimensions shown apply to all hex-head Flanged Fittings
3 The dimensions shown apply to all knurled-head Flanged Fittings
** Flanged tubing not included*

RELATED PRODUCTS

- For an alternative to flanging tubing, we highly recommend the Flangeless Fittings found on pages 24–27, the Super Flangeless™ Fittings found on pages 21–23, or the VacuTight™ Fittings on page 28.

Part No.	Description	Port Geometry	Head Style	Material (Nut/Washer)	Qty.
FLANGED FITTINGS (INCLUDES STAINLESS STEEL WASHERS)					
P-401x	Flanged Fitting for 1/16″ OD Tubing	1/4-28 Flat-Bottom	5/16″ Square	Delrin Black/SST	10-pk
★ **P-480BLK**	Flanged Fitting for 1/16″ OD Tubing	1/4-28 Flat-Bottom	5/16″ Hex	Delrin Black/SST	ea.
P-482BLK	Flanged Fitting for 1/16″ OD Tubing	1/4-28 Flat-Bottom	Standard Knurl	Delrin Black/SST	ea.
P-501x	Flanged Fitting for 1/8″ OD Tubing	1/4-28 Flat-Bottom	5/16″ Square	Delrin Black/SST	10-pk
P-580BLK	Flanged Fitting for 1/8″ OD Tubing	1/4-28 Flat-Bottom	5/16″ Hex	Delrin Black/SST	ea.
P-582BLK	Flanged Fitting for 1/8″ OD Tubing	1/4-28 Flat-Bottom	Standard Knurl	Delrin Black/SST	ea.
P-982BLKx	Flanged Fitting for 1/16″ OD Tubing	M6 Flat-Bottom	Standard Knurl	Delrin Black/SST	10-pk
P-1082BLKx	Flanged Fitting for 1/8″ OD Tubing	M6 Flat-Bottom	Standard Knurl	Delrin Black/SST	10-pk
REPLACEMENT WASHERS					
P-407x	Washer for 1/16″ OD Tubing	1/4-28 Flat-Bottom	—	SST	10-pk
P-507x	Washer for 1/8″ OD Tubing	1/4-28 Flat-Bottom	—	SST	10-pk
P-987x	Washer for 1/16″ OD Tubing	M6 Flat-Bottom	—	SST	10-pk
P-1087x	Washer for 1/8″ OD Tubing	M6 Flat-Bottom	—	SST	10-pk

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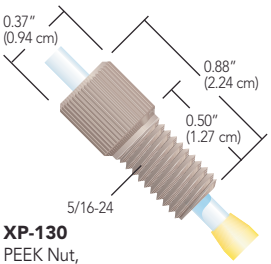
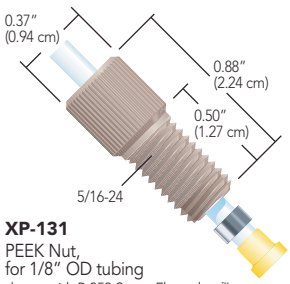
Large Bore Fittings

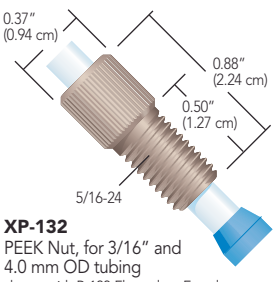
- 5/16-24 or 1/2-20 threads
- For use with 1/16", 1/8", 3/16", 1/4", 5/16", 3.0 mm, or 4.0 mm OD tubing



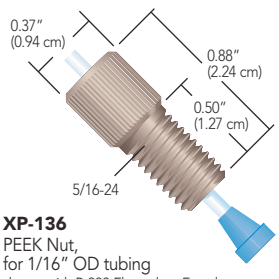
XP-130
PEEK Nut,
for 1/8" OD tubing
shown with P-300 Flangeless Ferrule
(page 26)



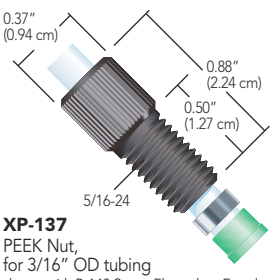
XP-131
PEEK Nut,
for 1/8" OD tubing
shown with P-359 Super Flangeless™ Ferrule (included and found on page 23)



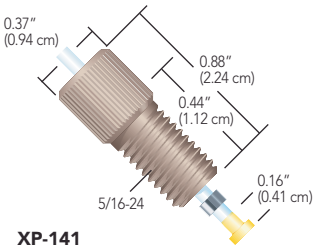
XP-132
PEEK Nut, for 3/16" and
4.0 mm OD tubing
shown with P-133 Flangeless Ferrule
(included and found on this page)



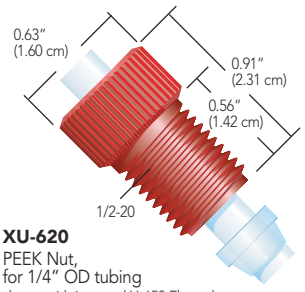
XP-136
PEEK Nut,
for 1/16" OD tubing
shown with P-200 Flangeless Ferrule
(included and found on page 25)



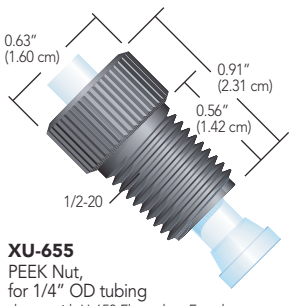
XP-137
PEEK Nut,
for 3/16" OD tubing
shown with P-140 Super Flangeless Ferrule
(included and found on this page)



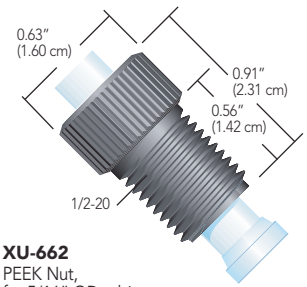
XP-141
PEEK Nut,
for 1/16" OD tubing
shown with P-259 Super Flangeless Ferrule
(included and found on page 23)



XU-620
PEEK Nut,
for 1/4" OD tubing
shown with inverted U-650 Flangeless Ferrule for coned ports
(included and found on this page)



XU-655
PEEK Nut,
for 1/4" OD tubing
shown with U-650 Flangeless Ferrule
(included and found on this page)



XU-662
PEEK Nut,
for 5/16" OD tubing
shown with U-660 Flangeless Ferrule
(included and found on this page)

Please Note: Each of the Large Bore Fittings shown on this page comes in a convenient 10-pack and is packaged with the most popularly chosen Ferrule option. The Fittings can be ordered separately by removing the preceding letter "X" from the part number. Additionally, to connect metric-sized tubing with outer diameters less than 4.0 mm to 5/16-24 threaded ports, reference the chart on page 27 to choose the correct nut/ferrule combination.

RELATED PRODUCTS

More Large Bore Products

	Page
5/16-24 Coned Fittings	18
Barbed Adapters	58
Threaded Adapters	48
Plugs	32, 159
Y Connector	47
ETFE Tubing	73

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Tubing Cutter	74
Pressure Relief Valve	154
Solvent Inlet Filters	157
Bottle Caps	159
Semi-Prep Inline Filters	161

Part No.	Description	Port	Pressure Rating	Head Style	Material (Nut/Washer)	Qty.
LARGE BORE FITTINGS						
XP-130x	Flangeless Fitting for 1/8" OD tubing	5/16-24 Flat-Bottom	500 psi (34 bar)	Standard Knurl	PEEK Natural/ETFE Yellow	10-pk
XP-131x	Super Flangeless Fitting for 1/8" OD tubing	5/16-24 Flat-Bottom	1,000 psi (69 bar)	Standard Knurl	PEEK Natural/ETFE Yellow/SST	10-pk
★ **XP-132x**	Flangeless Fitting for 3/16" OD tubing	5/16-24 Flat-Bottom	500 psi (34 bar)	Standard Knurl	PEEK Natural/ETFE Blue	10-pk
XP-136x	Flangeless Fitting for 1/16" OD tubing	5/16-24 Flat-Bottom	2,000 psi (138 bar)	Standard Knurl	PEEK Natural/ETFE Blue	10-pk
XP-137x	Super Flangeless Fitting for 3/16" OD tubing	5/16-24 Flat-Bottom	500 psi (34 bar)	Standard Knurl	PEEK Black/ETFE Green/SST	10-pk
XP-141x	Super Flangeless Fitting for 1/16" OD tubing	5/16-24 Flat-Bottom	1,350 psi (93 bar)	Standard Knurl	PEEK Natural/ETFE Yellow/SST	10-pk
XP-143x	Flangeless Fitting for 3.0 mm OD tubing	5/16-24 Flat-Bottom	500 psi (34 bar)	Standard Knurl	PEEK Natural/ETFE Orange	10-pk
XU-620x	Flangeless Fitting for 1/4" OD tubing	1/2-20 Coned	250 psi (17 bar)	Large Knurl	PEEK Red/ETFE Natural	10-pk
XU-655x	Flangeless Fitting for 1/4" OD tubing	1/2-20 Flat-Bottom	250 psi (17 bar)	Large Knurl	PEEK Black/ETFE Natural	10-pk
XU-662x	Flangeless Fitting for 5/16" OD tubing	1/2-20 Flat-Bottom	250 psi (17 bar)	Large Knurl	PEEK Black/ETFE Natural	10-pk
REPLACEMENT FERRULES						
★ **P-133x**	Flangeless Ferrule for 3/16" OD tubing	5/16-24 Flat-Bottom	500 psi (34 bar)	—	ETFE Blue	10-pk
P-133Nx	Flangeless Ferrule for 3/16" OD tubing	5/16-24 Flat-Bottom	500 psi (34 bar)	—	ETFE Natural	10-pk
P-140x	Super Flangeless Ferrule for 3/16" OD tubing	5/16-24 Flat-Bottom	500 psi (34 bar)	—	ETFE Green	10-pk
U-650x	Flangeless Ferrule for 1/4" OD tubing	1/2-20 Flat-Bottom	250 psi (17 bar)	—	ETFE Natural	10-pk
U-660x	Flangeless Ferrule for 5/16" OD tubing	1/2-20 Flat-Bottom	250 psi (17 bar)	—	ETFE Natural	10-pk

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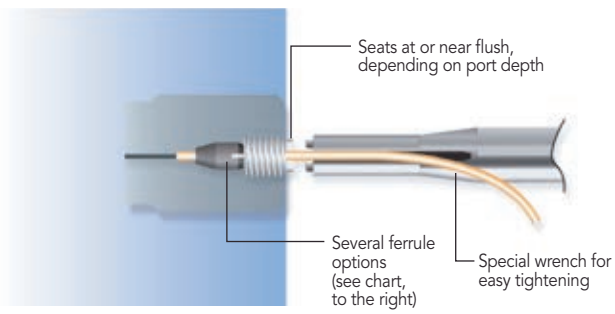
FlushNut™ Fittings

- Tightens flush with the top of the receiving port
- Several ferrule options

Upchurch Scientific® FlushNut Fittings are designed for those tight-space applications where nut heads often interfere with each other. When coupled with an appropriate ferrule and tightened into a receiving port, the FlushNut's slotted head seats at or near flush with the top of the port. This feature allows FlushNut Fittings to reside in closer proximity than any other option on the market. All FlushNut Fittings are manufactured from 316 stainless steel, except the P-321 Plug, which is made of PEEK polymer.

Tighten or remove FlushNut Fittings with our specially designed FlushNut Wrenches, available in 10-32 or 1/4-28 versions. For more information on the FlushNut wrenches, see page 33.

FlushNut Fittings System

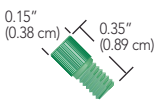


Lee Company "MINSTAC®" Compatible Fittings

- Super Flangeless™ style ferrules designed specifically to work with 6-40 nuts in Lee MINSTAC valve ports
- For 1/16" OD tubing

Upchurch Scientific TinyTight™ Fittings are easy-to-use alternatives for Lee Company 062 MINSTAC fittings systems. These fittings consist of a TinyTight Ferrule which works with the 6-40 threaded nut on this page, M-644-03. Choose from two ferrule options, with 0.020" (0.50 mm) or 0.030" (0.75 mm) thru-holes. To use, simply slide a fitting head-first onto your tubing, followed by the ring and ferrule, and thread this assembly into the solenoid valve receiving port, while making sure the tubing is bottomed out. No collets, colleting tools, or chamfering tools required; however, if needed for easier assembly of the TinyTight fittings, the M-150 tool is available. To use, first place the tool in a vise, then tighten tubing, fitting, and ferrule into the tool as you would into any port. Once removed, the swaged ferrule will be held in place on the tubing.

The TinyTight fittings have a pressure range that depends upon the tubing used for the connection. Please contact your distributor or IDEX Health & Science for more information.



M-644-03
Headless Nut
6-40 threads

M-647
TinyTight Ferrule
for 1/16" OD tubing
0.020" thru-hole

M-657
TinyTight Ferrule
for 1/16" OD tubing
0.030" thru-hole

RELATED PRODUCTS

FlushNut Ferrule Options

FlushNut	Threads/ Port*	For Tubing OD	Ferrule Options	Page
F-350	10-32 C	1/16"	SealTight™ F-192	14
F-354	10-32 C	1/32"	LiteTouch® LT-132	16
	10-32 C	1/16"	LiteTouch LT-100	16
	10-32 C	1/16"	LiteTouch SealTight LT-135	16
F-364	1/4-28 C	1/8"	LiteTouch LT-200	16
	1/4-28 FB	1/8"	Super Flangeless P-350, P-352, P-359, P-360	23
	1/4-28 FB	2.0 mm	Super Flangeless P-355	23
F-356	1/4-28 FB	1/32"	Super Flangeless P-248	23
	1/4-28 FB	1/16"	Super Flangeless P-250, P-259, P-260	23
XF-358	1/4-28 FB	1/16"	Flangeless P-200, P-200N, P-240	24
XF-368	1/4-28 FB	1/8"	Flangeless P-300, P-300N, P-340	24
	1/4-28 FB	1.8 mm	Flangeless P-342	24
	1/4-28 FB	2.0 mm	Flangeless P-363R	24
	1/4-28 FB	2.5 mm	Flangeless P-353	24
	1/4-28 FB	3.0 mm	Flangeless P-343	24
P-321	1/4-28 FB	N/A	Plug — No ferrule required	32

** C=Coned; FB=Flat-bottom*
To order FlushNuts separately from the included ferrules, simply remove the preceding "X" from the appropriate part number — for example, order F-358 instead of XF-358.

Part No.	Description	Port	Pressure Rating	Head Style	Material	Qty.
TINYTIGHT FITTINGS						
M-150	Swaging Tool for TinyTight Fittings	6-40 MINSTAC	—	—	SST	ea.
M-644-03x	Super Flangeless Nut for 1/16" OD Tubing	6-40 Flat Bottom or MINSTAC	750–3,750 psi (52–259 bar)	Micro Headless	PEEK Green	10-pk
M-647x	TinyTight Ferrule for 1/16" OD Tubing, 0.020" Thru-Hole	6-40 MINSTAC	750–3,750 psi (52–259 bar)	—	PEEK Natural/SST	10-pk
★ **M-657x**	TinyTight Ferrule for 1/16" OD Tubing, 0.030" Thru-Hole	6-40 MINSTAC	750–3,750 psi (52–259 bar)	—	PEEK Natural/SST	10-pk

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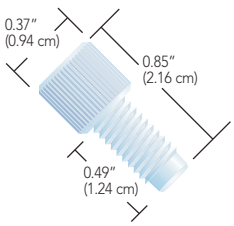
Plugs & Caps

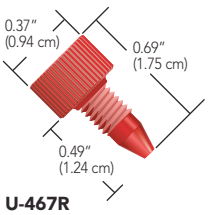
- Seal 6-32, 6-40, 10-32, 1/4-28, M6, or 5/16-24 threaded ports or fittings

Use Upchurch Scientific® plugs to close off unused ports in valves and multi-port connectors. Our color-coded 10-32 threaded plugs are perfect for identifying stored columns that have different packing materials, or in which different mobile phases have been utilized. Cap off tubing with one of the PEEK or ETFE caps presented on this page and the appropriate fittings from this chapter.

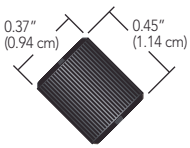
To help determine which plug or cap is best suited for your application, please visit www.idex-hs.com for detailed chemical compatibility data.



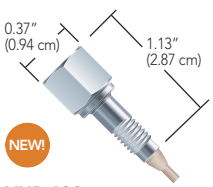
P-316
PFA Plug
for 1/4-28 flat-bottom ports



U-467R
Delrin® Column Plug
for 10-32 coned ports



P-755
ETFE Cap
for 1/4-28 flat-bottom fittings



VHP-600
VHP Plug
for 10-32 coned ports

	Part No.	Description	Head Style	Material	Qty.
	PLUGS				
	P-120	Plug for 1/4-28 Coned Ports for 1/8″ OD Tubing	Standard Knurl	PCTFE Natural	ea.
	P-123	Plug for 1/4-28 Flat-Bottom Ports	5/16″ Hex	ETFE Natural	ea.
★	**P-309x**	Plug for 1/4-28 Flat-Bottom Ports	Standard Knurl	Delrin Black	10-pk
★	**P-311**	Plug for 1/4-28 Flat-Bottom Ports	Standard Knurl	ETFE Natural	ea.
	P-314	Plug for M6 Flat-Bottom Ports	Standard Knurl	ETFE Black	ea.
★	**P-316**	Plug for 1/4-28 Flat-Bottom Ports	Standard Knurl	PFA Natural	ea.
	P-321	Plug for 1/4-28 Flat-Bottom Ports, FlushNut™	FlushNut	PEEK Natural	ea.
	P-520	Plug for 10-32 Coned Ports	5/16″ Hex	SST	ea.
	P-550	Plug for 10-32 Coned Ports, Extra Long	Standard Knurl	PEEK Natural	ea.
★	**P-551**	Plug for 10-32 Coned Ports	Standard Knurl	PEEK Natural	ea.
	P-552	Plug for 6-40 Coned Ports	Headless Knurl	PEEK Natural/PCTFE	ea.
	P-555	Plug for 6-32 Coned Ports	Standard Micro Knurl	PEEK Natural	ea.
	P-556	Plug for 5/16-24 Flat-Bottom Ports	Standard Knurl	PEEK Natural	ea.
	P-558	Plug for 6-40 Flat-Botton Ports	Micro Headless Knurl	PEEK Green	ea.
	P-559	Plug for 6-32 Flat-Bottom Ports	Micro Headless Knurl	PEEK Natural	ea.
	P-849	Plug for 10-32 Flat-Bottom Ports	Standard Knurl	Delrin Black	ea.
	U-467Rx	Plug for 10-32 Coned Ports	Standard Knurl	Delrin Red	10-pk
NEW!	**VHP-600**	VHP Plug for 10-32 Coned Ports	3/8″ Hex	PK-SST	ea.
	CAPS				
	P-754	Cap for 10-32 Coned Ports	Standard Knurl	ETFE Yellow	ea.
★	**P-755**	Cap for 1/4-28 Flat-Bottom Ports	Standard Knurl	ETFE Black	ea.
	P-756	Cap for M6 Flat-Bottom Ports	Standard Knurl	ETFE Blue	ea.

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Extender Tools

These tools can be used to tighten most of our knurled nuts in hard to reach places. See the application note on this page for knurl size and corresponding extender tool.

For precise tightening, the extender tools listed with 1/4" hex drives are designed to adapt to any torque wrench with a female 1/4" socket, such as the VHP-4000 Torque Driver on page 8. The tools featured on this page also include the FlushNut™ wrenches, used to tighten the FlushNuts found throughout this chapter and described in detail on page 31.

Removal Tool

Use the LT-300 Removal Tool to detach LiteTouch® and Super Flangeless™ Ferrules from tubing. Simply slide the appropriate tool blade slot between the lock ring and the ferrule body. With a slight twist, the ring will pop off, releasing the ferrule from the tubing. *Please Note: This Removal Tool will not work with the LT-135 Ferrule System.*

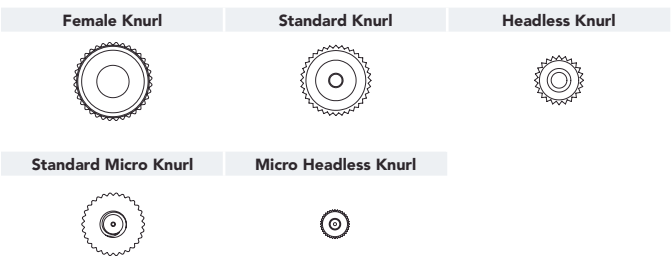
Wrenches

For your convenience, we offer wrenches in three standard sizes. You will need two A-304 wrenches to tighten most nuts into unions found on page 36 (for union 1593, you need one A-304 and one A-320 wrench).

The IDEX Wrench is slotted to fit over 1/16" and 1/8" OD tubing, and has 1/4" and 5/16" internal hex ends, to engage with the heads of the hex-head fittings most commonly used with Rheodyne® valves and the stainless steel fittings listed on page 10.

APPLICATION NOTE

The drawings represent actual size of the various knurled head designs of the Upchurch Scientific® nuts featured in this chapter. Select the appropriate extender tool for the knurl pattern of the nut you've selected.



Part No.	Description	Material	Qty.
EXTENDER TOOLS			
P-291	Extender Tool for Standard Head Nuts, with 1/4" Hex Drive	Aluminum	ea.
P-298	Extender Tool for Standard Head Nuts	Delrin®	ea.
P-299	Extender Tool for Standard Head Nuts	Aluminum	ea.
P-399	Extender Tool for Standard Head Nuts, Short	Aluminum	ea.
P-297	Extender Tool for Headless Nuts	Aluminum	ea.
P-292	Extender Tool for Headless Nuts, with 1/4" Hex Drive	Aluminum	ea.
P-277	Extender Tool for Standard Micro Nuts	Aluminum	ea.
N-290	Extender Tool for Micro Headless Nuts	Aluminum	ea.
P-278	Extender Tool for Female Nuts, with 1/4" Hex Drive	Aluminum	ea.
MISCELLANEOUS TOOLS			
A-304	Wrench, 1/4" x 5/16"	Steel	ea.
A-305	Wrench, 1/2" x 9/16"	Steel	ea.
A-320	Wrench, 3/8" x 7/16"	Steel	ea.
6810	IDEX Wrench, 1/4" x 5/16"	Steel	ea.
F-345	FlushNut Wrench for 10-32 Threaded Fittings	Steel/Plastic Handle	ea.
F-346	FlushNut Wrench for 1/4-28 Threaded Fittings	Steel/Plastic Handle	ea.
LT-300	Removal Tool for LiteTouch and Super Flangeless Ferrules	Steel/Plastic Handle	ea.

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CONNECTORS

VHP UNIONS
PAGE 36

LOW PRESSURE UNIONS
PAGE 40

THREADED ADAPTERS
PAGE 48

BARBED ADAPTERS
PAGE 58

SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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Connectors Reference Chart

This chart offers suggestions for connecting two pieces of inline tubing. The required product numbers are listed, with the appropriate page numbers listed below them in respective order. In most cases other options exist. For more information, please contact IDEX Health & Science or your local distributor.

TUBING SIZE (OD)	CAPILLARY (<1/32" OD)	1/32"	1 mm	1/16"	1.8–3 mm	1/8"	4 mm, 3/16"	1/4"	5/16"
CAPILLARY (<1/32" OD)	P-720 + MTSlv or P-882 or P-772 or P-779 + (2) NTSlv Pages: 39, 19, 52, 39, 38, 19	P-779 + NTSlv + F-247 Pages: 38, 19	P-779 + NTSlv + F-252 Pages: 38, 19	P-770 + MTSlv Pages: 38, 19	P-627 + NTSys + MFF + XP-335 Pages: 48, 19, 27, 26	P-627 + NTSys + XP-335 Pages: 49, 19, 26	P-135 + P-259 + NTSys + LT-115 + LBFF + XP-132 Pages: 48, 23, 19, 23, 30	U-665 + P-259 + NTSlv + LT-115 Pages: 48, 23, 19, 23	U-665 + XU-662 + P-259 + NTSlv + LT-115 Pages: 48, 30, 60, 19, 23
1/32"	P-779 + NTSlv + F-247 Pages: 38, 19	P-771 Page: 39	P-779 + F-247 + F-252 Pages: 38, 19, 19	P-881 Page: 52	P-702 + P-248 + LT-115 + MFF + XP-335 Pages: 40, 23, 23, 27, 26	P-702 + P-248 + LT-115 + XP-335 Pages: 40, 23, 23, 26	P-135 + P-248 + LT-115 + LBFF + XP-132 Pages: 48, 23, 23, 30, 30	U-665 + P-248 + LT-115 Pages: 48, 23, 23	U-665 + XU-662 + P-248 + LT-115 Pages: 48, 30, 23, 23
1 mm	P-779 + NTSlv + F-252 Pages: 38, 19	P-779 + F-247 + F-252 Pages: 38, 19, 19	P-779+ (2) F-252 Pages: 38, 19	P-779 + F-252 Pages: 38, 19	P-702 + F-252 + MFF + XP-335 Pages: 40, 19, 27, 26	P-702 + F-252 + XP-335 Pages: 40, 19, 26	P-135 + XP-235 + F-252 + LBFF + XP-132 Pages: 48, 25, 19, 27, 30	U-665 + XP-235 + F-252 Pages: 48, 25, 19	U-665 + XU-662 + XP-235 + F-252 Pages: 48, 30, 25, 19
1/16"	P-770 + MTSlv Pages: 38, 19	P-881 Page: 52	P-779+ F-252 Pages: 38, 19	P-742 or P-702 Pages: 38, 40	P-702 + MFF + XP-335 Pages: 40, 27, 26	P-703 + XP-235 Pages: 40, 25	P-135 + XP-235 + LBFF + XP-132 Pages: 48, 25, 30, 30	U-665 + XP-235 Pages: 49, 25	U-665 + XU-662 + XP-235 Pages: 48, 30, 25
1.8–3 mm	P-627 + NTSys + MFF + XP-335 Pages: 48, 19, 27, 26	P-702 + P-248 + LT-115 + MFF + XP-335 Pages: 40, 23, 23, 27, 26	P-702 + F-252 + MFF + XP-335 Pages: 40, 19, 27, 26	P-702 + MFF + XP-335 Pages: 40, 27, 26	P-703 + (2) MFF Pages: 40, 27	P-703 + MFF Pages: 40, 27	P-135 + XP-335 + LBFF + XP-132 Pages: 48, 27, 26, 30	U-665 + MFF + XP-335 Pages: 48, 27, 26	U-665 + XU-662 + MFF + XP-335 Pages: 48, 30, 27, 26
1/8"	P-627 + NTSys + XP-335 Pages: 48, 19, 26	P-702 + P-248 + LT-115 + XP-335 Pages: 40, 23, 23, 26	P-702 + F-252 + XP-335 Pages: 40, 19, 26	P-703 + XP-235 Pages: 40, 25	P-703 + MFF Pages: 40, 27	P-703 Page: 40	P-135 + XP-335 + LBFF + XP-132 Pages: 48, 26, 30, 30	U-665 + XP-335 Pages: 48, 26	U-665 + XU-662 + X P-335 Pages: 48, 30, 26
4 mm, 3/16"	P-135 + P-259 + NTSys + LT-115 + LBFF + XP-132 Pages: 48, 23, 19, 23, 30	P-135 + P-248 + LT-115 + LBFF + XP-132 Pages: 48, 23, 23, 30, 30	P-135 + XP-235 + F-252 + LBFF + XP-132 Pages: 48, 25, 19, 27, 30	P-135 + XP-235 + LBFF + XP-132 Pages: 48, 25, 30, 30	P-135 + XP-335 + LBFF + XP-132 Pages: 48, 27, 26, 30	P-135 + XP-335 + LBFF + XP-132 Pages: 48, 26, 30, 30	P-134 + (2) LBFF + (2) XP-132 Pages: 41, 27, 30, 30	U-659 + LBFF + XP-132 Pages: 48, 30, 30	U-659 + XU-662 + LBFF + XP-132 Pages: 48, 30, 27, 30, 30
1/4"	U-665 + P-259 + NTSlv + LT-115 Pages: 48, 23, 19, 23	U-665 + P-248 + LT-115 Pages: 48, 23, 23	U-665 + XP-235 + F-252 Pages: 48, 25, 19	U-665 + XP-235 Pages: 48, 25	U-665 + MFF + XP-335 Pages: 48, 27, 26	U-665 + XP-335 Pages: 48, 26	U-659 + LBFF + XP-132 Pages: 48, 30, 30	Contact Us	U-665 + P-684 + XU-662 Pages: 48, 48, 30
5/16"	U-665 + XU-662 + P-259 + NTSlv + LT-115 Pages: 48, 30, 60, 19, 23	U-665 + XU-662 + P-248 + LT-115 Pages: 48, 30, 23, 23	U-665 + XU-662 + XP-235 + F-252 Pages: 48, 30, 25, 19	U-665 + XU-662 + XP-235 Pages: 48, 30, 25	U-665 + XU-662 + MFF + XP-335 Pages: 48, 30, 27, 26	U-665 + XU-662 + XP-335 Pages: 48, 30, 26	U-659 + XU-662 + LBFF + XP-132 Pages: 48, 30, 27, 30, 30	U-665 + P-684 + XU-662 Pages: 48, 48, 30	Contact Us

MTSlv *MicroTight® Sleeves. Select the appropriate MicroTight Sleeve(s) for your tubing OD size.*
NTSys *NanoTight™ System. Select the appropriate NanoTight Sleeve(s) for your tubing OD size, and NanoTight fitting(s).*
NTSlv *Select the appropriate NanoTight Sleeves for your tubing OD size.*
MFF *Select the appropriate Metric Flangeless Ferrule(s) for your tubing OD size. Choose from P-342, P-343, P-353, and P-363R.*
LBFF *Select from the following Large-Bore Flangeless Ferrules: P-133 (3/16" OD) or P-139 (4.0 mm OD).*

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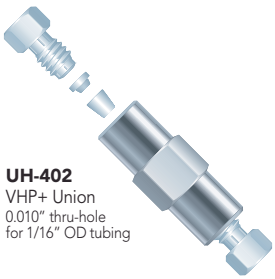
VHP Stainless Steel ZDV Unions

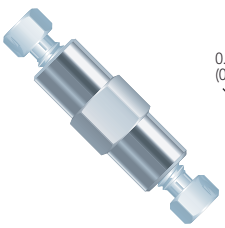
- Supplied with fittings for 1/16″ OD or 1/8″ OD tubing
- Manufactured from 316 stainless steel
- All union assemblies rated to 20,000 psi (1,380 bar) or higher

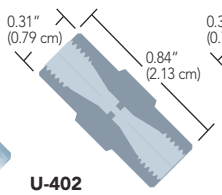
These Upchurch Scientific®, high pressure, zero-dead-volume (ZDV) unions, manufactured by IDEX Health & Science, are precision machined from 316 stainless steel, carefully passivated, then thoroughly rinsed. Each comes complete with stainless steel nuts and ferrules.

U-411
NanoTight™ Union
0.007″ thru-hole
for 1/16″ OD tubing

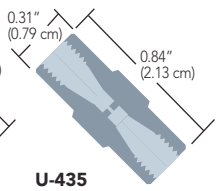


UH-402
VHP+ Union
0.010″ thru-hole
for 1/16″ OD tubing



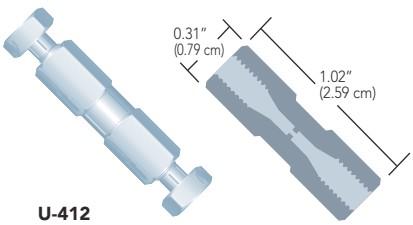


U-402
ZDV Union
0.020″ thru-hole
for 1/16″ OD tubing

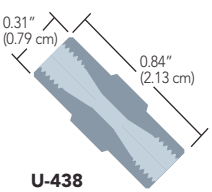


U-435
ZDV Union
0.010″ thru-hole
for 1/16″ OD tubing

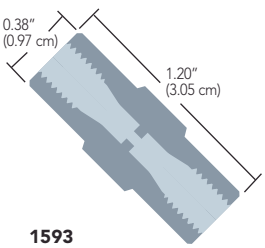
U-322
VICI® (Valco) Compatible
ZDV Union
0.020″ thru-hole
for 1/16″ OD tubing



U-412
Waters Compatible
ZDV Union
0.020″ thru-hole
for 1/16″ OD tubing



U-438
True ZDV Union
0.067″ thru-hole
for 1/16″ OD tubing



1593
ZDV Union
0.050″ thru-hole
for 1/8″ OD tubing

NOTE

It is possible to order the products on this page without the fittings. Simply use a -01 at the end of the product number to order the union body without fittings.

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	VHP STAINLESS STEEL ZDV UNIONS						
	1593	Stainless Steel Union for 1/8″ OD Tubing	1/4-28 Coned	(2) C-235/C-236	0.050″ (1.25 mm)	1.48 µL	20,000 psi (1,380 bar)
★	**U-402**	Stainless Steel Union for 1/16″ OD Tubing	10-32 Coned	(2) U-400/U-401	0.020″ (0.50 mm)	0.13 µL	20,000 psi (1,380 bar)
★	**U-411**	Stainless Steel Union for 1/16″ OD Tubing	10-32 Coned	(2) U-400/U-401	0.007″ (178 µm)	13 nL	20,000 psi (1,380 bar)
★	**U-435**	Stainless Steel Union for 1/16″ OD Tubing	10-32 Coned	(2) U-400/U-401	0.010″ (0.25 mm)	20 nL	20,000 psi (1,380 bar)
	U-438	Stainless Steel Union for 1/16″ OD Tubing	10-32 Coned	(2) U-400/U-401, (1) P-554 Gauge Plug	0.067″ (1.70 mm)	Near 0 µL	20,000 psi (1,380 bar)
	UH-402	VHP+ Stainless Steel Union for 1/16″ OD Tubing	10-32 Coned	(2) VHP-200	0.010″ (0.25 mm)	20 nL	30,000 psi (2,070 bar)
	VICI (VALCO) COMPATIBLE ZDV UNION						
★	**U-322**	Stainless Steel Union for 1/16″ OD Tubing	10-32 Coned	(2) U-320/U-321	0.020″ (0.50 mm)	0.15 µL	20,000 psi (1,380 bar)
	WATERS® COMPATIBLE ZDV UNION						
	U-412	Stainless Steel Union for 1/16″ OD Tubing	10-32 Coned	(2) U-410/U-401	0.020″ (0.50 mm)	0.10 µL	20,000 psi (1,380 bar)

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VHP Unions for Capillary Tubing

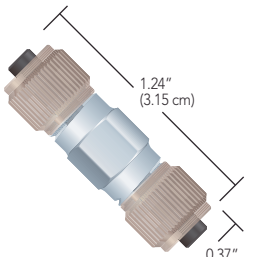
- Featuring stainless steel bodies and PK/PEEK fittings
- Pressure rated up to 15,000 psi (1,034 bar)
- Options to direct-connect both 1/32" OD tubing and 360 µm OD tubing

Upchurch Scientific® has expanded its line of specialized fittings and connectors for UHPLC applications to include several innovative unions and adapters.

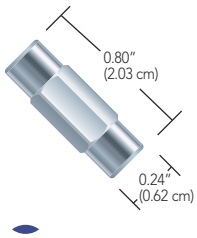
Two of these products — the UH-432 and UH-436 — follow the design of our popular Mini MicroFilters (see page 162) and allow a convenient union between either 1/32" OD tubing or 360 µm OD tubing. Each features a stainless steel union body and a unique stainless steel union capsule, enabling both excellent chemical compatibility as well as conductivity, making these a great choice for electrical interfacing in certain LC-MS applications. Each is also coupled with direct-connect ferrules made from our proprietary PEEK polymer blend (PK), allowing tubing connections up to 15,000 psi (1,034 bar). *(Please Note: While these connectors can be used at elevated pressures, they are not recommended for applications above 100 °C.)*

The UH-632 is a more traditionally designed connector, incorporating internally threaded ports. The union (UH-632) features a true ZDV (zero dead volume) connection between both tubes. This unique product is coupled with our one-piece Ultra-High Performance Fingertight fittings manufactured from our proprietary PEEK polymer blend, allowing them to be used in high temperature applications (up to 200 °C) at pressures up to 6,000 psi (414 bar) — or use these connectors at room temperature up to 15,000 psi (1,034 bar)!

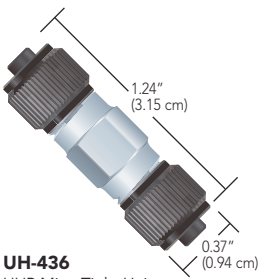
The 1959-01 is a new VHP union designed to accept the popular M4x0.7 threaded fittings for 1/32" OD tubing, made popular by Rheodyne®. These unions will work nicely with both the VHP-900 fittings (found on page 7) as well as the reusable VHP-920 (found on page 6).



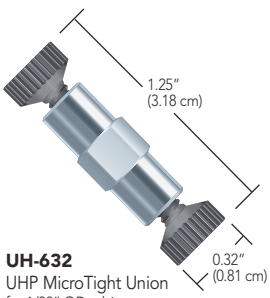
UH-432
UHP MicroTight® Union
for 1/32" OD tubing
with fittings and capsule union included



1959-01
UHP MicroTight® Union
for 1/32" OD tubing



UH-436
UHP MicroTight Union
for 360 µm OD tubing
with fittings and capsule union included

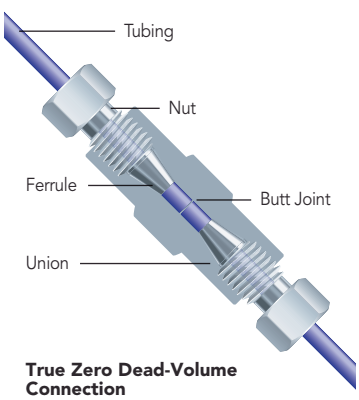


UH-632
UHP MicroTight Union
for 1/32" OD tubing
with fittings included

APPLICATION NOTE

What is a True ZDV Union?

True zero dead volume (ZDV) unions are designed so that the two joined pieces of tubing butt perfectly together as shown in the image to the right. These products have no swept volume contained within the union body. The fluid moves directly from one tube into another in this type of connector.



True Zero Dead-Volume Connection

When using true ZDV unions, it is important to take care to ensure connecting tubing has burr-free 90 degree ends. Find tubing cutters on page 74 to assist with cleanly cutting polymer and fused silica tubing. Gauge plugs are supplied with True ZDV Unions to assist with assembly. With the gauge plug inserted into one side of the union, a hard stop is created for the tubing to bottom out against as it is connected to the opposite port. The gauge plug is removed and then the second piece of tubing is connected, using the first piece of tubing to bottom out against resulting in the two tubes joined together in the center of the union.

ORDER ONLINE

RELATED PRODUCTS

- Find replacement VHP fittings on page 9.
- Find Fused Silica tubing on page 67.
- Find 1/32" OD Stainless Steel tubing on page 64–65.
- To achieve 15,000 psi (1,034 bar) with the female threaded fittings used with some of these products, use the P-278 extender tool found on page 8.

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	VHP UNIONS FOR CAPILLARY TUBING						
★	**UH-432**	VHP Union for 1/32" OD Tubing, PEEK/SST	5/16-24 Coned	(2) PK-112, (2) P-416	0.006" (0.150 mm)	5 nL	15,000 psi (1,034 bar)
	UH-436	VHP Union for 360 µm OD Tubing, PEEK/SST	5/16-24 Coned	(2) PK-152, (2) P-416BLK	0.006" (0.150 mm)	5 nL	15,000 psi (1,034 bar)
	UH-632	VHP True ZDV Union for 1/32" OD Tubing, PEEK/SST	6-32 Coned	(2) PK-126, (1) P-553 Gauge Plug	N/A	N/A	15,000 psi (1,034 bar)
NEW!	**1959-01**	VHP Union for 1/32" OD Tubing, SST	M4x0.7	N/A (Fittings must be ordered separately)	0.007" (178 µm)	16 nL	30,000 psi (2,070 bar)

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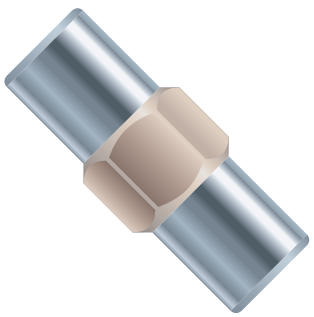
New Bio-Inert UHPLC Unions

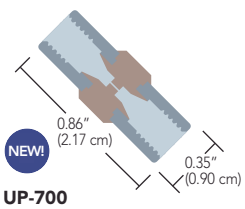
- Unique, Patent-Pending Process allows a fully-PEEK fluid contact area combined with the strength of stainless steel
- Pressure rated to 1,200 bar (17,400 psi)
- Two inner diameters available: 0.008″ and 0.016″

Upchurch Scientific® introduces two new unions specifically engineered for Bio-Inert UHPLC applications. Combining the physical strength of 316 stainless steel with the inertness and biocompatibility of an all-PEEK fluid pathway, these unions will work well in applications where pressures reach up to 17,400 psi (1,200 bar) — without allowing metal contact by the fluid.

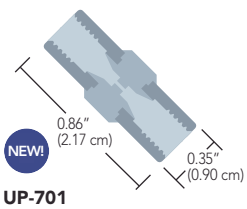
Neither union comes with fittings, but can be paired successfully with any 10-32 coned fitting that uses a polymer nose or ferrule.

Note: All-stainless steel fittings should NOT be used with these unions, as they will damage the internal conical seat.





UP-700
Bio-Inert UHPLC Union
0.008″ thru-hole
for 1/16″ OD tubing

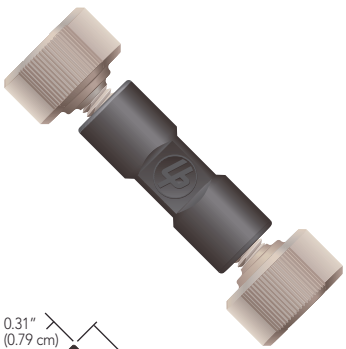


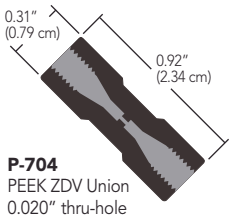
UP-701
Bio-Inert UHPLC Union
0.016″ thru-hole
for 1/16″ OD tubing

Biocompatible

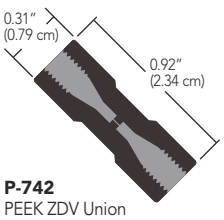
PEEK ZDV Unions

Upchurch Scientific PEEK zero-dead-volume (ZDV) Unions come complete with two F-300 Fingertight Fittings for 1/16″ OD tubing and are pressure rated to 5,000 psi (344 bar).

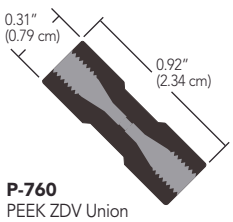




P-704
PEEK ZDV Union
0.020″ thru-hole
with F-300 Fittings



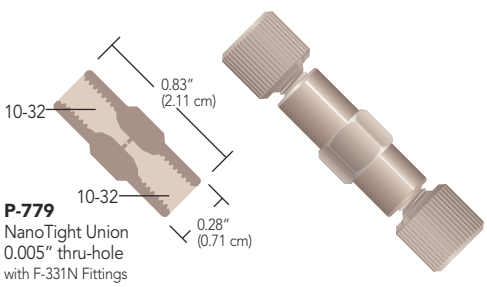
P-742
PEEK ZDV Union
0.010″ thru-hole
with F-300 Fittings



P-760
PEEK ZDV Union
0.050″ thru-hole
with F-300 Fittings

NanoTight™ Union

This Upchurch Scientific NanoTight Union improves capillary tubing connections in several ways. The internal design of the union greatly reduces the incidence of tubing misalignment. When using 1/16″ OD tubing sleeves (found on page 19) to connect capillary tubing, the webbed thru-hole minimizes breaking of fused silica while adding only miniscule swept volume. The results are fewer blockages, fewer flow rate reductions and fewer back pressure problems.



P-779
NanoTight Union
0.005″ thru-hole
with F-331N Fittings

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	BIO-INERT UHPLC UNIONS						
NEW!	UP-700	Bio-Inert UHPLC Union for 1/16″ OD Tubing, Natural (Tan)	10-32 Coned	N/A	0.008″ (0.20 mm)	0.05 µL	17,400 psi (1,200 bar)
NEW!	UP-701	Bio-Inert UHPLC Union for 1/16″ OD Tubing, Gray	10-32 Coned	N/A	0.016″ (0.40 mm)	0.20 µL	17,400 psi (1,200 bar)
	PEEK ZDV UNIONS						
★	P-704	PEEK Union for 1/16″ OD Tubing	10-32 Coned	(2) F-300	0.020″ (0.50 mm)	0.28 µL	5,000 psi (344 bar)
★	P-742	PEEK Union for 1/16″ OD Tubing	10-32 Coned	(2) F-300	0.010″ (0.25 mm)	0.07 µL	5,000 psi (344 bar)
★	P-760	PEEK Union for 1/16″ OD Tubing	10-32 Coned	(2) F-300	0.050″ (1.25 mm)	1.2 µL	5,000 psi (344 bar)
	NANOTIGHT UNION						
★	P-779	PEEK NanoTight Union for 1/16″ OD Tubing and Tubing Sleeves	10-32 Coned	(2) F-331N	0.005″ (125 µm)	8 nl	5,000 psi (344 bar)

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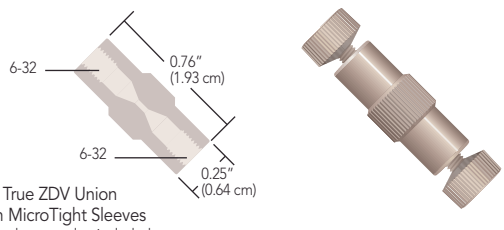
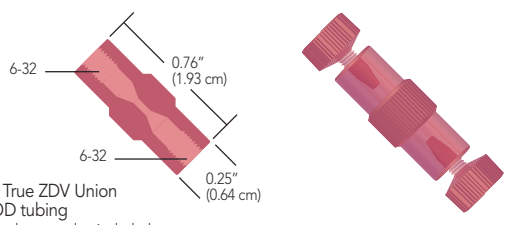
MicroTight® Connectors for Capillary Tubing

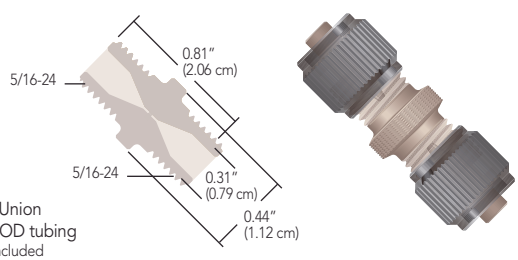
Connect two pieces of capillary tubing with these Upchurch Scientific® PEEK MicroTight Connectors. The True ZDV Unions allow two pieces of tubing to connect directly to each other — using the included gauge plug to ensure proper alignment. The standard union and elbow both feature a 0.006" (0.150 mm) thru-hole, adding only a small amount of additional flow-path volume to help ensure proper chromatographic results. For MicroTight unions designed for UHPLC applications, see page 37.



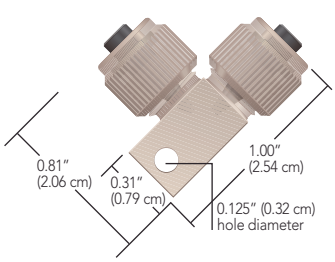
P-720
MicroTight True ZDV Union
for use with MicroTight Sleeves
with fittings and gauge plug included



P-771
MicroTight True ZDV Union
for 1/32" OD tubing
with fittings and gauge plug included



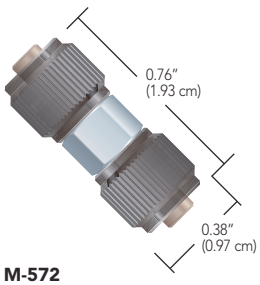
P-772
MicroTight Union
for 360 µm OD tubing
with fittings included



P-874
MicroElbow for
MicroTight Tubing Sleeves
with fittings included

Conductive MicroTight Union

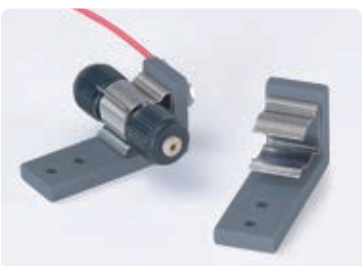
The Upchurch Scientific Conductive MicroTight Union manufactured by IDEX Health & Science provide an excellent opportunity to introduce voltage into an electrospray or capillary electrophoresis system. With an extremely low internal volume of 16 nL, this union can be placed inline with 360 µm OD capillary tubing. Mount and apply voltage to these unions using our Insulating Mounting Bracket below.



M-572
Conductive MicroTight Union
for 360 µm OD tubing
with fittings and Capsule Union included

Insulating Mounting Bracket

Use our Insulating Mounting Bracket to easily integrate the Conductive MicroTight Union (shown above) or our Conductive Mini MicroFilters (on page 162) into your system or lab.



Insulating Mounting Bracket, shown with lead wire and Conductive MicroTight Union, not included.

The product snaps into place. Voltage from your lead wire is conducted through the attaching stainless steel nut and screw (included), then onto the mounted product via the stainless steel clip.

The bracket's base includes two holes (#2 screw clearance) for easy mounting onto any lab surface. Dimensions are 1.25" L x 0.45" W x 0.63" H.

APPLICATION NOTE

For an example of using a Conductive MicroTight Union in a pressure driven ion preconcentration application see: "Self-Sealed Vertical Polymeric Nanoporous Junctions for High Throughput Nanofluidic Applications."

Sun Jae Kim and Jong Yoon Han. Analytical Chem. 2008, 80: 3507-3511.

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	MICROTIGHT UNIONS						
★	**P-720**	PEEK True ZDV Union for MicroTight Sleeves	6-32 Coned	(2) F-125, (1) P-553	N/A	N/A	4,000 psi (276 bar)
★	**P-771**	PEEK True ZDV Union for 1/32" OD Tubing	6-32 Coned	(2) F-126S, (1) P-553	N/A	N/A	5,000 psi (345 bar)
★	**P-772**	PEEK Union for 360 µm OD Tubing	5/16-24 Coned	(2) F-152, (2) P-416BLK	0.006" (0.150 mm)	5 nL	5,000 psi (345 bar)
	P-874	PEEK MicroElbow for MicroTight Sleeves	5/16-24 Coned	(2) F-172, (2) P-416	0.006" (0.150 mm)	20 nL	4,000 psi (276 bar)
	REPLACEMENT GAUGE PLUGS (TO ACHIEVE TRUE ZDV CONNECTIONS WITH OUR P-720 AND P-771 UNIONS)						
	P-553	Gauge Plug, Delrin®	6-32 Coned	N/A	N/A	N/A	N/A
	CONDUCTIVE MICROTIGHT UNIONS						
	M-572	Conductive Union for 360 µm OD Tubing, PEEK/SST	5/16-24 Coned	(2) F-152, (2) P-416BLK, (1) M-128NF	0.011" (0.279 mm)	16 nL	5,000 psi (345 bar)
	INSULATING MOUNTING BRACKET						
	M-447	Insulating Mounting Bracket	N/A	N/A	N/A	N/A	N/A

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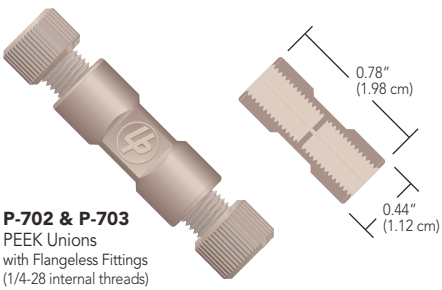
Low Pressure Unions

- Manufactured from PEEK, ETFE, Delrin®, polypropylene, or PCTFE
- Available with 1/4-28, M6, or 10-32 flat-bottom threads

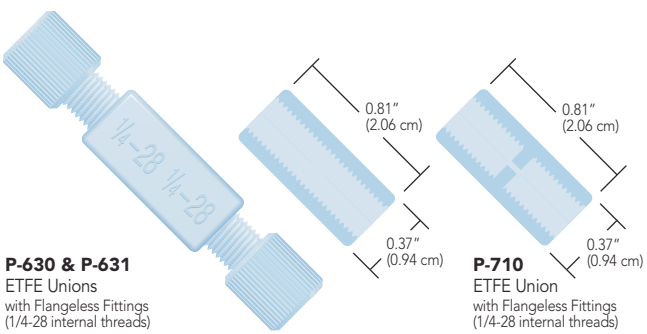
Upchurch Scientific® Low Pressure Unions are available in a variety of polymers, providing several low-cost and chemically-resistant options. The union assemblies below include fittings as shown in the table. The unions in the right column do not include fittings, allowing for customizing the fitting selection. In some cases, a union can be configured to connect two different tubing sizes—for example, if 1/4-28 Flangeless fittings for 1/16″ and 1/8″ OD tubing were selected from pages 25 and 26 they can be used with the P-603 union to connect the two different tubing sizes.

Low Pressure PEEK Union Assemblies



P-702 & P-703
PEEK Unions
with Flangeless Fittings
(1/4-28 internal threads)

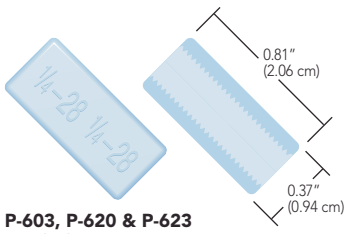
Low Pressure ETFE Union Assemblies



P-630 & P-631
ETFE Unions
with Flangeless Fittings
(1/4-28 internal threads)

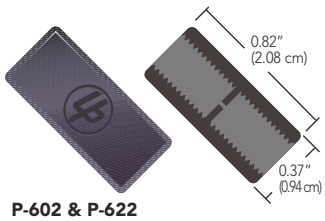
P-710
ETFE Union
with Flangeless Fittings
(1/4-28 internal threads)

Low Pressure Standard Unions



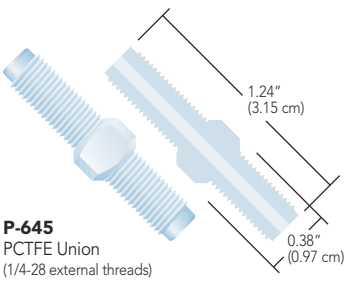
P-603, P-620 & P-623
Standard Unions
(1/4-28 internal threads)

Low Pressure Metric Unions



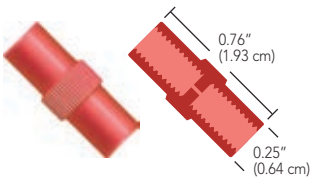
P-602 & P-622
Metric Unions
(M6 internal threads)

Low Pressure Male Union



P-645
PCTFE Union
(1/4-28 external threads)

VacuTight™ Union



P-845-01
PEEK Union
(10-32 internal threads)

Biocompatible

RELATED PRODUCTS

- To use connectors in higher pressure applications, simply replace the provided fittings with Super Flangeless™ Nuts and Ferrules, found on pages 21–23.
- Use any of the 10-32 flat-bottom fittings on page 21 and 28 to make an inline connection with our VacuTight Union. This product is designed for use with 1/16″ OD tubing.

	Part No.	Description	Color	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	PEEK UNION ASSEMBLIES							
★	**P-702**	PEEK Union for 1/16″ OD Tubing	Natural	1/4-28 FB	(2) XP-235	0.020″ (0.50 mm)	0.41 µL	1,000 psi (69 bar)
★	**P-703**	PEEK Union for 1/8″ OD Tubing	Natural	1/4-28 FB	(2) XP-335	0.050″ (1.25 mm)	2.57 µL	1,000 psi (69 bar)
	ETFE UNION ASSEMBLIES							
	P-630	ETFE True ZDV Union for 1/16″ OD Tubing	Natural	1/4-28 FB	(2) P-200N/P-245	N/A	N/A	1,000 psi (69 bar)
	P-631	ETFE True ZDV Union for 1/8″ OD Tubing	Natural	1/4-28 FB	(2) P-300N/P-345	N/A	N/A	1,000 psi (69 bar)
	P-710	ETFE Union for 1/16″ OD Tubing	Natural	1/4-28 FB	(2) XP-245	0.030″ (0.75 mm)	0.93 µL	1,000 psi (69 bar)
	STANDARD UNIONS							
★	**P-603**	Delrin True ZDV Standard Union	Natural	1/4-28 FB	N/A	N/A	N/A	N/A*
★	**P-620**	Polypropylene True ZDV Standard Union	Natural	1/4-28 FB	N/A	N/A	N/A	N/A*
★	**P-623**	ETFE True ZDV Standard Union	Natural	1/4-28 FB	N/A	N/A	N/A	N/A*
	METRIC UNIONS							
	P-602	Delrin Metric Union	Black	M6 FB	N/A	0.020″ (0.50 mm)	0.41 µL	N/A*
	P-622	ETFE Metric Union	Blue	M6 FB	N/A	0.020″ (0.50 mm)	0.41 µL	N/A*
	MALE UNION							
★	**P-645**	PCTFE Male Union	Natural	1/4-28 FB	N/A	0.062″ (1.60 mm)	61.3 µL	500 psi (34 bar)
	VACUTIGHT UNION							
	P-845-01	PEEK Union for 1/16″ OD Tubing	Red	10-32 FB	N/A	0.020″ (0.50 mm)	0.20 µL	N/A*

** Pressure Rating depends on Fittings selected. See pressure rating for fittings on appropriate page.*
FB = Flat-Bottom

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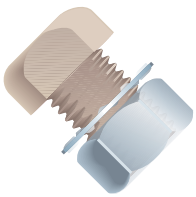
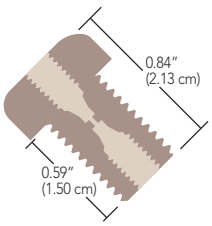
Bulkhead Unions

- Designed for plumbing tubing through equipment housing
- For use with standard 10-32 coned or 1/4-28 flat-bottom threaded fittings

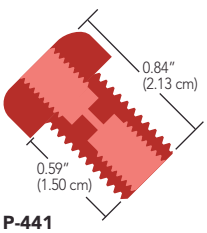
Thread Upchurch Scientific® PEEK Bulkhead Unions directly through your equipment housing to connect internal tubing to the outside. Each union has unique 3/8-24 external threads and comes complete with a stainless steel nut and lock washer to hold it in place. Requires a 3/8" hole to mount. The recommended torque limit for these unions is 15 in.– lbs (1.7 N·m).



Bulkhead Union
includes stainless steel nut/lock washer



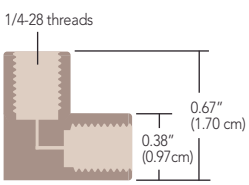
P-440
10-32 internal threads



P-441
1/4-28 internal threads

Elbow Connectors

Use these Elbow Connectors to easily navigate tight corners. One Elbow is designed for use with 1/16" OD tubing and has a 0.020" (0.50 mm) thru-hole. Use 1/8" OD tubing with the other Elbow, which has a 0.062" (1.6 mm) thru-hole. Both come complete with 1/4-28 PEEK nuts and ETFE ferrules, and are pressure rated to 1,000 psi (69 bar).

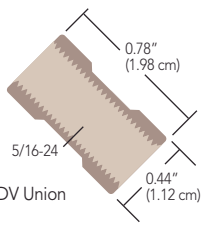


P-430
PEEK Elbow
comes with Flangeless Fittings

Large Bore Union

- 5/16-24 flat-bottom threads

Use any of the 5/16-24 fittings on page 55 and the appropriate ferrule to create a true zero dead volume (ZDV) connection with the P-134 Union.



P-134
PEEK ZDV Union

RELATED PRODUCTS

- Stainless Steel Bulkhead Unions are also available. Please contact us for more information.
- To use Elbows in higher pressure applications, simply replace the provided fittings with Super Flangeless™ Nuts and Ferrules, found on pages 21–23.

	Part No.	Description	Threads	Color	Includes	Thru-hole	Swept Volume
	BULKHEAD UNIONS						
★	**P-440**	PEEK Bulkhead Union	10-32 Coned	Natural	(1) SST Nut/Washer	0.020" (0.50 mm)	1.9 µL
★	**P-441**	PEEK Bulkhead Union	1/4-28 Flat-Bottom	Red	(1) SST Nut/Washer	0.040" (1.00 mm)	2.9 µL
★	**P-441N**	PEEK Bulkhead Union	1/4-28 Flat-Bottom	Natural	(1) SST Nut/Washer	0.040" (1.00 mm)	2.9 µL
	ELBOW CONNECTORS						
	P-430	PEEK Elbow for 1/16" OD Tubing	1/4-28 Flat-Bottom	Natural	(2) XP-235	0.020" (0.50 mm)	1.4 µL
	P-432	PEEK Elbow for 1/8" OD Tubing	1/4-28 Flat-Bottom	Natural	(2) XP-335	0.062" (1.60 mm)	13.6 µL
	LARGE BORE UNION						
	P-134	PEEK True ZDV Union	5/16-24 Flat-Bottom	Natural	N/A	N/A	N/A

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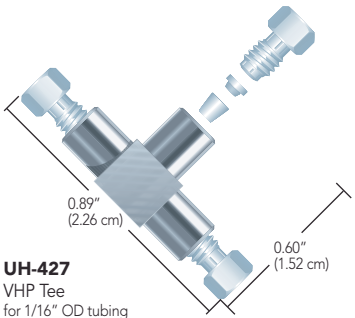
VHP Tee for 1/16" OD Tubing

IDEX Health & Science offers this Very High Pressure (VHP) Tee Connector, designed to bring three pieces of tubing together. The all-316 stainless steel connector is designed for 1/16" OD tubing and is pressure rated to 30,000 psi (2,070 bar).



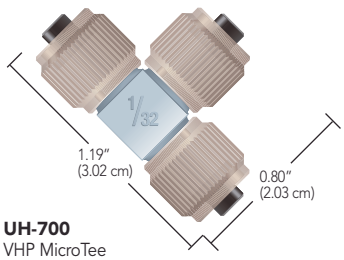
UH-427
VHP Tee
for 1/16" OD tubing
with fittings included

VHP Tees & Crosses for Capillary Tubing

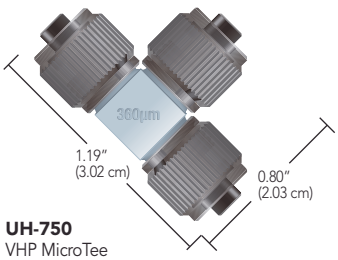
- Direct-connect either 360 µm or 1/32" OD tubing — no sleeves required!
- Available in both tee and cross configurations
- Pressure rated to 15,000 psi (1,034 bar)

To help facilitate multi-port connections in UHPLC applications, Upchurch Scientific® has developed a line of MicroTees and MicroCrosses, manufactured from stainless steel and featuring small thru-holes and very low internal volume. Additionally, the stainless steel construction allows these products to be used in applications where electrical conductivity is desired.

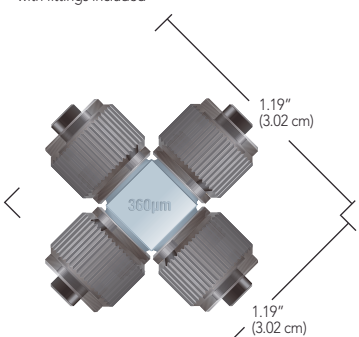
Included with the MicroTees and MicroCrosses are the VHP MicroFerrules found on page 9. The P-278 Extender Tool on page 33 can be used to tighten the female nuts that are included with these connectors.



UH-700
VHP MicroTee
for 1/32" OD tubing
with fittings included



UH-750
VHP MicroTee
for 360 µm OD tubing
with fittings included



UH-752
VHP MicroCross
for 360 µm OD tubing
with fittings included

APPLICATION NOTE

Why 1/32" OD Tubing and 360 µm OD Tubing?

IDEX Health & Science has focused strongly on the development of a variety of connectors and accessories for 1/32" OD tubing and 360 µm OD tubing. We have focused on these specific sizes due to their overwhelming popularity in analytical instruments, especially where micro and nano-scale analyses are being performed. By creating products designed for these popular sizes, the overall connection is easier to make and generally holds to increased pressures over connections where tubing sleeves are involved.

Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
VHP TEE FOR 1/16" OD TUBING						
UH-427	VHP Tee for 1/16" OD Tubing, SST	10-32 Coned	(3) VHP-200	0.020" (0.50 mm)	0.57 µL	30,000 psi (2,070 bar)
VHP TEES & CROSSES FOR CAPILLARY TUBING						
★ **UH-700**	VHP MicroTee for 1/32" OD Tubing, PEEK/SST	5/16-24 Coned	(3) PK-112, (3) P-416	0.010" (0.25 mm)	84 nL	15,000 psi (1,034 bar)
UH-750	VHP MicroTee for 360 µm OD Tubing, PEEK/SST	5/16-24 Coned	(3) PK-152, (3) P-416BLK	0.010" (0.25 mm)	84 nL	15,000 psi (1,034 bar)
UH-752	VHP MicroCross for 360 µm OD Tubing, PEEK/SST	5/16-24 Coned	(4) PK-152, (4) P-416BLK	0.010" (0.25 mm)	101 nL	15,000 psi (1,034 bar)

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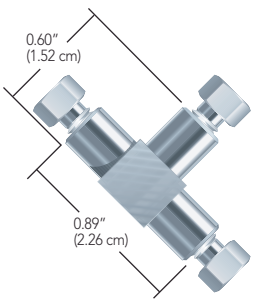
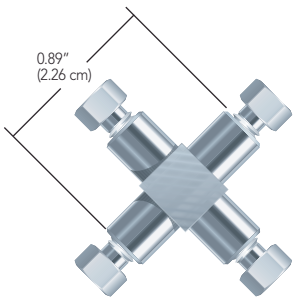
Stainless Steel Tees & Crosses

These 316 stainless steel connectors come complete with 10-32 stainless steel fittings for use with 1/16" OD tubing and are rated to 20,000 psi (1,380 bar). They are compatible with any 10-32 coned threaded fittings.



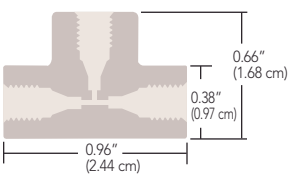
U-428 Stainless Steel Tee
0.020" thru-hole
with U-400 and U-401 Fittings



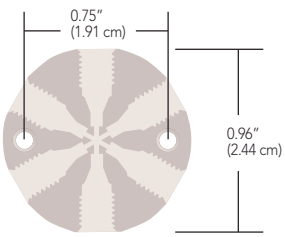
U-430 Stainless Steel Cross
0.020" thru-hole
with U-400 and U-401 Fittings

PEEK 7-Port Manifold

Combine several streams into one or split one fluid stream into several. This PEEK 7-Port Manifold comes complete with F-331 Fingertight Fittings for 1/16" OD tubing and offers a pressure rating of 5,000 psi (345 bar). Seal unused ports with any of our polymer 10-32 coned plugs on page 32.



Side View

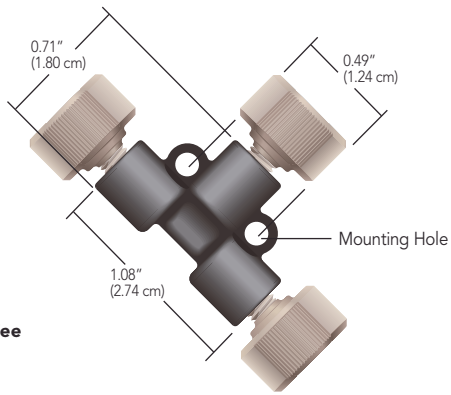


Top View

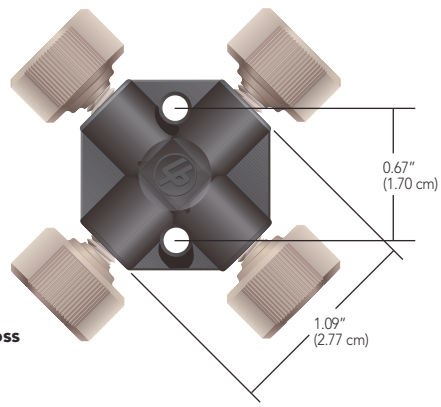
P-170
PEEK 7-Port Manifold
0.020" thru-holes
with F-331 Fittings

PEEK Tees & Crosses

Our PEEK Tees and Crosses include high pressure F-300 PEEK Fingertight Fittings — allowing maximum operating pressures to 3,500 psi (241 bar) when used with 1/16" OD PEEK or stainless steel tubing.



P-727 PEEK Tee
0.020" thru-hole
with F-300 Fittings



P-729 PEEK Cross
0.020" thru-hole
with F-300 Fittings

Biocompatible

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	VHP TEE FOR 1/16" OD TUBING						
★	**U-428**	Stainless Steel Tee for 1/16" OD Tubing	10-32 Coned	(3) U-400, (3) U-401	0.020" (0.50 mm)	0.57 µL	20,000 psi (1,380 bar)
★	**U-429**	Stainless Steel Tee for 1/16" OD Tubing	10-32 Coned	(3) U-400, (3) U-401	0.040" (1.00 mm)	2.1 µL	20,000 psi (1,380 bar)
	U-430	Stainless Steel Cross for 1/16" OD Tubing	10-32 Coned	(4) U-400, (4) U-401	0.020" (0.50 mm)	0.72 µL	20,000 psi (1,380 bar)
★	**U-431**	Stainless Steel Cross for 1/16" OD tubing	10-32 Coned	(4) U-400, (4) U-401	0.040" (1.00 mm)	2.5 µL	20,000 psi (1,380 bar)
	PEEK MANIFOLD						
	P-170	PEEK 7-Port Manifold for 1/16" OD Tubing	10-32 Coned	(7) F-331	0.020" (0.50 mm)	2.2 µL	5,000 psi (345 bar)
	PEEK TEES AND CROSSES						
★	**P-727**	PEEK Tee for 1/16" OD Tubing	10-32 Coned	(3) F-300	0.020" (0.50 mm)	0.57 µL	3,500 psi (241 bar)
	P-728	PEEK Tee for 1/16" OD Tubing	10-32 Coned	(3) F-300	0.050" (1.25 mm)	3.0 µL	3,500 psi (241 bar)
	P-729	PEEK Cross for 1/16" OD Tubing	10-32 Coned	(4) F-300	0.020" (0.50 mm)	0.72 µL	3,500 psi (241 bar)

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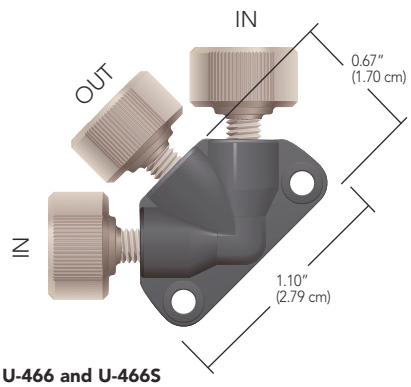
Static Mixing Tees

- PEEK body with two-piece fingertight fittings
- Low swept volume

Upchurch Scientific® Static Mixing Tees are ideal for microbore or analytical gradient HPLC. They have a low swept volume of 2.2 µL (includes frit volume) and are designed for flow rates of 0.5 to 3 mL/min and a maximum pressure of 5,000 psi (345 bar). The back pressure caused by the tee is typically only 10 to 20 psi (0.7 to 1.4 bar) at these flow rates. The thru-holes are 0.020" (0.50 mm) and the center port features a 10 µm UHMWPE or stainless steel frit that aids mixing.

NOTE

- Turbulent mixing of solvents often increases outgassing. To maintain a bubble-free fluid pathway, we recommend solvent degassing when using this product.
- The frit incorporated into our U-466 and U-466S Static Mixing Tees is not replaceable. If it becomes clogged, the Mixing Tee must be replaced.

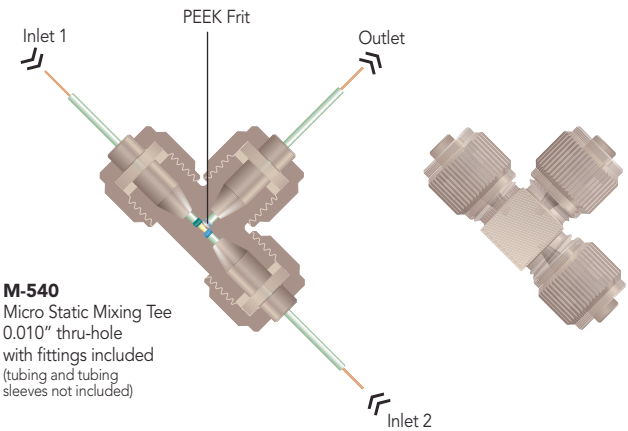


U-466 and U-466S Static Mixing Tees
with F-300 Fingertight Fittings for 1/16" OD tubing

Micro Static Mixing Tee

- Constructed of inert PEEK and PCTFE
- Low swept volume of 0.95 µL
- Designed for flow rates of 20–250 µL/min

The Upchurch Scientific® Micro Static Mixing Tee utilizes a specifically engineered internal geometry to efficiently mix two fluid streams into one combined stream. The center port also features a 0.5 µm porosity PEEK polymer frit to aid in mixing. This frit adds a maximum of 20 psi (1.4 bar) back pressure to most systems (within the stated flow rate range). The Mixing Tee handles a maximum pressure of 5,000 psi (345 bar) when directly connecting 1/16" OD tubing, or up to 4,000 psi (276 bar) with capillary tubing when using our NanoTight™ Fittings and Tubing Sleeves (pages 17 and 19).



M-540
Micro Static Mixing Tee
0.010" thru-hole
with fittings included
(tubing and tubing sleeves not included)

RELATED PRODUCTS

- See the Systec® Vacuum Degassing Systems on pages 178.
- Our standard Static Mixing Tees are designed for flow rates from 0.5 mL/min to 3 mL/min.

Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
STATIC MIXING TEE						
U-466	PEEK Static Mixing Tee for 1/16" OD Tubing, 10 µm UHMWPE Frit	10-32 Coned	(3) F-300	0.020" (0.50 mm)	2.2 µL	5,000 psi (345 bar)
★ U-466S	PEEK Static Mixing Tee for 1/16" OD Tubing, 10 µm SST Frit	10-32 Coned	(3) F-300	0.020" (0.50 mm)	2.2 µL	5,000 psi (345 bar)
MICRO STATIC MIXING TEE						
★ M-540	PEEK Micro Static Mixing Tee, for 1/16" OD Tubing	5/16-24 Coned	(3) F-132/P-416	0.010" (0.250 mm)	0.95 µL	5,000 psi (345 bar)

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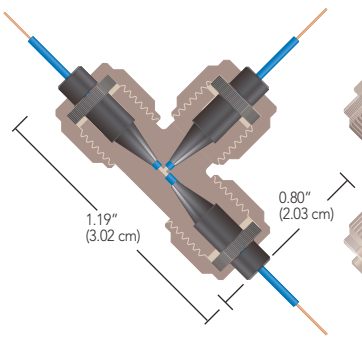
MicroTee & Cross for Capillary Tubing

- Direct connect 1/16", 1/32", 360 µm OD tubing, plus other capillary tubing
- Low swept volume

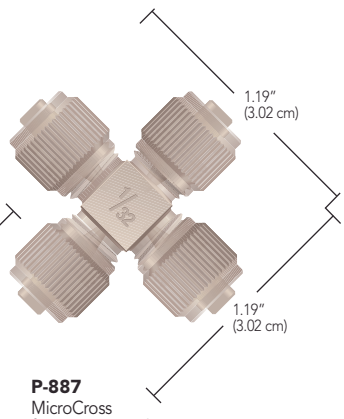
Use Upchurch Scientific® MicroTees and MicroCrosses to join capillary tubing. All of these products are made entirely of PEEK and have 0.006" (0.150 mm) thru-holes, with resulting swept volumes ranging from 29 to 81 nL.

NOTE

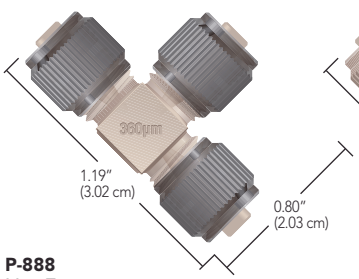
- Use only the ferrules supplied with each connector — they are not interchangeable. Replacement ferrules and female nuts are available on page 18. For MicroUnions, MicroTees, and MicroCrosses for UHPLC applications, see page 42.



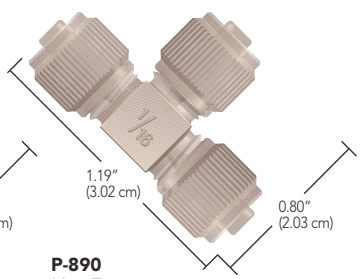
P-775
MicroTee for MicroTight® Tubing Sleeves
0.006" thru-holes
with fittings included
(tubing sleeves not included)



P-887
MicroCross
for 1/32" OD tubing
0.006" thru-holes
with fittings included



P-888
MicroTee
for 360 µm OD tubing
0.006" thru-holes
with fittings included



P-890
MicroTee
for 1/16" OD tubing
0.006" thru-holes
with fittings included

Biocompatible

APPLICATION NOTE

Several researchers use our PEEK MicroTee to introduce ionizing voltage to their fluid stream just prior to a Mass Spectrometer[1]. MicroTees are well suited for this application due to advantageous internal geometry and PEEK polymer's electrical resistance. The materials required for this setup are as follows: one gold or platinum conducting wire, one P-775 or P-875 MicroTee (this page), one MicroTight Tubing Sleeve (page 19) for the conducting wire (as needed to accommodate wire diameter), and at least two more MicroTight Tubing Sleeves (page 19) to connect your capillary tubing.

To set up a similar connection, first thread your wire through the appropriate tubing sleeve, if necessary, with the wire extending beyond both ends of the sleeve. Slip the female nut included with the MicroTee over the wire or sleeved wire, followed by the ferrule — ensuring the wire (and its sleeve) extends well past the end of the ferrule tip. Align the tip of the wire with the thru-hole of the MicroTee and gently insert the wire until it bottoms out. Now finger tighten the female nut into place. Attach your flow path tubing to the MicroTee's two other available ports, following the instructions provided with the MicroTee.

Begin fluid flow through the tee and apply voltage to the conducting wire lead. This setup typically provides effective electrospray ionization in applications having a flow rate of 100 µL/min or greater.

[1] *One such paper describing pioneering electrospray work:* ***Protein Identification at the Low Femtomole Level from Silver-Stained Gels Using a New Fritless Electrospray Interface for Liquid Chromatography-Microspray and Nanospray Mass Spectrometry.*** *Christine L. Gatlin, Gerd R. Kleemann, Lara G. Hays, Andrew J. Link, John R. Yates III (1998) Analytical Biochemistry 263, 93-101.*

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	MICROTEE, MICROCROSS AND MICROELBOW						
★	**P-775**	PEEK MicroTee for MicroTight Sleeves	5/16-24 Coned	(3) F-172, (3) P-416	0.006" (0.150 mm)	29 nL	4,000 psi (276 bar)
★	**P-777**	PEEK MicroCross for MicroTight Sleeves	5/16-24 Coned	(4) F-172, (4) P-416	0.006" (0.150 mm)	38 nL	4,000 psi (276 bar)
	P-875	PEEK MicroTee with Mounting Hole, for MicroTight Sleeves	5/16-24 Coned	(3) F-172, (3) P-416	0.006" (0.150 mm)	29 nL	4,000 psi (276 bar)
★	**P-885**	PEEK MicroTee for 1/32" OD Tubing	5/16-24 Coned	(3) F-112, (3) P-416	0.006" (0.150 mm)	29 nL	5,000 psi (345 bar)
	P-887	PEEK MicroCross for 1/32" OD Tubing	5/16-24 Coned	(4) F-112, (4) P-416	0.006" (0.150 mm)	38 nL	5,000 psi (345 bar)
★	**P-888**	PEEK MicroTee for 360 µm OD Tubing	5/16-24 Coned	(3) F-152, (3) P-416BLK	0.006" (0.150 mm)	29 nL	5,000 psi (345 bar)
	P-889	PEEK MicroCross for 360 µm OD Tubing	5/16-24 Coned	(4) F-152, (4) P-416BLK	0.006" (0.150 mm)	38 nL	5,000 psi (345 bar)
★	**P-890**	PEEK MicroTee for 1/16" OD Tubing	5/16-24 Coned	(3) F-132, (3) P-416	0.006" (0.150 mm)	58 nL	5,000 psi (345 bar)
	P-891	PEEK MicroCross for 1/16" OD Tubing	5/16-24 Coned	(4) F-132, (4) P-416	0.006" (0.150 mm)	81 nL	5,000 psi (345 bar)

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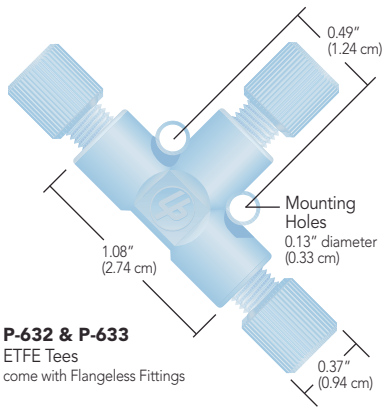
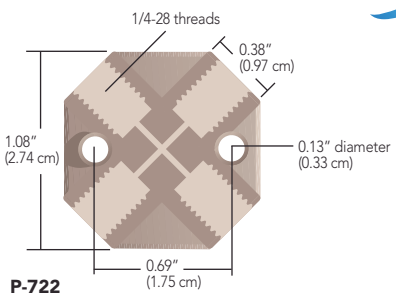
Low Pressure Tees & Crosses

Upchurch Scientific® Low Pressure Tees and Crosses manufactured by IDEX Health & Science are available in two inert polymers and can handle pressures to 500 psi (34 bar) or 1,000 psi (69 bar), depending upon the configuration of the products. Each is designed with handy mounting holes. All ETFE Tees and Crosses ship complete with 1/4-28 PFA Flangeless nuts and ETFE ferrules, while their PEEK polymer counterparts ship with 1/4-28 PEEK nuts and ETFE ferrules. Replacement fittings are located on pages 25 and 26.



P-632 & P-633
ETFE Tees
come with Flangeless Fittings



P-722
PEEK Cross
comes with Flangeless Fittings

Biocompatible

NOTE

- To order just the body of one of our tees and crosses without fittings, simply add a '-01' to the part number — e.g., P-632-01.

RELATED PRODUCTS

- Seal off unused ports with any of our 1/4–28 flat-bottom plugs found on page 32.
- To use the PEEK polymer versions of our Tees and Crosses in higher pressure applications, simply replace the provided fittings with Super Flangeless™ Nuts and Ferrules, found on pages 21–23.
- High Pressure Tees, Crosses, and a 7-Port Manifold (all with 10-32 threaded ports) are on page 43.

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
★	**P-632**	ETFE Tee for 1/16" OD Tubing	1/4-28 Flat-Bottom	(3) P-245, (3) P-200N	0.020" (0.50 mm)	2.9 µL	1,000 psi (69 bar)
★	**P-633**	ETFE Tee for 1/8" OD Tubing	1/4-28 Flat-Bottom	(3) P-345, (3) P-300N	0.050" (1.25 mm)	17.5 µL	500 psi (34 bar)
	P-634	ETFE Cross for 1/16" OD Tubing	1/4-28 Flat-Bottom	(4) P-245, (4) P-200N	0.020" (0.50 mm)	3.8 µL	1,000 psi (69 bar)
	P-635	ETFE Cross for 1/8" OD Tubing	1/4-28 Flat-Bottom	(4) P-345, (4) P-300N	0.050" (1.25 mm)	22.8 µL	500 psi (34 bar)
★	**P-712**	PEEK Tee for 1/16" OD Tubing	1/4-28 Flat-Bottom	(3) XP-235	0.020" (0.50 mm)	2.9 µL	1,000 psi (69 bar)
★	**P-713**	PEEK Tee for 1/8" OD Tubing	1/4-28 Flat-Bottom	(3) XP-335	0.050" (1.25 mm)	17.5 µL	500 psi (34 bar)
★	**P-714**	PEEK Tee for 1/16" OD Tubing	1/4-28 Flat-Bottom	(3) XP-235	0.040" (1.00 mm)	11.4 µL	1,000 psi (69 bar)
	P-722	PEEK Cross for 1/16" OD Tubing	1/4-28 Flat-Bottom	(4) XP-235	0.020" (0.50 mm)	3.8 µL	1,000 psi (69 bar)
	P-723	PEEK Cross for 1/8" OD Tubing	1/4-28 Flat-Bottom	(4) XP-335	0.050" (1.25 mm)	22.8 µL	500 psi (34 bar)

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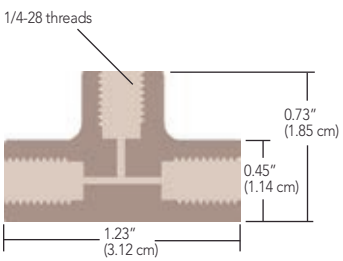
Manifolds

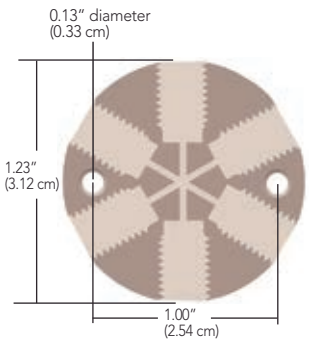
Choose a 5, 7, or 9 Port Manifold to combine several streams into one, or split one fluid stream into several. Each PEEK manifold comes complete with 1/4-28 Super Flangeless™ Fittings for either 1/16" or 1/8" OD tubing, with pressure ratings of 2,000 psi (138 bar) and 500 psi (34 bar), respectively.

A few useful applications include:

- Multiport mixing chamber
- Gas sparging splitting union
- Sample injection onto multi-well plates or a multiple direction flow path union



Side View



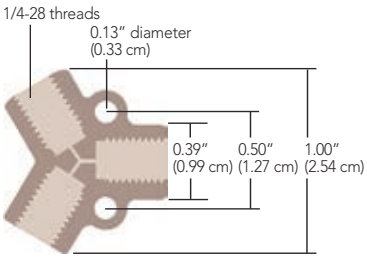
Top View

P-150
PEEK 7-Port Manifold
comes with Super Flangeless Fittings

Y Connectors

Upchurch Scientific® PEEK Y Connectors are designed to split a stream or join two streams together, just like a tee. However, the configuration of a tee can lead to turbulent flow and solvent outgassing, which increases baseline noise and reduces sensitivity. The geometry of a Y connector creates less turbulence and thus can improve analytical results.

All of these Y Connectors use 1/4-28 Flangeless fittings, except P-515 which uses 5/16-24 fittings (to accommodate larger tubing).



P-512
PEEK Y
comes with Flangeless Fittings

Biocompatible

	Part No.	Description	Threads	Includes	Thru-hole	Swept Volume	Pressure Rating
	MANIFOLDS						
	Standard						
★	**P-150**	PEEK 7-Port Manifold for 1/16" OD Tubing	1/4-28 FB	(7) P-255, (7) P-250	0.040" (1.00 mm)	42.0 µL	1,000 psi (69 bar)
	P-154	PEEK 5-Port Manifold for 1/16" OD Tubing	1/4-28 FB	(5) P-255, (5) P-250	0.040" (1.00 mm)	22.3 µL	1,000 psi (69 bar)
	P-155	PEEK 5-Port Manifold for 1/8" OD Tubing	1/4-28 FB	(5) P-331, (5) P-359	0.062" (1.60 mm)	53.8 µL	500 psi (34 bar)
★	**P-190**	PEEK 9-Port Manifold for 1/8" OD Tubing	1/4-28 FB	(9) P-331, (9) P-359	0.062" (1.60 mm)	160 µL	500 psi (34 bar)
	P-191	PEEK 9-Port Manifold for 1/16" OD Tubing	1/4-28 FB	(9) P-255, (9) P-250	0.040" (1.00 mm)	139 µL	1,000 psi (69 bar)
	Y CONNECTORS						
★	**P-512**	PEEK Y for 1/16" OD Tubing	1/4-28 FB	(3) XP-235	0.020" (0.50 mm)	1.7 µL	1,000 psi (69 bar)
	P-513	PEEK Y for 1/8" OD Tubing	1/4-28 FB	(3) XP-335	0.040" (1.00 mm)	6.0 µL	500 psi (34 bar)
★	**P-514**	PEEK Y for 1/8" OD Tubing	1/4-28 FB	(3) XP-335	0.060" (1.50 mm)	13.6 µL	500 psi (34 bar)
	P-515	PEEK Y for 3/16" OD Tubing	5/16-24 FB	(3) XP-132	0.125" (3.20 mm)	47.7 µL	500 psi (34 bar)

FB = Flat-Bottom

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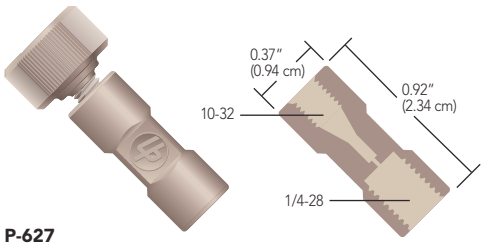
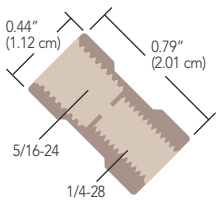
Threaded Adapters

- Threaded adapters in a variety of configurations
- Both English and Metric threaded adapters offered
- Bring together connectors with different threads
- Manufactured from inert polymers — PEEK, PCTFE, ETFE, and PTFE

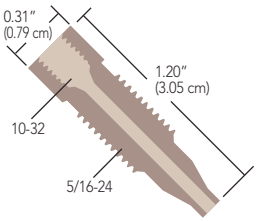
English Threaded Adapters



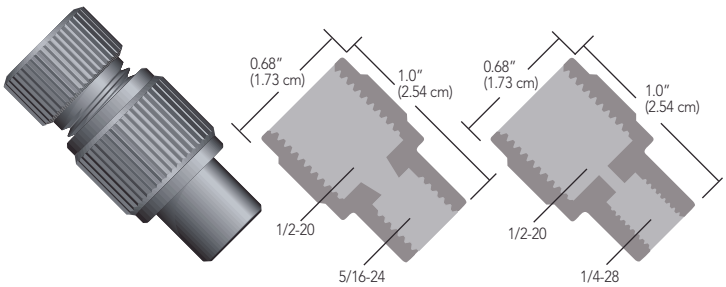
P-627
0.020" (0.50 mm) thru-hole
Includes (1) F-300 for 1/16" OD tubing



P-135
0.080" (2.05 mm) thru-hole

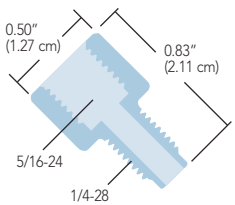


6000-076
0.066" (1.70 mm) thru-hole

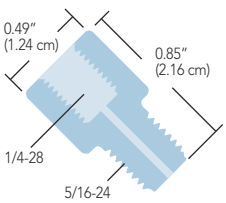


U-659
Tapered thru-hole
Includes (1) U-650/U-655
for 1/4" OD tubing

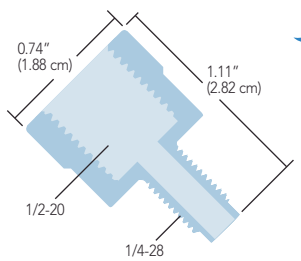
U-665
0.063" (1.60 mm) thru-hole
Includes (1) U-650/U-655
for 1/4" OD tubing



P-681
0.125" (3.20 mm) thru-hole



P-718
0.040" (1.00 mm) thru-hole



P-684
0.130" (3.30 mm) thru-hole

Biocompatible

RELATED PRODUCTS

- Please refer to our Connections Reference Chart on page 35 for assistance with choosing the right product for your needs.
- Use the Rheodyne® 6000-076 Adapter to connect 1/16" OD tubing to the Rheodyne Preparative-Scale Injector Valve (page 132).

Part No.	Description	Includes	Thru-hole	Swept Volume	Pressure Rating
ENGLISH THREADED ADAPTERS					
6000-076	PEEK Adapter, 5/16-24 C, M to 10-32 C, F	N/A	0.066" (1.70 mm)	49.8 µL	3,000 psi (207 bar)
P-135	PEEK Adapter, 5/16-24 FB, F to 1/4-28 F	N/A	0.080" (2.05 mm)	4.1 µL	1,000 psi (69 bar)
★ **P-627**	PEEK Adapter, 10-32 C, F to 1/4-28 FB, F	(1) F-300	0.020" (0.50 mm)	0.30 µL	1,000 psi (69 bar)
★ **P-681**	PCTFE Adapter, 5/16-24 FB, F to 1/4-28 FB, M	N/A	0.125" (3.20 mm)	96.6 µL	1,000 psi (69 bar)
P-684	PCTFE Adapter, 1/2-20 FB, F to 1/4-28 FB, M	N/A	0.130" (3.30 mm)	121.7 µL	250 psi (17 bar)
P-718	PCTFE Adapter, 5/16-24 FB, M to 1/4-28 FB, F	N/A	0.040" (1.00 mm)	10.3 µL	1,000 psi (69 bar)
U-659	PEEK Adapter, 5/16-24 FB, F to 1/2-20 FB, F	(1) XU-655	Tapered*	42.0 µL	250 psi (17 bar)
U-665	PEEK Adapter, 1/2-20 FB, F to 1/4-28 FB, F	(1) XU-655	0.063" (1.60 mm)	6.6 µL	250 psi (17 bar)

F = Female (internal) threads; M = Male (external) threads; C = Coned; FB = Flat-Bottom
** Thru-hole tapers from 0.188" (4.80 mm) to 0.125" (3.20 mm).*

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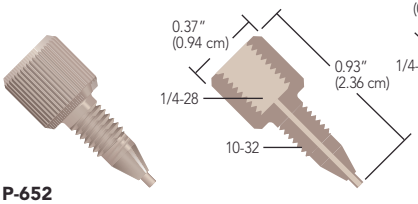
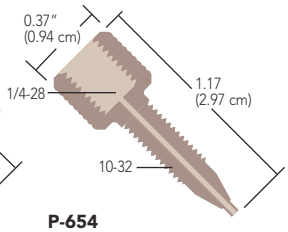
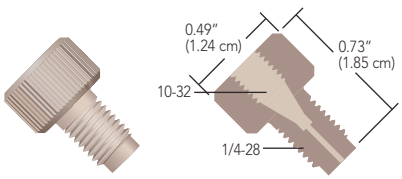
English Threaded Adapters, cont.



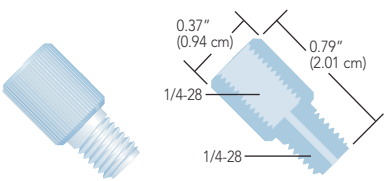
P-652
0.030" (0.75 mm) thru-hole
Note the new knurled design



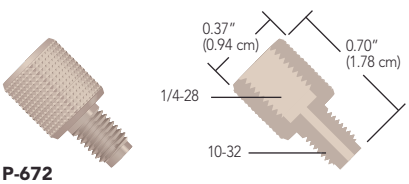
P-654
Extra Long, 0.030"
(0.76 mm) thru-hole



P-669-01
0.040" (1.00 mm) thru-hole



P-671
0.040" (1.00 mm) thru-hole



P-672
0.050" (1.25 mm) thru-hole

Biocompatible

APPLICATION NOTE

Here are application ideas using two of our popular adapters:

- Many injection valves used in HPLC systems have 10-32 coned ports designed to accept 1/16" OD tubing. However, this may be a problem if large injection volumes are required (in excess of 10 mL). The most popular loops for large volume samples are made from 1/8" OD tubing, making it impossible to connect these larger volume loops to your injection valve. The solution: use our P-654 Adapter and the appropriate fittings for your sample loop. This set-up allows connection of 1/8" OD sample loop leads to your injection valve.
- Another potential application is connecting tubing to low-pressure solenoid valves with 1/4-28 flat-bottom ports. Most low-pressure valves of this type have very shallow threaded ports, which typically preclude the use of our Flangeless Fittings. However, by first threading our P-671 Adapter into the valve port(s), you can effectively use standard 1/4-28 fittings to connect your tubing into the backside of the adapter body. This also saves "wear and tear" on the threads in the valve ports.

NOTE

- When using an adapter with male (external) threads, we recommend you first attach the adapter body into the receiving port, and then connect your tubing and fitting into the head of the adapter body.

RELATED PRODUCTS

- You may not need an adapter to connect 1/16" OD tubing into your flat-bottom port. A less expensive alternative is to use a Flangeless Nut and Ferrule starting on page 24 or a Super Flangeless™ Nut and Ferrule starting on page 21. Our Connections Reference chart on page 35 is also a good resource to consult when making connections.

	Part No.	Description	Includes	Thru-hole	Swept Volume	Pressure Rating
	ENGLISH THREADED ADAPTERS					
★	**P-652**	PEEK Adapter, 1/4-28 FB, F to 10-32 C, M	N/A	0.030" (0.75 mm)	6.7 µL	1,000 psi (69 bar)
★	**P-654**	PEEK Adapter, 1/4-28 FB, F to 10-32 C, M, Extra Long	N/A	0.030" (0.75 mm)	9.5 µL	1,000 psi (69 bar)
★	**P-669-01**	PEEK Adapter, 10-32 C, F to 1/4-28 FB, M	N/A	0.040" (1.00 mm)	6.6 µL	1,000 psi (69 bar)
	P-671	PTFE Adapter, 1/4-28 FB, F to 1/4-28 FB, M	N/A	0.040" (1.00 mm)	8.0 µL	1,000 psi (69 bar)
	P-672	PEEK Adapter, 1/4-28 FB, F to 10-32 FB, M	N/A	0.050" (1.25 mm)	11.4 µL	1,000 psi (69 bar)

F = Female (internal) threads; M = Male (external) threads; XL = extra long; C = Coned; FB = Flat-Bottom
** The pressure ratings of these adapters exceed the pressure holding ability of the fittings and tubing used with them.*

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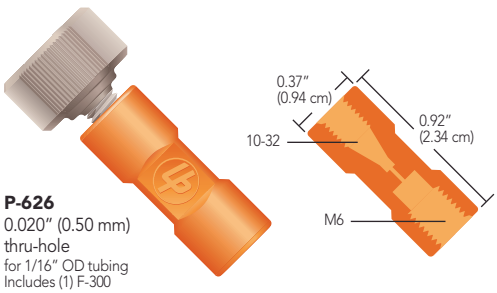
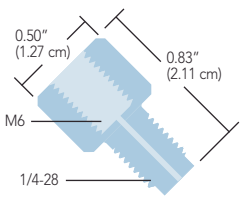
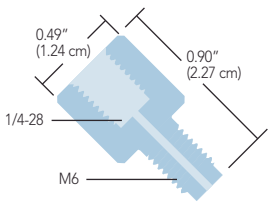
Metric Threaded Adapters



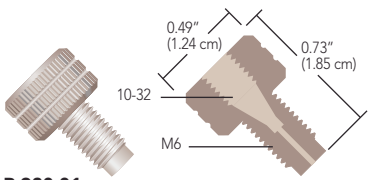
P-626
0.020" (0.50 mm) thru-hole
for 1/16" OD tubing
Includes (1) F-300



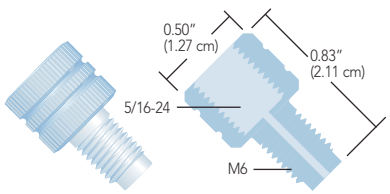
P-670
0.030" (0.75 mm) thru-hole



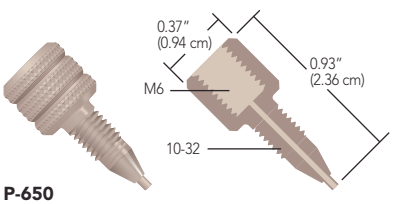
P-694
0.040" (1.00 mm) thru-hole



P-920-01
0.040" (1.00 mm) thru-hole



P-673
0.040" (1.00 mm) thru-hole



P-650
0.030" (0.75 mm) thru-hole

RELATED PRODUCTS

- For an alternative to the Female M6 Adapters presented in the left column of this page, try a P-602 or P-622 Low Pressure Metric Union from page 40, along with the appropriate Metric Flangeless Fittings on page 27.
- To direct connect your tubing into a flat-bottom port, find the appropriate Flangeless or Super Flangeless™ Fittings on pages 24–27 and 21–23 respectively.
- Need metric fittings for your connections? See page 27.

Part No.	Description	Includes	Thru-hole	Swept Volume	Pressure Rating
METRIC M6 THREADED ADAPTERS					
P-626	PEEK Adapter, 10-32 C, F to M6 FB, F	(1) F-300	0.020" (0.50 mm)	0.3 µL	1,000 psi (69 bar)
★ **P-650**	PEEK Adapter, M6 FB, F to 10-32 C, M Standard	N/A	0.030" (0.75 mm)	6.7 µL	1,000 psi (69 bar)
P-670	PCTFE Adapter, M6 FB, F to 1/4-28 FB, M	N/A	0.030" (0.75 mm)	2.6 µL	1,000 psi (69 bar)
P-673	PCTFE Adapter, 5/16-24 FB, F to M6 FB, M	N/A	0.040" (1.00 mm)	9.9 µL	1,000 psi (69 bar)
P-694	PCTFE Adapter, 1/4-28 FB, F to M6 FB, M	N/A	0.040" (1.00 mm)	11.3 µL	1,000 psi (69 bar)
P-920-01	PEEK Adapter, 10-32 C, F to M6 FB, M	N/A	0.040" (1.00 mm)	8.0 µL	1,000 psi (69 bar)

F = Female (internal) threads; M = Male (external) threads; C = Coned; FB = Flat-Bottom
** The pressure rating of this adapter exceeds the pressure holding ability of the fittings and tubing used with it.*

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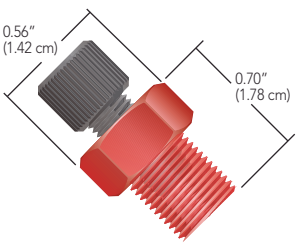
External National Pipe Thread Adapters

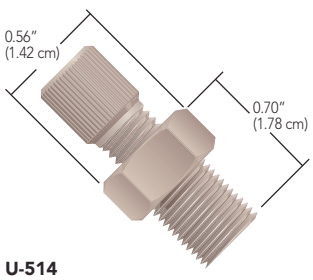
These adapters make connections to female 1/8″ and 1/4″ National Pipe Thread (NPT) ports.

Manufactured from PEEK polymer by IDEX Health & Science, Upchurch Scientific® NPT Adapters are durable and chemically resistant. We provide versions with either 1/4-28 or 5/16-24 flat-bottom threads, suitable for most low pressure applications.

Please Note: Wrap the threads on the NPT side of these adapters with thread seal tape (plumber's tape) to ensure a leak-free seal.



U-510
1/8″ NPT to 1/4-28 Flat-Bottom Female Adapter
for 1/8″ OD tubing
Includes (1) XP-308 Fitting



U-514
1/8″ NPT to 5/16-24 Flat-Bottom Female Adapter
for 3/16″ OD tubing
Includes (1) XP-132 Fitting

Biocompatible

APPLICATION NOTE

Our U-500 and U-510 NPT Adapters are great for attaching 1/8″ OD fluoropolymer sparging lines to sparging gas tank regulating valves. Simply thread the appropriately-sized NPT Adapter into the valve's receiving port and then attach your sparging tubing to the adapter body using the fittings provided.

RELATED PRODUCTS

Replacement fittings for these adapters are located on the pages indicated below:

	Page(s)
1/4-28 for 1/8″ OD tubing	26
5/16-24 for 1/8″ OD tubing	23, 30
5/16-24 for 3/16″ OD tubing	30

Other tubing/fitting combinations are available. For more information, please contact your local Distributor or IDEX Health & Science directly.

Part No.	Description	Color	Tubing OD	Includes	Thru-hole	Swept Volume	Pressure Rating
1/8″ MALE NPT ADAPTERS							
★ **U-510**	PEEK 1/8″ NPT, M to 1/4-28 FB, F Adapter	Red	1/8″	(1) XP-308	0.062″ (1.60 mm)	17.3 µL	500 psi (34 bar)
U-514	PEEK 1/8″ NPT, M to 5/16-24 FB, F Adapter	Natural	3/16″	(1) XP-132	0.125″ (3.2 mm)	70.4 µL	500 psi (34 bar)
1/4″ MALE NPT ADAPTERS							
U-500	PEEK 1/4″ NPT, M to 1/4-28 FB, F Adapter	Red	1/8″	(1) XP-308	0.062″ (1.60 mm)	17.3 µL	500 psi (34 bar)
U-504	PEEK 1/4″ NPT, M to 5/16-24 FB, F Adapter	Natural	3/16″	(1) XP-132	0.125″ (3.2 mm)	70.4 µL	500 psi (34 bar)

F = Female (internal) threads; M = Male (external) threads; FB = Flat-Bottom

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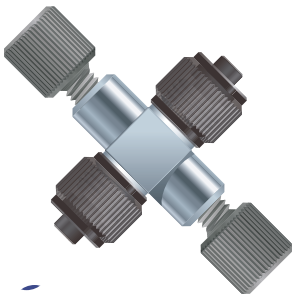
MicroTight Adapters

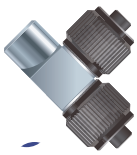
- Convenient adapters for common 1/16" OD to capillary tubing
- Direct connect to 1/32" OD or 360 µm OD tubing options available
- VHP adapters pressure rated to 12,000 psi (828 bar)

Create a true zero dead volume (ZDV) connection between 1/16" OD tubing and capillary tubing with these Upchurch Scientific® MicroTight Adapters.

For Very High Pressure applications the UH-630 will connect 1/16" OD to 1/32" OD tubing in an inline true ZDV connection with the ability to withstand 12,000 psi (828 bar)! The materials of construction also allow this product to be used up to 200 °C, which reduces the pressure rating to 8,000 psi (552 bar). For more information on the fittings used with the VHP adapter, please see page 9.

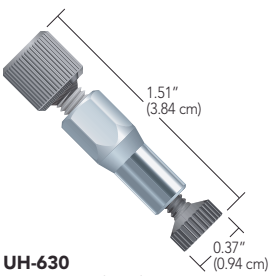


UH-906
VHP MicroTight Adapting Cross
10-32 Coned for 1/16" OD tubing and 5/16-24 Coned for 360 µm OD tubing



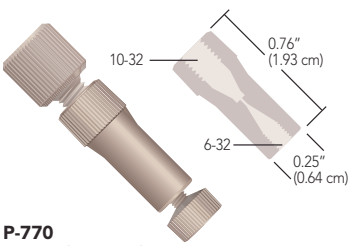
UH-753
VHP MicroTight Adapting Tee
360 µm (2 ports) to 10-32 C for 1/16" OD tubing (1 port)

UH-631-01
VHP MicroTight Adapter
10-32 Coned for 1/16" OD tubing and 6-40 Coned for 1/32" OD tubing fittings not included



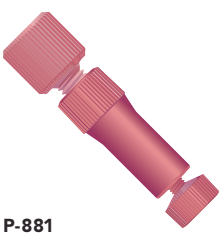
UH-630
VHP MicroTight Adapter
for 1/16" and 1/32" OD tubing with fittings included

UH-634
VHP MicroTight Adapter
for 1/16" and 360 µm OD tubing with fittings included

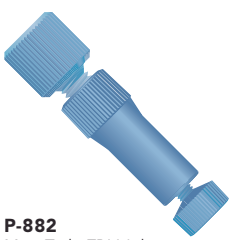


P-770
MicroTight ZDV Adapter
for 1/16" OD to MicroTight Sleeves with fittings included

1958-01
VHP MicroTight Adapter
10-32 Coned for 1/16" OD tubing and M4x0.7 for 1/32" OD tubing



P-881
MicroTight ZDV Adapter
for 1/16" to 1/32" OD tubing with fittings included



P-882
MicroTight ZDV Adapter
for 1/16" to 360 µm OD tubing with fittings included

NOTE

While many 10-32 coned fittings are interchangeable, coned fittings using different threads are generally not interchangeable. As such, IDEX Health & Science recommends that only the style of coned fittings that accompanies these connectors be used for replacements.

RELATED PRODUCTS

- Replacement 6-32 fittings are on page 54.
- Replacement F-120 style nuts are on page 11 (when ordering, replace the "x" with an "R" or "B" to order either red or blue fittings).
- Use this list to find micro flow products outside this chapter.

	Page
360 µm, 510 µm (0.020"), and 1/32" OD PEEK Tubing	67
360 µm OD Fused Silica Tubing	67
1/16" and 1/32" OD PEEKsil™ Tubing	68
1/32" OD FEP Tubing	71
360 µm OD High Purity PFA Tubing	72
510 µm (0.020") and 1/32" OD Stainless Steel Tubing	64
Polymer Capillary and Fused Silica Tubing Cutters	74
Rheodyne® MX Series II™ Injection and Switching Valves	130
Rheodyne Manual Injection Valves	132
Micro Injection Port Adapters	143
Micro-Splitter Valves	146
Micro-Metering Valves	147
Microbore Guard Column	172
Ultra-Low Volume Back-Pressure Regulators	154
Nonmetallic 10-32 Micro-Volume Inline Check Valve	149
Ismatec® Peristaltic Tubing Pumps	92

	Part No.	Description	Threads	Includes	Color	Swept Volume	Pressure Rating
	MICROTIGHT ADAPTERS						
★	**P-770**	PEEK Micro Adapter, True ZDV, for 1/16" OD Tubing to MicroTight Tubing Sleeve	10-32 C to 6-32 C	(1) F-120, (1) F-125, (1) P-554	Natural	N/A	4,000 psi (276 bar)
	P-881	PEEK Micro Adapter, True ZDV, for 1/16" to 1/32" OD Tubing	10-32 C to 6-32 C	(1) F-120R, (1) F-126S, (1) P-554	Red	N/A	5,000 psi (345 bar)
★	**P-882**	PEEK Micro Adapter, True ZDV, for 1/16" to 360 µm OD Tubing	10-32 C to 6-32 C	(1) F-120B, (1) F-124S, (1) P-554	Blue	N/A	5,000 psi (345 bar)
	UH-630	Stainless Steel VHP Micro Adapter, for 1/16" to 1/32" OD Tubing	10-32 C to 6-32 C	(1) PK-120BLK, (1) PK-126, (1) P-554	SST/Black	N/A	12,000 psi (827 bar)
NEW!	**UH-634**	Stainless Steel VHP Micro Adapter, for 1/16" to 360 µm OD Tubing	10-32 C to 6-32 C	(1) PK-120BLK, (1) PK-124, (1) P-554	SST/Black	N/A	12,000 psi (827 bar)
NEW!	**UH-753**	Stainless Steel VHP Micro Adapting Tee, for 1/16" to 360 µm OD Tubing	10-32 C to 5/16-24 C	(2) P-416BLK, (2) PK-152	SST/Black	152 nL	15,000 psi (1,035 bar)*
NEW!	**1958-01**	Stainless Steel VHP Micro Adapter, for 1/16" to 1/32" OD Tubing	10-32 C to M4x0.7 C	N/A	SST	16 nL	30,000 psi (2,070 bar)*
NEW!	**UH-631-01**	Stainless Steel VHP Micro Adapter, for 1/16" to 1/32" OD Tubing	10-32 C to 6-40 C	N/A	SST	13 nL	30,000 psi (2,070 bar)*
NEW!	**UH-906**	Stainless Steel VHP Micro Adapting Cross, for 1/16" to 360 µm OD Tubing	10-32 C to 5/16-24 C	(2) PK-120BLK, (2) P-416BLK, (2) PK-152	SST/Black	0.11 µL	15,000 psi (1,035 bar)*
	REPLACEMENT GAUGE PLUGS (TO ACHIEVE TRUE ZDV CONNECTIONS WITH THE ABOVE ADAPTERS)						
	P-554	Delrin® Gauge Plug	10-32 C		White	N/A	N/A

C = Coned
** Pressure rating depends upon the fitting used.*

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NanoPort Assemblies

- For lab-on-a-chip applications
- Options to connect 360 µm, MicroTight® tubing sleeves, 1/32″ OD or 1/16″ OD tubing
- Wetted materials: PEEK and perfluoroelastomer

Upchurch Scientific® NanoPort Assemblies provide consistent fluid connections for chip-based analyses. Once attached, NanoPort connections can withstand pressures to 1,000 psi (69 bar).* NanoPorts will adhere to silicon, quartz, glass and some polymers.

All NanoPort components are made of inert, biocompatible PEEK polymer (nuts and ports) and Perlast® perfluoroelastomer (ferrules and gaskets). These products bond easily to chip surfaces with the provided Preformed Adhesive Rings (see Application Note below). Their unique design also prevents adhesive contamination of the fluid path. And NanoPort connections add no additional volume to the fluid path, virtually eliminating dead volume traditionally associated with chip-based fluid connections.

Our NanoPort Reservoir Assembly is designed for open well applications, such as CE.

**Except the N-333 NanoPort Assembly, which is rated to 500 psi (34 bar).*

APPLICATION NOTE

NanoPort Adhesive Cure Requirements

- Preformed Adhesive Rings (included with each order).

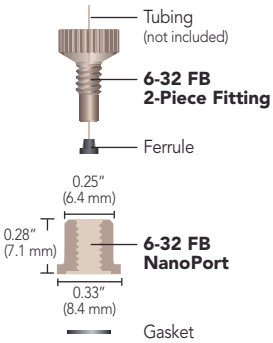
Cure Temperature	Cure Time
165–177 °C (330–350 °F)	1 hour

- Place clamped Ports in oven at a temperature of 165–177 °C (330–350 °F) for one hour to develop a complete bond between the Port and the substrate.
- Due to differences in thermal expansion rates, IDEX Health & Science does not recommend the use of the Preformed Adhesive Rings when connecting NanoPorts to metal substrates. For information on this, for information regarding the adherence of NanoPorts to other polymer substrates, or for information on other adhesive options, please contact us or your authorized Distributor directly.

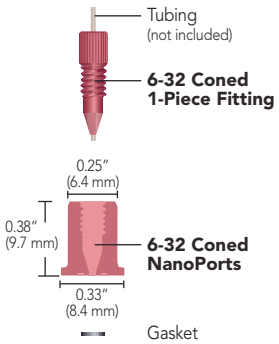
NanoPort Reservoir Applications

- Sample reservoir.
- Open wells for capillary electrophoresis.
- Syringe injection or flushing/priming, using our P-604 Luer Adapter, page 55, and luer syringe (such as our B-310) on page 55.

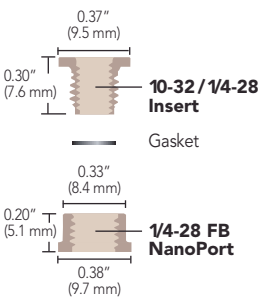
6-32 Flat-Bottom Assemblies



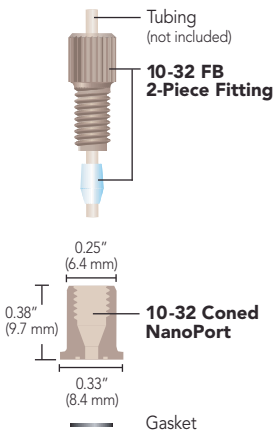
6-32 Coned Assemblies



Reservoir Assembly



10-32 Coned Assembly



See following page for replacement parts

Part No.	Nut	Ferrule	For Chip Hole (dia. x depth)	For Tubing OD	Qty.
NANOPORT ASSEMBLIES					
6-32 Flat-Bottom NanoPort Assemblies					
N-121S	F-123S	N-123-04	0.04″ x 0.04″ (1.0 mm x 1.0 mm)	360 µm	ea.
N-123H	F-123H	N-123-03	0.04″ (1.0 mm) dia. or less	360 µm	ea.
N-123S	F-123S	N-123-03	0.04″ (1.0 mm) dia. or less	360 µm	ea.
6-32 Coned NanoPort Assemblies					
N-124S	F-124S	None	Up to 0.063″ (1.6 mm)	360 µm	ea.
N-125S	F-125	None	Up to 0.063″ (1.6 mm)	70–520 µm[1]	ea.
N-126H	F-126H	None	Up to 0.063″ (1.6 mm)	1/32″	ea.
N-126S	F-126S	None	Up to 0.063″ (1.6 mm)	1/32″	ea.
10-32 Coned NanoPort Assembly					
★ **N-333**	F-333N	F-142N	Up to 0.063″ (1.6 mm)	1/16″	ea.
NanoPort Reservoir Assembly					
N-131	80 µL Reservoir with Insert				ea.

[1] Designed to use our MicroTight® Tubing Sleeves (page 19) to connect tubing OD sizes from 70–520 µm.

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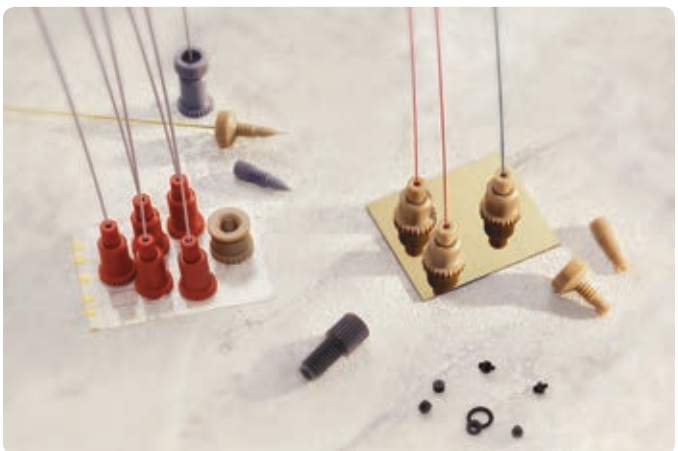
NanoPort Assemblies (cont.)



NOTE

To select the appropriate NanoPort assembly you will need to consider:

- Size of tubing you are connecting
- Dimensions of the chip hole
- Fitting style (one-piece or two-piece fittings)
- Nut head style (standard or headless nut)

Please Note: Each NanoPort Assembly includes a fitting (one- or two-piece), a NanoPort, gasket, a 2-pack of preformed adhesive rings, and a clamp for holding the port in place while the adhesive cures.

Full NanoPort Assemblies can be found on the previous page

	Part No.	Description	Threads	For Chip Hole	Tubing OD	Qty.
	NANOPORT REPLACEMENT PARTS					
	Fittings					
	F-123Hx	Headless Nuts	6-32 FB	N/A	360 µm	10-pk
	F-123Sx	Standard Head Nuts	6-32 FB	N/A	360 µm	10-pk
	F-124Sx	Standard Head Fittings	6-32 C	N/A	360 µm	10-pk
★	**F-125x**	Standard Head Fittings	6-32 C	N/A	70–520 µm[1]	10-pk
	F-126Hx	Headless Fittings	6-32 C	N/A	1/32"	10-pk
	F-126Sx	Standard Head Fittings	6-32 C	N/A	1/32"	10-pk
	F-333Nx	Headless Fittings	10-32 C	Up to 0.063" (1.6 mm)	1/16"	10-pk
	F-142Nx	Ferrules	10-32 C	Up to 0.063" (1.6 mm)	1/16"	10-pk
★	**N-123-03x**	Ferrules	6-32 FB	0.04" (1.0 mm) dia. or less	360 µm	10-pk
★	**N-123-04x**	Ferrules	6-32 FB	0.04" x 0.04" (1.0 mm x 1.0 mm)	360 µm	10-pk
	N-123-05x	Ferrules	6-32 FB	0.04" x 0.06" (1.0 mm x 1.5 mm)	360 µm	10-pk
	Gaskets					
	N-123-02	Gasket, For all assemblies *except* 6-32 Coned Assemblies		N/A	N/A	ea.
	N-124-02	Gasket, For 6-32 Coned Assemblies		N/A	N/A	ea.
	Adhesives and Clamp					
	N-006	Clamp		N/A	N/A	ea.
★	**N-100-01**	Preformed Adhesive Rings		N/A	N/A	2-pk

[1] Designed to use our MicroTight® Tubing Sleeves (page 19) to connect tubing OD sizes from 70–520 µm.
Abbreviation Definitions: FB = Flat-Bottom; C = Coned; N/A = Not Applicable

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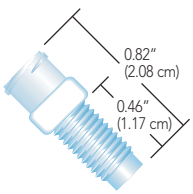
Quick Connect Luer Adapters

- Delrin®, polypropylene, ETFE, or PEEK Versions
- Adapts luers to 1/4-28, 10-32, 5/16-24, or M6 threaded ports

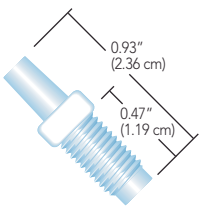
These luer adapters were designed to work in a variety of applications. By connecting any male luer to any female luer, you can create your own quick connect union or adapter. Each Upchurch Scientific® Quick Connect Luer Adapter conforms to ISO requirements for medical luer taper configuration and performance (45 psi/3.1 bar).

Find fittings to connect tubing to the threaded ports of these adapters in the Fittings chapter, starting on page 4.

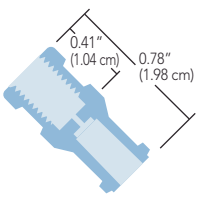
Please Note: Our Female Quick Connect Luer Adapters can be used with any of the Male Luers on this page, i.e., those with and without lock hubs.



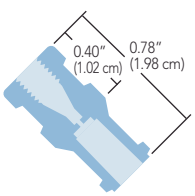
P-604, P-618, P-624
Female Luer to 1/4-28 Male
(luer end of P-604 different than shown)



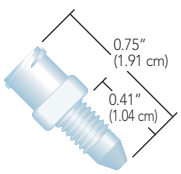
P-619, P-625
Male Luer to 1/4-28 Male



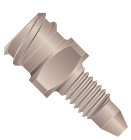
P-628
Female Luer to 1/4-28 Female



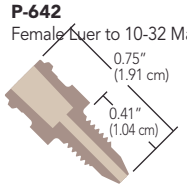
P-629
Female Luer to 10-32 Female

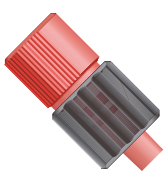


P-642
Female Luer to 10-32 Male

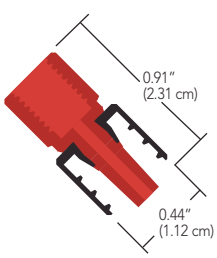


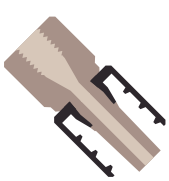
P-719
Female Luer to 10-32 Male



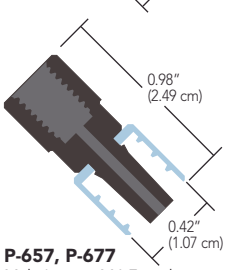


P-655, P-675
Male Luer to 1/4-28 Female

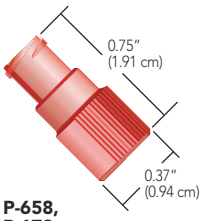




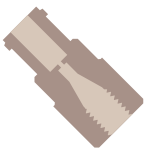
P-656
Male Luer to 10-32 Female



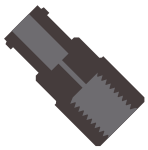
P-657, P-677
Male Luer to M6 Female



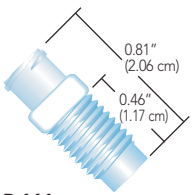
P-658, P-678
Female Luer to 1/4-28 Female



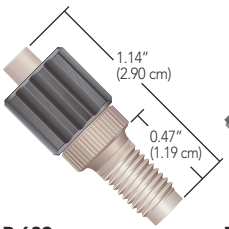
P-659
Female Luer to 10-32 Female



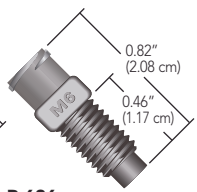
P-660, P-680
Female Luer to M6 Female



P-661
Female Luer to 5/16-24 Male



P-683
Male Luer to 1/4-28 Male



P-686
Female Luer to M6 Male

APPLICATION NOTE

- Our A-626 Bottle Cap Plug (page 159) can be used to plug any of the female luer adapters on this page.
- To prevent a chemical spill when disconnecting your solvent reservoir tubing from the pump, try our Quick-Stop Luer Check Valve on page 151.
- To economically prime an HPLC pump, simply remove the 10-32 fitting on the outlet check valve (standard on most models), insert a P-642 luer adapter, attach a syringe (such as our B-310) and draw the mobile phase through the pump head.

	Part No.	Description	Body Material	Lock Hub Material	Thru-hole
	QUICK CONNECT LUER ADAPTERS				
	P-604	F Luer to 1/4-28 FB, M	Nat. Delrin	N/A	0.05" (1.3 mm)
	P-618	F Luer to 1/4-28 FB, M	Nat. PP	N/A	0.05" (1.3 mm)
	P-619	M Luer to 1/4-28 FB, M	Nat. PP	None *	0.05" (1.3 mm)
★	**P-624**	F Luer to 1/4-28 FB, M	Nat. ETFE	N/A	0.05" (1.3 mm)
★	**P-625**	M Luer to 1/4-28 FB, M	Nat. ETFE	None *	0.04" (1.0 mm)
★	**P-628**	F Luer to 1/4-28 FB, F	Nat. ETFE	N/A	0.04" (1.0 mm)
	P-629	F Luer to 10-32 C, F	Nat. ETFE	N/A	0.04" (1.0 mm)
★	**P-642**	F Luer to 10-32 C, M	Nat. ETFE	N/A	0.05" (1.3 mm)
★	**P-655**	M Luer to 1/4-28 FB, F	Red PEEK	Black PEEK	0.04" (1.3 mm)
★	**P-656**	M Luer to 10-32 C, F	Nat. PEEK	Black PEEK	0.05" (1.3 mm)
	P-657	M Luer to M6 FB, F	Black PEEK	Black PEEK	0.05" (1.3 mm)
★	**P-658**	F Luer to 1/4-28 FB, F	Red PEEK	N/A	0.05" (1.3 mm)
★	**P-659**	F Luer to 10-32 C, F	Nat. PEEK	N/A	0.05" (1.3 mm)
	P-660	F Luer to M6 FB, F	Black PEEK	N/A	0.05" (1.3 mm)
	P-661	F Luer to 5/16-24 FB, M	Nat. ETFE	N/A	0.05" (1.3 mm)
★	**P-675**	M Luer to 1/4-28 FB, F	Red ETFE	Natural PP	0.05" (1.3 mm)
	P-677	M Luer to M6 FB, F	Black ETFE	Natural PP	0.05" (1.3 mm)
★	**P-678**	F Luer to 1/4-28 FB, F	Red ETFE	N/A	0.05" (1.3 mm)
	P-680	F Luer to M6 FB, F	Black ETFE	N/A	0.05" (1.3 mm)
★	**P-683**	M Luer to 1/4-28 FB, M	Nat. PEEK	Black PEEK	0.04" (1.0 mm)
★	**P-686**	F Luer to M6 FB, M	Black ETFE	N/A	0.05" (1.3 mm)
NEW!	**P-719**	F Luer to 10-32 C, M	Nat. PEEK	N/A	0.05" (1.3 mm)
	SYRINGE WITH MALE LUER LOCK				
	B-310	10 cc Disposable Luer-Lock Syringe For use with any Female Luer Adapter			0.05" (1.3 mm)

F = Female (internal) threads; M = Male (external) threads; Nat. = Natural; N/A = Not Applicable; PP = Polypropylene; FB = Flat-Bottom; C = Coned
** Slip-type male luer.*

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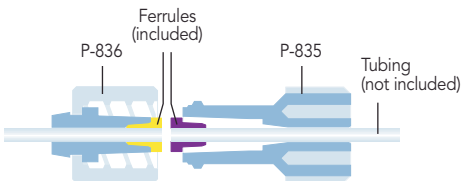
LuerTight™ Fittings

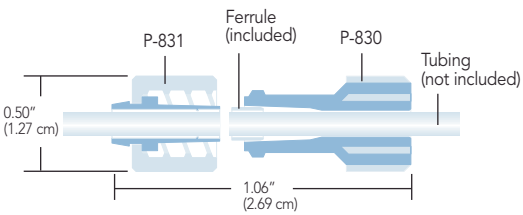
- Luer fittings for fluoropolymer tubing
- Quick disconnect and barbless
- For 1/16" and 1/8" OD tubing

Upchurch Scientific® LuerTight fittings are specifically designed to connect fluoropolymer tubing without barbs or nuts! By integrating ferrules into the luer bodies, LuerTights will reliably hold your tubing in place while giving you the convenience of a luer connection. An inline set of LuerTight fittings provides a quick and easy disconnection option. LuerTight connections are also less bulky and more economical than nut-to-luer style fittings.

The bodies of these products are manufactured from polypropylene and the ferrules, where used, are made of ETFE.



P-837
LuerTight Fittings System
for 1/16" OD tubing



P-838
LuerTight Fittings System
for 1/8" OD tubing

NOTE

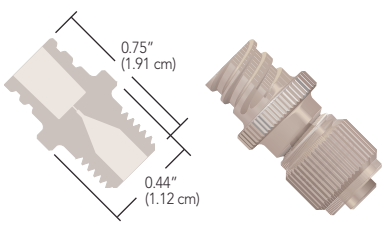
LuerTight fittings are designed to be used exclusively within the LuerTight family. Combining LuerTight fittings with non-LuerTight luer products may result in a poor connection.

Luer-To-MicroTight® Adapter

- Easily connect 360 µm OD tubing to a syringe

The Upchurch Scientific Luer-to-MicroTight Adapter is ideal for infusing sample into lab-on-a-chip devices. This product is made entirely of biocompatible PEEK polymer and introduces only 14 nL of additional volume to the flow path. Use it to directly connect a luer-tip syringe or other product that terminates with a standard male luer to 360 µm OD capillary tubing without tubing sleeves (see photo). MicroTight Fittings are included.

P-662 Luer-to-MicroTight Adapter, shown with a B-310 Syringe (page 55) and PEEK capillary tubing (page 67), not included.



P-662
Luer-To-MicroTight Adapter
for Luer to 360 µm OD tubing
with fittings included

Biocompatible

ORDER ONLINE

Part No.	Description	Includes	Thru-hole	Pressure Rating
LUERTIGHT FITTINGS SYSTEMS				
★ **P-837**	LuerTight System for 1/16" OD Tubing	(1) P-835, (1) P-836, (1) P-830T	N/A	100 psi (7 bar)
P-838	LuerTight System for 1/8" OD Tubing	(1) P-830, (1) P-831, (1) P-830T	N/A	100 psi (7 bar)
LUERTIGHT FITTING COMPONENTS				
P-830	Female Fitting for 1/8" OD Tubing	(1) Ferrule	N/A	N/A
P-830T	Set Plug to swage Ferrules into P-835 and P-830	N/A	N/A	N/A
P-831	Male Fitting for 1/8" OD Tubing	No Ferrule Required	N/A	N/A
P-835	Female Fitting for 1/16" OD Tubing	(1) Ferrule	N/A	N/A
P-836	Male Fitting for 1/16" OD Tubing	(1) Ferrule	N/A	N/A
LUER-TO-MICROTIGHT ADAPTER				
★ **P-662**	Luer-to-MicroTight Adapter	(1) F-152, (1) P-416	0.006" (0.150 mm)	45 psi (2.4 bar)

Female = internal receiving luer pocket; Male = external luer nose (surrounded by internally-threaded locking ring)

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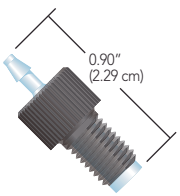
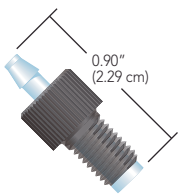
Swivel Barb Adapters

- Barb connection spins freely from the nut to prevent twist during installation
- Manufactured from polypropylene

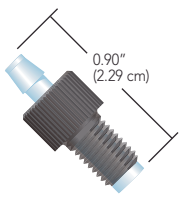
The new Swivel Barb Adapters from Upchurch Scientific® are made up of two captive pieces acting as a one-piece fitting for ease of use. Manufactured from polypropylene and available in three barb sizes, the Swivel Barb will facilitate connection between flexible tubing to a 1/4-28 flat-bottom port. The barbed insert spins freely from the threaded nut in order to prevent the tubing from twisting during installation.



D-646
1/4-28 to 1/16" ID tubing



D-647
1/4-28 to 3/32" ID tubing



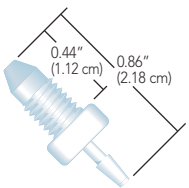
D-648
1/4-28 to 1/8" ID tubing

Biocompatible

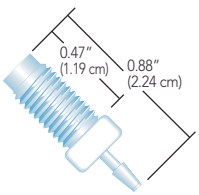
Thread to Barbed Adapters

- Three barb sizes, for 1/16", 1/8", and 3/16" ID flexible tubing
- Adapt to 1/4-28 flat-bottom, 5/16-24 flat-bottom, or 10-32 coned receiving ports

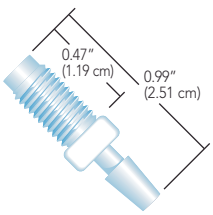
These Upchurch Scientific adapters make it easy to connect flexible tubing to any standard 1/4-28 flat-bottom or 10-32 coned receiving port. Simply thread the adapter into a receiving port and slip tubing over the barbed stem to create a reliable low pressure connection.



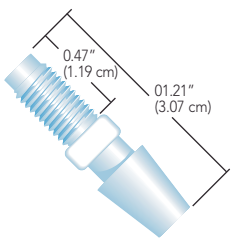
P-663
10-32 to 1/16" ID tubing



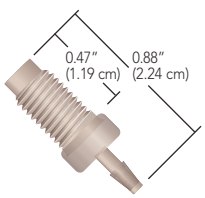
P-646
1/4-28 to 1/16" ID tubing



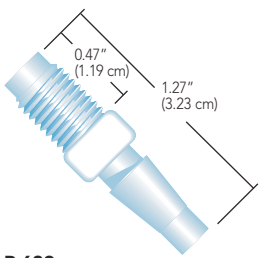
P-647
1/4-28 to 1/8" ID tubing



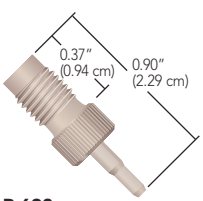
P-648
1/4-28 to 3/16" ID tubing



P-668
1/4-28 to 1/16" ID tubing



P-689
5/16-24 to 3/16" ID tubing



P-692
1/4-28 to 0.020"–1/32"ID tubing

RELATED PRODUCTS

- To connect low pressure fluoropolymer tubing, try the LuerTight™ Adapters on page 56.
- To connect peristaltic tubing to low pressure fluoropolymer tubing, see page 60.
- For peristaltic tubing, see pages 75–89.

	Part No.	Description	Material	Threads	Thru-hole
	SWIVEL BARB ADAPTERS				
	D-646	Swivel Barb Adapter, 1/16" (1.55 mm) ID Tubing	Polypropylene	1/4-28 Flat-Bottom	0.03" (0.75 mm)
	D-647	Swivel Barb Adapter, 3/32" (2.40 mm) ID Tubing	Polypropylene	1/4-28 Flat-Bottom	0.056" (1.5 mm)
	D-648	Swivel Barb Adapter, 1/8" (3.20 mm) ID Tubing	Polypropylene	1/4-28 Flat-Bottom	0.08" (2.0 mm)
	THREAD TO BARBED ADAPTERS				
★	P-663	Barb Adapter, 1/16" (1.55 mm) ID Tubing	ETFE	10-32 Coned	0.04" (1.0 mm)
★	P-646	Barb Adapter, 1/16" (1.55 mm) ID Tubing	ETFE	1/4-28 Flat-Bottom	0.04" (1.0 mm)
★	P-647	Barb Adapter, 1/8" (3.20 mm) ID Tubing	ETFE	1/4-28 Flat-Bottom	0.08" (2.0 mm)
	P-648	Barb Adapter, 3/16" (4.75 mm) ID Tubing	ETFE	1/4-28 Flat-Bottom	0.10" (2.5 mm)
★	P-668	Barb Adapter, 1/16" (1.55 mm) ID Tubing	PEEK	1/4-28 Flat-Bottom	0.04" (1.0 mm)
	P-689	Barb Adapter, 3/16" (4.75 mm) ID Tubing	ETFE	5/16-24 Flat-Bottom	0.10" (2.5 mm)
	P-692	Barb Adapter, 0.020" to 1/32" (0.50 to 0.80 mm) ID Tubing	PEEK	1/4-28 Flat-Bottom	0.02" (0.5 mm)

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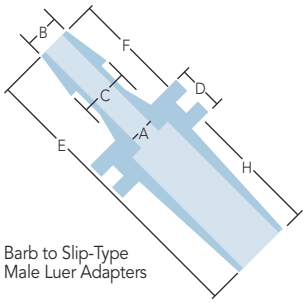
Barbed Adapters

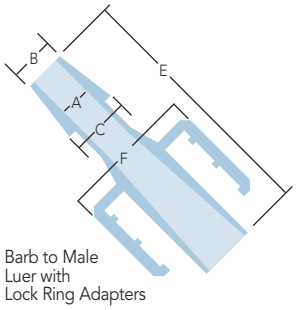
- Adapters on this page feature various luer to barb adaptations
- Adapters on the next page feature a variety of barb-to-barb connectors

Use these barbed adapters to connect peristaltic-type flexible tubing for general, low pressure applications, such as plumbing Ismatec® Peristaltic Pumps (listed on pages 92–108).

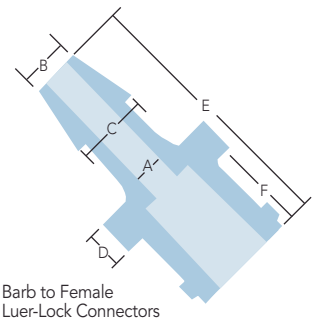
The polypropylene used to manufacture the majority of these products is a Class VI material. Due to the low melt point of polypropylene (PP), these adapters are not autoclavable, however, they can be sterilized via gamma radiation. There are also Barb to Female Luer-Lock connectors available from ETFE, which has superior solvent resistance and a higher temperature rating (80 °C).



Barb to Slip-Type Male Luer Adapters



Barb to Male Luer with Lock Ring Adapters



Barb to Female Luer-Lock Connectors

Part No.	Description	Material
BARB TO SLIP-TYPE MALE LUER ADAPTERS (10-PK)		
P-854x	Male Luers (Slip-type) for use with 1/16″ ID (1.55 mm) Tubing A=0.046″ B=0.064″ C=0.090″ D=0.129″ E=0.711″ F=0.198″ H=0.384″	PP
These slip-type male luer fittings are for use in systems for which luer lock rings are not desired.		
BARB TO MALE LUER WITH LOCK RING ADAPTERS (10-PK)		
P-850x	Male Luers with Lock Ring for use with 1/16″ ID (1.55 mm) Tubing A=0.049″ B=0.065″ C=0.090″ E=0.583″ F=0.434″	PP
P-851x	Male Luers with Lock Ring for use with 3/32″ ID (2.40 mm) Tubing A=0.071″ B=0.100″ C=0.139″ E=0.681″ F=0.436″	PP
P-852x	Male Luers with Lock Ring for use with 1/8″ ID (3.20 mm) Tubing A=0.099″ B=0.132″ C=0.184″ E=0.777″ F=0.436″	PP
BARB TO FEMALE LUER-LOCK CONNECTORS (10-PK)		
★ **P-857x**	Female Luer Connectors for use with 1/16″ ID (1.55 mm) Tubing A=0.030″ B=0.063″ C=0.106″ D=0.100″ E=0.598″ F=0.253″	PP
P-858x	Female Luer Connectors for use with 3/32″ ID (2.40 mm) Tubing A=0.056″ B=0.102″ C=0.145″ D=0.100″ E=0.648″ F=0.253″	PP
P-859x	Female Luer Connectors for use with 1/8″ ID (3.20 mm) Tubing A=0.080″ B=0.135″ C=0.187″ D=0.100″ E=0.733″ F=0.253″	PP
P-870	For use with 1/16″ (1.55 mm) ID Tubing A=0.030″ B=0.063″ C=0.106″ D=0.100″ E=0.598″ F=0.253″	ETFE
P-872	For use with 1/8″ (3.20 mm) ID Tubing A=0.080″ B=0.137″ C=0.187″ D=0.100″ E=0.733″ F=0.253″	ETFE
An "x" in the product part number designates "10-pk."		

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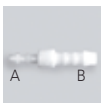
Barbed Connectors

- Specifically designed for Ismatec® pump tubing
- Wide variety of unions, adapters and multi-port connectors in multiple material choices

There are several Ismatec connectors for connecting multiple pieces of peristaltic tubing. Reference the tubing size of the barb in the tables below to select from unions (to connect same tubing size), reducers (to connect two different tubing sizes) in both straight, tee, Y, elbow and cross configurations.

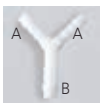
For very small peristaltic tubing, steel connectors are available to couple two pieces of the same size tubing together. Match the OD of the steel tubing connector to be slightly larger than the ID of the peristaltic tubing.

Reducer Tube Connectors in Plastic



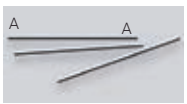
Type 6

Type 7



Type 8

Steel 18/8 Standard Tube Connectors



Standard Tube Connectors in Plastic

Type 1

Type 2

Type 3

Part No.	Tubing ID	Material	Qty.
STANDARD TUBE CONNECTORS IN PLASTIC			
Type 1			
P-801x	0.06″ (1.5 mm)	Polypropylene	10-pk
ISM557A	0.10″ (2.5 mm)	Polypropylene	10-pk
P-802x	0.12″ (3.0 mm)	Polypropylene	10-pk
ISM559	0.16″ (4.0 mm)	Nylon	10-pk
ISM560	0.20″ (5.0 mm)	Nylon	10-pk
ISM561	0.24″ (6.0 mm)	Nylon	10-pk
ISM562	0.31″ (8.0 mm)	Nylon	10-pk
ISM563	0.40″ (10.0 mm)	Nylon	10-pk
ISM564	0.47″ (12.0 mm)	Nylon	10-pk
ISM565	0.51″ (13.0 mm)	Nylon	10-pk
ISM566	0.55″ (14.0 mm)	Nylon	10-pk
ISM567	0.63″ (16.0 mm)	Nylon	10-pk
Type 2			
ISM693A	0.06″ (1.5 mm)	Polypropylene	10-pk
ISM694	0.10″ (2.5 mm)	Polypropylene	10-pk
ISM510	0.12″ (3.0 mm)	Polypropylene	10-pk
ISM511	0.16″ (4.0 mm)	Nylon	10-pk
ISM512	0.20″ (5.0 mm)	Nylon	10-pk
ISM513	0.24″ (6.0 mm)	Nylon	10-pk
ISM514	0.28″ (7.0 mm)	Nylon	10-pk
ISM515	0.31″ (8.0 mm)	Nylon	10-pk
ISM516	0.40″ (10.0 mm)	Nylon	10-pk
Type 3			
P-860x	0.06″ (1.5 mm)	Polypropylene	10-pk
P-861x	0.10″ (2.5 mm)	Polypropylene	10-pk
ISM524	0.12″ (3.0 mm)	Polypropylene	10-pk
ISM525	0.16″ (4.0 mm)	Polypropylene	10-pk
ISM526	0.20″ (5.0 mm)	Polypropylene	10-pk
ISM527	0.24″ (6.0 mm)	Polypropylene	10-pk
P-862x	0.12″ (3.0 mm)	Polypropylene	10-pk
P-863x	0.18″ (4.8 mm)	Polypropylene	10-pk
P-864x	0.25″ (6.4 mm)	Polypropylene	10-pk
ISM528	0.31″ (8.0 mm)	Polypropylene	10-pk
ISM529	0.40″ (10.0 mm)	Polypropylene	10-pk
ISM530	0.47″ (12.0 mm)	Polypropylene	10-pk

Part No.	Tubing ID		Material	Qty.
REDUCER TUBE CONNECTORS IN PLASTIC				
Type 6	**A**	**B**		
ISM569A	0.06″ (1.5 mm)	0.10″ (2.5 mm)	Polypropylene	10-pk
ISM570A	0.06″ (1.5 mm)	0.12″ (3.0 mm)	Polypropylene	10-pk
ISM571A	0.10″ (2.5 mm)	0.12″ (3.0 mm)	Polypropylene	10-pk
ISM572	0.12″ (3.0 mm)	0.16″ (4.0 mm)	Nylon	10-pk
ISM573A	0.16″ (4.0 mm)	0.24″ (6.0 mm)	Nylon	10-pk
ISM574	0.16″ (4.0 mm)	0.31″ (8.0 mm)	Nylon	10-pk
ISM575	0.24″ (6.0 mm)	0.31″ (8.0 mm)	Nylon	10-pk
ISM576	0.24″ (6.0 mm)	0.40″ (10.0 mm)	Nylon	10-pk
ISM577	0.31″ (8.0 mm)	0.40″ (10.0 mm)	Nylon	10-pk
ISM578	0.31″ (8.0 mm)	0.47″ (12.0 mm)	Nylon	10-pk
ISM579	0.40″ (10.0 mm)	0.47″ (12.0 mm)	Nylon	10-pk
Type 7	**A**	**B**		
ISM538	0.12″ (3.0 mm)	0.16″ (4.0 mm)	Polypropylene	10-pk
ISM539	0.16″ (4.0 mm)	0.24″ (6.0 mm)	Polypropylene	10-pk
ISM540	0.24″ (6.0 mm)	0.16″ (4.0 mm)	Polypropylene	10-pk
ISM541	0.31″ (8.0 mm)	0.16″ (4.0 mm)	Polypropylene	10-pk
ISM542	0.31″ (8.0 mm)	0.24″ (6.0 mm)	Polypropylene	10-pk
ISM544	0.40″ (10.0 mm)	0.24″ (6.0 mm)	Polypropylene	10-pk
ISM545	0.40″ (10.0 mm)	0.31″ (8.0 mm)	Polypropylene	10-pk
ISM546	0.40″ (10.0 mm)	0.51″ (13.0 mm)	Polypropylene	10-pk
ISM547	0.47″ (12.0 mm)	0.31″ (8.0 mm)	Polypropylene	10-pk
Type 8	**A**	**B**		
ISM553	0.16″ (4.0 mm)	0.24″ (6.0 mm)	Polypropylene	10-pk
ISM554	0.24″ (6.0 mm)	0.31″ (8.0 mm)	Polypropylene	10-pk

STEEL 18/8 STANDARD TUBE CONNECTORS

Part No.	Tubing ID	Tubing OD	Connector Length	Material	Qty.
ISM580	0.01″ (0.30 mm)	0.02″ (0.63 mm)	0.59″ (15.0 mm)	SST	6-pk
ISM581	0.02″ (0.58 mm)	0.04″ (0.90 mm)	0.59″ (15.0 mm)	SST	6-pk
ISM582	0.02″ (0.58 mm)	0.04″ (0.90 mm)	0.43″ (11 mm)	SST	6-pk
ISM583	0.03″ (0.84 mm)	0.05″ (1.27 mm)	0.43″ (11 mm)	SST	6-pk
ISM584	0.03″ (0.84 mm)	0.05″ (1.27 mm)	0.63″ (16.0 mm)	SST	6-pk
ISM585A	0.01″ (0.30 mm)	0.02″ (0.63 mm)	0.98″ (25 mm)	SST	6-pk
ISM586A	0.02″ (0.58 mm)	0.04″ (0.90 mm)	0.98″ (25 mm)	SST	6-pk
ISM587	0.02″ (0.58 mm)	0.04″ (0.90 mm)	0.75″ (19.0 mm)	SST	6-pk

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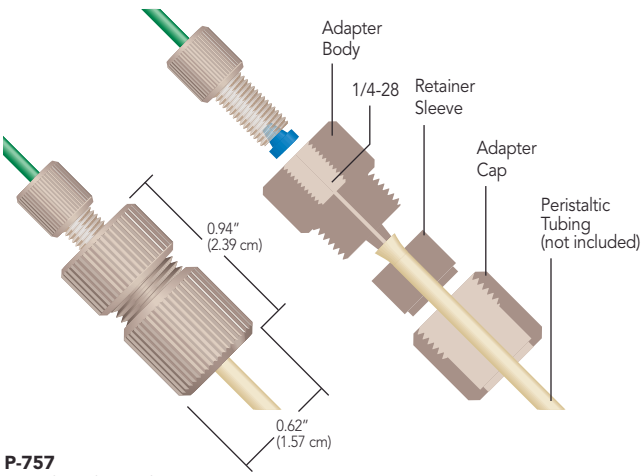
Peristaltic Tubing Adapters

These unique adapters connect peristaltic tubing to standard 1/16" or 1/8" OD tubing. A specially-designed nose allows the peristaltic tubing to simply press fit over the nose and then be held tightly in place by the retainer sleeve. Your 1/16" OD tubing may then be connected with the Flangeless Fittings supplied with the adapter. To connect your peristaltic tubing to tubing with a different OD, simply replace the supplied fittings with your choice of Flangeless Fittings from page 24.

One popular application for these adapters is to use them as "stops" for your peristaltic pump. By doing so, you can reduce the amount of peristaltic tubing required for your flow path, thus reducing cost.

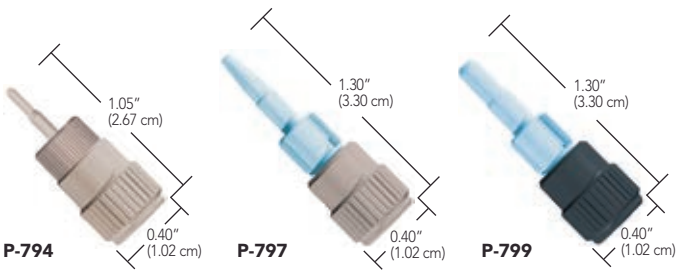


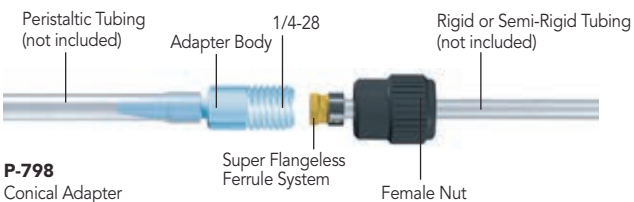
P-757
Peristaltic Tubing Adapter
includes P-200/P-235 Flangeless Fittings, and 3 sizes of retainer sleeves

Conical Adapters

- Direct connect 1/16" and 1/8" OD rigid and semi-rigid tubing to peristaltic tubing
- Accept 0.020"–1/8" (0.50–3.2 mm) ID peristaltic tubing
- Biocompatible flow path with excellent chemical compatibility

Upchurch Scientific® Conical Adapters manufactured by IDEX Health & Science provide a reliable connection between rigid/semi-rigid tubing and peristaltic-type flexible tubing, such as Tygon® and PharMed®. These adapters are composed of a PEEK polymer female nut, our Super Flangeless™ ferrule system and an ETFE or PEEK conical adapter body. The narrow coned end of the adapter body allows peristaltic tubing to slide on more easily than it does onto conventional barbed adapters. Peristaltic tubing is also easier to remove from our Conical Adapters, since no cutting or excessive pulling is required.





P-798
Conical Adapter

Biocompatible

RELATED PRODUCTS

- Use the adapters on this page to connect rigid and semi-rigid tubing (pages 63–69 and 70–73) to the peristaltic tubing on pages 75–89.

APPLICATION NOTE

To help secure peristaltic tubing more firmly to the Upchurch Scientific Conical Adapters, simply attach a cable tie to the outside of the peristaltic tubing once it has been placed onto the Adapter body.

	Part No.	Description	Peristaltic Tubing OD	Peristaltic Tubing ID	Thru-Hole
	PERISTALTIC TUBING ADAPTERS				
★	**P-757**	Standard Adapter	up to 0.180" (4.55 mm)	0.048"–0.110" (1.20–2.80 mm)	0.030" (0.75 mm)
	P-767	Large Bore Adapter	up to 0.250" (6.35 mm)	0.100"–0.150" (2.55–3.80 mm)	0.070" (1.78 mm)
	CONICAL ADAPTER ASSEMBLIES				
	Part No.	**Description**	**Rigid or Semi-Rigid Tubing OD**	**Peristaltic Tubing ID**	**Thru-Hole**
★	**P-794**	Conical Adapter	1/16"	0.020"–0.030" (0.50 mm–0.75 mm)	0.020" (0.50 mm)
	P-797	Conical Adapter	1/16"	1/16"–3/32" (1.55 mm–2.40 mm)	0.040" (1.0 mm)
	P-798	Conical Adapter	1/8"	1/16"–3/32" (1.55 mm–2.40 mm)	0.040" (1.0 mm)
	P-799	Conical Adapter	1/8"	3/32"–1/8" (2.40 mm–3.20 mm)	0.060" (1.5 mm)
	CONICAL ADAPTER REPLACEMENT PARTS				
	Part No.	**Description**	**Material**	**For Use With**	
	F-156	Female Nut, 1/8", 1/4-28	Black PEEK	P-798, P-799	
	P-420	Female Nut, 1/16", 1/4-28	Natural PEEK	P-794, P-797	
	P-259	Super Flangeless Ferrule, 1/16"	Yellow ETFE/SST	P-794, P-797	
	P-359	Super Flangeless Ferrule, 1/8"	Yellow ETFE/SST	P-798, P-799	
	P-691	Conical Adapter Body	Natural ETFE	P-799	
	P-692	Conical Adapter Body	Natural PEEK	P-794	

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TUBING

NEW! PEEK-LINED STAINLESS STEEL (PLS) TUBING
PAGE 63

HIGH PRESSURE TUBING
PAGE 63

FLUOROPOLYMER TUBING
PAGE 71

TUBING CUTTERS
PAGE 74

PERISTALTIC TUBING
PAGE 75

SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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TUBING	PEEK-LINED STAINLESS STEEL (PLS)	STAINLESS STEEL	PEEK	CAPILLARY PEEK	FUSED SILICA	PEEKsil™	SPIRAL-LINK™	RADEL®
Page	63	64	66	67	67	68	69	69
Description	Biocompatible, chemically inert to most commonly-used solvents, PLS tubing offers a PEEK inner layer which serves as the fluid pathway, jacketed by stainless steel. • Ideal for bio-inert UHPLC applications • Can be bent into various shapes without affecting performance	Seamless, pre-cut 316 stainless steel tubing meets the exacting requirements of today's analyses. Thorough preparation guarantees that the tubing is truly ready-to-use, with flat-burr-free ends and a clean finish. • Wide selection of outside and inside diameters and lengths • Pre-cut to ensure burr-free, flat connections • Many sizes feature a color-coded band for easy ID identification	Biocompatible, chemically inert to most commonly used solvents, PEEK tubing is flexible, offers a very smooth internal surface, and can be easily cut to desired lengths. • Great alternative for stainless steel tubing in high pressure applications • Many sizes available in color scheme to help identify ID	All the benefits of larger sized PEEK tubing, while serving as an excellent alternative to more traditional fused silica and stainless steel capillary tubing. Capillary PEEK tubing is available in a wide range of micro and nano-scale inner diameters. • Available in common capillary tubing sizes with tight tolerances on OD and ID • Tubing sleeves available for capillary tubing connections	Because of the tight tolerances of fused silica's inner diameters, this tubing is used for micro-scale analyses such as micro and nano-HPLC and capillary electrophoresis. • Most commonly used OD and ID sizes available • High quality, polyimide-clad fused silica • Offered in convenient, two meter lengths	PEEKsil is mechanically strong and has ideal characteristics for sealing with metal or polymer fittings. • Comprised of high quality fused silica sheathed by PEEK tubing • Excellent chemical compatibility • Very tight manufacturing tolerances • Good replacement for stainless steel, PEEK, or standard fused silica	The PEEK Spiral Link coils expand and contract, allowing you to easily move your system components or even make equipment repairs whenever needed, without the hassle of breaking connections. • Available in several specific volumes • Includes two SealTight™ fittings	A mechanically strong and chemically resistant material, much like PEEK polymer, Radel is frequently used in medical applications where repeated autoclave sterilization is performed (tests show product stability after 1,000 cycles). Radel tubing is also transparent, allowing technicians to visually monitor flow through their instrument. Readily wetted surfaces help keep air bubbles from accumulating on inner surfaces as well. • Withstands up to 12,500 psi (862 bar) • Transparent and autoclavable
Specifications								
OD (outside diameter)	1/16" (1.6 mm)	0.020" (510 µm), 1/32" (785 µm), 1/16" (1.55 mm), 1/8" (3.2 mm)	1/16" (1.55 mm), 0.071" (1.8 mm), 0.079" (2.0 mm), 1/8" (3.2 mm)	0.0145" (360 µm), 1/32" (785 µm), 0.020" (0.5 mm)	0.0145" (360 µm)	0.0145" (360 µm), 1/32" (785 µm), 1/16" (1.55 mm)	1/16" (1.55 mm)	1/16" (1.55 mm), 1/8" (3.2 mm)
ID (inside diameter)	0.001" (25 µm)–0.010" (254 µm)	0.004" (100 µm)–0.080" (2.0 mm)	0.001" (25 µm)–0.080" (2.0 mm)	0.001" (25 µm)–0.020" (0.50 mm)	0.0008" (20 µm)–0.006" (150 µm)	0.001" (25 µm)–0.012" (300 µm)	0.005" (125 µm)–0.030" (0.75 mm)	0.010" (0.25 mm)–0.062" (1.55 mm)
Operating Temp	-51 to 100 °C	-51 to 289 °C	-51 to 100 °C	-51 to 100 °C	-51 to 100 °C	-51 to 100 °C	-51 to 100 °C	-51 to 100 °C
Pressure Rating	17,400 psi (1,200 bar)	N/A*	500–10,000 psi (34–690 bar)	2,000–5,000 psi (138–345 bar)	N/A*	10,000 psi (690 bar)	7,000 psi (484 bar)	5,500–12,500 psi (379–862 bar)
Typical Tolerances	±5 to 15 µm	±0.001" (25 µm) for 1/16" OD tubing, ±0.003" (75 µm) for 1/8" OD tubing	±0.001" (25 µm) for 1/16" OD tubing, ±0.003" (75 µm) for 1/8" OD tubing	±0.0005" (12.5 µm)	±0.0004" (10 µm)	±0.0004" (10 µm)	±0.001" (25 µm) for 1/16" OD tubing	±0.001" (25 µm) for 1/16" OD tubing, ±0.003" (75 µm) for 1/8" OD tubing
Refractive Index (Clarity)	Opaque	Opaque	Opaque	Opaque	1.78	Opaque	Opaque	1.672
pH Range	0–14	1–14	0–14	0–14	0–10	0–10	0–14	1–14
Sterilization Techniques	Gamma irradiation; ethylene oxide; thermal	Gamma irradiation; ethylene oxide; thermal	Gamma irradiation; ethylene oxide; thermal	Gamma irradiation; ethylene oxide; thermal	Ethylene oxide; thermal	Ethylene oxide; thermal	Gamma irradiation; ethylene oxide; thermal	Thermal, gamma irradiation
Autoclavable?	Y	Y	Y	Y	Y	Y	Y	Y

**The manufacturer of this tubing or material does not publish this specification.*

Upchurch Scientific® Tubing OD Sizes

Please use this table as a reference tool to help quickly locate within this chapter the appropriate OD size tubing for your application.

Size	Tubing OD	Page(s)
•	360 µm	67, 68, 72
•	510 µm	65, 67
•	1/32"	65, 67, 68, 71
•	1/16"	63, 65, 66, 68, 69, 71, 72, 73, 77
•	1/8"	65, 66, 69, 71, 72, 73
•	3/16"	71, 72
•	1/4"	71, 72, 73

Size	Tubing OD	Page(s)
•	5/16"	71
•	1 mm	71
•	1.8 mm	66
•	2 mm	66, 71
•	3 mm	71
•	4 mm	71

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Biocompatible UHPLC Tubing

- PEEK-Lined Stainless Steel (PLS)
- Pressures to 17,400 psi (1,200 bar)
- Bends with no loss of performance
- 6 different inner diameters in 4 pre-cut lengths available
- Pre-assembled with VHP-325 fittings

IDEX Health & Science introduces NEW PEEK-Lined Stainless Steel (PLS) Tubing for biocompatible UHPLC applications. The tubing combines the strength of industry-standard 316 Stainless Steel with the chemical inertness of PEEK polymer to enable more efficient bio-separations at pressures up to 17,400 psi (1,200 bar).

The unique design features of PLS Tubing allow it to be bent into shapes that may be required by the system equipment — including angled bends and even sample loops for the injection valve — all with no loss of performance. Even in a bent shape, the PEEK lining maintains its integrity along the entire length.

PLS Tubing achieves its maximum performance of 17,400 psi (1,200 bar) when used with Upchurch Scientific® VHP Fittings. The standard configuration of this tubing automatically pairs a length of tubing with two VHP-325 fittings, which allow repeat connections at UHPLC pressures.

PLS Tubing

Part No.	ID	Length	Includes
PEEK-LINED STAINLESS STEEL (PLS) TUBING, 1/16" OD			
UP-6025100	25 µm (0.001")	100 mm (4")	(2) VHP-325
UP-6025200	25 µm (0.001")	200 mm (8")	(2) VHP-325
UP-6025300	25 µm (0.001")	300 mm (12")	(2) VHP-325
UP-6025500	25 µm (0.001")	500 mm (1.6')	(2) VHP-325
UP-6050100	50 µm (0.002")	100 mm (4")	(2) VHP-325
UP-6050200	50 µm (0.002")	200 mm (8")	(2) VHP-325
UP-6050300	50 µm (0.002")	300 mm (12")	(2) VHP-325
UP-6050500	50 µm (0.002")	500 mm (1.6')	(2) VHP-325
UP-6075100	75 µm (0.003")	100 mm (4")	(2) VHP-325
UP-6075200	75 µm (0.003")	200 mm (8")	(2) VHP-325
UP-6075300	75 µm (0.003")	300 mm (12")	(2) VHP-325
UP-6075500	75 µm (0.003")	500 mm (1.6')	(2) VHP-325
UP-6100100	100 µm (0.004")	100 mm (4")	(2) VHP-325
UP-6100200	100 µm (0.004")	200 mm (8")	(2) VHP-325
UP-6100300	100 µm (0.004")	300 mm (12")	(2) VHP-325
UP-6100500	100 µm (0.004")	500 mm (1.6')	(2) VHP-325
UP-6125100	125 µm (0.005")	100 mm (4")	(2) VHP-325
UP-6125200	125 µm (0.005")	200 mm (8")	(2) VHP-325
UP-6125300	125 µm (0.005")	300 mm (12")	(2) VHP-325
UP-6125500	125 µm (0.005")	500 mm (1.6')	(2) VHP-325
UP-6175100	175 µm (0.007")	100 mm (4")	(2) VHP-325
UP-6175200	175 µm (0.007")	200 mm (8")	(2) VHP-325
UP-6175300	175 µm (0.007")	300 mm (12")	(2) VHP-325
UP-6175500	175 µm (0.007")	500 mm (1.6')	(2) VHP-325
UP-6254100	254 µm (0.010")	100 mm (4")	(2) VHP-325
UP-6254200	254 µm (0.010")	200 mm (8")	(2) VHP-325
UP-6254300	254 µm (0.010")	300 mm (12")	(2) VHP-325
UP-6254500	254 µm (0.010")	500 mm (1.6')	(2) VHP-325

Custom lengths of tubing are available. Contact us for more information.

SPECIFICATIONS & DETAILS

PEEK-lined Stainless Steel (PLS) tubing carries a maximum pressure rating of 17,400 psi (1,200 bar). Additionally, inner diameter tolerances range from ±5–15 µm, depending upon the nominal inner diameter of the tubing.

Peek-lined Stainless Steel (PLS) Tubing "Smart" Numbering System

UP-{OD}{ID}{Length}

{OD}	{ID}	{Length}
6 (for 1/16")	025 (for 25 µm)	050 (for 50 mm)
	050 (for 50 µm)	100 (for 100 mm)
	075 (for 75 µm)	200 (for 200 mm)
	100 (for 100 µm)	300 (for 300 mm)
	125 (for 125 µm)	
	175 (for 175 µm)	
	254 (for 254 µm)	

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Stainless Steel Tubing

- Precut 316 stainless steel*
- Available ODs include 0.020", 1/32", 1/16", and 1/8"
- Color-coded banding for easy identification of the inner diameter

IDEX Health & Science seamless, precut stainless steel tubing is designed to meet the exacting requirements of today's analyses. We machine cut and polish each end, deburr the inside and outside edges, and passivate the tubing (please see the passivation information on this page). Finally, we flush reagent-grade isopropanol through each piece.

Our thorough preparation and cleaning procedure guarantees tubing that is truly ready-to-use, with flat, burr-free ends and a clean finish. This care is important in achieving zero-dead-volume connections and good chromatographic results.

We offer a variety of precut lengths as well as longer lengths (5' and 25') of some sizes. Cutting the tubing disturbs and roughens the tubing's end surface, so we recommend using our precut tubing whenever possible. If you need to cut tubing to custom lengths, we suggest you then passivate the tubing. For a description of a cold passivation process, please contact IDEX Health & Science or visit our website at www.idex-hs.com and search for "stainless steel tubing."

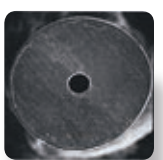
** Except our 0.020" OD Stainless Steel Tubing, which is manufactured from 304 series stainless steel.*

NOTE

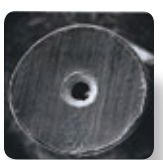
PEEK polymer tubing can be used to replace stainless steel tubing in most liquid analytical systems. Unlike stainless steel tubing, PEEK tubing is biocompatible, flexible, and can easily be cut to desired lengths. See pages 66–68.

All Stainless Steel tubing longer than 1 m is coiled.

The Beauty of Precut Tubing



Precut tubing



Tubing cut by a commercially available tubing cutter

File cut tubing

APPLICATION NOTE

- Our 1/32" OD tubing is designed for enhanced flexibility in high pressure applications.
- Standard 1/16" and 1/8" OD stainless steel tubing is suited for most analytical applications.

SPECIFICATIONS & DETAILS

- Maximum Recommended Operating Temperature: 750 °F (399 °C).
- Rockwell Hardness (B): Maximum of 95.
- Meets ASTM A269 and A213.

Tubing OD	OD Tolerance	Tubing ID	ID Tolerance
0.020"	±0.0005" (12.5 µm)	All	±0.0005" (12.5 µm)
1/32"	+0.002"/-0.000" (+50 µm/-0 µm)	All, except 0.004" (0.10 mm)	+0.000"/-0.002" (+0 µm/-50 µm)
1/32"	+0.002"/-0.000" (+50 µm/-0 µm)	0.004" (0.10 mm)	+0.002"/-0.000" (+50 µm/-0 µm)
1/16"	+0.002"/-0.000" (+50 µm/-0 µm)	All	±0.001" (25 µm)
1/8"	±0.003" (75 µm)	All	±0.003" (75 µm)

RELATED PRODUCTS

- Our 0.020" OD tubing is the size of choice for the Rheodyne® Model 8125 Micro-Scale Injector Valve (page 132).
- PEEK polymer tubing is available in all of these sizes, listed on pages 66–67.

Stainless Steel Tubing Passivation

Stainless steel is naturally self-passivating, forming an oxidized layer on newly created surfaces. IDEX Health & Science takes extra steps to ensure the chemical resistance of our stainless steel tubing by manually passivating before and after the tubing is cut into specified lengths (except in a few cases where size is prohibitive). In the precut stage, the internal wall is acid passivated and flushed. After the tubing is cut, deburred and polished, it is completely submerged in an acid passivation bath and again flushed clean. The table below summarizes the manual passivation steps performed for each size of our stainless steel tubing:

Tubing OD	Precut Passivation	Postcut Passivation
0.020"	All	All
1/32"	All	All
1/16"	All	All, ex. 25' lengths
1/8"	None	All, ex. 3 & 5 m lengths

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NOTE

Understanding the Maximum Pressure Value of Stainless Steel Tubing

Stainless steel is unique as a material. The Maximum Pressure value listed for each part number is the safe, continuous working pressure limit that IDEX Health & Science has assigned for the tubing. It reflects a safety margin before the tubing begins to "yield" — which is well below the tubing's "burst" pressure. For more information, contact IDEX Health & Science or your authorized Distributor.

Part No.	ID	Length	Color	Maximum Pressure
STAINLESS STEEL, 0.020" OD				
U-119	0.005" (0.125 mm)	5 cm (2")	N/A	17,200 psi (1,186 bar)
U-120	0.005" (0.125 mm)	10 cm (4")	N/A	17,200 psi (1,186 bar)
U-121	0.005" (0.125 mm)	20 cm (8")	N/A	17,200 psi (1,186 bar)
U-122	0.005" (0.125 mm)	30 cm (12")	N/A	17,200 psi (1,186 bar)
U-123	0.005" (0.125 mm)	50 cm (1.6')	N/A	17,200 psi (1,186 bar)
U-124	0.005" (0.125 mm)	1 m (3.2')	N/A	17,200 psi (1,186 bar)
U-125	0.005" (0.125 mm)	1.5 m (5')	N/A	17,200 psi (1,186 bar)
STAINLESS STEEL, 1/32" OD				
U-1114	0.004" (0.10 mm)	5 cm (2")	Red	19,300 psi (1,331 bar)
U-1115	0.004" (0.10 mm)	10 cm (4")	Red	19,300 psi (1,331 bar)
U-1116	0.004" (0.10 mm)	20 cm (8")	Red	19,300 psi (1,331 bar)
U-1117	0.004" (0.10 mm)	30 cm (12")	Red	19,300 psi (1,331 bar)
U-1120	0.006" (0.15 mm)	5 cm (2")	Yellow	19,300 psi (1,331 bar)
U-1121	0.006" (0.15 mm)	10 cm (4")	Yellow	19,300 psi (1,331 bar)
U-1122	0.006" (0.15 mm)	20 cm (8")	Yellow	19,300 psi (1,331 bar)
U-1123	0.006" (0.15 mm)	30 cm (12")	Yellow	19,300 psi (1,331 bar)
U-1125	0.008" (0.20 mm)	5 cm (2")	Clear	17,800 psi (1,227 bar)
U-1126	0.008" (0.20 mm)	10 cm (4")	Clear	17,800 psi (1,227 bar)
U-1127	0.008" (0.20 mm)	20 cm (8")	Clear	17,800 psi (1,227 bar)
★ U-1128	0.008" (0.20 mm)	30 cm (12")	Clear	17,800 psi (1,227 bar)
U-1130	0.010" (0.25 mm)	5 cm (2")	Blue	16,200 psi (1,117 bar)
U-1131	0.010" (0.25 mm)	10 cm (4")	Blue	16,200 psi (1,117 bar)
U-1132	0.010" (0.25 mm)	20 cm (8")	Blue	16,200 psi (1,117 bar)
U-1133	0.010" (0.25 mm)	30 cm (12")	Blue	16,200 psi (1,117 bar)
U-1140	0.015" (0.40 mm)	5 cm (2")	Green	12,300 psi (848 bar)
U-1141	0.015" (0.40 mm)	10 cm (4")	Green	12,300 psi (848 bar)
U-1142	0.015" (0.40 mm)	20 cm (8")	Green	12,300 psi (848 bar)
U-1143	0.015" (0.40 mm)	30 cm (12")	Green	12,300 psi (848 bar)
U-1145	0.018" (0.45 mm)	5 cm (2")	Black	10,000 psi (689 bar)
U-1146	0.018" (0.45 mm)	10 cm (4")	Black	10,000 psi (689 bar)
U-1147	0.018" (0.45 mm)	20 cm (8")	Black	10,000 psi (689 bar)
U-1148	0.018" (0.45 mm)	30 cm (12")	Black	10,000 psi (689 bar)

Part No.	ID	Length	Color	Maximum Pressure
STAINLESS STEEL, 1/16" OD				
U-220	0.004" (0.100 mm)	5 cm (2")	N/A	22,100 psi (1,523 bar)
U-221	0.004" (0.100 mm)	10 cm (4")	N/A	22,100 psi (1,523 bar)
U-222	0.004" (0.100 mm)	20 cm (8")	N/A	22,100 psi (1,523 bar)
U-223	0.004" (0.100 mm)	30 cm (12")	N/A	22,100 psi (1,523 bar)
U-224	0.004" (0.100 mm)	0.5 m (1.6')	N/A	22,100 psi (1,523 bar)
U-225	0.004" (0.100 mm)	1 m (3.2')	N/A	22,100 psi (1,523 bar)
U-152	0.005" (0.125 mm)	5 cm (2")	Red	21,600 psi (1,489 bar)
U-153	0.005" (0.125 mm)	10 cm (4")	Red	21,600 psi (1,489 bar)
U-154	0.005" (0.125 mm)	20 cm (8")	Red	21,600 psi (1,489 bar)
U-155	0.005" (0.125 mm)	30 cm (12")	Red	21,600 psi (1,489 bar)
U-156	0.005" (0.125 mm)	0.5 m (1.6')	Red	21,600 psi (1,489 bar)
U-157	0.005" (0.125 mm)	1 m (3.2')	Red	21,600 psi (1,489 bar)
U-158	0.005" (0.125 mm)	1.5 m (5')	Red	21,600 psi (1,489 bar)
U-160	0.005" (0.125 mm)	7.6 m (25')	Red	21,600 psi (1,489 bar)
U-126	0.007" (0.175 mm)	5 cm (2")	Black	20,900 psi (1,441 bar)
U-127	0.007" (0.175 mm)	10 cm (4")	Black	20,900 psi (1,441 bar)
U-128	0.007" (0.175 mm)	20 cm (8")	Black	20,900 psi (1,441 bar)
U-129	0.007" (0.175 mm)	30 cm (12")	Black	20,900 psi (1,441 bar)
U-130	0.007" (0.175 mm)	0.5 m (1.6')	Black	20,900 psi (1,441 bar)
U-131	0.007" (0.175 mm)	1 m (3.2')	Black	20,900 psi (1,441 bar)
U-108	0.007" (0.175 mm)	1.5 m (5')	Black	20,900 psi (1,441 bar)
U-161	0.007" (0.175 mm)	7.6 m (25')	Black	20,900 psi (1,441 bar)
★ U-111	0.010" (0.25 mm)	5 cm (2")	Blue	19,700 psi (1,358 bar)
★ U-112	0.010" (0.25 mm)	10 cm (4")	Blue	19,700 psi (1,358 bar)
U-113	0.010" (0.25 mm)	20 cm (8")	Blue	19,700 psi (1,358 bar)
★ U-114	0.010" (0.25 mm)	30 cm (12")	Blue	19,700 psi (1,358 bar)
U-132	0.010" (0.25 mm)	0.5 m (1.6')	Blue	19,700 psi (1,358 bar)
U-133	0.010" (0.25 mm)	1 m (3.2')	Blue	19,700 psi (1,358 bar)
U-106	0.010" (0.25 mm)	1.5 m (5')	Blue	19,700 psi (1,358 bar)
U-162	0.010" (0.25 mm)	7.6 m (25')	Blue	19,700 psi (1,358 bar)
U-101	0.020" (0.5 mm)	5 cm (2")	Yellow	15,800 psi (1,089 bar)
U-102	0.020" (0.5 mm)	10 cm (4")	Yellow	15,800 psi (1,089 bar)
U-103	0.020" (0.5 mm)	20 cm (8")	Yellow	15,800 psi (1,089 bar)
U-104	0.020" (0.5 mm)	30 cm (12")	Yellow	15,800 psi (1,089 bar)
U-134	0.020" (0.5 mm)	0.5 m (1.6')	Yellow	15,800 psi (1,089 bar)
U-135	0.020" (0.5 mm)	1 m (3.2')	Yellow	15,800 psi (1,089 bar)
★ U-105	0.020" (0.5 mm)	1.5 m (5')	Yellow	15,800 psi (1,089 bar)
U-163	0.020" (0.5 mm)	7.6 m (25')	Yellow	15,800 psi (1,089 bar)
U-115	0.030" (0.75 mm)	5 cm (2")	White	12,000 psi (827 bar)
U-116	0.030" (0.75 mm)	10 cm (4")	White	12,000 psi (827 bar)
U-117	0.030" (0.75 mm)	20 cm (8")	White	12,000 psi (827 bar)
U-118	0.030" (0.75 mm)	30 cm (12")	White	12,000 psi (827 bar)
U-136	0.030" (0.75 mm)	0.5 m (1.6')	White	12,000 psi (827 bar)
U-137	0.030" (0.75 mm)	1 m (3.2')	White	12,000 psi (827 bar)
★ U-107	0.030" (0.75 mm)	1.5 m (5')	White	12,000 psi (827 bar)
★ U-164	0.030" (0.75 mm)	7.6 m (25')	White	12,000 psi (827 bar)
U-138	0.040" (1.0 mm)	5 cm (2")	N/A	8,100 psi (558 bar)
U-139	0.040" (1.0 mm)	10 cm (4")	N/A	8,100 psi (558 bar)
U-140	0.040" (1.0 mm)	20 cm (8")	N/A	8,100 psi (558 bar)
U-141	0.040" (1.0 mm)	30 cm (12")	N/A	8,100 psi (558 bar)
U-142	0.040" (1.0 mm)	0.5 m (1.6')	N/A	8,100 psi (558 bar)
U-143	0.040" (1.0 mm)	1 m (3.2')	N/A	8,100 psi (558 bar)
U-144	0.040" (1.0 mm)	1.5 m (5')	N/A	8,100 psi (558 bar)
★ U-165	0.040" (1.0 mm)	7.6 m (25')	N/A	8,100 psi (558 bar)
U-145	0.046" (1.15 mm)	5 cm (2")	N/A	5,800 psi (400 bar)
U-146	0.046" (1.15 mm)	10 cm (4")	N/A	5,800 psi (400 bar)
U-147	0.046" (1.15 mm)	20 cm (8")	N/A	5,800 psi (400 bar)
U-148	0.046" (1.15 mm)	30 cm (12")	N/A	5,800 psi (400 bar)
U-149	0.046" (1.15 mm)	0.5 m (1.6')	N/A	5,800 psi (400 bar)
U-150	0.046" (1.15 mm)	1 m (3.2')	N/A	5,800 psi (400 bar)
U-151	0.046" (1.15 mm)	1.5 m (5')	N/A	5,800 psi (400 bar)
STAINLESS STEEL, 1/8" OD				
U-815	0.080" (2.0 mm)	15 cm (6")	N/A	7,600 psi (524 bar)
U-825	0.080" (2.0 mm)	25 cm (10")	N/A	7,600 psi (524 bar)
U-800	0.080" (2.0 mm)	1 m (3.2')	N/A	7,600 psi (524 bar)
U-803	0.080" (2.0 mm)	3 m (9.8')	N/A	7,600 psi (524 bar)
U-805	0.080" (2.0 mm)	5 m (16')	N/A	7,600 psi (524 bar)

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PEEK Tubing

- 1/16", 1/8", 1.8 mm, or 2.0 mm outside diameter available
- Biocompatible, inert, and easily cut
- Great for high pressure applications
- Maximum continuous use temperature: 100 °C

Upchurch Scientific® PEEK (polyetheretherketone) polymer tubing is biocompatible, chemically inert to most solvents, and can be used to replace stainless steel tubing in most liquid analytical systems. Unlike stainless steel tubing, PEEK tubing is flexible and can be easily cut to desired lengths.

PEEK tubing has a very smooth internal surface, which causes less turbulence than similarly sized metal tubing, contributing to improved resolution of sample bands. Of all our polymer tubing materials, PEEK is the least permeable to gas (see material properties on our website: www.idex-hs.com).

In addition, much of our 1/16" OD tubing is color-coded so different IDs are easily identified. Our proprietary extrusion process ensures color permanence in our tubing.

Our 5' length tubing is rough cut to approximately 5'1". A trim cut should be made before use, especially for smaller ID tubing. PEEK tubing can be cut easily with a razor blade. However for an improved cut, try our Tubing Cutters on page 74.

	Part No.	ID	Color	Max. Pressure
	PEEK TUBING, 1/16" OD X 5' (1.5 M)			
	1559	0.001" (25 µm) ID	Natural	10,000 psi (690 bar)
	1560	0.0025" (65 µm) ID	Natural	7,000 psi (483 bar)
★	1561	0.004" (0.10 mm) ID	Black	7,000 psi (483 bar)
★	1535	0.005" (0.125 mm) ID	Red	7,000 psi (483 bar)
★	1562	0.006" (0.15 mm) ID	Purple	7,000 psi (483 bar)
	1536	0.007" (0.175 mm) ID	Yellow	7,000 psi (483 bar)
★	1531	0.010" (0.25 mm) ID	Natural	7,000 psi (483 bar)
★	1531B	0.010" (0.25 mm) ID	Blue	7,000 psi (483 bar)
★	1565	0.015" (0.40 mm) ID	Gray	7,000 psi (483 bar)
	1532	0.020" (0.50 mm) ID	Orange	7,000 psi (483 bar)
★	1533	0.030" (0.75 mm) ID	Green	7,000 psi (483 bar)
★	1538	0.040" (1.00 mm) ID	Natural	5,000 psi (345 bar)
★	1537	0.055" (1.40 mm) ID	Natural	500 psi (34 bar)
	PEEK TUBING, 1/8" OD X 5' (1.5 M)			
	1534	0.062" (1.55 mm) ID	Natural	4,000 psi (276 bar)
★	1544	0.080" (2.00 mm) ID	Natural	3,000 psi (207 bar)
	PEEK TUBING, 1.8 MM OD X 5' (1.5 M)			
	1539	0.055" (1.40 mm) ID	Natural	500 psi (34 bar)
	PEEK TUBING, 2.0 MM OD X 5' (1.5 M)			
	1590	0.042" (1.05 mm) ID	Natural	5,000 psi (345 bar)

APPLICATION NOTE

What Size PEEK Tubing Should I Use?

- It is usually safe to use 1/16" OD x 0.010" ID tubing throughout an analytical HPLC system. With a 0.010" ID, the pressure drop across most tubing lengths is negligible, and the ID is small enough to minimize band broadening.
- High pressure semi-prep LC systems will most likely use 1/8" OD tubing.
- Use 1.8 mm OD tubing to replace fluoropolymer tubing used in some Pharmacia®/GE Healthcare systems.
- Use our 1/32" OD tubing for the high pressure flow path of some microbore HPLC systems.
- Choose 360 µm OD tubing for most capillary systems.
- PEEK tubing is available in additional sizes and in 50' and 100' lengths. Contact your local Distributor or IDEX Health & Science directly for pricing information.

SPECIFICATIONS & DETAILS

Tubing OD	OD Tolerance
1/16"	±0.001" (25 µm)
1.8 mm	±0.002" (50 µm)
2.0 mm	±0.002" (50 µm)
1/8"	±0.003" (75 µm)

Tubing ID	ID Tolerance
25 µm	±0.0005" (12.5 µm)
All	±0.001" (25 µm)
All	±0.001" (25 µm)
All	±0.003" (75 µm)

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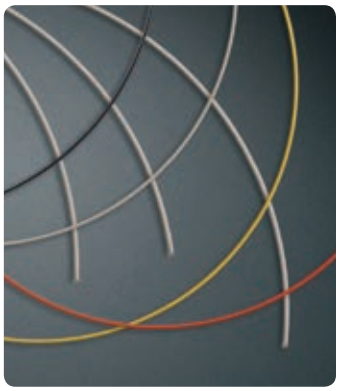
Capillary PEEK Tubing

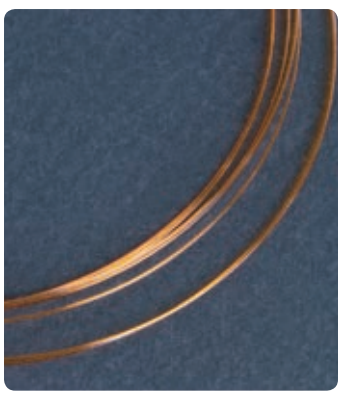
- 360 µm, 510 µm, or 1/32" outside diameter available
- IDs as small as 25 µm (0.001")



Capillary PEEK tubing offers all the benefits of larger sized PEEK tubing, while serving as an excellent alternative to more traditional fused silica and stainless steel capillary tubing (see Application Note, right). The capillary tubing can be coupled to many of the products in the Connectors chapter (starting on page 34) and to some of the valves in the Valves chapter (starting on page 124).

Fused Silica Tubing

- Five inner diameters with most common capillary outside diameter, 360 µm
- Cut in convenient lengths, up to 2 m



These products are manufactured from synthetic fused silica with a polyimide coating.

Part No.	ID	Color	Max. Pressure	Qty.
CAPILLARY PEEK TUBING, 360 µm OD				
1574	25 µm (0.001") ID x 5' (1.5 m)	Natural	5,000 psi (345 bar)	ea.
1570	50 µm (0.002") ID x 5' (1.5 m)	Natural	2,000 psi (138 bar)	ea.
1573	75 µm (0.003") ID x 5' (1.5 m)	Black	2,000 psi (138 bar)	ea.
1571	100 µm (0.004") ID x 5' (1.5 m)	Red	2,000 psi (138 bar)	ea.
1572	150 µm (0.006") ID x 5' (1.5 m)	Yellow	2,000 psi (138 bar)	ea.
CAPILLARY PEEK TUBING, 510 µm (0.020") OD				
1543	0.0025" (65 µm) ID x 5' (1.5 m)	Natural	2,000 psi (138 bar)	ea.
★ **1541**	0.005" (0.125 mm) ID x 5' (1.5 m)	Natural	2,000 psi (138 bar)	ea.
1542	0.010" (0.254 mm) ID x 5' (1.5 m)	Natural	2,000 psi (138 bar)	ea.
CAPILLARY PEEK TUBING, 1/32" OD				
1567	0.001" (25 µm) ID x 5' (1.5 m)	Natural	5,000 psi (345 bar)	ea.
1579	0.0025" (65 µm) ID x 5' (1.5 m)	Natural	5,000 psi (345 bar)	ea.
1578	0.0035" (90 µm) ID x 5' (1.5 m)	Black	5,000 psi (345 bar)	ea.
1576	0.005" (0.125 mm) ID x 5' (1.5 m)	Red	5,000 psi (345 bar)	ea.
1577	0.007" (0.175 mm) ID x 5' (1.5 m)	Yellow	5,000 psi (345 bar)	ea.
1575	0.008" (0.20 mm) ID x 5' (1.5 m)	Natural	5,000 psi (345 bar)	ea.
1580	0.009" (0.23 mm) ID x 5' (1.5 m)	Gray	5,000 psi (345 bar)	ea.
1581	0.010" (0.25 mm) ID x 5' (1.5 m)	Blue	5,000 psi (345 bar)	ea.
1568	0.015" (0.40 mm) ID x 5' (1.5 m)	Natural	5,000 psi (345 bar)	ea.
★ **1569**	0.020" (0.50 mm) ID x 5' (1.5 m)	Orange	3,000 psi (207 bar)	ea.
787-KIT	1/32" OD x 12" Kit Kit contains (1) 10-pack of each 1/32" OD x 12" size listed above.			Kit
FUSED SILICA TUBING, 360 µm OD				
★ **FS-120**	20 µm (0.0008") ID x 2 m (6.4')	Natural	10,000 psi (690 bar)	ea.
★ **FS-150**	50 µm (0.002") ID x 2 m (6.4')	Natural	10,000 psi (690 bar)	ea.
FS-175	75 µm (0.003") ID x 2 m (6.4')	Natural	10,000 psi (690 bar)	ea.
FS-110	100 µm (0.004") ID x 2 m (6.4')	Natural	10,000 psi (690 bar)	ea.
FS-115	150 µm (0.006") ID x 2 m (6.4')	Natural	10,000 psi (690 bar)	ea.

APPLICATION NOTE

- An independent study conducted by a major pharmaceutical company indicated LC-MS chromatographic performance could be improved in some cases by switching the post-column transfer line from fused silica to PEEK polymer tubing. The switch dramatically reduced peak tailing and eliminated the degradation of peak symmetry as injection volume was reduced. For more information, please contact us or order the "Improved LC-MS Results Study" from the "Request Literature" section of our website at www.idex-hs.com.
- To straighten PEEK polymer tubing, first choose a piece of stainless steel tubing with an inner diameter slightly larger than the OD of your tubing and with an appropriate length for the PEEK tubing you wish to straighten. For instance, for 1/16" OD PEEK tubing with a length of 10", choose our U-825 tubing (stainless steel, 1/8" OD x 0.080" ID x 25 cm long, page 64). Slip your PEEK tubing into the stainless steel tubing. Place this "sleeved" tubing into an oven and bake at 425 °F (218 °C) for 30 minutes or 350 °F (177 °C) for 60 minutes. Allow the sleeved tubing to return to room temperature naturally (i.e., do not quench it with water). Once cooled, remove the PEEK tubing from the stainless steel sleeve and inspect it for straightness. If needed, repeat the process until the desired straightness is achieved.

NOTE

Because the thru-hole of our 25 µm ID PEEK tubing is very small, it is possible for some fittings to cause the ID to become occluded. Please use caution, especially with wrench-tightened fittings. For more information, please contact IDEX Health & Science or your local Distributor directly.

SPECIFICATIONS & DETAILS

Capillary PEEK Tubing Specifications

Tubing OD	Tubing ID	OD/ID Tolerances
360 µm	All	±0.0005" (12.5 µm)
510 µm	All	±0.001" (25 µm)
1/32"	All	±0.0005" (12.5 µm)

Fused Silica Tubing Specifications

Tubing OD	Tubing ID	OD Tolerance	ID Tolerance
360 µm	20 µm (0.0008")	±0.0004" (10 µm)	±0.00008" (2 µm)
360 µm	50 µm (0.002") and 75 µm (0.003")	±0.0004" (10 µm)	±0.00012" (3 µm)
360 µm	100 µm (0.004") and 150 µm (0.006")	±0.0004" (10 µm)	±0.00016" (4 µm)

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PEEKsil™ Tubing

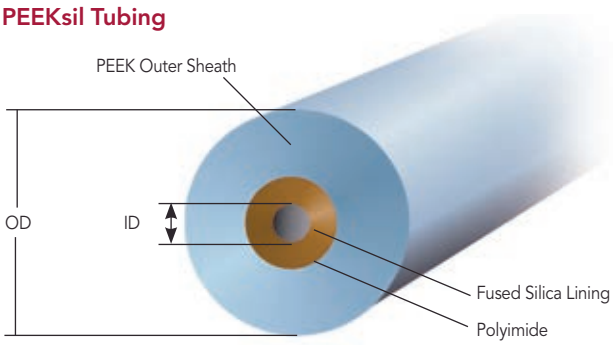
- PEEK covered fused silica
- 360 µm, 1/32", and 1/16" outside diameters with a wide variety of inside diameters
- Precut to numerous standard lengths

PEEKsil's sheathing is mechanically strong and has ideal characteristics for sealing with many styles of fittings. The fused silica core provides a consistent and rigid fluid pathway with very tight tolerances and industry-accepted chemical properties. Together, this makes PEEKsil tubing ideal for numerous applications. In fact, PEEKsil can be used as a direct replacement for conventional stainless steel or PEEK tubing in many analytical systems.

Like traditional fused silica tubing, PEEKsil has excellent chemical compatibility and extremely low adsorption characteristics, especially when compared with stainless steel.

Please Note: ***Do not cut this tubing.*** *It should be used at its precut lengths because of permanent damage caused by conventional cutters.*

PEEKsil Tubing



SPECIFICATIONS & DETAILS

Tubing OD	OD Tolerance
360 µm	±0.0004" (10 µm)
1/32"	±0.0008" (20 µm)
1/16"	±0.0012" (30 µm)

Tubing ID	ID Tolerance
25 µm	±0.00004" (1 µm)
50–100 µm	±0.00012" (3 µm)
0.15–0.30 mm	±0.0002" (5 µm)

Part No.	ID	Length	Color	Qty.
PEEKSIL TUBING, 360 µm OD				
360255	25 µm (0.001")	5 cm (2")	Orange	2-pk
3602510	25 µm (0.001")	10 cm (4")	Orange	2-pk
3602515	25 µm (0.001")	15 cm (6")	Orange	2-pk
3602525	25 µm (0.001")	25 cm (10")	Orange	2-pk
3602550	25 µm (0.001")	50 cm (1.6')	Orange	2-pk
360505	50 µm (0.002")	5 cm (2")	Natural	2-pk
3605010	50 µm (0.002")	10 cm (4")	Natural	2-pk
3605015	50 µm (0.002")	15 cm (6")	Natural	2-pk
3605025	50 µm (0.002")	25 cm (10")	Natural	2-pk
3605050	50 µm (0.002")	50 cm (1.6')	Natural	2-pk
PEEKSIL TUBING, 1/32" OD				
3255	25 µm (0.001")	5 cm (2")	Orange	2-pk
32510	25 µm (0.001")	10 cm (4")	Orange	2-pk
32515	25 µm (0.001")	15 cm (6")	Orange	2-pk
32520	25 µm (0.001")	20 cm (8")	Orange	2-pk
32550	25 µm (0.001")	50 cm (1.6')	Orange	2-pk
3505	50 µm (0.002")	5 cm (2")	Natural	2-pk
35010	50 µm (0.002")	10 cm (4")	Natural	2-pk
35015	50 µm (0.002")	15 cm (6")	Natural	2-pk
35020	50 µm (0.002")	20 cm (8")	Natural	2-pk

SPECIFICATIONS & DETAILS

Because PEEKsil tubing has fused silica tubing at its core, the pressure rating for this tubing is determined by the inner diameter of the tubing. The following chart highlights the Maximum Pressure values for this tubing, as determined by SGE International Pty., Ltd., the manufacturer of this tubing:

Tubing ID	Maximum Pressure
25 µm	25,000 psi (1,723 bar)
50 µm	20,000 psi (1,379 bar)
75–100 µm	15,000 psi (1,034 bar)

Tubing ID	Maximum Pressure
150–175 µm	8,500 psi (586 bar)
200–300 µm	6,000 psi (414 bar)

The pressure ratings provided are indicative of the performance capabilities of the tubing. The actual pressure limits achievable will depend upon the fittings used, the quality of the receiving port, and other factors. Contact IDEX Health & Science or your authorized Distributor for more information.

Part No.	ID	Length	Color	Qty.
PEEKSIL TUBING, 1/32" OD				
★ **35050**	50 µm (0.002")	50 cm (1.6')	Natural	2-pk
3755	75 µm (0.003")	5 cm (2")	Black	2-pk
37510	75 µm (0.003")	10 cm (4")	Black	2-pk
37515	75 µm (0.003")	15 cm (6")	Black	2-pk
37520	75 µm (0.003")	20 cm (8")	Black	2-pk
37550	75 µm (0.003")	50 cm (1.6')	Black	2-pk
31005	100 µm (0.004")	5 cm (2")	Red	2-pk
310010	100 µm (0.004")	10 cm (4")	Red	2-pk
310015	100 µm (0.004")	15 cm (6")	Red	2-pk
310020	100 µm (0.004")	20 cm (8")	Red	2-pk
310050	100 µm (0.004")	50 cm (1.6')	Red	2-pk
31505	150 µm (0.006")	5 cm (2")	Purple	2-pk
315010	150 µm (0.006")	10 cm (4")	Purple	2-pk
315015	150 µm (0.006")	15 cm (6")	Purple	2-pk
315020	150 µm (0.006")	20 cm (8")	Purple	2-pk
★ **315050**	150 µm (0.006")	50 cm (1.6')	Purple	2-pk
PEEKSIL TUBING, 1/16" OD				
6255	25 µm (0.001")	5 cm (2")	Orange	5-pk
62510	25 µm (0.001")	10 cm (4")	Orange	5-pk
62515	25 µm (0.001")	15 cm (6")	Orange	5-pk
62520	25 µm (0.001")	20 cm (8")	Orange	5-pk
62550	25 µm (0.001")	50 cm (1.6')	Orange	2-pk
6505	50 µm (0.002")	5 cm (2")	Natural	5-pk
65010	50 µm (0.002")	10 cm (4")	Natural	5-pk
65015	50 µm (0.002")	15 cm (6")	Natural	5-pk
★ **65020**	50 µm (0.002")	20 cm (8")	Natural	5-pk
65050	50 µm (0.002")	50 cm (1.6')	Natural	2-pk
6755	75 µm (0.003")	5 cm (2")	Black	5-pk
67510	75 µm (0.003")	10 cm (4")	Black	5-pk
67515	75 µm (0.003")	15 cm (6")	Black	5-pk
67520	75 µm (0.003")	20 cm (8")	Black	5-pk
67550	75 µm (0.003")	50 cm (1.6')	Black	2-pk
61005	100 µm (0.004")	5 cm (2")	Red	5-pk
610010	100 µm (0.004")	10 cm (4")	Red	5-pk
610015	100 µm (0.004")	15 cm (6")	Red	5-pk
610020	100 µm (0.004")	20 cm (8")	Red	5-pk
610050	100 µm (0.004")	50 cm (1.6')	Red	2-pk
61505	150 µm (0.006")	5 cm (2")	Purple	5-pk
615010	150 µm (0.006")	10 cm (4")	Purple	5-pk
615015	150 µm (0.006")	15 cm (6")	Purple	5-pk
615020	150 µm (0.006")	20 cm (8")	Purple	5-pk
615050	150 µm (0.006")	50 cm (1.6')	Purple	2-pk
61755	175 µm (0.007")	5 cm (2")	Yellow	5-pk
617510	175 µm (0.007")	10 cm (4")	Yellow	5-pk
617515	175 µm (0.007")	15 cm (6")	Yellow	5-pk
617520	175 µm (0.007")	20 cm (8")	Yellow	5-pk
617550	175 µm (0.007")	50 cm (1.6')	Yellow	2-pk
62005	200 µm (0.008")	5 cm (2")	Blue	5-pk
620010	200 µm (0.008")	10 cm (4")	Blue	5-pk
620015	200 µm (0.008")	15 cm (6")	Blue	5-pk
620020	200 µm (0.008")	20 cm (8")	Blue	5-pk
620050	200 µm (0.008")	50 cm (1.6')	Blue	2-pk
63005	300 µm (0.012")	5 cm (2")	Gray	5-pk
630010	300 µm (0.012")	10 cm (4")	Gray	5-pk
630015	300 µm (0.012")	15 cm (6")	Gray	5-pk
630020	300 µm (0.012")	20 cm (8")	Gray	5-pk
630050	300 µm (0.012")	50 cm (1.6')	Gray	2-pk

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Spiral-Link™ Tubing

- Preformed PEEK tubing into a convenient spiral for a sample loop or to facilitate tubing movement
- Many volumes available

The coils of our 1/16" OD Spiral-Link tubing expand and contract, allowing you to more easily move your system components or even make equipment repairs whenever needed, without the hassle of breaking connections.

Upchurch Scientific® Spiral-Link tubing is made of PEEK polymer, a biocompatible, chemically inert material. Spiral-Links come in six different lengths. Our proprietary extrusion process ensures color permanence.

Each Spiral-Link ships with two F-287 SealTight™ Fittings.

NOTE

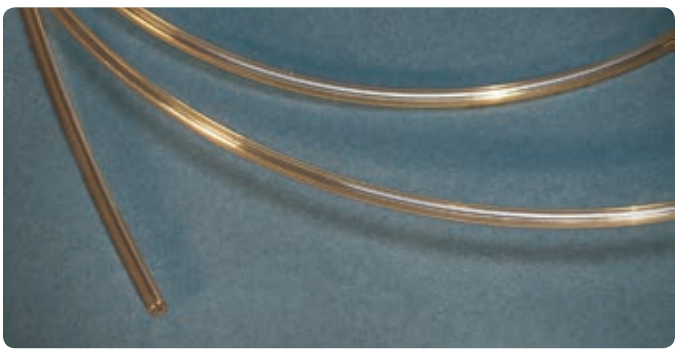
In addition to 0.010" ID shown in the price block below, Spiral-Link tubing is also available with the following IDs: 0.005" (125 µm), 0.020" (0.50 mm), and 0.030" (0.75 mm), all with 1/16" OD. Please contact us or an IDEX Health & Science Distributor for more information, or find these products at www.idex-hs.com.

Radel® Tubing

- Withstands up to 12,500 psi (862 bar)
- Transparent and autoclavable
- 1/16" and 1/8" outside diameters available
- Maximum continuous use temperature: 100 °C

Radel (polyphenylsulfone) is a mechanically strong and chemically resistant material, much like PEEK. Radel is frequently used in medical applications where repeated autoclave sterilization is performed (tests show product stability even after 1,000 cycles). Radel tubing is also transparent, allowing technicians to visually monitor flow through their instrument. Readily wetted surfaces help keep air bubbles from accumulating on inner surfaces.

Please visit our website, www.idex-hs.com, for more information regarding chemical compatibility of Radel.



SPECIFICATIONS & DETAILS

Tubing OD	OD Tolerance
1/16"	±0.001" (25 µm)
1/8"	±0.003" (75 µm)

Tubing ID	ID Tolerance
All	±0.001" (25 µm)
All	±0.003" (75 µm)

Part No.	ID	Length (Prior to Coiling)		Max coil span	Volume
SPIRAL LINK TUBING, 1/16" OD					
17202	0.25 mm (0.010")	20 cm (8")		1.3 cm (0.5")	10 µL
17204	0.25 mm (0.010")	40 cm (15.75")		6.1 cm (2.4")	20 µL
17205	0.25 mm (0.010")	50 cm (19.69")		7.6 cm (3.0")	25 µL
17210	0.25 mm (0.010")	100 cm (39.37")		17.8 cm (7.0")	51 µL
17220	0.25 mm (0.010")	200 cm (78.74")		33 cm (13.0")	101 µL
RADEL TUBING, 1/16" OD					
Part No.	**ID**	**Length**	**Color**	**Max Pressure**	**Volume**
1210	0.25 mm (0.010")	1.5 m (5')	Natural	12,500 psi (862 bar)	N/A
1210L	0.25 mm (0.010")	15 m (50')	Natural	12,500 psi (862 bar)	N/A
1210XL	0.25 mm (0.010")	30 m (100')	Natural	12,500 psi (862 bar)	N/A
1220	0.50 mm (0.020")	1.5 m (5')	Natural	7,500 psi (518 bar)	N/A
1220L	0.50 mm (0.020")	15 m (50')	Natural	7,500 psi (518 bar)	N/A
1220XL	0.50 mm (0.020")	30 m (100')	Natural	7,500 psi (518 bar)	N/A
1230	0.75 mm (0.030")	1.5 m (5')	Natural	5,500 psi (379 bar)	N/A
1230L	0.75 mm (0.030")	15 m (50')	Natural	5,500 psi (379 bar)	N/A
1230XL	0.75 mm (0.030")	30 m (100')	Natural	5,500 psi (379 bar)	N/A
RADEL TUBING, 1/8" OD					
1235	1.55 mm (0.062")	1.5 m (5')	Natural	4,500 psi (310 bar)	N/A
1235L	1.55 mm (0.062")	15 m (50')	Natural	4,500 psi (310 bar)	N/A
★ **1235XL**	1.55 mm (0.062")	30 m (100')	Natural	4,500 psi (310 bar)	N/A

RELATED PRODUCTS

- Some customers report using longer lengths of polymer tubing to add a little back pressure to their system. A more precise way to achieve this objective is to use one of our Back Pressure Regulators, found on page 152.

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TUBING	DuPont® FEP	DuPont PFA	DuPont HIGH PURITY PFA	360 µm DuPont HIGH PURITY PFA	ETFE
Page	71	72	72	72	73
Description	FEP tubing is a great alternative to traditional PTFE tubing, desirable for use because it is chemically inert to most solvents, easy to cut, and translucent for easy monitoring of solutions passing through. • Great for general, low pressure applications • Many sizes available in multiple colors for easy identification • Tight manufacturing tolerances to ensure product consistency	Offers excellent chemical compatibility, plus due to its inner surface smoothness, PFA tubing tends to be more translucent than PTFE tubing. • Offers higher purity and enhanced translucence when compared with other fluoropolymer tubes • Great for more critical, low pressure applications	This polymer tubing is manufactured from a premium grade of PFA — one of the most contaminant-free polymers on the market. • Offers chemical stability, mechanical strength, and purity for applications such as medical, diagnostic, pharmaceutical, biotechnology, and semiconductor • Excellent replacement for PTFE where gas permeability and surface texture are issues • Clarity of tubing makes PFA an excellent choice for monitoring fluid movement	This tubing offers excellent chemical compatibility, transparency, very low contaminant levels and is available in the most commonly-used outside diameter for capillary tubing applications. • Replacement for capillary tubing in low pressure applications where excellent chemical compatibility is required • Tubing sleeves available for capillary tubing connections	ETFE is chemically inert and more suitable for higher pressure applications (when using aqueous mobile phases) than PTFE, FEP, and PFA. Additionally, because ETFE is more rigid than PTFE, FEP, and PFA, this tubing better resists inner diameter collapse. • Excellent solvent resistance • More durable and less gas permeable than PTFE, FEP, and PFA • Operating temperatures up to 80 °C
Specifications					
OD (outside diameter)	1/32" (785 µm), 0.040" (1.0 mm), 1/16" (1.55 mm), 0.080" (2.0 mm), 0.118"(3.0 mm), 1/8" (3.2 mm), 0.157"(4.0 mm), 3/16" (4.8 mm), 1/4" (6.35 mm), 5/16" (7.94 mm)	1/16" (1.55 mm), 1/8" (3.2 mm)	1/16" (1.55 mm), 1/8" (3.2 mm), 3/16" (4.8 mm), 1/4" (6.35 mm)	0.0145" (360 µm)	1/16" (1.6 mm), 1/8" (3.2 mm), 1/4" (6.35 mm)
ID (inside diameter)	0.003" (0.075 mm) – 0.250" (6.35 mm)	0.020" (0.50 mm)– 0.062" (1.55 mm)	0.020" (0.50 mm)– 0.188" (4.80 mm)	0.002" (50 µm)– 0.006" (150 µm)	0.010" (0.25 mm)– 0.188" (4.80 mm)
Operating Temp	-51 to 50 °C	-51 to 80 °C	-51 to 80 °C	-51 to 80 °C	-51 to 80 °C
Pressure Rating	2,500–4,000 psi (172 - 276 bar)	500–2,000 psi (34–138 bar)	250–2,000 psi (17–138 bar)	1,750–3,500 psi (121–241 bar)	250–4,000 psi (17–276 bar)
Typical Tolerances	±0.001" (25 µm) for 1/16" OD tubing, ±0.003" (75 µm) for 1/8" OD tubing	±0.001" (25 µm) for 1/16" OD tubing, ±0.003" (75 µm) for 1/8" OD tubing	±0.001" (25 µm) for 1/16" OD tubing	±0.0005" (12.5 µm)	±0.001" (25 µm) for 1/16" OD tubing, ±0.003" (75 µm) for 1/8" OD tubing
Refractive Index (Clarity)	1.338	1.34	1.34	1.34	1.4
pH Range	0–14	0–14	0–14	0–14	0–14
Sterilization Techniques	Ethylene oxide; thermal	Ethylene oxide; thermal	Gamma irradiation; ethylene oxide; thermal	Gamma irradiation; ethylene oxide; thermal	Ethylene oxide
Autoclavable?	Y	Y	Y	Y	Y

Upchurch Scientific® Tubing OD Sizes

Please use this table as a reference tool to help quickly locate within this chapter the appropriate OD size tubing for your application.

Size	Tubing OD	Page(s)
.	360 µm	67, 68, 72
•	510 µm	65, 67
•	1/32"	65, 67, 68, 71
•	1/16"	63, 65, 66, 68, 69, 71, 72, 73, 77
•	1/8"	65, 66, 69, 71, 72, 73
•	3/16"	71, 72
•	1/4"	71, 72, 73

Size	Tubing OD	Page(s)
•	5/16"	71
•	1 mm	71
•	1.8 mm	66
•	2 mm	66, 71
•	3 mm	71
•	4 mm	71

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DuPont® FEP Fluoropolymer Tubing

- Great for moderate-to-low pressure applications
- 1/32", 1/16", 1/8", 3/16", 1/4", or 5/16" outside diameter available
- 1 mm, 2 mm, 3 mm, or 4 mm outside diameter available
- Maximum continuous use temperature: 50 °C

With virtually identical chemical resistance to PFA at a lower price, FEP tubing is great for general, low pressure applications. Compared to PTFE, FEP (fluorinated ethylene propylene) tubing is held to tighter tolerances and has lower gas permeability (see material properties on our website: www.idex-hs.com).

Much of our FEP Tubing — even the color-tinted options — is translucent, making it possible to watch fluid flow. Using different colored tubing can help identify transfer lines in multisolvent systems. Color coding also allows easy identification of the tubing thru-hole size. Black FEP tubing is available for light-sensitive applications (such as enzymatic and chemi-luminescent reactions) and entering/exiting flow cells.

SPECIFICATIONS & DETAILS

Tubing Size	OD Tolerances	ID Tolerances
1/32" OD	±0.0005" (12.5 µm)	±0.0005" (12.5 µm)
1/16" OD	±0.001" (25 µm)	±0.001" (25 µm)
1/8" OD	±0.003" (75 µm)	±0.003" (75 µm)
3/16" OD	±0.004" (0.10 mm)	±0.004" (0.10 mm)
5/16" OD	±0.004" (0.10 mm)	±0.004" (0.10 mm)
1 mm OD	±0.001" (25 µm)	±0.001" (25 µm)
2 mm OD	±0.003" (75 µm)	±0.003" (75 µm)
3 mm OD	±0.003" (75 µm)	±0.003" (75 µm)
4 mm OD	±0.004" (0.10 mm)	±0.004" (0.10 mm)

Part No.	ID	Length	Color	Max. Pressure
FEP TUBING, 1/32" OD				
1683	0.003" (75 µm)	5' (1.5 m)	Natural	4,000 psi (276 bar)
1684	0.004" (0.10 mm)	5' (1.5 m)	Black	3,000 psi (207 bar)
1685	0.005" (0.125 mm)	5' (1.5 m)	Red	3,000 psi (207 bar)
1686	0.006" (0.15 mm)	5' (1.5 m)	Violet	3,000 psi (207 bar)
1687	0.007" (0.175 mm)	5' (1.5 m)	Yellow	3,000 psi (207 bar)
1688	0.008" (0.20 mm)	5' (1.5 m)	Natural	2,500 psi (172 bar)
1689	0.009" (0.23 mm)	5' (1.5 m)	Blue	2,500 psi (172 bar)
1692	0.016" (0.405 mm)	5' (1.5 m)	Natural	1,500 psi (104 bar)
FEP TUBING, 1/16" OD				
1474	0.004" (0.10 mm)	10' (3 m)	Black	4,000 psi (276 bar)
1475	0.005" (0.125 mm)	10' (3 m)	Red	4,000 psi (276 bar)
1476	0.006" (0.150 mm)	10' (3 m)	Violet	4,00t0 psi (276 bar)
1477	0.007" (0.175 mm)	10' (3 m)	Yellow	4,000 psi (276 bar)
1478	0.008" (0.20 mm)	10' (3 m)	Natural	4,000 psi (276 bar)
1479	0.009" (0.23 mm)	10' (3 m)	Blue	4,000 psi (276 bar)
1526	0.010" (0.25 mm)	10' (3 m)	Natural	3,000 psi (207 bar)
1526B	0.010" (0.25 mm)	10' (3 m)	Blue	3,000 psi (207 bar)
1527	0.010" (0.25 mm)	20' (6 m)	Natural	3,000 psi (207 bar)
1527B	0.010" (0.25 mm)	20' (6 m)	Blue	3,000 psi (207 bar)
1518	0.020" (0.50 mm)	10' (3 m)	Black	2,000 psi (138 bar)
1549	0.020" (0.50 mm)	10' (3 m)	Natural	2,000 psi (138 bar)
1549OR	0.020" (0.50 mm)	10' (3 m)	Orange	2,000 psi (138 bar)
1519	0.020" (0.50 mm)	20' (6 m)	Black	2,000 psi (138 bar)
★ **1548**	0.020" (0.50 mm)	20' (6 m)	Natural	2,000 psi (138 bar)
1548OR	0.020" (0.50 mm)	20' (6 m)	Orange	2,000 psi (138 bar)
1522	0.030" (0.75 mm)	10' (3 m)	Natural	1,000 psi (69 bar)
1522G	0.030" (0.75 mm)	10' (3 m)	Green	1,000 psi (69 bar)
★ **1520**	0.030" (0.75 mm)	20' (6 m)	Natural	1,000 psi (69 bar)
1520G	0.030" (0.75 mm)	20' (6 m)	Green	1,000 psi (69 bar)

Part No.	ID	Length	Color	Max. Pressure
FEP TUBING, 1/8" OD				
★ **1521**	0.062" (1.55 mm)	20' (6 m)	Natural	500 psi (34 bar)
1521BL	0.062" (1.55 mm)	50' (15 m)	Blue	500 psi (34 bar)
1521GL	0.062" (1.55 mm)	50' (15 m)	Green	500 psi (34 bar)
1521ORL	0.062" (1.55 mm)	50' (15 m)	Orange	500 psi (34 bar)
1521RL	0.062" (1.55 mm)	50' (15 m)	Red	500 psi (34 bar)
1521YL	0.062" (1.55 mm)	50' (15 m)	Yellow	500 psi (34 bar)
1523	0.062" (1.55 mm)	10' (3 m)	Natural	500 psi (34 bar)
FEP TUBING, 3/16" OD				
1524	0.125" (3.20 mm)	20' (6 m)	Natural	500 psi (34 bar)
1524L	0.125" (3.20 mm)	50' (15 m)	Natural	500 psi (34 bar)
★ **1524XL**	0.125" (3.20 mm)	100' (30 m)	Natural	500 psi (34 bar)
1525	0.125" (3.20 mm)	10' (3 m)	Natural	500 psi (34 bar)
FEP TUBING, 1/4" OD				
1651	0.156" (4.0 mm)	10' (3 m)	Natural	250 psi (17 bar)
1651L	0.156" (4.0 mm)	50' (15 m)	Natural	250 psi (17 bar)
1651XL	0.156" (4.0 mm)	100' (30 m)	Natural	250 psi (17 bar)
1650	0.188" (4.80 mm)	10' (3 m)	Natural	250 psi (17 bar)
1650L	0.188" (4.80 mm)	50' (15 m)	Natural	250 psi (17 bar)
1650XL	0.188" (4.80 mm)	100' (30 m)	Natural	250 psi (17 bar)
FEP TUBING, 5/16" OD				
1652	0.250" (6.35 mm)	10' (3 m)	Natural	250 psi (17 bar)
1652L	0.250" (6.35 mm)	50' (15 m)	Natural	250 psi (17 bar)
1652XL	0.250" (6.35 mm)	100' (30 m)	Natural	250 psi (17 bar)
FEP TUBING, 1.0 mm OD				
1671	0.020" (0.50 mm)	10' (3 m)	Natural	500 psi (34 bar)
1671L	0.020" (0.50 mm)	50' (15 m)	Natural	500 psi (34 bar)
1671XL	0.020" (0.50 mm)	100' (30 m)	Natural	500 psi (34 bar)
FEP TUBING, 2.0 mm OD				
1673	0.040" (1.0 mm)	10' (3 m)	Natural	500 psi (34 bar)
1673L	0.040" (1.0 mm)	50' (15 m)	Natural	500 psi (34 bar)
1673XL	0.040" (1.0 mm)	100' (30 m)	Natural	500 psi (34 bar)
FEP TUBING, 3.0 mm OD				
1675	0.040" (1.0 mm)	10' (3 m)	Natural	500 psi (34 bar)
1675L	0.040" (1.0 mm)	50' (15 m)	Natural	500 psi (34 bar)
1675XL	0.040" (1.0 mm)	100' (30 m)	Natural	500 psi (34 bar)
1677	0.080" (2.0 mm)	10' (3 m)	Natural	500 psi (34 bar)
1677L	0.080" (2.0 mm)	50' (15 m)	Natural	500 psi (34 bar)
1677XL	0.080" (2.0 mm)	100' (30 m)	Natural	500 psi (34 bar)
FEP TUBING, 4.0 mm OD				
1679	0.120" (3.0 mm)	10' (3 m)	Natural	500 psi (34 bar)
1679L	0.120" (3.0 mm)	50' (15 m)	Natural	500 psi (34 bar)
1679XL	0.120" (3.0 mm)	100' (30 m)	Natural	500 psi (34 bar)

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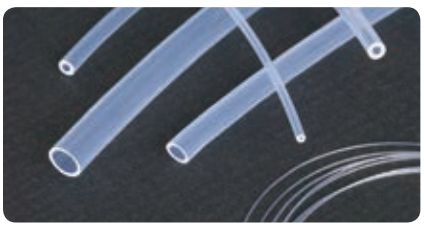
DuPont® PFA Tubing

- 1/16" and 1/8" ODs available
- Excellent solvent resistance and low gas permeability

PFA (perfluoroalkoxyalkane) tubing offers excellent solvent resistance (virtually identical to FEP and PTFE) while adding several advantages. These include smoother surface texture, higher continuous service temperature and superior polymer purity. The recommended maximum operating temperature for our PFA tubing is 80 °C.



DuPont High Purity PFA Tubing

- 360 µm, 1/16", 1/8", 3/16", and 1/4" outside diameters available
- PFA HP and PFA HP Plus Grades available
- Virtually contaminant free

PFA High Purity (HP) tubing offers all of the benefits of standard PFA tubing, with the additional benefit of being manufactured from a premium grade of PFA that is one of the most contaminant-free polymers available. In PFA HP, we offer tubing with the following outer diameters: 1/16", 1/8", 3/16", and 1/4".

PFA High Purity (HP) Plus tubing carries all of the benefits of PFA HP tubing, with the additional benefits of increased ability to withstand repeated flexing; improved resistance to stress cracking when exposed to aggressive fluorosurfactants; and smoother, clearer walls. In PFA HP Plus, we offer tubing with the following outer diameters: 360 µm, 1/16", and 1/8".

(Please Note: Due to the physical nature of the 360 µm OD tubing, we recommend using our A-350 Polymer Tubing Cutter from page 74 when cutting this tubing to length. Additionally, extra care should be taken to ensure fittings are not overtightened and to ensure the tubing is not stretched once secured in place, to ensure the dimensional stability of the tubing.)

Part No.	ID	Length	Color	Max. Pressure
PFA TUBING, 1/16" OD				
1500	0.020" (0.50 mm)	5' (1.5 m)	Natural	2,000 psi (138 bar)
1511	0.020" (0.50 mm)	10' (3 m)	Natural	2,000 psi (138 bar)
1512	0.020" (0.50 mm)	20' (6 m)	Natural	2,000 psi (138 bar)
1512L	0.020" (0.50 mm)	50' (15 m)	Natural	2,000 psi (138 bar)
1502	0.030" (0.75 mm)	5' (1.5 m)	Natural	1,000 psi (69 bar)
1513	0.030" (0.75 mm)	10' (3 m)	Natural	1,000 psi (69 bar)
1514	0.030" (0.75 mm)	20' (6 m)	Natural	1,000 psi (69 bar)
★ **1514L**	0.030" (0.75 mm)	50' (15 m)	Natural	1,000 psi (69 bar)
1503	0.040" (1.0 mm)	5' (1.5 m)	Natural	500 psi (34 bar)
1504	0.040" (1.0 mm)	10' (3 m)	Natural	500 psi (34 bar)
1507	0.040" (1.0 mm)	20' (6 m)	Natural	500 psi (34 bar)
1507L	0.040" (1.0 mm)	50' (15 m)	Natural	500 psi (34 bar)
PFA TUBING, 1/8" OD				
1508	0.062" (1.55 mm)	10' (3 m)	Natural	500 psi (34 bar)
★ **1509**	0.062" (1.55 mm)	20' (6 m)	Natural	500 psi (34 bar)
1509L	0.062" (1.55 mm)	50' (15 m)	Natural	500 psi (34 bar)
PFA TUBING, 1/4" OD				
1649	0.156" (4.0 mm)	10' (3 m)	Natural	250 psi (17 bar)
1649L	0.156" (4.0 mm)	50' (15 m)	Natural	250 psi (17 bar)
1649XL	0.156" (4.0 mm)	100' (30 m)	Natural	250 psi (17 bar)
PFA HP TUBING, 1/16" OD				
1620	0.020" (0.50 mm)	5' (1.5 m)	Natural	2,000 psi (138 bar)
1621	0.020" (0.50 mm)	10' (3 m)	Natural	2,000 psi (138 bar)
1622	0.020" (0.50 mm)	20' (6 m)	Natural	2,000 psi (138 bar)
1622L	0.020" (0.50 mm)	50' (15 m)	Natural	2,000 psi (138 bar)
1630	0.030" (0.75 mm)	5' (1.5 m)	Natural	1,000 psi (69 bar)
1631	0.030" (0.75 mm)	10' (3 m)	Natural	1,000 psi (69 bar)
1632	0.030" (0.75 mm)	20' (6 m)	Natural	1,000 psi (69 bar)
1632L	0.030" (0.75 mm)	50' (15 m)	Natural	1,000 psi (69 bar)
PFA HP TUBING, 1/8" OD				
1640	0.062" (1.55 mm)	10' (3 m)	Natural	500 psi (34 bar)
1641	0.062" (1.55 mm)	20' (6 m)	Natural	500 psi (34 bar)
★ **1641L**	0.062" (1.55 mm)	50' (15 m)	Natural	500 psi (34 bar)
PFA HP TUBING, 3/16" OD				
1642	0.125" (3.20 mm)	10' (3 m)	Natural	250 psi (17 bar)
1642L	0.125" (3.20 mm)	50' (15 m)	Natural	250 psi (17 bar)
1642XL	0.125" (3.20 mm)	100' (30 m)	Natural	250 psi (17 bar)
PFA HP TUBING, 1/4" OD				
1645	0.188" (4.80 mm)	10' (3 m)	Natural	250 psi (17 bar)
1645L	0.188" (4.80 mm)	50' (15 m)	Natural	250 psi (17 bar)
1645XL	0.188" (4.80 mm)	100' (30 m)	Natural	250 psi (17 bar)
PFA HP PLUS TUBING, 1/16" OD				
1900	0.010" (0.25 mm)	5' (1.5 m)	Natural	3,000 psi (207 bar)
1901	0.010" (0.25 mm)	10' (3 m)	Natural	3,000 psi (207 bar)
1902	0.010" (0.25 mm)	20' (6 m)	Natural	3,000 psi (207 bar)
1902L	0.010" (0.25 mm)	50' (15 m)	Natural	3,000 psi (207 bar)
1905	0.020" (0.50 mm)	5' (1.5 m)	Natural	2,000 psi (138 bar)
1906	0.020" (0.50 mm)	10' (3 m)	Natural	2,000 psi (138 bar)
1907	0.020" (0.50 mm)	20' (6 m)	Natural	2,000 psi (138 bar)
1907L	0.020" (0.50 mm)	50' (15 m)	Natural	2,000 psi (138 bar)
1910	0.030" (0.75 mm)	5' (1.5 m)	Natural	1,000 psi (69 bar)
1911	0.030" (0.75 mm)	10' (3 m)	Natural	1,000 psi (69 bar)
1912	0.030" (0.75 mm)	20' (6 m)	Natural	1,000 psi (69 bar)
1912L	0.030" (0.75 mm)	50' (15 m)	Natural	1,000 psi (69 bar)
PFA HP PLUS TUBING, 1/8" OD				
1920	0.062" (1.55 mm)	10' (3 m)	Natural	500 psi (34 bar)
1921	0.062" (1.55 mm)	20' (6 m)	Natural	500 psi (34 bar)
1921L	0.062" (1.55 mm)	50' (15 m)	Natural	500 psi (34 bar)
PFA HP PLUS TUBING, 360 µm OD				
1930	50 µm (0.002")	5' (1.5 m)	Natural	3,500 psi (241 bar)
1931	75 µm (0.003")	5' (1.5 m)	Natural	3,000 psi (207 bar)
1932	100 µm (0.004")	5' (1.5 m)	Natural	2,500 psi (172 bar)
1933	150 µm (0.006")	5' (1.5 m)	Natural	1,750 psi (121 bar)

SPECIFICATIONS & DETAILS

PFA Tubing Specifications

Tubing OD	OD Tolerances	Tubing ID	ID Tolerance
1/16"	±0.001" (25 µm)	All	±0.001" (25 µm)
1/8"	±0.003" (75 µm)	All	±0.003" (75 µm)

High Purity PFA Tubing Specifications

Tubing OD	OD Tolerances	Tubing ID	ID Tolerance
1/16"	±0.001" (25 µm)	All	±0.001" (25 µm)
1/8"	±0.003" (75 µm)	All	±0.003" (75 µm)
3/16"	±0.003" (75 µm)	All	±0.003" (75 µm)
1/4"	±0.004" (100 µm)	All	±0.004" (100 µm)

360 µm OD PFA HP Tubing Specifications

Tubing OD	OD Tolerance	Tubing ID	ID Tolerance
360 µm	±0.0005" (12.5 µm)	All	±0.0005" (12.5 µm)

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ETFE Tubing

- Excellent chemical resistance
- Holds pressure up to 4,000 psi (276 bar)
- 1/16", 1/8", or 1/4" outside diameter available
- Maximum continuous operating temperature: 80 °C

Upchurch Scientific® ETFE (ethylene-tetrafluoroethylene) tubing is an excellent fluoropolymer product that offers several benefits over tubing manufactured from PTFE, FEP, or PFA. These benefits include enhanced pressure holding capabilities, increased mechanical stability and lower gas permeability.

Other tubing materials and dimensions may be available. Please contact IDEX Health & Science or your local representative directly.

APPLICATION NOTE

ETFE tubing is an ideal choice for the fluid pathway between the vacuum degasser and the system's pump. Its low gas permeability will help ensure the mobile phase solvents do not regas while in transit.

SPECIFICATIONS & DETAILS

ETFE Tubing Specifications

Tubing OD	Tubing ID	OD/ID Tolerances
1/16" OD	0.010" (0.25 mm), 0.020" (0.50 mm), 0.030" (0.75 mm)	±0.001" (25 µm)
1/16" OD	0.040" (1.0 mm)	±0.002" (50 µm)
1/8" OD	All	±0.003" (75 µm)
1/4" OD	All	±0.004" (100 µm)

	Part No.	ID	Length	Color	Max. Pressure
	ETFE TUBING, 1/16" OD				
	1529	0.010" (0.25 mm)	5' (1.5 m)	Natural	4,000 psi (276 bar)
	1529L	0.010" (0.25 mm)	50' (15 m)	Natural	4,000 psi (276 bar)
	1529XL	0.010" (0.25 mm)	100' (30 m)	Natural	4,000 psi (276 bar)
	1516	0.020" (0.50 mm)	5' (1.5 m)	Natural	3,000 psi (207 bar)
	1516L	0.020" (0.50 mm)	50' (15 m)	Natural	3,000 psi (207 bar)
★	1516XL	0.020" (0.50 mm)	100' (30 m)	Natural	3,000 psi (207 bar)
	1528	0.030" (0.75 mm)	5' (1.5 m)	Natural	2,000 psi (138 bar)
	1528L	0.030" (0.75 mm)	50' (15 m)	Natural	2,000 psi (138 bar)
★	1528XL	0.030" (0.75 mm)	100' (30 m)	Natural	2,000 psi (138 bar)
	1517	0.040" (1.00 mm)	5' (1.5 m)	Natural	500 psi (34 bar)
	1517L	0.040" (1.00 mm)	50' (15 m)	Natural	500 psi (34 bar)
	1517XL	0.040" (1.00 mm)	100' (30 m)	Natural	500 psi (34 bar)
	ETFE TUBING, 1/8" OD				
	1515	0.062" (1.55 mm)	5' (1.5 m)	Black	1,000 psi (69 bar)
	1515L	0.062" (1.55 mm)	50' (15 m)	Black	1,000 psi (69 bar)
	1515XL	0.062" (1.55 mm)	100' (30 m)	Black	1,000 psi (69 bar)
★	1530	0.062" (1.55 mm)	5' (1.5 m)	Natural	1,000 psi (69 bar)
	1530L	0.062" (1.55 mm)	50' (15 m)	Natural	1,000 psi (69 bar)
★	1530XL	0.062" (1.55 mm)	100' (30 m)	Natural	1,000 psi (69 bar)
	1648	0.093" (2.40 mm)	5' (1.5 m)	Natural	500 psi (34 bar)
	1648L	0.093" (2.40 mm)	50' (15 m)	Natural	500 psi (34 bar)
★	1648XL	0.093" (2.40 mm)	100' (30 m)	Natural	500 psi (34 bar)
	ETFE TUBING, 1/4" OD				
	1647	0.188" (4.80 mm)	5' (1.5 m)	Natural	250 psi (17 bar)
	1647L	0.188" (4.80 mm)	50' (15 m)	Natural	250 psi (17 bar)
	1647XL	0.188" (4.80 mm)	100' (30 m)	Natural	250 psi (17 bar)

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Fused Silica Tubing Cutters

FS-315
for fused silica tubing

We offer a precision cutter for fused silica tubing — SGT's Shortix™ Cutter (FS-315). This cutter ensures clean, trouble-free cutting of fused silica tubing, providing better cuts than any other product on the market. It also includes a built-in magnifying glass to examine the cut tubing ends. Order the FS-315-02 Maintenance Kit, as needed, to replace a worn or damaged cutting wheel.

When using traditional fused silica tubing cutters, only a small part of the tubing wall is scratched, then the tubing is snapped or pulled in two, often resulting in a jagged, uneven cut. With a Shortix Cutter, a clean cut is made every time, regardless of skill or experience, as the cut is made by rotating a diamond blade around the entire circumference of the tubing.

Please Note: The FS-315 Fused Silica Tubing Cutters are designed to cut only tubing with ODs of 350 µm–780 µm and IDs of 100 µm–350 µm.

Polymer Tubing Cutters

- For 1/16", 1/8", 3/16", 1/4", and 5/16" OD tubing

A flat, 90˚, burr-free cut is difficult to obtain with most commercial polymer tubing cutters. Upchurch Scientific® has designed several tubing cutters specifically to cut polymer tubing. This line of tubing cutters includes a standard cutter for 1/16" and 1/8" OD tubing (A-327), and another for large bore tubing (A-329). Each has guide holes to ensure precise cutting. These cutters are durable, reliable, and easy to operate. Five replacement blades are included with each tool.

A-329
for 3/16" - 5/16" OD tubing

A-327
for 1/16" and 1/8" OD tubing

NOTE

- The A-350 Capillary Polymer Tubing Cutter can be used to cut tubing OD sizes other than 360 µm, 510 µm, and 1/32". Simply use the proper NanoTight™ Tubing Sleeve found on page 17. Please note, however, that these sleeves are shorter than those listed on this page, and therefore will last through fewer cuts.
- Our tubing cutters are material specific: the A-327, A-329, A-350, and A-370 should only be used to cut polymer tubing, where as the FS-315 should only be used to cut fused silica tubing.

Capillary Polymer Tubing Cutters

The Upchurch Scientific A-350 Cutter is designed to cut capillary-sized polymer tubing. The cutter makes clean, perpendicular cuts without collapsing thin capillary walls. A set of ten tubing sleeves, required for cutting, are included with each cutter, along with five replacement blades. The included tubing sleeves are for cutting 360 µm OD polymer capillary tubing. Alternative sleeves are available for cutting 510 µm and 1/32" OD tubing. All tubing sleeves are 2" long and are made of DuPont® FEP.

Upchurch Scientific introduces a new tubing cutter specifically for cutting 2.0 mm OD polymer tubing. The A-370 tubing cutter is designed to cut in a similar method to the A-350 capillary polymer tubing cutter. The tubing slides through the cutter and the knob is rotated to spin the tubing as the razor blade circumscribes the tubing, providing a very clean, perpendicular cut.

A-350
for capillary polymer tubing

	Part No.	Description	Qty.
	FS-315	Shortix Fused Silica Tubing Cutter	ea.
		CAPILLARY POLYMER TUBING CUTTER	
★	**A-350**	Capillary Polymer Tubing Cutter* for 360 µm–1/32" OD tubing Includes (1) F-262x 10-pack of sleeves and (1) M-438-03 wrench	ea.
	F-262x	Replacement Sleeves for A-350, 0.0155" ID, Green, for cutting 360 µm OD tubing	10-pk
	F-264x	Alternative Sleeves for A-350, 0.021" ID, Natural, for cutting 510 µm OD tubing	10-pk
	F-267Bx	Alternative Sleeves for A-350, 0.033" ID, Blue, for cutting 1/32" OD tubing	10-pk
★	**A-327**	Standard Polymer Tubing Cutter* for 1/16" and 1/8" OD tubing	ea.
	A-329	Large Bore Polymer Tubing Cutter* for 3/16"– 5/16" OD tubing	ea.
	A-328	Replacement Blades for A-350, A-370, A-327 and A-329	5-pk
NEW!	**A-370**	Polymer Tubing Cutter* for 2.0 mm OD tubing	ea.

** Includes (1) A-328 5-pack of replacement blades.*

TUBING	TYGON® LMT-55	TYGON E-LFL	ISMAPRENE (PHARMED®)	TYGON 3350 SI	SILICONE PEROXIDE
Page	78	78	79	79	80
Description	The inexpensive all-round tubing for general laboratory applications. • Transparent • Resistant to almost all inorganic chemicals • Smooth polished inner wall • Low gas permeability • Non-aging and non-oxidizing	The tubing with the longest service-life of any clear Tygon tubing. • Transparent • Broad chemical resistance • Tasteless • Extremely low particulate spallation • Meets USP Class VI and FDA criteria • Non-aging	The ideal tubing for pharmaceutical and medical applications, and for foodstuffs. • Recommended for cell cultures and tissue • Ideal for production filtration, fermentation, and bioreactor process lines • Very long service-life • Non-toxic and non-hemolytic • Impermeable to normal light and UV-radiation • Appropriate for medical products and foodstuffs • Low particulate spallation • Can be autoclaved repeatedly • Withstands repeated CIP and SIP cleaning and sterilization • Meets USP class VI, FDA, and NSF criteria	The platinum-cured silicone tubing with an ultra-smooth inner surface for sanitary transfer of sensitive fluids. • Can be autoclaved with steam • Excellent biological compatibility • Ultra-smooth inner-bore reduces potential for particle entrapment • Lower level of protein binding • Entirely non-toxic, non-hemolytic and non-pyrogenic • Weather, ozone, sunlight, and radiation resistant • Resistant to fungus • Odorless	Silicone tubing blended with organic peroxide for biological applications. • Can be autoclaved with steam • Excellent biological compatibility • Greater physical compression capability • Not prone to mold • Non-toxic • Waterproof and resistant to ozone, radiation, and sunlight • Resistant to fungus • Odorless
Specifications					
OD (outside diameter)	0.16–0.88″ (4.0–22.3 mm)	0.19–0.75″ (4.8–19.1 mm)	0.16–1.3″ (4.0–33.4 mm)	0.16–1.3″ (4.0–33.4 mm)	0.16–1.3″ (4.0–33.4 mm)
ID (inside diameter)	0.03–0.61″ (0.8–15.9 mm)	0.06–0.5″ (1.6–12.7 mm)	0.03–1″ (0.8–25.4 mm)	0.03–1″ (0.8–25.4 mm)	0.03–1″ (0.8–25.4 mm)
Operating Temp	-50 to 74 °C	-50 to 74 °C	-60 to 135 °C	-60 to +200 °C	-51 to 238 °C
Certification(s)		FDA 21 CFR 175.300; US Pharmacopoeia Class VI	FDA 21 CFR 177.2600; US Pharmacopoea Class VI, NSF listed (Standard 51)	FDA 21 CFR, 177.2600, Also exceeds 3A sanitary standards; US Pharmacopoea XXIII Cl.VI;	FDA 21 CFR 177.2600; US Pharmacopoea XXIII Cl.VI
Chemical Resistance					
Acids	Good	Fair	Good	Limited	Limited
Alkaline Solutions	Good	Fair	Good	Limited	Good
Solvents	Not Recommended	Not Recommended	Not Recommended	Limited	Not Recommended
Pressure	Fair	Good	Not Recommended	Not Recommended	Not Recommended
Vacuum	Good	Good	Excellent	Good	Good
Viscous Media	Excellent	Excellent	Good	Fair	Fair
Sterile Media	Limited	Limited	Excellent	Excellent	Excellent
Gas Permeability (at 25 °C)*					
CO_2	360	720	1200	25147	25147
H_2	—	—	—	—	—
0_2	80	160	200	4715	4715
N_2	40	80	80	2284	2284

** Permeability Coefficient =* $\frac{\text{Amount of Gas (cm}^3\text{) x tubing wall thickness (cm)}}{\text{Surface Area of tubing ID (cm}^2\text{) x time (sec) x pressure drop across tubing wall (cm Hg)}} \times 10^{-10}$

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TUBING	TYGON 2001	TYGON MHLL	TYGON HC F-4040-A	NORPRENE® A-60-G	FLURAN® F-5500-A
Page	80	81	81	82	82
Description	The transparent, plasticizer-free tubing with superior pump-life. Especially designed for MEK and other aggressive solvents. • Plasticizer and oil-free • Smooth inner-bore • Low sorption maintains fluid and tube integrity • Does not impart anything into the pumping medium • No release of hazardous materials when properly incinerated	Chemically resistant to Acetone, MEK and other aggressive solvents. Long life tubing. • Plasticizer-free • Smooth inner-bore • Low sorption maintains fluid integrity • Minimal adhesion and diffusion • Suitable for MEK, Acetone and other corrosive solvents • Long life tubing	The special tubing for hydrocarbons, petroleum products and distillates. • Specially formulated to transport hydrocarbons, petroleum products and distillates • Ideal for gasoline, kerosene, heating oils, cutting liquids and coolants based on glycols • Low gas permeability	The high performance tubing for industrial use. • Offers longest service-life with good flow consistency • Good resistance to acids and alkaline chemicals • Superior weathering • Abrasion resistant • Non-aging and non-oxidizing • Outstanding flexural fatigue resistance • Low gas permeability versus rubber tubing • Ozone (300 pphm) and UV light resistant • Ideal for use in vacuum system	The special tubing for concentrated acids and corrosive solvents. • High chemical resistance • Low gas permeability • Wide temperature range
Specifications					
OD (outside diameter)	0.19–0.88″ (4.8–22.3 mm)	0.09–0.18″ (2.22–4.63 mm)	0.19–0.75″ (4.8–19.1 mm)	0.16–0.9″ (4.0–22.3 mm)	0.16–0.6″ (4.0–15.9 mm)
ID (inside diameter)	0.06–0.61″ (1.6–15.9 mm)	0.01–0.1″ (0.38–2.79 mm)	0.06–0.5″ (1.6–12.7 mm)	0.03–0.6″ (0.8–15.9 mm)	0.03–0.4″ (0.8–9.5 mm)
Operating Temp	-73 to 57 °C	-70 to 74 °C	-37 to 74 °C	-60 to 135 °C	-32 to 204 °C
Certification(s)	FDA 21 CFR 177.2600; FDA Approved for contact with foods	FDA 21 CFR 177.2600; US Pharmacopoea Class VI	None	None	GMP
Chemical Resistance					
Acids	Excellent	Excellent	Limited	Excellent	Excellent
Alkaline Solutions	Excellent	Excellent	Not Recommended	Excellent	Excellent
Solvents	Good	Excellent	Not Recommended	Not Recommended	Limited
Pressure	Good	Not Recommended	Good	Not Recommended	Not Recommended
Vacuum	Good	Good	Good	Good	Good
Viscous Media	Excellent	Good	Excellent	Excellent	Good
Sterile Media	Good	Good	Limited	Not Recommended	Fair
Permeability (at 25 °C)					
CO_2	1140	3800	100	1200	38
H_2	—	—	—	—	—
0_2	76	800	22	200	14
N_2	190	320	12	80	5

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Peristaltic Pumps & Tubing

The pumps presented on pages 92–108 require peristaltic tubing to operate. Flow rate of a given fluid through a peristaltic tubing pump depends on two variables:

1. The speed of the pump, measured in revolutions per minute (rpm)
2. The volume held with the internal diameter (ID) of the selected tubing

Variable Speed Pump Flow Rates

For a variable speed pump, such as the products on pages 92, 93, and 95–104, the flow rate of a channel can be changed by varying the pump rpm, or by using tubing with different IDs, or a combination of both.

Ordering your Pump & Tubing

Follow these steps to complete your Ismatec® peristaltic tubing pump order:

1. Select the pump for your application from pages 92–104, determined by the requirements of your fluid delivery task(s):
   a. Level of accuracy
   b. Fluid streams (# of channels)
   c. Flow rate range(s)
   d. Need for constant flow, discrete dispensing, or both
   e. Need for variable speed
   f. Need for automation/programmability
2. Note whether the selected pump requires 2-stop, 3-stop, or standard tubing.
3. Review the tubing properties tables on pages 62, 70, 75, and 76 and select the tubing material best suited for your application.
4. Review the page that contains information and options for the tubing material you have selected.
5. Identify the correct part number for the tubing you need, based upon two factors: a) if your pump requires tubing with stops or not, and if so how many; and b) the correct inner diameter and wall thickness for the model pump you are using.
6. If required, order extension tubing that corresponds as closely as possible to the tubing material and ID of your 2-stop or 3-stop tubing.

RELATED PRODUCTS

- Connectors and adapters for peristaltic tubing are on pages 58, 59, and 60.

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Tygon® LMT-55 Tubing

- DEHP Free
- The Tygon blend of choice for general laboratory applications

Tygon LMT-55 offers an all-around, inexpensive option for general laboratory applications. Featuring transparent walls and low gas permeability — and with many different sizes from which to choose — this tubing material option is the option of choice for many less-critical applications. To determine the expected flow rates related to the tubing inner diameters, see the technical specifications for your pump model, listed here in this catalog or in your pump's operating manual.

Please Note: The low overall lifetime of this material will require tubing to replaced more frequently. For a longer life version of Tygon LMT-55, consider Tygon S3 E-LFL.

SPECIFICATIONS & DETAILS

Special Properties	The inexpensive all-round tubing for general laboratory applications	
Advantages	• Transparent • Resistant to almost all inorganic chemicals • Tasteless • Smooth polished inner wall	• Low gas permeability • Non-aging and non-oxidizing • High dielectric constant • LMT-55 will outlast R-3603 in most applications by 3 to 1
Limitations	• Potential leaching of plasticizers	• Short service-life
Physical Properties	• Thermoplastic • PVC-based material with phthalate-free plasticizer	• Flexible, firm, transparent
Service Temperature Range	-50 °C to +74 °C (-58 °F to + 165 °F)	
Applications		
Acids	Good	
Alkaline solutions	Good	
Solvents	Not recommended	
Pressure	Fair	
Vacuum	Good	
Viscous media	Excellent	
Sterile media	Limited	
Complies with the Following Standards		
Sterilization	Autoclavable with steam, 30 minutes at 1 bar (15 psi) and 121 °C (250 °F); tubing will appear milky. Gas sterilization with Ethylene oxide. **Not recommended for sterilization with radiation.**	
Permeability		
CO_2	360	$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$
O_2	80	
N_2	40	
Odor and taste	None	
Toxicity	Non-toxic	
Tubing life at 0 bar	35 hrs	
at 0.7 bar	30 hrs	

Tygon E-LFL Tubing

- DEHP Free
- Longest service life of any clear Tygon tubing material
- Excellent choice where transparency and good chemical resistance is needed

Tygon S3 E-LFL tubing is available in a broad range of sizes for use throughout our pump product line. Its good chemical resistance coupled with its durability makes it an excellent choice in those applications where longer-life tubing is desired (i.e., where tubes are not disposed of frequently).

In many cases, this tubing can withstand system pressures that are in excess of most peristaltic pumps' abilities, providing built-in safety precautions for your system flow path.

Choose tubing without stops for use with most single-channel pumps. *(Note: Ensure the wall thickness of the tubing you have selected matches the requirements for the pump you are using.)* Choose the 2-stop or 3-stop tubing for use with the versions of our pumps that incorporate cassettes into the pumphead design.

SPECIFICATIONS & DETAILS

Special Properties	The tubing with the longest service-life of any clear Tygon tubing	
Advantages	• Transparent • Broad chemical resistance • Tasteless • Extremely low particulate spallation • Meets USP Class VI and FDA criteria • Non-aging	
Limitations	• Potential leaching of plasticizers	
Physical Properties	• Thermoplastic • PVC-based material with phthalate-free plasticizer • Flexible, firm, transparent	
Service Temperature Range	-50 °C to +74 °C (-58 °F to + 165 °F)	
Applications		
Acids	Fair	
Alkaline solutions	Fair	
Solvents	Not recommended	
Pressure	Good	
Vacuum	Good	
Viscous media	Excellent	
Sterile media	Limited	
Complies with the Following Standards	FDA 21 CFR 175.300; US Pharmacopoea Class VI	
Sterilization	Autoclavable with steam, 30 minutes at 1 bar (15 psi) and 121 °C (250 °F); tubing will appear milky. Gas sterilization with Ethylene oxide. **Not recommended for sterilization with radiation.**	
Permeability		
CO_2	720	$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$
O_2	160	
N_2	80	
Odor and taste	None	
Toxicity	Non-toxic	
Tubing life at 0 bar	800 hrs	
at 0.7 bar	700 hrs	

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Ismaprene Tubing (PharMed®)

- Excellent chemical resistance for traditional peristaltic pump tubing
- Offers FDA and USP Class VI certification

PharMed Ismaprene tubing has long been the tubing of choice for many demanding applications where other polymer blends have been unsuitable for use.

With strong chemical resistance, excellent lifetime, and low gas permeability — coupled with industry-standard certifications — PharMed tubing is offered in options for standard pumps as well as for pumps requiring 2-stop and 3-stop tubing. Special versions are available with welded stops for applications where repeated autoclaving must take place.

SPECIFICATIONS & DETAILS

Special Properties	The ideal tubing for pharmaceutical and medical applications, and for foodstuffs	
Advantages	• Recommended for cell cultures and tissue • Ideal for production filtration, fermentation, and bioreactor process lines • Very long service-life • Non-toxic and non-hemolytic • Impermeable to normal light and UV-radiation • Appropriate for medical products and foodstuffs • Low particulate spallation • Can be autoclaved repeatedly • Withstands repeated CIP and SIP cleaning and sterilization • Meets USP Class VI, FDA, and NSF criteria	
Limitations	• Potential leaching of additives (lubricants)	
Physical Properties	• Thermoplastic elastomer based on polypropylene • Firm, opaque, beige color	
Service Temperature Range	-60 °C to +135 °C (-75 °F to +275 °F)	
Applications		
Acids	Good	
Alkaline solutions	Good	
Solvents	Not recommended	
Pressure	Not recommended	
Vacuum	Excellent	
Viscous media	Good	
Sterile media	Excellent	
Complies with the Following Standards	FDA 21 CFR Part 177.2600; US Pharmacopoea Class VI, NSF listed (Standard 51)	
Sterilization	Autoclavable with steam, 30 minutes at 1 bar (15 psi) and 141 °C (250 °F) Gas sterilization with Ethylene oxide. Sterilization with radiation up to 2.5 mrad. **Caution: Use special tubing version (welded stoppers) when autoclaving 2 or 3-stop color-coded tubing.**	
Permeability		
CO_2	1200	$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$
O_2	200	
N_2	80	
Odor and taste	Low	
Toxicity	Non-toxic and non-hemolytic	
Tubing life at 0 bar	1000+ hrs	
at 0.7 bar	1000 hrs	

Tygon® 3350 SI Tubing

- Platinum-cured silicone tubing
- Features ultra-smooth inner-bore
- Biocompatible for life science applications

Tygon 3350 SI tubing is a special silicone-based tubing that undergoes a special treatment with platinum to ensure a very smooth internal surface. This surface feature helps improve the material's use with biological applications where solid material may be present. Additionally, the material exhibits a low-level of protein-binding as well as being non-toxic, helping to make this material the top choice for many life science applications.

SPECIFICATIONS & DETAILS

Special Properties	The platinum-cured silicone tubing with an ultra-smooth inner surface for sanitary transfer of sensitive fluids	
Advantages	• Steam autoclavability • Excellent biological compatibility • Ultra-smooth inner-bore reduces potential for particle entrapment • Lower level of protein binding • Entirely non-toxic, non-hemolytic, and non-pyrogenic • Weather, ozone, sunlight, and radiation resistant • Resistant to fungus • Odorless	
Limitations	• Not suitable for concentrated solvents, oils, acids, or diluted sodium hydroxide • Relatively high gas permeability	
Physical Properties	• Thermal set rubber • Siloxane polymers and amorphous silica • Soft, translucent, clear to light amber • Excellent compression strength	
Service Temperature Range	-60 °C to +200 °C (-75 °F to +392 °F)	
Applications		
Acids	Limited	
Alkaline solutions	Limited	
Solvents	Limited	
Pressure	Not recommended	
Vacuum	Good	
Viscous media	Fair	
Sterile media	Excellent	
Complies with the Following Standards	US Pharmacopoea XXIII Cl.VI, FDA 21 CFR, Part 177.2600. Also exceeds 3A sanitary standards.	
Sterilization	Autoclavable with steam, 30 minutes at 1 bar (15 psi) and 121 °C (250 °F) Gas sterilization with Ethylene oxide Sterilization with radiation up to 2.5 mrad.	
Permeability		
CO_2	25147	$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$
O_2	4715	
N_2	2284	
Odor and taste	None	
Toxicity	Non-toxic	
Tubing life at 0 bar	200 hrs	
at 0.7 bar	100 hrs	

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Silicone Peroxide Tubing

- Non-toxic material great for biological applications
- Soft and translucent for applications requiring visual checks

SPECIFICATIONS & DETAILS

Special Properties	Silicone tubing blended with organic peroxide for biological applications
Advantages	• Steam autoclavability • Excellent biological compatibility • Greater physical compression capability • Not prone to mold • Non-toxic • Waterproof and resistant to ozone, radiation, and sunlight • Resistant to fungus • Odorless
Limitations	• Not recommended for concentrated solvents, oils, acids, or diluted sodium hydroxide • Relatively high gas permeability
Physical Properties	• Polydimethylsiloxane with silica filter and silicone oil • Excellent resistance to compression • Soft, translucent, clear to light amber
Service Temperature Range	-51 °C to +238 °C (-60 °F to +460 °F)
Applications	
Acids	Limited
Alkaline solutions	Good
Solvents	Not recommended
Pressure	Not recommended
Vacuum	Good
Viscous media	Fair
Sterile media	Excellent
Complies with the Following Standards	FDA 21 CFR 177.2600; US Pharmacopoea XXIII Cl.VI
Sterilization	Autoclavable with steam, 30 minutes at 1 bar (15 psi) and 121 °C (250 °C) Radiation: Irradiate at up to 2.5 mrad **Gas: Not recommended to sterilize with ethylene oxide**
Permeability	
CO_2	25147
O_2	4715
N_2	2284
Odor and taste	—
Toxicity	—
Tubing life at 0 bar	—
at 0.7 bar	—

$$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$$

Tygon® 2001 Tubing for Aggressive Media

- High chemical resistance for broad application use
- Options available for single and multi-channel pump systems
- Ultra-pure tubing for peristaltic pumps

Tygon 2001 tubing features all of the benefits of most Tygon blends — including wall transparency and FDA approval. Added to this is strong chemical resistance for many solutions (excluding hydrocarbons), making Tygon 2001 a material of choice for many demanding applications where other blends may not be suitable.

Options are available in both Standard Tubing, up to 0.626" (15.9 mm) and Stopper Tubing up to 0.109" (2.79 mm).

SPECIFICATIONS & DETAILS

Special Properties	The transparent, plasticizer-free tubing with superior pump-life; especially designed for MEK and other aggressive solvents
Advantages	• Plasticizer and oil-free • Smooth inner-bore • Low sorption maintains fluid and tube integrity • Does not impart anything into the pumping medium • No release of hazardous materials when properly incinerated
Limitations	None
Physical Properties	Polyolefin
Service Temperature Range	-73 °C to +57 °C (-100 °F to +135 °F)
Applications	
Acids	Excellent
Alkaline solutions	Excellent
Solvents	Good / Excellent
Complies with the Following Standards	FDA certification for food contact
Sterilization	Autoclavable with steam, 30 minutes at 1 bar (15 psi) and 141 °C (250 °F). Gas sterilization with Ethylene oxide. Sterilization with radiation up to 2.5 mrad.
Permeability	
CO_2	1140
O_2	76
N_2	190
Odor and taste	No odor or taste
Toxicity	–
Tubing life at 0 bar	75 hrs
at 0.7 bar	–

$$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$$

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Tygon® MHLL Tubing

- Dual-layered tubing material
- Pairs chemical resistance and long-life

Tygon MHLL is a unique tubing material, comprised of an inner layer of Tygon MH and an outer layer of PharMed®. This combination helps ensure excellent chemical resistance (except for hydrocarbons and strong ketones) as well as long service life. Available as Stopper Tubing for use with MS/CA cassettes.

Additionally, this material offers both FDA approval as well as USP Class VI approval, making it a material of choice for more demanding life-science applications.

SPECIFICATIONS & DETAILS

Special Properties	• The tubing can be used with acetone and MEK • Long life tubing	
Advantages	• Plasticizer-free • Smooth inner-bore • Low sorption maintains fluid integrity • Minimal adhesion and diffusion • Suitable for MEK, Acetone and other corrosive solvents • Long life tubing	
Limitations	• Cannot be repeatedly sterilized • Only available as stopper tubing	
Physical Properties	• Special thermoplastic of high purity • Without additives • Without plasticizer • Environmental-friendly disposal • Flexible, firm, opaque	
Service Temperature Range	-70 °C to +74 °C (-94 °F to + 165 °F)	
Applications		
Acids	Excellent	
Alkaline solutions	Excellent	
Solvents	Excellent	
Pressure	Not recommended	
Vacuum	Good	
Viscous media	Good	
Sterile media	Good	
Complies with the Following Standards	FDA 21 CFR, Part 177.2600; USP Pharmacopoea Class VI FDA certification for food contact	
Sterilization	Autoclavable with steam, 30 minutes at 1 bar (15 psi) and 121 °C (250 °F). Gas sterilization with Ethylene oxide. Sterilization with radiation up to 2.5 mrad **Caution: Can not be repeatedly sterilized.**	
Permeability	$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}}$	**x 10^{-10}**
CO_2	—	
O_2	—	
N_2	—	
Odor and taste	No odor or taste	
Toxicity	—	
Tubing life at 0 bar	800+ hrs	
at 0.7 bar	800+ hrs	

Tygon HC F-4040-A Tubing

- Specially formulated for hydrocarbon-based applications
- Features low gas permeability and good pressure resistance

Tygon F-4040-A tubing has been specially-formulated for use in petroleum (and similar) applications where other Tygon blends cannot be used successfully. The material offers some of the lowest gas permeability rates for atmospheric gases of all the Tygon blends, making it ideal for use in those applications where sensitivity to gas permeation is high or where vacuum may be applied.

In addition to being suitable for hydrocarbon-based applications, this material can also be used successfully with low-concentration acidic solutions as well as mineral salt solutions.

Yellow-tinted, the material offers some degree of translucency, however, it is not as transparent as many other Tygon blends.

SPECIFICATIONS & DETAILS

Special Properties	The special tubing for hydrocarbons, petroleum products and distillates	
Advantages	• Specially formulated to transport hydrocarbons, petroleum products, and distillates • Ideal for gasoline, kerosene, heating oils, cutting liquids, and coolants based on glycols • High dielectric constant • Low gas permeability	
Limitations	• Not recommended for strong acids and alkalies, foodstuffs, beverages, and medicines • Potential leaching of plasticizers	
Physical Properties	• Thermoplastic • PVC-based material with plasticizer • Flexible, firm, translucent, yellow	
Service Temperature Range	-37 °C to +74 °C (-35 °F to +165 °F)	
Applications		
Acids	Limited	
Alkaline solutions	Not recommended	
Solvents	Not recommended	
Pressure	Good	
Vacuum	Good	
Viscous media	Excellent	
Sterile media	Limited	
Complies with the Following Standards	None	
Sterilization	Not recommended	
Permeability	$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}}$	**x 10^{-10}**
CO_2	100	
O_2	22	
N_2	12	
Odor and taste	Must not be used for foodstuffs, beverages, and drugs	
Toxicity	Must not be used for foodstuffs, beverages, and drugs	
Tubing life at 0 bar	60 hrs	
at 0.7 bar	60 hrs	

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Norprene® A-60-G Tubing

- Long-life tubing with strong chemical resistance
- Excellent option for industrial applications

Norprene tubing is an excellent alternative to traditional rubber tubing in industrial applications where good chemical resistance is paired with a desire for longer service life.

This tubing material offers additional benefits, including low gas permeability and broad temperature range compatibility. Combined, this material's features help make this tubing the tubing of choice in many applications.

SPECIFICATIONS & DETAILS

Special Properties		The high performance tubing for industrial use
Advantages		• Offers longest service-life with good flow consistency • Good resistance to acids and alkaline chemicals • Superior weathering • Abrasion resistant • Non-aging and non-oxidizing • Outstanding flexural fatigue resistance • Low gas permeability versus rubber tubing • Ozone (300 pphm) and UV light resistant • Ideal for use in vacuum system
Limitations		• Potential leaching of blend material
Physical Properties		• Thermoplastic elastomer based on polypropylene • Excellent tensile strength • Firm, opaque, black
Service Temperature Range		-60 °C to +135 °C (-75 °F to +275 °F)
Applications		
Acids		Excellent
Alkaline solutions		Excellent
Solvents		Not recommended
Pressure		Not recommended
Vacuum		Good
Viscous media		Excellent
Sterile media		Not recommended
Complies with the Following Standards		None
Sterilization		Not recommended
Permeability		$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$
CO_2	1200	
O_2	200	
N_2	80	
Odor and taste		Must not be used for foodstuffs, beverages and drugs
Toxicity		Must not be used for foodstuffs, beverages and drugs
Tubing life	at 0 bar	1000+ hrs
	at 0.7 bar	1000 hrs

Fluran® F-5500-A Tubing

- Specially-formulated elastomer for use with strong acidic and basic solutions
- Very low gas permeability

Fluran tubing has been specially formulated for use in applications where strong acidic solutions or strong basic solutions are being used.

The material's very low gas permeability also makes this the choice material for applications where fluids can be transferred without being contaminated by atmospheric gases. Additionally, the low gas permeability and relative strength of this material make it a material of choice in vacuum based applications.

SPECIFICATIONS & DETAILS

Special Properties		The special tubing for concentrated acids and corrosive solvents
Advantages		• High chemical resistance • Low gas permeability • Wide temperature range
Limitations		• Limited service-life
Physical Properties		• Fluoroelastomer • Firm, opaque, black
Service Temperature Range		-31 °C to +204 °C (-25 °F to + 400 °F)
Applications		
Acids		Excellent
Alkaline solutions		Excellent
Solvents		Limited
Pressure		Not recommended
Vacuum		Good
Viscous media		Good
Sterile media		Fair
Complies with the Following Standards		None
Sterilization		Not recommended
Permeability		$\frac{\text{Volume of gas [cm3] x wall thickness [mm]}}{\text{Area of tubing ID [cm2] x time [sec] x pressure drop across tubing wall [cm Hg]}} \times 10^{-10}$
CO_2	38	
O_2	14	
N_2	5	
Odor and taste		—
Toxicity		—
Tubing life	at 0 bar	150
	at 0.7 bar	90

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The next seven pages contain product numbers for ordering Standard, 2-Stop, 3-Stop, and Extension tubing in each material offered.

Extension Tubing

ID (mm)	TYGON® LMT-55	TYGON R3603/ R3607*	ISMAPRENE (PHARMED®)	SILICONE PEROXIDE	TYGON 2001	TYGON HC F-4040-A	FLURAN® F-5500-A
	Part No.	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
0.13	SC0226T	SC0226*					
0.19	SC0025T	SC0025*					
0.25	SC0026T	SC0026*	SC0337			SC0173	
0.38	SC0027T	SC0027*	SC0338		SC0854	SC0174	
0.44	SC0028T	SC0028*					
0.51	SC0029T	SC0029*	SC0339			SC0175	SC0550
0.57	SC0030T	SC0030*					
0.64	SC0031T	SC0031*	SC0340	SC0448	SC0856	SC0176	SC0551
0.76	SC0032T	SC0032*	SC0341	SC0449		SC0177	SC0552
0.89	SC0033T	SC0033*	SC0342	SC0450		SC0120	SC0553
0.95	SC0034T	SC0034*					
1.02	SC0035T	SC0035*	SC0343	SC0451	SC0858	SC0121	SC0554
1.09	SC0036T	SC0036*					
1.14	SC0037T	SC0037*	SC0344	SC0452		SC0122	SC0555
1.22	SC0038T	SC0038*					
1.30	SC0039T	SC0039*	SC0345	SC0453		SC0123	SC0556
1.42	SC0040T	SC0040*	SC0346	SC0454		SC0124	SC0557
1.52	SC0041T	SC0041*	SC0347	SC0455	SC0860	SC0125	SC0558
1.65	SC0042T	SC0042*	SC0348	SC0456		SC0126	SC0559
1.75	SC0043T	SC0043*					
1.85	SC0044T	SC0044*	SC0349	SC0457		SC0127	SC0560
2.06	SC0045T	SC0045*	SC0350	SC0458	SC0862	SC0128	SC0561
2.29	SC0046T	SC0046*	SC0351	SC0459		SC0129	SC0562
2.54	SC0047T	SC0047*	SC0352	SC0460		SC0130	SC0563
2.79	SC0048T	SC0048*	SC0353	SC0461	SC0864	SC0131	SC0564
3.17	SC0223T	SC0223*					
Roll Length	10 m	10 m	3 m	15 m	10 m	3 m	10 m

** The Tygon R3603/R3607 formulation is being phased out. Substituting Tygon LMT-55 is highly recommended.*

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2-Stop Tubing

ID (mm)	COLOR CODES	TYGON® LMT-55	TYGON R3603/ R3607 *	TYGON E-LFL	ISMAPRENE (PHARMED®)	PHARMED BPT **	TYGON 3350 SI
		Part No.	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
0.13	Orange-black	SC0188T	SC0188*				
0.19	Orange-red	SC0001T	SC0001*				
0.25	Orange-blue	SC0002T	SC0002*		SC0320	SC0740**	
0.27	Orange-blue			SCE0414			
0.38	Orange-green	SC0003T	SC0003*	SCE0415	SC0321		
0.44	Green-yellow	SC0004T	SC0004*				
0.48	Orange-yellow			SCE0416			
0.51	Orange-yellow	SC0005T	SC0005*		SC0322	SC0741**	SC0620
0.57	White-yellow	SC0006T	SC0006*				
0.64	Orange-white	SC0007T	SC0007*	SCE0417	SC0323		SC0621
0.76	Black-black	SC0008T	SC0008*	SCE0418	SC0324		SC0622
0.89	Orange-orange	SC0009T	SC0009*	SCE0419	SC0325	SC0742**	SC0623
0.95	White-black	SC0010T	SC0010*				
1.02	White-white	SC0011T	SC0011*	SCE0420	SC0326	SC0747**	SC0624
1.09	White-red	SC0012T	SC0012*				
1.14	Red-red	SC0013T	SC0013*	SCE0421	SC0327		SC0625
1.22	Red-grey	SC0014T	SC0014*				
1.25	Grey-grey			SCE0422			
1.30	Grey-grey	SC0015T	SC0015*		SC0328	SC0743**	SC0626
1.37	Yellow-yellow			SCE0423			
1.42	Yellow-yellow	SC0016T	SC0016*		SC0329		SC0627
1.52	Yellow-blue	SC0017T	SC0017*	SCE0424	SC0330	SC0744**	SC0628
1.53	Yellow-blue						
1.60	Blue-blue			SCE0425			
1.65	Blue-blue	SC0018T	SC0018*		SC0331		SC0629
1.75	Blue-green	SC0019T	SC0019*				
1.85	Green-green	SC0020T	SC0020*	SCE0426	SC0332		SC0630
2.06	Purple-purple	SC0021T	SC0021*	SCE0427	SC0333	SC0745**	SC0631
2.20	Purple-black			SCE0428			
2.29	Purple-black	SC0022T	SC0022*		SC0334		SC0632
2.54	Purple-orange	SC0023T	SC0023*		SC0335		SC0633
2.62	Purple-orange			SCE0429			
2.79	Purple-white	SC0024T	SC0024*	SCE0430	SC0336	SC0746**	SC0634
3.17	Black-white	SC0222T	SC0222*				
Tube Length		400 mm	400 mm	400 mm	400 mm	400 mm	400 mm
Pack Size		12 pieces	12 pieces	12 pieces	6 pieces	6 pieces	6 pieces

** The Tygon R3603/R3607 formulation is being phased out. Substituting Tygon LMT-55 is highly recommended.*
*** Welded stoppers for use in an autoclave.*

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SILICONE PEROXIDE	TYGON® 2001	TYGON MHLL	TYGON HC F-4040-A	FLURAN F-5500-A	COLOR CODES	ID (mm)
Part No.	**Part No.**	**Part No.**	**Part No.**	**Part No.**		
					Orange-black	0.13
					Orange-red	0.19
			SC0156		Orange-blue	0.25
					Orange-blue	0.27
	SC0814	SC0716	SC0157		Orange-green	0.38
					Green-yellow	0.44
					Orange-yellow	0.48
			SC0158	SC0132	Orange-yellow	0.51
					White-yellow	0.57
SC0092	SC0816		SC0159	SC0133	Orange-white	0.64
SC0093		SC0717	SC0160	SC0134	Black-black	0.76
SC0094			SC0161	SC0135	Orange-orange	0.89
					White-black	0.95
SC0095	SC0818		SC0162	SC0136	White-white	1.02
					White-red	1.09
SC0096		SC0718	SC0163	SC0137	Red-red	1.14
					Red-grey	1.22
					Grey-grey	1.25
SC0097			SC0164	SC0138	Grey-grey	1.30
					Yellow-yellow	1.37
SC0098			SC0165	SC0139	Yellow-yellow	1.42
SC0099	SC0820	SC0719	SC0166	SC0140	Yellow-blue	1.52
					Yellow-blue	1.53
					Blue-blue	1.60
SC0100			SC0167	SC0141	Blue-blue	1.65
					Blue-green	1.75
SC0101			SC0168	SC0142	Green-green	1.85
SC0102	SC0822	SC0720	SC0169	SC0143	Purple-purple	2.06
					Purple-black	2.20
SC0103			SC0170	SC0144	Purple-black	2.29
SC0104			SC0171	SC0145	Purple-orange	2.54
					Purple-orange	2.62
SC0105	SC0824	SC0721	SC0172	SC0146	Purple-white	2.79
					Black-white	3.17
400 mm	381 mm	381 mm	400 mm	180 mm		**Tube Length**
6 pieces	6 pieces	6 pieces	12 pieces	12 pieces		**Pack Size**

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3-Stop Tubing

ID (mm)	COLOR CODES	TYGON® LMT-55	TYGON R3603/ R3607 *	TYGON E-LFL	ISMAPRENE (PHARMED®)	PHARMED BPT **	TYGON 3350 SI
		Part No.	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
0.13	Orange-black	SC0189T	SC0189*				
0.19	Orange-red	SC0049T	SC0049*				
0.25	Orange-blue	SC0050T	SC0050*		SC0303	SC0730**	
0.27	Orange-blue			SCE0397			
0.38	Orange-green	SC0051T	SC0051*	SCE0398	SC0304		
0.44	Green-yellow	SC0052T	SC0052*				
0.48	Orange-yellow			SCE0399			
0.51	Orange-yellow	SC0053T	SC0053*		SC0305	SC0731**	SC0600
0.57	White-yellow	SC0054T	SC0054*				
0.64	Orange-white	SC0055T	SC0055*	SCE0400	SC0306		SC0601
0.76	Black-black	SC0056T	SC0056*	SCE0401	SC0307		SC0602
0.89	Orange-orange	SC0057T	SC0057*	SCE0402	SC0308	SC0732**	SC0603
0.95	White-black	SC0058T	SC0058*				
1.02	White-white	SC0059T	SC0059*	SCE0403	SC0309	SC0737**	SC0604
1.09	White-red	SC0060T	SC0060*				
1.14	Red-red	SC0061T	SC0061*	SCE0404	SC0310		SC0605
1.22	Red-grey	SC0062T	SC0062*				
1.25	Grey-grey			SCE0405			
1.30	Grey-grey	SC0063T	SC0063*		SC0311	SC0733**	SC0606
1.37	Yellow-yellow			SCE0406			
1.42	Yellow-yellow	SC0064T	SC0064*		SC0312		SC0607
1.52	Yellow-blue	SC0065T	SC0065*	SCE0407	SC0313	SC0734**	SC0608
1.53	Yellow-blue						
1.60	Blue-blue			SCE0408			
1.65	Blue-blue	SC0066T	SC0066*		SC0314		SC0609
1.75	Blue-green	SC0067T	SC0067*				
1.85	Green-green	SC0068T	SC0068*	SCE0409	SC0315		SC0610
2.06	Purple-purple	SC0069T	SC0069*		SC0316	SC0735**	SC0611
2.20	Purple-black			SCE0411			
2.29	Purple-black	SC0070T	SC0070*		SC0317		SC0612
2.54	Purple-orange	SC0071T	SC0071*		SC0318		SC0613
2.62	Purple-orange			SCE0412			
2.79	Purple-white	SC0072T	SC0072*	SCE0413	SC0319	SC0736**	SC0614
3.17	Black-white	SC0224T	SC0224*				
Tube Length		400 mm	400 mm	400 mm	400 mm	400 mm	400 mm
Pack Size		12 pieces	12 pieces	12 pieces	6 pieces	6 pieces	6 pieces

** The Tygon R3603/R3607 formulation is being phased out. Substituting Tygon LMT-55 is highly recommended.*
*** Welded stoppers for use in an autoclave.*
**** These tubes are equipped with only 2 stoppers for use with MS/CA cassettes.*

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SILICONE PEROXIDE	TYGON® 2001***	TYGON MHLL***	TYGON HC F-4040-A	FLURAN F-5500-A	COLOR CODES	ID (mm)
Part No.	**Part No.**	**Part No.**	**Part No.**	**Part No.**		
					Orange-black	0.13
					Orange-red	0.19
			SC0286		Orange-blue	0.25
					Orange-blue	0.27
	SC0802***	SC0710***	SC0287		Orange-green	0.38
					Green-yellow	0.44
					Orange-yellow	0.48
			SC0288	SC0255	Orange-yellow	0.51
					White-yellow	0.57
SC0106	SC0804***		SC0289	SC0256	Orange-white	0.64
SC0107		SC0711***	SC0290	SC0257	Black-black	0.76
SC0108			SC0291	SC0258	Orange-orange	0.89
					White-black	0.95
SC0109	SC0806***		SC0292	SC0259	White-white	1.02
					White-red	1.09
SC0110		SC0712***	SC0293	SC0260	Red-red	1.14
					Red-grey	1.22
					Grey-grey	1.25
SC0111			SC0294	SC0261	Grey-grey	1.30
					Yellow-yellow	1.37
SC0112			SC0295	SC0262	Yellow-yellow	1.42
SC0113	SC0808***	SC0713***	SC0296	SC0263	Yellow-blue	1.52
					Yellow-blue	1.53
					Blue-blue	1.60
SC0114			SC0297	SC0264	Blue-blue	1.65
					Blue-green	1.75
SC0115			SC0298	SC0265	Green-green	1.85
SC0116	SC0810***	SC0714***	SC0299	SC0266	Purple-purple	2.06
					Purple-black	2.20
SC0117			SC0300	SC0267	Purple-black	2.29
SC0118			SC0301	SC0268	Purple-orange	2.54
					Purple-orange	2.62
SC0119	SC0812***	SC0715***	SC0302	SC0269	Purple-white	2.79
					Black-white	3.17
	300 mm	300 mm	400 mm	400 mm		**Tube Length**
	6 pieces	6 pieces	12 pieces	12 pieces		**Pack Size**

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Standard Tubing

ID (mm)	OD (mm)	TYGON® LMT-55	TYGON R3603/ R3607 *	TYGON E-LFL	ISMAPRENE (PHARMED®)	TYGON 3350 SI	SILICONE PEROXIDE
1.6 mm wall thickness (1/16") Standard Tubing		**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
0.8	4.0	SC0355T	MF0001*		MF0009	MF0291	MF0044
1.6	3.2						
1.6	4.8	SC0373T	MF0028*	SCE0389	MF0010	SC0580B	MF0035
2.4	5.6	SC0691T	SC0691*		SC1006	SC0590B	
3.2	6.4	SC0374T	MF0030*	SCE0390	MF0012	SC0581B	MF0037
4.0	7.2	SC0462T	SC0462*				
4.8	8.0	SC0379T	SC0379*	SCE0391	MF0011	SC0582B	MF0045
6.4	9.6	SC0375T	MF0031*	SC0E392	MF0013	SC0584B	MF0046
8.0	11.2	SC0376T	MF0032*	SC0E394	MF0014	SC0587B	MF0047
9.5	12.7	SC0383T	SC0383*			SC0387B	
11.1	14.3	SC0384T	SC0384*			SC0697B	
Roll Length		15 m	15 m	7.5 m	7.5 m	15 m	7.5 m
2.4 mm wall thickness (3/32")							
4.8	9.6	SC0500T	MF0029*		MF0448	SC0583B	MF0288
6.4	11.2	SC0501T	MF0033*			SC0585B	MF0040
8.0	12.8	SC0502T	SC0502*			SC0515B	
9.5	14.3	SC0503T	SC0503*			SC0516B	
11.1	15.9	SC0504T	SC0504*			SC0517B	
12.7	17.5	SC0505T	SC0505*			SC0518B	
15.9	20.7	SC0506T	SC0506*			SC0519B	
Roll Length		15 m	15 m	7.5 m	7.5 m	15 m	7.5 m
3.2 mm wall thickness (1/8")							
4.8	11.2	SC0694T	SC0694*				
6.4	12.8	SC0380T	SC0380*	SCE0393	MF0015	SC0586B	MF0314
8.0	14.4	SC0535T	SC0535*				
9.5	15.9	SC0381T	SC0381*	SCE0395	MF0016	SC0588B	MF0041
11.1	17.5	SC0534T	SC0534*				
12.7	19.1	SC0382T	SC0382*	SCE0396	MF0034	SC0589B	MF0315
15.9	22.3	SC0695T	SC0695*		SC0696	SC0532B	
Roll Length		15 m	15 m	7.5 m	7.5 m	15 m	7.5 m

** The Tygon R3603/R3607 formulation is being phased out. Substituting Tygon LMT-55 is highly recommended.*

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TYGON® 2001	TYGON HC F-4040-A	NORPRENE A-60-G	NORPRENE CHEMICAL	VITON®	OD (mm)	ID (mm)
Part No.	**Part No.**	**Part No.**	**Part No.**	**Part No.**	**1.6 mm wall thickness (1/16") Standard Tubing**	
		MF0017		MF0048	4.0	0.8
					3.2	1.6
SC0830	MF0002	SC0357		MF0049	4.8	1.6
					5.6	2.4
SC0831	MF0004	SC0358	SC1022	MF0051	6.4	3.2
					7.2	4.0
SC0832	MF0003	SC0359	SC1023	MF0322	8.0	4.8
SC0833	MF0005	SC0360	SC1024	MF0052	9.6	6.4
SC0834	MF0006	SC0361		MF0053	11.2	8.0
SC0835		SC0385	SC1025		12.7	9.5
		SC0386			14.3	11.1
15 m	15 m	15 m	15 m	7.5 m		**Roll Length**
						2.4 mm wall thickness (3/32")
	MF0476	SC0362		MF0050	9.6	4.8
	MF0007	SC0363		MF0054	11.2	6.4
		SC0511			12.8	8.0
		SC0512			14.3	9.5
					15.9	11.1
					17.5	12.7
					20.7	15.9
	15 m	15 m		7.5 m		**Roll Length**
						3.2 mm wall thickness (1/8")
					11.2	4.8
		SC0364		MF0323	12.8	6.4
					14.4	8.0
	MF0008	SC0365		MF0055	15.9	9.5
					17.5	11.1
SC0845	SC0725	SC0366	SC1026		19.1	12.7
SC0846		SC0698			22.3	15.9
15 m	15 m	15 m	15 m	7.5 m		**Roll Length**

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LABORATORY PUMPS

ALL-NEW REGLO ICC
PAGE 92

PERISTALTIC PUMPS
PAGE 93

GEAR PUMPS
PAGE 110

ROTARY PISTON PUMPS
PAGE 116

SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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IDEX Health & Science's Ismatec® pump drives are available with three pump types — peristaltic, gear, and piston — to make a complete pumping system. The chart below will help you choose the right pump technology. Once you find the desired pumping technology, proceed to the section pages listed and choose the pump/drive combination best suited for your application.

SELECTION CRITERIA		PERISTALTIC PUMPS	GEAR PUMPS	ROTARY PISTON PUMPS
Pages		**92**	**110**	**116**
Flow Rate Min. to Max.		< 0.001 mL/min to 13 L/min	1 mL/min to 7 L/min	0.025 mL/min–2.3 L/min
Number of Channels		1–24	1	1
Differential Pressure		Max. 2.5 bar (36 psi)	Max. 5.6 bar (81 psi)	Max. 6.9 bar (100 psi)
Suction Lift (water)		7–8 m	< 1 m	~5 m
Dead Volume		Practically None	5–45 mL	Very Small
Chemical Resistance		Depends on Tubing Material	High	Very High
Accuracy and Repeatability		High	High [1]	Very High
Self-Priming		Yes	Possible [4]	Possible
Sensitive to Dry-Running		No	Yes	Yes
Syphoning Effect		No	Yes	No
Pumping	Gently = Low Shearing Forces	Yes	No	No
	Under Sterile Conditions	Yes	No	No
	In Both Directions	Yes	Yes [4]	Yes
	Pulse-Free	[2]	Yes	[2]
	Contamination-Free	Yes	No	No
Media	Containing Particles	Very Good	No	Max. 0.8 mm Ø
	Viscous	Very Good	Possible	Good
	Containing Living Cells	Very Good	No	No
	Foaming	Very Good	No	No
	Corrosive/Aggressive	[3]	Good	Very Good
	Gas	[3]	No	[4]

[1] Requires non-return valve.
[2] Pumping with low pulsation possible; depends on the pump head.
[3] Depends on the tubing material.
[4] Depends on the pump head.

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Reglo ICC Independent-Channel Control Peristaltic Pump

- Continuous pumping or precision dispensing
- Flexibility of bi-directional flow in each channel
- Easy-to-use tubing cassettes allow quick changeovers
- Independent channel calibration minimizes the tube to tube differences resulting in the best calibration accuracy possible in a multichannel peristaltic pump
- New easy-to-use USB interface makes connections quickly
- Windows® software is included. Control up to eight Reglo ICC pumps. Time based routines allow for complex experiment development.

Expand the power of your peristaltic pumping application! By providing individually addressable control of each fluidic channel, the new Ismatec® Reglo ICC eliminates the clutter of multiple pumps on the bench top as well as allowing you, the scientist, to solve your application complexity in a single pump.

Long hailed in Europe as the gold standard of Swiss precision, Ismatec drives will now power up to four channels — flowing, dispensing, starting, stopping, reversing, aspirating, and calibrating — all working independently at the command of your PC or keypad. Plus the precision and accuracy of Ismatec's traditional peristaltic pumps for low-volume applications. For the first time, you'll be able to perform multiple precision fluidic tasks — at multiple flow rates — all from a single space-saving pump.

NEW!

ISM4408
Reglo ICC
4-Channel Pump

ISM4308
Reglo ICC
3-Channel Pump

SPECIFICATIONS & DETAILS

Reglo ICC

Motor Type	Stepper Motor (1/channel)
Speed Range	0.1–100 rpm
Speed Setting	rpm (Resolution = 0.01 rpm)
Flow Rate Range	0.0002–35 mL/min/channel (tubing dependent)
Number of Channels	2-4
Number of Rollers	8 Ertalyte® rollers standard; 6 and 12-roller options also available
Cassettes	MS/CA Click'n'Go (POM-C; alternatives available)
Dimensions (HxWxD)	6.7" (170 mm) x 5" (125 mm) x 8.1" (205 mm)* (*=for 3-channel model)
Weight	6 lbs. (2.7 kg)
Power Consumption	30 W (Max.) Main Voltage: 100–264 V AC/50/60 Hz (Requires use of included power supply, cables)
Protection Rating	IP 30
Differential Pressure	1.0 bar/14.5 psi (Max.)

FLOW RATES & TUBING

Tubing ID (mm)	Flow Rate (mL/min per channel)	
	0.1 rpm	**100 rpm**
	Min.	**Max.**
0.13	0.0002	0.11
0.25	0.0005	0.41
0.51	0.0017	1.7
0.76	0.0036	3.6
1.02	0.0063	6.3
1.22	0.0088	8.8
1.52	0.013	13
1.85	0.017	17
2.54	0.027	27
3.17	0.035	35

Part No.	Description	Flow rates mL/min	Channels	Rollers	Speed rpm
REGLO ICC					
ISM4308	Reglo ICC	0.0002–35	3	8	100
ISM4408	Reglo ICC	0.0002–35	4	8	100

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Peristaltic Pumps & Tubing

The pumps presented on pages 94–108 require peristaltic tubing to operate. Flow rate of a given fluid through a peristaltic tubing pump depends on two variables:

1. The speed of the pump, measured in revolutions per minute (rpm)
2. The volume held within the internal diameter (ID) of the selected tubing

Variable Speed Pump Flow Rates

For a variable speed pump, such as the products on pages 93–103, 112–115, and 117–118, the flow rate of a channel can be changed by varying the pump rpm, or by using tubing with different IDs, or a combination of both.

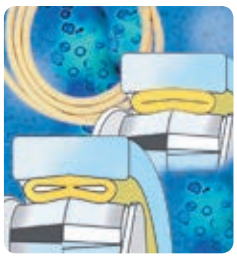
Fixed Speed Pump Flow Rates

Single-channel and multichannel peristaltic tubing pumps are available in this catalog. The number of channels refers to how many pieces of tubing that can be used simultaneously. Tubing with different IDs can be used in each channel to deliver varying flow rates at any given pump speed.

Convex Rollers and Concave Tube-Bed

- Treat the liquid gently (e.g. living cells)
- Improve the delivery stability
- Increase the repeatability
- Guarantee optimum tube centering

The tube is progressively closed, starting from the center outwards.



CELL SENSITIVE PUMPING

Pump heads with this sign are ideal for cell and media sensitive pumping.

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

NOTE

All microprocessor controlled drives are LabVIEW™ compatible and can easily be integrated into process control systems. The LabVIEW drivers can be downloaded from the website: www.idex-hs.com/ismatec

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PUMP SERIES		CHANNELS	FLOW RANGE	DRIVE OPTIONS	INTERFACE	PAGE
REGLO		1–4	0.001–230 mL/min	Variable	Digital = RS-232 only interface Analog = Analog only	**95**
FLOWMASTER®		Single channel only	37–13,000 mL/min	Variable	Analog	**98**
ECOLINE		1–8	0.005–5,400 mL/min	Variable	Analog	**99**
IP / IPC		4–24	0.001–44 mL/min	Variable	RS-232, Analog	**101**
BVP/MCP		1–24	0.001–3,700 mL/min	Variable	RS-232, Analog	**103**

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Reglo Analog/Digital

The Smallest Dispensing Pump with Calibration Features

Reglo Analog
without dispensing functions
0.002–68 mL/min (per channel)
Variable speed drive

DISPENSING & CALIBRATING

Reglo Digital
with dispensing functions
0.001–68 mL/min (per channel)
Microprocessor controlled

SPECIFICATIONS & DETAILS

Reglo Analog

Motor Type	DC motor	
Speed	2-channel	3.2–160 rpm
	4-channel	2.0–100 rpm
Speed Setting	2–99%, resolution 1%	
	2-digit potentiometer	
Power Consumption	20 W	
Mains Connection	230 V AC/50 Hz,115 V AC/60 Hz, selectable	
Protection Rating	IP 30	
Depth/Width/Height	2-channel 178 x 100 x 143 mm	
	4-channel 190 x 100 x 143 mm	
Weight	2-channel 2.0 kg	
	4-channel 2.1 kg	

Reglo Digital

Motor Type	DC motor	
Speed	2-channel	1.6–160 rpm
	4-channel	1.0–100 rpm
Speed Setting	rpm, resolution 0.1 rpm	
Flow Rate Setting	µL/min or mL/min	
Power Consumption	75 W	
Mains Connection	100–230 V AC/50–60 Hz, selectable	
Protection Rating	IP 30	
Depth/Width/Height	2-channel 178 x 100 x 135 mm	
	4-channel 190 x 100 x 135 mm	
Weight	2-channel 2.0 kg	
	4-channel 2.1 kg	

Interfaces

RPM
ANALOG

Reglo Analog

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output 2-channel: 0–8 kHz 4-channel: 0–5 kHz
- Start/Stop
- Rotation direction

Reglo Analog
2-digit potentiometer
2–99%, resolution 1% (for speed setting)

RS232
RPM
ANALOG

Reglo Digital

- PC-controllable
- Digital is RS-232 only

Reglo Digital
6-button membrane key-pad, LED-display
Flow rate setting in µL/min and mL/min

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FLOW RATES & TUBING

	Model	Reglo Analog+Digital		Reglo Analog+Digital		Reglo Analog+Digital		Reglo Analog+Digital		Reglo Analog+Digital		Reglo Analog+Digital	
	Channels	2		2		2		4		4		4	
	Rollers	6		8		12		6		8		12	
	Speed rpm	1.61	160	1.61	160	1.61	160	1.0[1]	100	1.0[1]	100	1.0[1]	100
Tygon® ST R-3603/R-3607 Part No.	**Tubing ID mm**	**mL/min per channel**		**mL/min per channel**		**mL/min per channel**		**mL/min per channel**		**mL/min per channel**		**mL/min per channel**	
		min.[1]	**max.[2]**	**min.[1]**	**max.[2]**	**min.[1]**	**max.[2]**	**min.[1]**	**max.[2]**	**min.[1]**	**max.[2]**	**min.[1]**	**max.[2]**
SC0189	0.13	0.003	0.22	0.002	0.17	0.002	0.15	0.002	0.14	0.002	0.11	0.001	0.093
SC0050	0.25	0.008	0.76	0.007	0.65	0.007	0.61	0.005	0.48	0.005	0.41	0.004	0.38
SC0053	0.51	0.031	3.1	0.027	2.7	0.025	2.5	0.019	1.9	0.017	1.7	0.016	1.6
SC0056	0.76	0.067	6.7	0.058	5.8	0.053	5.3	0.042	4.2	0.036	3.6	0.033	3.3
SC0059	1.02	0.12	12	0.10	10	0.090	9.0	0.073	7.3	0.063	6.3	0.056	5.6
SC0062	1.22	0.16	16	0.14	14	0.12	12	0.10	10	0.088	8.8	0.075	7.5
SC0065	1.52	0.24	24	0.20	20	0.17	17	0.15	15	0.13	13	0.10	10
SC0068	1.85	0.34	34	0.28	28	0.21	21	0.21	21	0.17	17	0.13	13
SC0071	2.54	0.53	53	0.44	44	0.31	31	0.33	33	0.27	27	0.19	19
SC0224	3.17	0.68	68	0.57	57	0.38	38	0.43	43	0.35	35	0.24	24

Approx. values: determined with water, at 22 °C, no differential pressure, Tygon tubing.
[1] Min. flow rates shown are for the Reglo Digital. Min. flow rate for Reglo Analog =2% of max. flow rate.
[2] Max. flow rates shown are for both the Reglo Analog and Digital pumps.

APPLICATION NOTE

- Addition of a reagent to a reactor and simultaneous removal of the reaction product from the upper fraction. Ramp control combined with a thermostat to maintain the ΔT during the reaction.
- Simultaneous addition of both components of a 2-component adhesive in ratio 1:10 with two different tubing sizes.

Part No.	Model	Flow rates mL/min per channel	Channels	Rollers	Speed rpm
REGLO ANALOG					
ISM830	MS-2/06	0.005–68	2	6	1.6–160
ISM829	MS-2/08	0.004–57	2	8	1.6–160
ISM795	MS-2/12	0.003–38	2	12	1.6–160
ISM828	MS-4/06	0.003–43	4	6	1.0–100
ISM827	MS-4/08	0.003–35	4	8	1.0–100
ISM796	MS-4/12	0.002–24	4	12	1.0–100
REGLO DIGITAL					
ISM831	MS-2/06	0.003–68	2	6	3.2–160
ISM832	MS-2/08	0.002–57	2	8	3.2–160
ISM596	MS-2/12	0.002–38	2	12	3.2–160
ISM833	MS-4/06	0.002–43	4	6	2.0–100
ISM834	MS-4/08	0.002–35	4	8	2.0–100
ISM597	MS-4/12	0.001–24	4	12	2.0–100
ACCESSORIES					
Part No.	**Description**				
ISM891	Reglo Analog Foot switch, see page 109				
ISM894	Reglo Digital Foot switch, see page 109				
LabVIEW™ driver for Reglo Digital download for free: www.idex-hs.com/ismatec					

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

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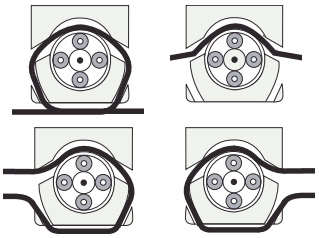
Reglo *Quick*™

Very Fast Tubing Change-Over

Reglo *Quick*
2.1–230 mL/min
Easily accessible tube-bed thanks to wide opening angle.



TIP Flexible layout for tubing appropriate to your application

APPLICATION NOTE

Single-channel delivery processes with variable flow rates where frequent tubing change-over is required e.g.:

- Addition of dye stuffs with tubing exchange after each dispensing process.
- Flushing cylinder heads of HPLC pumps.

SPECIFICATIONS & DETAILS

Reglo *Quick*

Motor Type	DC motor
Speed	3.2–160 rpm
Speed Setting	1–99 %, resolution 1% 2-digit potentiometer
Power Consumption	30 W
Mains Connection	230 V AC /50 Hz,115 V AC /60 Hz, selectable
Protection Rating	IP 30
Depth/Width/Height	178 x 100 x 143 mm (pump head closed)
Weight	2.2 kg

Interfaces

RPM
ANALOG

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–8 kHz)
- Start/stop
- Rotation direction

Reglo *Quick*
2-digit potentiometer
1–99%, resolution 1% (for speed setting)

FLOW RATES & TUBING

		Model/Type	Reglo *Quick*	
		Channels	1	
		Rollers	4	
		Speed rpm	3.2	160
Tygon® ST R-3603/R-3607 Part No.	**Wall (mm)**	**Tubing ID (mm)**	**mL/min minimum**	**mL/min maximum**
MF0030	1.6	3.2	2.1	103
SC0379	1.6	4.8	4.6	230

Approx. values: determined with water, at 22°C, no differential pressure, Tygon tubing.

Part No.	Flow rates mL/min per channel	Channels max.	Rollers	Speed rpm
REGLO QUICK				
ISM897	2.1–230	1	4	3.2–160

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Flowmaster®

Ideal for Heavy-Duty Processes

- Ideal for dispensing and filling applications in a dusty, humid or corrosive environment and in clean room areas
- Protection rating of IP 65

Optimized for Increased Hygienic Requirements

- Stainless steel housing
- Tube-loading under sterile conditions without aspirating air
- Easy disassembly of the pump head
- Thorough cleaning thanks to easy disassembly and reassembly of the pump head

Safety

- Pump Stops When Opening the Tube-Bed
- Multiple Overload Protection

Flowmaster FMT300

37 mL/min–13 L/min

- 1 channel
- 3 convex stainless steel rollers
- Automatic tube retention
- Standard tubing 6.4–15.9 mm ID, wall thickness 3.2 mm, differential pressure max. 2 bar (30 psi) — depends on tubing material used

TIP TUBE EXCHANGE IN 5 SECONDS!!

- Insert the Tube (Easily and Fast)
- Press Down the Lever (Automatically Correct Pressure Setting of the Tube)
- Start the Pump!

SPECIFICATIONS & DETAILS

Motor type	DC motor
Speed	5 to 500 rpm
Speed setting	Resolution 0.1 rpm membrane key-pad, LED display
Power consumption	500 W
Mains connection	230 V AC/50 Hz,115 V AC/60 Hz, selectable
Protection rating	IP 65
Depth/Width/Height	500 x 220 x 262 mm
Weight	26 kg

Interfaces

PLC compatible interface with status information for process control systems (the level of the inputs can be configured: 5, 12, or 24 V).

RPM ANALOG

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Start/stop, rotation direction
- Autostart
- Speed output
- Digital output (potential free) (error, okay, busy)

Settings menu

- Configuration of analog interface
- Entry of basic settings, e.g. rpm, time, etc.
- Foot switch control
- Rotation speed (% or rpm)
- Service life of tubing
- Timer function, etc.

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

Part No.	Description	Flow rates mL/min	Channels	Rollers	Speed rpm
FLOWMASTER					
ISM1020A	Flowmaster FMT300 230 V 50 Hz	37–13,000	1	3	5–500
ISM1022A	Flowmaster FMT300 115 V 60 Hz	37–13,000	1	3	5–500
ACCESSORIES					
IS10279	Foot switch, see page 109				

FLOW RATES & TUBING

Tubing Information				Flow Rates in L/min							
Tygon® E-LFL Part No.	PharMed® Part No.	Wall (mm)	Tubing ID (mm)	rpm 5	rpm 10	rpm 50	rpm 100	rpm 200	rpm 300	rpm 400	rpm 500
SCE0393	MF0015	3.2	6.4	0.037	0.074	0.37	0.74	1.5	2.2	3.1	3.7
SCE0395	MF0016	3.2	9.5	0.08	0.16	0.80	1.6	3.2	4.8	6.4	8.0
SCE0396	MF0034	3.2	12.7	0.10	0.20	1.0	2.0	4.0	6.0	8.0	10.0
	SC0696	3.2	15.9	0.13	0.26	1.3	2.6	5.2	7.8	10.4	13.0

Approx. values: determined with water, at 22 °C, no differential pressure, PharMed tubing.

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Ecoline VC-MS/CA8-6

0.005–150 mL/min

- 8 channels
- 6 rollers
- 3-stop tubing
- Differential pressure 1.0 bar[1] (15 psi)

Ecoline VC-MS/CA4–12

0.003–83 mL/min

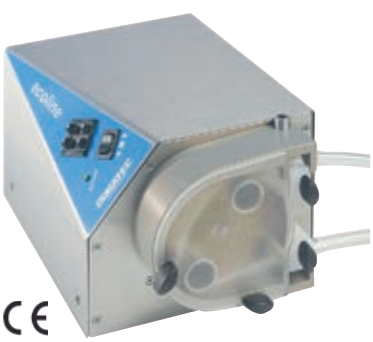
- 4 channels
- 12 rollers (low pulsation)
- Click'n'Go cassettes with automatic pressure setting
- 3-stop tubing
- Differential pressure 1.0 bar[1] (15 psi)

[1] Possible with appropriate tubing material; tubing with small ID's and/or cassettes with the pressure lever (see page 109) may enable higher pressures.

Ecoline VC-280 (1.7–5,400 mL/min) and Ecoline VC-380 (1.6–5,000 mL/min)

- 1 channel
- 2 or 3 convex rollers treat the liquid and tubing gently
- With exchangeable rotor e.g. for lower pulsation, higher flow rates, or elevated differential pressures
- Standard tubing 1.6 mm wall thickness (WT)
- Differential pressure 1.5 bar[1] (22 psi)

[1] Differential pressure depends on tubing material; tubing with small ID's may enable higher pressures.



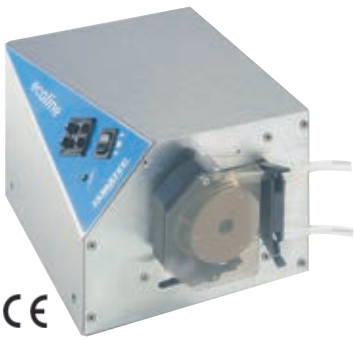
CELL SENSITIVE PUMPING

Ecoline VC-360

0.25–1,300 mL/min

- 1 channel
- 3 convex rollers treat the liquid and tubing gently
- Hinged tube-bed for easy and rapid tube change-over
- Standard tubing 1.6 mm WT
- Differential pressure 1.5 bar[1] (22 psi)

[1] Differential pressure depends on tubing material; tubing with small ID's may enable higher pressures.



CELL SENSITIVE PUMPING

APPLICATION NOTE

- **Ecoline VC-280**
  To apply protective lacquer to cartons
- **Ecoline VC-380**
  As recirculating pump for coolant in thermostat bath
- **Ecoline VC-360**
  Externally controlled spectrophotometer cuvette filling
- **Ecoline VC-MS/CA8-6**
  8-channel flushing of the tubing system of a digital fabric printing machine

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SPECIFICATIONS & DETAILS

Motor Type	DC motor
Speed	3.5–350 rpm
Speed Setting	1–99%, resolution 1% 2-digit potentiometer
Power Consumption	100 W
Mains Connection	230 V AC/50 Hz,115 V AC/60 Hz, selectable
Protection Rating	IP 30

Size and Weight

Model	Depth x Width x Height	Weight
Ecoline VC-280	256 x 169 x 138 mm	5.2 kg
Ecoline VC-380	256 x 169 x 138 mm	5.3 kg
Ecoline VC-360	238 x 169 x 138 mm	4.9 kg
Ecoline VC-Easy-Load™	285 x 169 x 138 mm	5.2 kg
Ecoline VC-MS/CA8-6	313 x 169 x 138 mm	5.5 kg
Ecoline VC-MS/CA4-12	281 x 169 x 138 mm	5.4 kg

Interfaces

RPM
ANALOG

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Start/stop, rotation direction

FLOW RATES & TUBING

3-Stop Tubing

	Model Type	Ecoline VC-MS / CA8-6		Ecoline VC-MS / CA4-12	
	Channels	8		4	
	Rollers	6		12	
	Speed rpm	3.5	350	3.5	350
Tygon® ST R-3603/R-3607 Part No.	**Tubing ID (mm)**	**mL/min per channel min.**	**max.**	**mL/min per channel min.**	**max.**
SC0189	0.13	0.005	0.49	0.003	0.32
SC0050	0.25	0.017	1.7	0.013	1.3
SC0053	0.51	0.067	6.7	0.055	5.5
SC0056	0.76	0.15	15	0.12	12
SC0059	1.02	0.26	26	0.20	20
SC0062	1.22	0.36	36	0.26	26
SC0065	1.52	0.53	53	0.36	36
SC0068	1.85	0.73	73	0.47	47
SC0071	2.54	1.2	120	0.68	68
SC0224	3.17	1.5	150	0.83	83

Approx. values: determined with water at 22 °C, no differential pressure, Tygon ST tubing.

Standard Tubing

	Model Type	Ecoline VC-280		Ecoline VC-380		Ecoline VC-260	
	Channels	1		1		1	
	Rollers	2		3		3	
	Speed rpm	3.5	350	3.5	350	3.5	350
Tygon ST R-3603/R-3607 Part No.	**WT (mm)** / **Tubing ID (mm)**	**mL/min per channel min.**	**max.**	**mL/min per channel min.**	**max.**	**mL/min per channel min.**	**max.**
MF0001	1.6 / 0.8					0.25	25
MF0028	1.6 / 1.6	1.7	170	1.6	160	0.9	90
MF0030	1.6 / 3.2	6.6	660	5.9	590	3.5	350
SC0379	1.6 / 4.8	5.1	1,500	13	1,300	7.7	770
MF0031	1.6 / 6.4	25	2,500	23	2,300	13	1,300
MF0032	1.6 / 8.0	37	3,700	34	3,400		
SC0383	1.6 / 9.5	48	4,800	44	4,400		
SC0384	1.6 / 11.1	54	5,400	50	5,000		

Approx. values: determined with water at 22 °C, no differential pressure, Tygon ST tubing.

Part No.	Model	Flow rates mL/min per channel	Channels max.	Rollers
COMPLETE ECOLINE PUMPS				
ISM1063	Ecoline VC-MS/CA8-6	0.005-150	8	6
ISM1076A	Ecoline VC-360	0.25–1,300	1	3
ISM1078B	Ecoline VC-280 WT 1.6	1.7–5,400	1	2
ISM1079B	Ecoline VC-380 WT 1.6	1.6–5,000	1	3
ISM1090	Ecoline VC-MS/CA4-12	0.003–82	4	12
ISM1091	Ecoline EasyLoad I	0.23–1,600	1	3
ISM1091B	Ecoline EasyLoad II	0.24–1,000	1	4

**For standard tubing 2.4 mm wall thickness 4.8–9.5 mm (3/16–3/8") inner diameter.*

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

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IPC/IP & IPC-N/IP-N

IPC (and IP)

- 0.002–44 mL/min (Per Channel)

IPC-N (and IP-N)

- 0.4 µL/min–11 mL/min (Per Channel)

DISPENSING & CALIBRATING

SPECIFICATIONS & DETAILS

Specifications IPC and IPC-N

Motor Type	DC motor
Speed	IPC 0.4–44 rpm IPC-N 0.11–11.25 rpm
Speed Setting	1–100 %, resolution 0.1%
Flow Rate Setting	µL/min or mL/min
Power Consumption	30 W
Mains Connection	230 V AC/50 Hz,115 V AC/60 Hz, selectable
Protection Rating	IP 30

Specifications IP and IP-N

Motor Type	DC motor
Speed	IP 0.4–44 rpm IP-N 0.11–11.25 rpm
Speed Setting	1–100 %, resolution 0.1% IP rpm, resolution 0.1 rpm IP-N rpm, resolution 0.03 rpm
Power Consumption	30 W
Mains Connection	230 V AC/50 Hz,115 V AC/60 Hz, selectable
Protection Rating	IP 30

Dimensions/Weight

4 Channels	
Depth/Width/Height	180 x 175 x 130 mm
Weight	4.6 kg
8 Channels	
Depth/Width/Height	220 x 175 x 130 mm
Weight	5.1 kg
12 Channels	
Depth/Width/Height	260 x 175 x 130 mm
Weight	5.8 kg
16 Channels	
Depth/Width/Height	300 x 175 x 130 mm
Weight	6.5 kg
24 Channels	
Depth/Width/Height	380 x 175 x 130 mm
Weight	7.9 kg

Interfaces

RS232

RPM
ANALOG

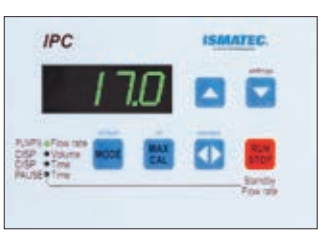
IPC, IPC-N

- PC-controllable
- Analog: same as IP, IP-N

RPM
ANALOG

IP, IP-N

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V or 0–11 kHz)
- Start/stop
- Rotation direction
- Autostart



Standard Speed (IPC)

FLOW RATES & TUBING

	Model	IPC / IP		IPC-N / IP-N	
	Channels	4 / 8 / 12 / 16 / 24		4 / 8 / 12 / 16 / 24	
	Rollers	8		8	
	Speed rpm	0.4	44.0	0.11	11.25
Tygon® ST R-3603/R-3607 Part No.	**Tubing ID (mm)**	**mL/min per channel min.**	**mL/min per channel max.**	**mL/min per channel min.**	**mL/min per channel max.**
SC0188	0.13	0.002	0.15	0.0004	0.039
SC0002	0.25	0.005	0.41	0.001	0.10
SC0005	0.51	0.015	1.5	0.004	0.38
SC0008	0.76	0.032	3.2	0.009	0.81
SC0011	1.02	0.057	5.7	0.041	1.4
SC0014	1.22	0.079	7.9	0.020	2.0
SC0017	1.52	0.12	12	0.030	3.0
SC0020	1.85	0.17	17	0.043	4.3
SC0023	2.54	0.30	30	0.075	7.5
SC0222	3.17	0.44	44	0.11	11

Approx. values: determined with water, at 22 °C, no differential pressure, Tygon tubing.

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4 channels

8 channels

12 channels

16 channels

24 channels

Planetary Drive System

With the planetary drive system each roller is directly driven by the sun wheel. This prevents axial push-pull friction on the tubing.

Result: increased service-life of the tubing, lower pulsation, high repeatability.

APPLICATION NOTE

- Toxicological in-vitro use.
- Perfusion of animal tissue samples.
- Sampling from tablet dissolution systems.
- Environmental applications.

Part No.	Model	Flow rates mL/min per channel	Channels	Speed rpm
IPC AND IPC-N				
ISM930	IPC 4	0.002–44	4	0.4–45
ISM931	IPC 8	0.002–44	8	0.4–45
ISM932	IPC 12	0.002–44	12	0.4–45
ISM933	IPC 16	0.002–44	16	0.4–45
ISM934	IPC 24	0.002–44	24	0.4–45
ISM935	IPC-N 4	0.0004–11	4	0.11–11.25
ISM936	IPC-N 8	0.0004–11	8	0.11–11.25
ISM937	IPC-N 12	0.0004–11	12	0.11–11.25
ISM938	IPC-N 16	0.0004–11	16	0.11–11.25
ISM939	IPC-N 24	0.0004–11	24	0.11–11.25
IP AND IP-N				
ISM940	IP 4	0.002–44	4	0.4–45
ISM941	IP 8	0.002–44	8	0.4–45
ISM942	IP 12	0.002–44	12	0.4–45
ISM943	IP 16	0.002–44	16	0.4–45
ISM944	IP 24	0.002–44	24	0.4–45
ISM945	IP-N 4	0.0004–11	4	0.11–11.25
ISM946	IP-N 8	0.0004–11	8	0.11–11.25
ISM947	IP-N 12	0.0004–11	12	0.11–11.25
ISM948	IP-N 16	0.0004–11	16	0.11–11.25
ISM949	IP-N 24	0.0004–11	24	0.11–11.25

LabVIEW™ driver, download for free www.idex-hs.com/ismatec

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

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BVP *Standard*

Economical

- Robust, powerful drive
- Variable speed

Without Dispensing Functions

- 3-digit potentiometer for speed setting
- 20 pump head configurations available
- Bayonet coupling system enables a system change without tools
- Flow rates, channels, rollers and differential pressure depend on the mounted pump head (see pages 105 to 108)

BVP *Standard* Drive
(pump heads on pages 105 to 108)

BVP *Process*

Washdown

- Protection rating of IP 65
- Extremely robust drive
- Microprocessor controlled
- Ideal for applications in a dusty, humid or corrosive environment and in clean room areas (IP 65, dust-tight and protected against water jets)

Without Dispensing Functions

Flow rates, channels, rollers and differential pressure depend on the mounted pump head (see pages 105 to 108)

- Membrane key-pad for speed setting, LED display
- Stainless steel housing
- More than 20 pump heads available
- Bayonet coupling system enables a system change without tools

BVP *Process* drive
(pump heads on pages 105 to 108)

SPECIFICATIONS & DETAILS

	BVP *Standard*	BVP *Process*
Motor Type	DC motor	DC motor
Speed	2.4–240 rpm	1–240 rpm
Speed Setting	1–99.9%, resolution 0.1% 3-digit potentiometer	rpm, resolution 0.1 rpm
Power Consumption	100 W	120 W
Mains Connection	230 V AC/50 Hz,115 V AC/60 Hz, selectable	230 V AC/50 Hz,115 V AC/60 Hz, selectable
Protection Rating	IP 30	IP 65
Depth/Width/Height	220 x 155 x 260 mm (without pump head)	220 x 155 x 260 mm (without pump head)
Weight	5.7 kg (without pump head)	6.9 kg (without pump head)

Interfaces

RPM ANALOG

BVP *Standard*

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V DC or 0–12 kHz)
- Start/stop, rotation direction

RPM ANALOG

BVP *Process*

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V DC or 0–7.2 kHz)
- Start/stop, rotation direction, autostart

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

Part No.	Includes
THE COMPLETE PUMP SYSTEM BVP *PROCESS* CONSISTS OF:	
ISM920A	Drive, page 103
Order the Following to Complete the BVP *Process* Pump System	
	Pump head, pages 105–108
	Tubing, pages 61–89
	Accessories, page 109
IS10039	Foot switch, page 109
THE COMPLETE PUMP SYSTEM BVP *STANDARD* CONSISTS OF:	
ISM444B	Drive, page 103
Order the Following to Complete the BVP *Standard* Pump System	
	Pump head, pages 105–108
	Tubing, pages 61–89
	Accessories, page 109
IS10039	Foot switch, page 109

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MCP *Standard*

Multi-Purpose

- Saves individual application parameters
- Robust, powerful drive
- Ideal for dispensing and filling
- Pre-programmed tube sizes and pump heads allow you to work with flow rates
- Membrane key-pad, LED display
- 4 program memories for saving individual application parameters
- More than 20 pump heads available
- Bayonet coupling system enables a system change without tools
- Flow rates, channels, rollers and differential pressure depend on the pump head mounted (see pages 105 to 108)

MCP *Standard* Drive
(pump heads on pages 104–107)

DISPENSING & CALIBRATING

MCP *Process*

Programmable

- Programs can be carried out on the spot independently of a PC
- Protection rating of IP 65
- Extremely robust drive, suitable for industries
- Ideal for dispensing and filling applications in a dusty, humid or corrosive environment, and in clean room areas
- Pre-programmed tube sizes and pump heads allow you to work with flow rates
- Stainless steel housing, membrane key-pad, LED display
- 4 program memories for saving individual application parameters or PC programmed command sequences
- More than 20 pump heads available
- Bayonet coupling system enables a system change without tools
- Flow rates, channels, rollers and differential pressure depend on the pump head mounted (see pages 105 to 108)

MCP *Process* Drive
(pump heads on pages 105 to 108)

DISPENSING & CALIBRATING

SPECIFICATIONS & DETAILS

	MCP *Process*	MCP *Standard*
Motor Type	DC motor	DC motor
Speed	1–240 rpm	1–240 rpm
Speed Setting	rpm, resolution 0.1 rpm	rpm, resolution 0.1 rpm
Flow Rate Settings	µL/min, mL/min, L/min	µL/min, mL/min, L/min
Power Consumption	100 W	100 W
Mains Connection	100–230 V AC/50–60 Hz, selectable	230 V AC/50 Hz, 115 V AC/60 Hz, selectable
Protection Rating	IP 65	IP 30
Depth/Width/Height	220 x 155 x 260 mm (without pump head)	220 x 155 x 260 mm (without pump head)
Weight	6.9 kg (without pump head)	6.4 kg (without pump head)

Interfaces

RS232
RPM
ANALOG

MCP *Standard*

- PC controllable
- RS-232
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V DC or 0–12 kHz)
- Start/stop, rotation direction, autostart

MCP *Process*

- PC controllable
- RS-232
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V DC or 0–7.2 kHz)
- Start/stop, rotation direction, autostart
- 2 universal inputs

Part No.	Includes
THE COMPLETE PUMP SYSTEM MCP *PROCESS* CONSISTS OF:	
ISM915A	Drive, page 104
Order the Following to Complete the MCP *Process* Pump System	
	Pump head, pages 105 to 108
	Tubing, pages 61–89
	Accessories, page 109
IS10039	Foot switch, page 109
THE COMPLETE PUMP SYSTEM MCP *STANDARD* CONSISTS OF:	
ISM404B	Drive, page 104
Order the Following to Complete the MCP *Standard* Pump System	
	Pump head, pages 105 to 108
	Tubing, pages 62–89
	Accessories, page 109

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Drive (MCP or BVP) + Pump Head + Tubing = Complete Pump System

BVP/MCP — an Investment for the Future

Instantly Interchangeable Pump Systems

BVP *Standard*
ISM444

MCP *Standard*
ISM404B

BVP *Process*
ISM920A
IP 65

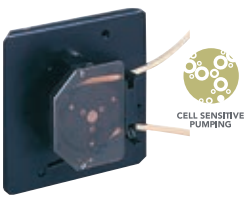
MCP *Process*
ISM915A
IP 65

Easy Interchangeable Pump Heads

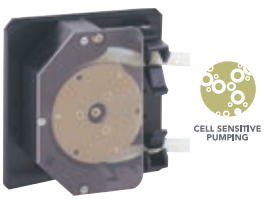
- Mount the pump head without using a tool

The MCP and BVP drives enable the user to choose individually from a large variety of different pump heads. These heads are interchangeable and can be mounted or exchanged within seconds.

Single-Channel



ISM719A
0.072–530 mL/min
Type 360



ISM718A
0.44–2,800 mL/min
Type 380

ISM785A
0.49–3,700 mL/min
Type Pro-280
For 1.6 mm Wall Thickness

ISM793A
3.6–3,100 mL/min
Type Pro-281
For 2.4 mm Wall Thickness

ISM791A
0.45–3,400 mL/min
Type Pro-380
For 1.6 mm Wall Thickness

ISM797A
3.3–2,900 mL/min
Type Pro-381
For 2.4 mm Wall Thickness

MF0313
0.07–1,100 mL/min
Type MF Easy-Load®

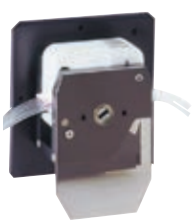
MF0446
0.24–1,000 mL/min
Type MF Easy-Load II
(with adjustable pressure setting)

Multi-Channel

SB 2V (2 channel)
ISM734B + ISM010A
1.1–1,100 mL/min

SB 3V (3 channel)
ISM734B + ISM011A
0.09–530 mL/min

ISM721A (4 channel)
ISM732B (8 channel)
ISM733A (12 channel)
0.002–230 mL/min
4–12 channels
Type CA 4, CA 8, and CA 12



ISM735A (4 channel)
(ISM737A 4 channel extension block)
0.001–57 mL/min
Type MS/CA 4–12
(Combine up to 3 extension blocks of 4 channels each)

ISM724B (8 channel)
(ISM185A 8 channel extension block)
0.002–100 mL/min
Type MS/CA 8-6
(Combine up to 2 extension blocks of 8 channels each)

Single-Channel for Corrosive Media

Rigid PTFE Tubing Pump Head

MF0330
0.07–15 mL/min
PTFE tubing 2 mm ID

0.19–45 mL/min
PTFE tubing 4 mm ID

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BVP/MCP Pump Heads

Pro-280

ISM785A

0.49–3,700 mL/min

- Coated aluminum pump head
- Can be dismantled for cleaning
- Self-centering tube-track thanks to concave tube-bed and convex rollers, which lengthens the tube-life
- 2 stainless steel rollers (higher max. flow rate but more pulsation than with 3 rollers)
- For tubing with 1.6 mm wall thickness
- 1.5 bar (22 psi) differential pressure[1]

CELL SENSITIVE PUMPING

Pro-281

ISM793A

3.6–3,100 mL/min

Same pump head as Pro-280, but

- For tubing with 2.4 mm wall thickness
- 2.5 bar (36 psi) differential pressure[1]

Pro-380

ISM791A

0.45–3,400 mL/min

Same pump head as Pro-280, but

- 3 stainless steel rollers (less pulsation but lower max. flow rate than with 2 rollers)

Pro-381

ISM797A

CELL SENSITIVE PUMPING

3.3–2,900 mL/min

Same pump head design as Pro-280, but

- 3 stainless steel rollers (less pulsation but lower max. flow rate than with 2 rollers)
- For tubing with 2.4 mm wall thickness
- 2.5 bar (36 psi) differential pressure[1]

[1] Differential pressure depends on tubing material; tubing with small ID's enable higher pressures.

The flow rates are based on a drive speed of 1 (or 2.4) to 240 rpm. For the BVP Standard drive the indicated min. flow rates must be multiplied by factor 2.4.

Approx. values: determined with water, at 22 °C, no differential pressure, Tygon tubing.

APPLICATION NOTE

- Chemical, biotechnological, and pharmaceutical applications.
- Food industry.
- Elevated differential pressures (Pro-281 and Pro-381).
- Viscous fluids.
- Fluids containing a high content of sensitive solids.
- Applications requiring hygienic conditions, durability, and reliability.
- Comparisons to gear, piston and centrifugal pumps proved that peristaltic pumps are the only suitable and sterilizable pump system for gently pumping media containing living cells.

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

FLOW RATES & TUBING

Tygon® ST R-3603/R-3607 Part No.	Wall (mm)	Tubing ID (mm)	mL/min min.	mL/min max.
MODEL PRO-280				
MF0028	1.6	1.6	0.49	120
MF0030	1.6	3.2	1.9	450
SC0379	1.6	4.8	4.2	1,000
MF0031	1.6	6.4	7.2	1,700
MF0032	1.6	8.0	11	2,600
SC0383	1.6	9.5	14	3,300
SC0384	1.6	11.1	16	3,700
MODEL PRO-281				
MF0029	2.4	4.8	3.6	870
MF0033	2.4	6.4	6.5	1,600
SC0502	2.4	8.0	9.9	2,400
SC0503	2.4	9.5	13	3,100
MODEL PRO-380				
MF0028	1.6	1.6	0.45	110
MF0030	1.6	3.2	1.7	400
SC0379	1.6	4.8	3.7	890
MF0031	1.6	6.4	6.5	1,600
MF0032	1.6	8.0	9.7	2,300
SC0383	1.6	9.5	13	3,000
SC0384	1.6	11.1	14	3,400
MODEL PRO-381				
MF0029	2.4	4.8	3.3	800
MF0033	2.4	6.4	5.8	1,400
SC0502	2.4	8.0	8.8	2,100
SC0503	2.4	9.5	12	2,900

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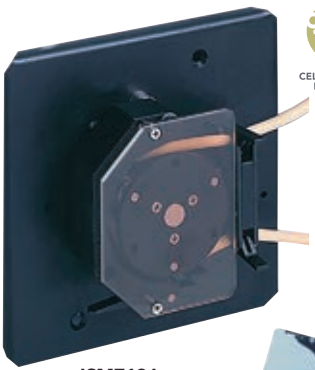
BVP/MCP Pump Heads

360[1]



ISM719A

CELL SENSITIVE PUMPING

0.072–530 mL/min

- Easily accessible flip-up tube-bed guarantees easy and rapid tube change-over
- Transparent protection cover allows monitoring the tube and the revolving rotor
- Self-centering tube-track design thanks to the concave tube-bed and convex rollers (lengthens tube-life)
- Rotor accepts tubing ID from 0.8 to 6.4 mm with 1.6 mm wall thickness
- 3 stainless steel rollers
- 1.5 bar (22 psi) differential pressure[2]

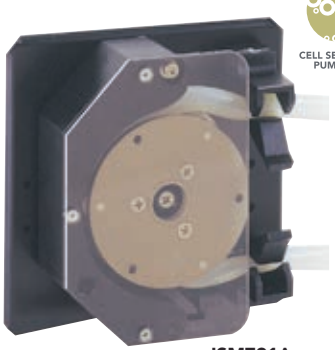
380[1]

CELL SENSITIVE PUMPING

0.44–2,800 mL/min

Same design as pump head 360, but larger size

- For tubing ID from 1.6 to 9.5 mm with 1.6 mm wall thickness
- 1.5 bar (22 psi) differential pressure[2]
- Ideal for sterile media



ISM791A

[1] *An OEM version of this pump head is also available. Ask for the detailed data sheet.*

[2] *Differential pressure depends on tubing material; tubing with small ID's may enable higher pressures.*

NOTE

The flow rates are based on a drive speed of 1 (or 2.4) to 240 rpm. For the BVP Standard drive the indicated min. flow rates must be multiplied by factor 2.4. Approx. values: determined with water, at 22 °C, no differential pressure, and Tygon® tubing.

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BVP/MCP Pump Heads

Easy-Load®[1]

0.07–1,100 mL/min

- Easily accessible pump head
- Allows rapid tube change-over
- PSF housing (polysulfone)
- Rotor designed for tubing with 1.6 mm wall thickness
- Rotor with 3 stainless steel rollers
- 0.7 bar (10 psi) differential pressure[2]

MF0313

Easy-Load II[1]

0.24–1,000 mL/min

Same specifications as Easy-Load, but

- Adjustable pressure setting
- Improved, automatic tubing retention
- PPS housing (polyphenylene sulfide)
- Rotor with 4 stainless steel rollers
- 0.7 bar (10 psi) differential pressure[2]

MF0446

[1] Two pump heads can be mounted on one drive. (Special mounting sets must be ordered separately).

[2] Differential pressure depends on tubing material; tubing with small ID's may enable higher pressures.

FLOW RATES & TUBING

Tygon® ST R-3603/R-3607 Part No.	Wall (mm)	Tubing ID (mm)	mL/min min.	mL/min max.
MODEL 360				
MF0001	1.6	0.8	0.072	17
MF0028	1.6	1.6	0.26	62
MF0030	1.6	3.2	1.0	240
SC0379	1.6	4.8	2.0	530
MODEL 380				
MF0028	1.6	1.6	0.44	100
MF0030	1.6	3.2	1.7	400
SC0379	1.6	4.8	3.6	860
MF0031	1.6	6.4	6.0	1,400
MF0032	1.6	8.0	8.8	2,100
SC0383	1.6	9.5	12	2,800
MODEL 380AD				
MF0028	1.6	1.6	0.4	99
MF0030	1.6	3.2	1.5	370
SC0379	1.6	4.8	3.4	830
MF0031	1.6	6.4	6.2	1,500
MF0032	1.6	8.0	9.5	2,300
SC0383	1.6	9.5	13.0	3,000
SC0384	1.6	11.1	15.0	3,600
MF0029	2.4	4.8	3.4	830
MF0033	2.4	6.4	6.2	1,500
MODEL EASY-LOAD				
MF0001	1.6	0.8	0.066	16
MF0028	1.6	1.6	0.25	59
MF0030	1.6	3.2	0.91	220
SC0379	1.6	4.8	1.9	450
MF0031	1.6	6.4	3.1	730
MF0032	1.6	8.0	4.7	1,100
MODEL EASY-LOAD II				
MF0028	1.6	1.6	0.24	58
MF0030	1.6	3.2	0.92	220
SC0379	1.6	4.8	1.9	460
MF0031	1.6	6.4	3.0	730
MF0032	1.6	8.0	4.2	1,000

RELATED PRODUCTS

Accessories	Page 109
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Tubing Cassettes

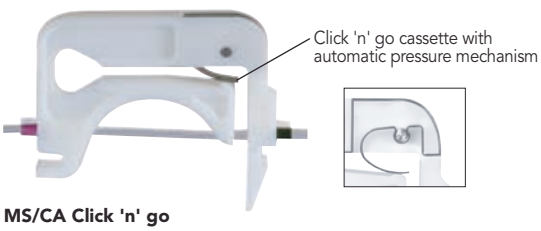
- Developed and consistently improved by Ismatec®

Click 'n' go Cassettes (Standard)[1]

Advantages:

- Automatic tubing pressure; no readjustment necessary
- Ideal for non-monitored, long-time use

Please Note: Click 'n' go cassettes are not suitable for differential pressure greater than 1 bar (15 psi). For these conditions you should choose the pressure lever cassettes.

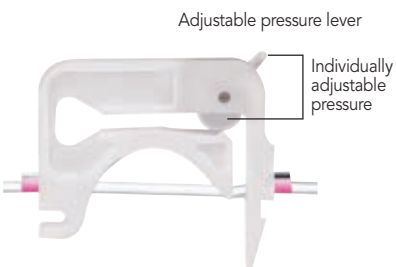


MS/CA Click 'n' go

CA Click 'n' go

Pressure Lever Cassettes (Optional)

The optional pressure lever allows you to set a different tubing pressure for each channel. Depending on the application, tubing material and diameter, an optimally adjusted tubing pressure can be set. To maintain constant flow rates it may be necessary to periodically adjust the tubing pressure.



MS/CA Pressure Lever (Optional)

CA Pressure Lever (Optional)

Foot Switch

The Ismatec foot switch for start/stop is very practical for use with pumps as dispensing systems, e.g. for filling tubes, bottles etc. A foot switch provides the start/stop signal required, allowing hands-free activation of the filling system. The switch's protection rating is IP21. A 6-foot (1.8 m) cable is included.

Part No.	Model	Material	Adapters Required?	Qty.
TUBING CASSETTES AND ADAPTERS				
Click 'n' go Spare Cassettes[1]				
IS3510A	MS/CA Click 'n' go	POM-C[4]	No	1
IS3710A	CA Click 'n' go	POM-C[4]	Yes[2]	1
Pressure Lever Optional Cassettes				
IS0649A	MS/CA Pressure Lever	POM-C[4]	No	1
IS3629A	MS/CA Pressure Lever	PVDF[3, 4]	No	1
IS0122A	CA Pressure Lever	POM-C[4]	Yes[2]	1
IS3820A	CA Pressure Lever	PVDF[3, 4]	Yes[2]	1
Replacement Adapters for CA Cassettes[2]				
IS0123A	Adapter for CA Cassettes	POM-C[4]		1
IS0123A-4	Insert Adapter Packs	POM-C[4]		4-pk
IS0123A-8	Insert Adapter Packs	POM-C[4]		8-pk
IS0123A-12	Insert Adapter Packs	POM-C[4]		12-pk
IS3861A	Adapter for CA Cassettes	PVDF[3, 4]		
FOOT SWITCH				
Part No.	**Foot switch suitable for pump models:**			
ISM016	IPC and IPC-N (firmware version older than 4.00)			
IS10039	IPC and IPC-N (from firmware version 4.00)			
ISM891	Reglo Analog, Reglo *Quick*™			
ISM894	Reglo Digital			

[1] *One set is included with all Ismatec cassette-style pumps.*
[2] *When ordering replacement CA Cassettes, two Adapters per cassette must also be ordered.*
[3] *PVDF offers higher chemical resistance.*
[4] *POM-C = Polyoxymethylene Copolymer, PVDF = Polyvinylidene Fluoride*

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Gear Pumps

Pulsefree Pumping

- Gear pumps allow differential pressures up to max. 5.6 bar (81 psi)

Low Operation Costs

- Interchangeable, magnetically coupled pump heads
- Maintenance-free drives
- Only few wearing parts (gears, seals)
- Service kits allow the user to exchange worn parts
- High quality and precision for an optimum performance even after many years of intensive use

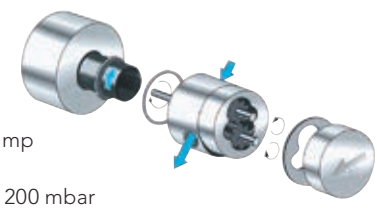
CLOCKWISE

Ismatec® gear pumps run only in the clockwise direction (Exception Reglo Z Digital).

CONTINUOUS DUTY

Cavity Style

Series GJ

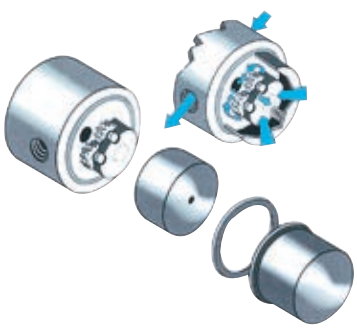


- Max. suction height with water and flooded pump head: 8 m, depending on pump head and tubing
- Pumping out of a vacuum of 200 mbar
- Based on the traditional gear pump technology
- For application with moderate differential pressure

In comparison to the Suction Shoe pump heads, the Cavity style pump heads can be used for viscous media and applications with a certain suction height.

Suction Shoe Style

Series GA and GB



- An exclusive Micropump® product featuring a patented technology
- Modified pump chamber compared to the conventional gear pump technique

This type of pump head design has a seal plate mounted with a deliberate play in the suction part of the pump chamber (hence the expression Suction Shoe). Discharge pressure keeps the Suction Shoe seated tightly on top of the gears which prevents flow from decreasing in high-pressure applications.

REVERSIBLE

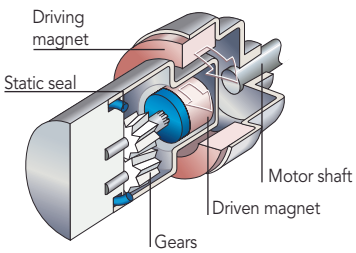
With Cavity Style pump head, rotation direction is reversible

CLOCKWISE

With Suction shoe pump head, run only in the clockwise direction

NOTE

The Magnetically Coupled Drive Principle



Consists of two magnets, a driving magnet that attaches to the motor shaft and a driven magnet that is completely sealed within the pump head and is connected to the driving gear. The driven magnet is a non-wetted component and is totally encapsulated.

The two magnets couple automatically such that the driving magnet turns the driven magnet and gears without physical contact.

Decoupling occurs when the pump load exceeds the coupling torque between the two magnets. This feature can act as a safety device to prevent damage to the pump and motor as well as associated piping. The magnets can be recoupled by bringing the motor to a complete stop, eliminating the cause of the decoupling and restarting.

Application Range of Gear Pumps

Industries	Applications	Special Media
Biotechnological	Sampling	Biozides
Chemical	Refrigeration Technology	Dye Stuffs
Food	Water Treatment	Thixotropic Products
Mining	Liquid Chromatography	Liquid Waxes
Power	Surface Treatment	Hydrogen Peroxide
Pulp and Paper	Distillation Systems	Flux
Semiconductor		Not suited for media containing particulates
Textile		

Pump Head Material Options

Enhance the chemical compatibility and application potential		
Base material	Standard:	Stainless Steel 316
	Options:	e.g., Hastelloy® B2,Hastelloy C-276, Alloy 20, and Titanium
Gears	Standard:	PPS, Graphite, PTFE (depends on pump head)
	Options:	e.g., PEEK, PPSKV
Static seals	Standard:	Viton®, PTFE (depends on pump head)
	Options:	EP, Buna N, Kalrez®
Magnets	Standard:	Ferrite
	Options:	e.g., SmCo, NdFeB
Further pump head options		
Integral Drive		
High System Pressure		
Deck Ports		
1/4-18 NPT Ports		
Tri-clamp Fittings		

PTFE = Polytetrafluoroethylene, PPS = Polyphenylenesulphide, PEEK = Polyetheretherketone

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PUMP SERIES		PUMP STYLE	FLOW RANGE*	GEAR MATERIALS	DRIVE OPTIONS	INTERFACE	PAGE
REGLO Z		Suction Shoe	1–466 mL/min	PEEK, PPS, Graphite	Digital and Analog	RS-232, Analog	**112**
		Cavity Style	33–3,290 mL/min	PEEK, PTFE, PPS			
REGLO ZS		Suction Shoe	1–466 mL/min	PEEK, PPS, Graphite	Digital and Analog	RS-232, Analog	**112**
		Cavity Style	33–3,290 mL/min	PEEK, PTFE, PPS			
BVP-Z		Suction Shoe	1–7,271 mL/min	PEEK, PPS, Graphite	Analog	Analog	**113**
		Cavity Style	40–5,480 mL/min	PEEK, PTFE, PPS			
MCP-Z STANDARD		Suction Shoe	1–7,271 mL/min	PEEK, PPS, Graphite	Digital and Analog	RS-232, Analog	**113**
		Cavity Style	40–5,480 mL/min	PEEK, PTFE, PPS			
MCP-Z PROCESS		Suction Shoe	1–7,271 mL/min	PEEK, PPS, Graphite	Digital and Analog	RS-232, Analog	**114**
		Cavity Style	40–5,480 mL/min	PEEK, PTFE, PPS			

**Depending on pump head.*

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Reglo Z, Reglo ZS

Reglo Z Analog

1–3,290 mL/min

- Variable speed
- Differential pressure of pump drive max. 3.0 bar (43.5 psi)

ISM895E

Reglo ZS Analog

1–3,290 mL/min

- Drive and pump head are separated by a 2 m long cable

ISM896B

Reglo Z Digital

1–3,290 mL/min with dispensing functions

- Membrane key-pad
- LED display with setting menu
- Differential pressure of pump drive max. 3.0 bar (43.5 psi)

ISM901B

Reglo ZS Digital

1–3,290 mL/min with dispensing functions

- Drive and pump head are separated by a 2 m long cable

ISM1143A

SPECIFICATIONS & DETAILS

	Reglo Z/ZS Analog	Reglo Z/ZS Digital
Motor Type	DC motor	DC motor
Speed	50–5,000 rpm	50–5,000 rpm
Speed Setting	1–99%, resolution 1% 2-digit potentiometer	For flow setting (mL/min) For dispensing volume (mL)
Flow Rate Setting		mL/min, L/min
Power Consumption	50 W	75 W
Mains Connection	230 V AC/50 Hz,115 V AC/60 Hz, selectable	100–230 V AC/50–60 Hz
Protection Rating	IP 30	IP 30
Depth/Width/Height		
Drive Reglo Z	178 x 100 x 143 mm	178 x 100 x 135 mm
Drive Reglo ZS	175 x 65 x 80 mm	175 x 65 x 80 mm
External Control Unit	178 x 100 x 143 mm	178 x 100 x 135 mm
Weight		
Drive Reglo Z	2.1 kg (without pump head)	1.7 kg (without pump head)
Drive Reglo ZS	0.7 kg (without pump head)	0.7 kg (without pump head)
External Control Unit	1.7 kg	1.2 kg

REVERSIBLE

With Cavity Style pump head, rotation direction is reversible

CLOCKWISE

With Suction shoe pump head, run only in the clockwise direction

Interfaces

RPM ANALOG

Reglo Z/ZS Analog

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output 0–10 KHz, start/stop
- Rotation direction

RS232

RPM ANALOG

Reglo Z Digital

- RS-232 PC-controllable
- Speed output 0–12 KHz, start/stop and autostart

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

Part No.	Description
REGLO Z AND REGLO ZS	
ISM895E	Reglo Z Analog
ISM896B	Reglo ZS Analog
ISM901B	Reglo Z Digital
ISM1143A	Reglo ZS Digital
ISM891	Footswitch
	Pump Head, page 115
	2 Nozzles, page 115

LabVIEW™ drivers for Reglo Z Digital download for free: www.idex-hs.com/ismatec
Never use a gear pump for media containing particulates.
Max. differential pressure limited by pump drive, pump head capable of max. 5.2 bar (75 psi).

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BVP-Z *Standard*

BVP-Z *Standard* without Dispensing Functions

- 3-digit potentiometer (for speed setting)
- Over 20 interchangeable Micropump® pump heads
- Flow rates and differential pressure depend on the pump head mounted

BVP-Z *Standard*
with interchangeable gear pump heads (see page 115)
(material options, see page 110)

ISM446B

MCP-Z *Standard*

MCP-Z *Standard* with Dispensing Functions

- Membrane key-pad, LED display
- 4 program memories for saving individual application parameters
- Over 20 interchangeable Micropump pump heads (pre-programmed)
- Flow rates and differential pressure depend on the pump head mounted

MCP-Z *Standard*
with interchangeable gear pump head (see page 115)
(material options, see page 110)

DISPENSING & CALIBRATING

ISM405A

SPECIFICATIONS & DETAILS

	BVP-Z *Standard*	**MCP-Z** *Standard*
Motor Type	DC motor	DC motor
Speed	60–6,000 rpm	60–6,000 rpm
Speed Setting	1–99.9%, resolution 0.1% 3-digit potentiometer	rpm, resolution 1 rpm
Flow Rate Setting		µL/min, mL/min, L/min
Power Consumption	150 W	150 W
Mains Connection	230 V AC/50 Hz, 115 V AC/60 Hz selectable	230 V AC/50 Hz, 115 V AC/60 Hz selectable
Protection Rating	IP 30	IP 30
Depth/Width/Height	220 x 155 x 260 mm (without pump head)	220 x 155 x 260 mm (without pump head)
Weight	5.7 kg (without pump head)	6.4 kg (without pump head)

Interfaces

BVP-Z *Standard*

RPM ANALOG

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V DC or 0–12 kHZ)
- Start/stop

MCP-Z *Standard*

RS232

RPM ANALOG

- PC-controllable
- RS-232
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V DC or 0–12 kHZ)
- Start/stop

APPLICATION NOTE

BVP-Z *Standard*

- Single-channel delivery processes under pressure for particulate-free fluids, e.g.: addition of reagents/solvents in organic synthesis at laboratory scale.
- Pumping propylene oxide into a laboratory reactor with a dispensing precision of +/–1% and a differential pressure of up to max. 3 bar.

MCP-Z *Standard*

- Single-channel delivery and dispensing processes of particulate-free fluids under pressure.
- With pump heads GJ-N23 and GA-X21: Pulseless dispensing under pressure of different reagents with 2 pumps in different quantity ratios via a mixing valve into a reactor.

Part No.	Includes
THE COMPLETE PUMP SYSTEM BVP-Z *STANDARD* CONSISTS OF:	
ISM446B	Drive (magnet included), page 113
Order the Following to Complete the BVP-Z Standard Pump System	
	Pump head, page 115
	2 Nozzles, page 115
	Accessories, page 109
ISM891	Foot switch, page 109
THE COMPLETE PUMP SYSTEM MCP-Z *STANDARD* CONSISTS OF:	
ISM405A	Drive (magnet included), page 113
Order the Following to Complete the MCP-Z Standard Pump System	
	Pump head, page 115
	2 Nozzles, page 115

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MCP-Z Process

Programmable

- Programs can be entered on the spot independently of a PC
- Protection rating of IP 65
- Suitable for industries, extremely robust gear pump drive
- For pulseless pumping up to 5.2 bar (75 psi)
- Stainless steel housing
- Membrane key-pad with LED display
- 4 program memories for saving individual application parameters or PC programmed command sequences
- Pre-programmed pump heads
- Over 20 interchangeable Micropump® pump heads
- Flow rates and differential pressure depend on the pump head mounted

ISM918A
MCP-Z Process
with interchangeable gear pump heads
(material options, see page 110)

DISPENSING & CALIBRATING

APPLICATION NOTE

- Single-channel delivery and dispensing processes under pressure, for particulate-free solutions.
- Addition of various reagents in different quantity ratios via mixing valve into reactor.
- Ideal for dispensing and filling applications in a dusty, humid or corrosive environment, and in clean room areas (IP 65, dust-tight and protected against water jets).

SPECIFICATIONS & DETAILS

Motor Type	DC motor
Speed	60–6,000 rpm
Speed Setting	rpm, resolution 1 rpm
Flow Rate Setting	µL/min, mL/min, L/min
Power Consumption	200 W
Mains Connection	100–230 V AC/50–60 Hz, selectable
Protection Rating	IP 65
Depth/Width/Height	260 x 160 x 262 mm (without pump head)
Weight	6.9 kg (without pump head)

Interfaces

RS232

- PC-controllable
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)

RPM
ANALOG

- Speed output (0–10 V DC or 0–12 kHZ)
- Start/stop
- Autostart
- 2 universal inputs
- 2 universal outputs

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

Part No.	Includes
THE COMPLETE PUMP SYSTEM MCP-Z *PROCESS* CONSISTS OF:	
ISM918A	MCP-Z Process Pump System
Order the Following to Complete the MCP-Z Process Pump System	
	Drive (magnet included), page 114
	Pump head, page 115
	2 Nozzles, page 115
	Accessories, page 109
IS10039	Foot Switch, page 109

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Ordering Information Pump Heads for BVP-Z/ MCP-Z/Reglo Z/Reglo ZS

Suction Shoe Pump Heads

- Enhanced pumping performance at elevated differential pressures
- Suited for higher temperature ranges
- Not recommended for applications requiring suction lift

Ismatec® gear pumps run only in the clockwise direction
Never use a gear pump for media containing particulates

SUCTION SHOE	Part No.	Pump Head No.	Flow rate (mL/min) min.	Flow rate (mL/min) max.	Differential pressure max. bar	Gear material	Seals	Stainless steel housing	System pressure, max. (bar)	Temperature range °C	Internal Bypass
	MI0006	GA-X21.CFS.B	1	99	1.4 (20 psi)	Graphite	PTFE	SS316	21	-46–+177	–
	MI0007	GA-V21.CFS.B	3	252	2.8 (40 psi)	Graphite	PTFE	SS316	21	-46–+177	–
	MI0008	GA-V23.CFS.B	5	504	2.8 (40 psi)	Graphite	PTFE	SS316	21	-46–+177	–
	MI0131	GA-T23.PFS.B	6	560	5.2 (75 psi)	PPS	PTFE	SS316	21	-46–+177	–
	MI0280	GA-V23.JFS.B	6	560	5.2 (75 psi)	PEEK	PTFE	SS316	21	-46–+177	–
	MI0022	GB-P25.PVS.A.B	35	3,509	3.5 (51 psi)	PPS	Viton®	SS316	21	-29–+177	✓
	MI0306	GB-P25.JVS.A	35	3,480	3.5 (51 psi)	PEEK	Viton	SS316	21	-29–+177	–
	MI0023	GB-P35.PVS.A.B	70	7,020	3.5 (51 psi)	PPS	Viton	SS316	21	-29–+177	✓
Organic solvents	**MI0378**	GB-P35.JKS.B	73	7,241	3.5 (51 psi)	PEEK	Kalrez®	SS316	21	-29–+177	✓
For corrosive media	**MI0309**	GA-X21.CFC.B	1	99	1.4 (20 psi)	Graphite	PTFE	Hastelloy®-C276	21	-46–+177	–
	MI0310	GA-V23.CFC.B	5	504	2.8 (40 psi)	Graphite	PTFE	Hastelloy-C276	21	-46–+177	–

Ports (internal thread) 1/8"-27NPT.
Flow rates without differential pressure.
Operating temperature: with other seals up to 99 °C possible.

Cavity Style Pump Heads

- Excellent chemical resistance
- Smooth and precise flow
- Recommended for applications requiring a modest suction lift

CAVITY STYLE	Part No.	Pump Head No.	Flow rate (mL/min) min.	Flow rate (mL/min) max.	Differential pressure max. bar	Gear material	Seals	Stainless steel housing	System pressure, max. (bar)	Temperature range °C	Internal Bypass
	MI0013	GJ-N23.FFS.B.B1	40	3,950	3.5 (51 psi)	PTFE	PTFE	SS316	21	-46–+54	✓
	MI0016	GJ-N23.FFS.B	40	3,950	3.5 (51 psi)	PTFE	PTFE	SS316	21	-46–+54	–
	MI0313	GJ-N23.JFS.B	40	3,950	5.6 (81 psi)	PEEK	PTFE	SS316	21	-46–+54	–
	MI0018	GJ-N25.FFS.B	55	5,460	3.5 (51 psi)	PTFE	PTFE	SS316	21	-46–+54	–
	MI0019	GJ-N23.JFS.B.B1	40	3,950	5.2 (75 psi)	PPS	PTFE	SS316	21	-46–+54	✓
	MI0020	GJ-N23.JFS.B	40	3,950	5.2 (75 psi)	PPS	PTFE	SS316	22	-46–+54	–
For corrosive media	**MI0284**	GJ-N23.FFC.B	40	3,950	3.5 (51 psi)	PTFE	PTFE	Hastelloy-C276	21	-46–+54	–
	MI0311	GJ-N25.FFC.B	55	5,480	3.5 (51 psi)	PTFE	PTFE	Hastelloy-C276	21	-46–+54	–

Ports (internal thread) 1/8"-27NPT.
Flow rates without differential pressure.
Operating temperature: with other seals up to 99 °C possible.

Service Kits Available for all Micropump® Gear Pumps
Service Kits contain the wearing parts (brushings, seals, gears). For ordering information, contact your local distributor or IDEX Health & Science.

Part No.	External Thread	Tubing Adaptor	Tubing ID mm
TUBING ADAPTERS FOR GEAR PUMP HEADS			
Threaded stainless steel connectors			
AR0002	1/8" NPT	Tube nozzle	3
AR0004	3/8" NPT	Tube nozzle	12
AR0008	1/8" NPT	Tube nozzle	8
AR0009	1/8" NPT	Tube nozzle	9.5
AR0024	1/8" NPT	Pipe connection	6 (outside)
Threaded connectors in Hastelloy-C			
AR0001-HC	1/8" NPT	Tube nozzle	6

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Rotary Piston Pumps Introduction

For Corrosive Media and Very Accurate Dispensing

The pump heads are available with ceramic pistons and ceramic cylinder liners, which makes these components very resistant even to highly aggressive chemicals.

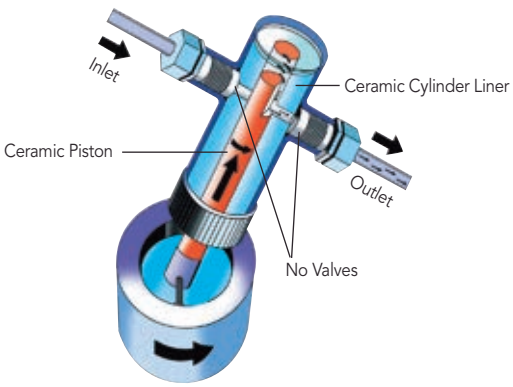
Inexpensive to Maintain

- Interchangeable pump heads
- No valves
- Only one moving part — the piston
- High quality and precision guarantee an optimum performance even after many years of intensive use

Valveless Pumping

The valveless pumping function is accomplished by the synchronous rotation and reciprocation of the ceramic piston in the precisely mated ceramic cylinder liner. One complete piston revolution is required for each suction/discharge cycle.

The piston always bottoms for maximum fluid and bubble clearing. Together with the drive speed the stroke volume, which can be pre-set by the adjustment of the pump head angle, determines the actual flow rate.



Only the Ismatec® Rotary Piston Pump MCP-CPF Process Features:

Carrying out programs independently of a PC

- Download the file data into the pump memory
- Disconnect the pump from the PC
- Carry out your application on the spot, using the pump as a stand-alone unit

APPLICATION NOTE

Application Range of Piston Pumps

Industries	Applications	Special Media
Biotechnology	Accurate dispensing e.g. into bioreactors	Biozides
Chemistry	Emulsion and slurry dosing	Dyes
Medical	Medical diagnostics production	Flux compound
Electronic	Milk and beverage enrichment	Hydrogen peroxide
Food and Diary	Plating bath replenishment	Liquid wax
Perfume/Cosmetics	Titration equipment	Thixotropic products
Rubber/Plastics		
Glass/Ceramic		Not suited for media containing particles larger than 0.8 mm
Pulp and Paper		

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

NOTE

All microprocessor controlled drives are LabVIEW™ compatible and can easily be integrated into process control systems.

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PUMP SERIES		FLOW RANGE	PISTON MATERIAL	DRIVE OPTIONS	INTERFACE	PAGE
RH 00		0.025–45 mL/min	316 SST, Ceramic	Analog or Digital	RS-232 or Analog	**118**
RH 00		0.045–45 mL/min	316 SST, Ceramic	Digital	RS-232 and Analog	**118**
RH 0		0.09–90 mL/min	Ceramic	Analog or Digital	RS-232 or Analog	**118**
RH 0		0.05–90 mL/min	Ceramic	Digital	RS-232 and Analog	**118**
RH 1		0.1–180 mL/min	Ceramic	Analog or Digital	RS-232 and Analog	**119**
RH 1 & Q-SERIES		0.18–180 mL/min	Ceramic	Digital	RS-232 or Analog	**120**
		0.4–144 mL/min	316 SST	Digital	RS-232 or Analog	**122**
		0.13–576 mL/min	316 SST, Ceramic	Digital	RS-232 or Analog	**121**
		0.29–1,300 mL/min	316 SST, Ceramic	Digital	RS-232 or Analog	**121**
		0.51–2,300 mL/min	Ceramic	Digital	RS-232 or Analog	**121**

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RH Pump Heads

Pump Head RH 00

Stroke volumes 2.5–25 µL

Drives and flow rates:

- Reglo CPF Analog 0.045–45 mL/min
- Reglo CPF Digital 0.1–45 mL/min
- MCP-CPF *Process* 0.025–45 mL/min

Part No.	FMI009	FMI010A
TYPE	RH00.CKC-LF	RH00.SKY-LF
Piston	Ceramic	316 Stainless Steel
Cylinder Case	Kynar® (Fluorocarbon {PVDF})	Kynar (Fluorocarbon {PVDF})
Cylinder Liner	Ceramic	Carbon
Lip Seals	Rulon® AR	Rulon J
Gland Washers	PTFE	PTFE
Max. Temperature	100 °C	60 °C
Max. Differential Pressure	6.9 bar (100 psi)	6.9 bar (100 psi)
Flow Ports	Kynar UNF 1/4"–28 (female)	Kynar UNF 1/4"–28 (female)

PTFE TUBING FOR PUMP HEADS MENTIONED ABOVE (MUST BE ORDERED SEPARATELY)

1.6 mm ID, 3.2 mm OD with 2 fittings UNF 1/4"–28 male

Part No.	Length	Part No.	Length
IC0053	0.25 m	**IC0061**	0.75 m

Pump Head RH 0

Stroke volumes 5–50 µL

Drives and flow rates:

- Reglo CPF Analog 0.09–90 mL/min
- Reglo CPF Digital 0.2–90 mL/min
- MCP-CPF *Process* 0.050–90 mL/min

LF = Low Flow
for flow rates below 50 mL/min

Part No.	FMI005A	FMI013
TYPE	RH0.CKC	RH0.CKC-LF
Piston	Ceramic	Ceramic
Cylinder Case	Kynar (Fluorocarbon {PVDF})	Kynar (Fluorocarbon {PVDF})
Cylinder Liner	Ceramic	Ceramic
Lip Seals	Rulon AR	Rulon AR
Gland Washers	PTFE	PTFE
Max. Temperature	100 °C	100 °C
Max. Differential Pressure	6.9 bar (100 psi)	6.9 bar (100 psi)
Flow Ports	2 fixed tube fittings for PTFE tubing 6 mm OD	Kynar UNF 1/4"–28 (female)

TUBING (MUST BE ORDERED SEPARATELY)

PTFE tubing 4 mm ID, 6 mm OD

Part No. MF0336

(For other tubing material; use tubing adapters, see page 123)

PTFE tubing 1.6 mm ID, 3.2 mm OD with 2 fittings UNF 1/4"–28 male

Part No.	Length
IC0053	0.25 m
IC0057	0.50 m
IC0061	0.75 m
IC0065A	1.00 m

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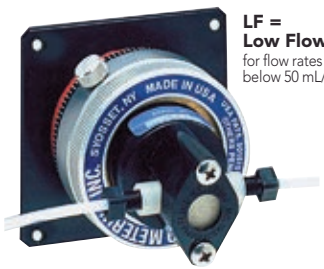
Pump Head RH 1

Stroke volumes 10–100 µL

Drives and flow rates:

- Reglo CPF Analog 0.18–180 mL/min
- Reglo CPF Digital 0.4–180 mL/min
- MCP-CPF Process 0.1–180 mL/min



LF = Low Flow
for flow rates below 50 mL/min

Part No.	FMI007	FMI015	FMI008A
TYPE	RH1.CKC	RH1.CKC-LF	RH1.CTC
Piston	Ceramic	Ceramic	Ceramic
Cylinder Case	Kynar® (Fluorocarbon {PVDF})	Kynar (Fluorocarbon {PVDF})	ETFE
Cylinder Liner	Ceramic	Ceramic	Ceramic
Lip Seals	Rulon® AR	Rulon AR	Rulon AR
Gland Washers	PTFE	PTFE	PTFE
Max. Temperature	100 °C	100 °C	100 °C
Max. Differential Pressure	6.9 bar (100 psi)	6.9 bar (100 psi)	6.9 bar (100 psi)
Flow Ports	2 fixed tube fittings for PTFE tubing 6 mm OD	Kynar UNF 1/4"–28 (female)	2 fixed tube fittings for PTFE tubing 6 mm OD

TUBING (MUST BE ORDERED SEPARATELY)

PTFE tubing 4 mm ID, 6 mm OD	PTFE tubing 1.6 mm ID, 3.2 mm OD with 2 fittings UNF 1/4"–28 male		PTFE tubing 4 mm ID, 6 mm OD
Part No. SC1016B0	**Part No.**	**Length**	**Part No. SC1016B0**
(For other tubing material; use tubing adapters, see page 123)	**IC0053**	0.25 m	(For other tubing material; use tubing adapters, see page 123)
	IC0057	0.50 m	
	IC0061	0.75 m	
	IC0065A	1.00 m	

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Reglo CPF Analog

REVERSIBLE

Reglo CPF Analog
without dispensing functions
0.045–180 mL/min
Variable speed

Reglo CPF Analog
ISM1014B
with piston pump head RH 00.CKC-LF

Overview of piston pump heads on pages 118 to 119

Reglo CPF Digital

REVERSIBLE

DISPENSING & CALIBRATING

Reglo CPF Digital
with dispensing functions
0.1–180 mL/min
Microprocessor controlled

Reglo CPF Digital
ISM321C
with piston pump head RH 00.CKC-LF

Dispensing Pumps — Ideal for Corrosive Media

- Easy to calibrate
- High repeatability
- Differential pressure up to 6.9 bar (100 psi)
- 10 cm wide, 13.5 cm high
- Wide selection of ceramic piston pumps

Reglo CPF Analog
2-digit potentiometer
1–99%, resolution 1% (for speed)

Reglo CPF Digital
6-button membrane key-pad, LED display
Flow rate setting in µL/min and mL/min

SPECIFICATIONS & DETAILS

	Reglo CPF Analog	Reglo CPF Digital
Motor Type	DC motor	DC motor
Speed	18–1,800 rpm	40–1,800 rpm
Speed Setting	1–99%, resolution 1% 2-digit potentiometer	rpm, resolution 0.1 rpm
Flow Rate Setting		µL/min and mL/min
Power Consumption	50 W	75 W
Mains Connection	230 V AC/50 Hz, 115 V AC/60 Hz, selectable	100–230 V AC/50–60 Hz, selectable
Protection Rating	IP 30	IP 30
Depth/Width/Height	250 x 100 x 143 mm	250 x 100 x 135 mm
Weight	2.5 kg	2.1 kg

Interfaces

RPM
ANALOG

Reglo CPF Analog

- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output 0–9 kHz
- Start/stop
- Rotation direction

RS232

Reglo CPF Digital

- RS-232
- Speed output 0–9 kHz, Start/stop, autostart

APPLICATION NOTE

- Highly reproducible, single-channel dispensing processes of organic solvents or acids/bases.
- Dispensing of hydrogen fluoride and other highly corrosive acids with an X-Y-Z dispenser.
- Remotely controlling the pump in hazardous environments.

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

Part No. (Drive Only)	Model (Drive Only)	Flow rates	Channels	Speed
REGLO CPF				
ISM1014B	Reglo CPF Analog	0.045–180	1	18–1,800
ISM321C	Reglo CPF Digital	0.1–180	1	40–1,800
FOOT SWITCH				
ISM891	Reglo CPF Analog, page 109			
ISM894	Reglo CPF Digital, page 109			
THE COMPLETE PUMP SYSTEM REGLO CPF CONSISTS OF:				
Select Drive, page 120				
Select Piston pump head, pages 118–119				

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MCP-CPF *Process*

MCP-CPF *Process*
ISM919A
with rotary piston pump head QP Q0.SSY-LF

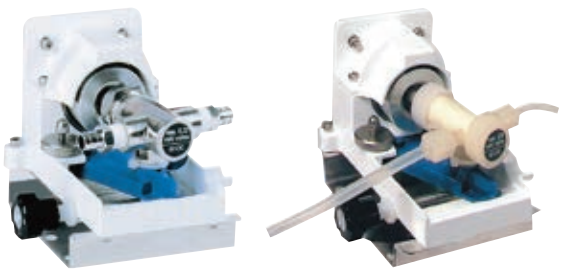
DISPENSING & CALIBRATING

REVERSIBLE

Rotation direction reversible

'RH' pump heads (description see pages 118 to 119)

Type	Flow rates mL/min	Stroke volumes µL
RH 00	0.025–45	2.5–25
RH 0	0.050–90	5.0–50
RH 1	0.10–180	10.0–100



'Q' pump heads (description see pages 122 to 123)

Type	Flow rates mL/min	Stroke volumes µL
QP Q0	0.04–144	3.2–80
QP Q1	0.13–576	12.8–320
QP Q2	0.29–1,300	28.8–720
QP Q3	0.51–2,300	51.2–1,280

SPECIFICATIONS & DETAILS

Motor Type	DC motor
Speed	10.0–1,800 rpm
Speed Setting	rpm, resolution 0.1 rpm
Flow Rate Setting	µL/min, mL/min, L/min
Power Consumption	100 W
Mains Connection	100–230 V AC/50–60 Hz
Protection Rating	IP 65
Depth/Width/Height	220 x 155 x 260 mm (without pump head)
Weight	6.9 kg (without pump head)

Interfaces

RS232

RPM
ANALOG

- PC-controllable
- RS-232
- Speed control (0–5 or 0–10 V, 0–20 or 4–20 mA)
- Speed output (0–10 V DC or 0–7.2 kHZ)
- Start/stop
- Rotation direction
- Autostart
- 2 universal inputs
- 2 universal outputs

APPLICATION NOTE

- Single-channel sterile delivery and dispensing processes under pressure for particulate-free solvents.
- Addition of various reagents in different volume ratios through mixing valve into reactor.

RELATED PRODUCTS

Accessories	Page 109
Tubing	Pages 75–89

Part No.	Description
THE COMPLETE PUMP SYSTEM MCP-CPF *PROCESS* CONSISTS OF:	
ISM919A	MCP-CPF Process Pump System
Order the Following to Complete the MCP-CPF Process Pump System	
	Drive, page 121
	Pump head and tubing, pages 122–123
IS10039	Foot switch, page 109

LabVIEW™ driver download for free: www.idex-hs.com/ismatec

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Q-Type Pump Heads

Pump Head Q0 and Q3

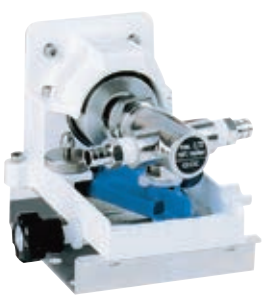
- Q0 = stroke vol. 3.2–80 µL
- Q3 = stroke vol. 51.2–1,280 µL
- Q0 = flow rate 0.04–144 mL/min
- Q3 = flow rate 0.51–2,300 mL/min

Part No.	FMI202	FMI217
TYPE QP	Q0.SSY	Q3.CKC
Piston	316 Stainless Steel	Ceramic
Cylinder Case	316 Stainless Steel	Kynar (Fluorocarbon {PVDF})
Cylinder Liner	Carbon	Ceramic
Lip Seals	Rulon® J	Rulon AR
Gland Washers	PTFE	PTFE
Cylinder Head Seal	PTFE	None
Max. Temperature	60 °C	100 °C
Max. Differential Pressure	6.9 bar	1.7 bar (to 1,600 rpm) 0.5 bar (from 1,600 rpm)
Flow Ports	1/4 NPT (female) Includes: 2 stainless steel adapters with thread 1/4 NPT (male) and fitting for tubing with 6.4 mm ID	For tubing up to 12.7 mm ID or PTFE tubing 6 mm OD Includes: 2 Kynar (PVDF) adapters for tubing with 6 mm OD

TUBING (MUST BE ORDERED SEPARATELY)			
Part No.	**Tubing ID**	**Part No.**	**Tubing ID**
Tygon® ST R-3603		**Tygon ST R-3603**	
MF0031	6.4 mm	**SC0382**	12.7 mm
Accessories		**PTFE Tubing**	
FMI056A	Low Flow Kit R 479 (see below)	**MF0336**	4 mm/6 mm, 3.6 m long

Pump Heads Q1 and Q2

- Q1 = stroke vol. 12.8–320 µL
- Q2 = stroke vol. 28.8–720 µL
- Q1 = flow rates 0.13–576 mL/min
- Q2 = flow rates 0.29–1,300 mL/min



Part No.	FMI205	FMI212	FMI352
TYPE QP	Q1.CSC	Q2.CSC	Q1.CKC
Piston	Ceramic		Ceramic
Cylinder Case	316 Stainless Steel		Kynar®2
Cylinder Liner	Ceramic		Ceramic
Lip Seals	Rulon AR		Rulon AR
Gland Washers	PTFE		PTFE
Cylinder Head Seal	PTFE		none
Max. Temperature	177 °C		100 °C
Max. Differential Pressure	6.9 bar (100 psi)		4.1 bar (60 psi)
Main Flow Ports	1/4 NPT (female) Includes: 2 stainless steel adapters with thread 1/4 NPT (male) and fitting for tubing with 9.5 mm ID		For tubing up to 9.5 mm ID

TUBING (MUST BE ORDERED SEPARATELY)	
Part No.	**Tubing ID**
Tygon ST R-3603	
SC0383A	9.5 mm
Accessories	
FMI056A	Low Flow Kit R 479

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Other Materials for Wetted Parts for:

Pump Heads Q1 and Q2 (see table below)

- Q1 = stroke vol. 12.8–320 µL
- Q2 = stroke vol. 28.8–720 µL
- Q1 = flow rates 0.13–576 mL/min
- Q2 = flow rates 0.29–1,300 mL/min

Part No.	FMI355	FMI356	FMI357	FMI358	FMI353	FMI359	FMI360	FMI361	FMI362	FMI363	FMI364	FMI365	FMI366
QP TYPE PUMP HEADS	Q2.CKC	Q1.CKC-W	Q2.CKC-W	Q1.CKY	Q2.CKY	Q1.CSY	Q2.CSY	Q1.SKY	Q2.SKY	Q1.SSY	Q2.SSY	Q1.SAN[1]	Q2.SAN[1]
Piston	Ceramic	Ceramic		Ceramic		Ceramic		316 Stainless Steel		316 Stainless Steel		Ceramic	
Cylinder Case	Kynar®[2]	Kynar[2]		Kynar[2]		316 Stainless Steel		Kynar[2]		316 Stainless Steel		316 Stainless Steel	
Cylinder Liner	Ceramic	Ceramic		Carbon		Carbon		Carbon		Carbon		316 Stainless Steel	
Lip Seals	Rulon® AR	Rulon AR		Rulon AR		Rulon AR		Rulon J		Rulon J		PTFE	
Gland Washers	PTFE	PTFE		PTFE		PTFE		PTFE		PTFE		PTFE	
Cylinder Head Seal	None	None		None		PTFE		None		PTFE		PTFE	
Max. Temperature	100 °C	100 °C		100 °C		177 °C		60 °C		60 °C		177 °C	
Max. Diff. Pressure	4.1 bar (60 psi)	4.1 bar (60 psi)		4.1 bar (60 psi)		6.9 bar (100 psi)		4.1 bar (60 psi)		6.9 bar (100 psi)		6.9 bar (100 psi)	
Main Flow Ports	For tubing up to 9.5 mm ID	For tubing up to 9.5 mm ID With isolation gland Fittings for tubing with 3.2 mm ID		For tubing up to 9.5 mm ID		1/4 NPT (female)		For tubing up to 9.5 mm ID		1/4 NPT (female)		PTFE tubing adaptor	

[1] Designed for sanitary applications.
[2] Kynar = Fluorocarbon (PVDF).

Low Flow Kit R 479

Part No. FMI056

Suitable for the following pump heads:

- QP Q0.SSY
- QP Q2.CSY
- QP Q2.CSC
- QP Q1.CSY
- QP Q1.SSY
- QP Q1.CSC
- QP Q2.SSY

This Low Flow adaptor Kit enables the use of the above mentioned pump heads for flow rates below 50 mL/min or in case that a minimum dead volume or a maximum of chemical compatibility are required. The adaptor features a 1/4-28 inner thread. These threads are used with low flow tube fittings for small bore tubing of 3.2 mm OD or less. Hence, this Low Flow Kit is also very useful for chromatography applications.

Part No.	Length
PTFE TUBING FOR LOW FLOW KIT R 479	
1.6 mm ID/3.2 mm OD, with 2 fittings 1/4-28 (male)	
IC0053	0.25 m long
IC0057	0.50 m long
IC0061	0.75 m long
IC0065A	1.00 m long

Tubing Adapters for Pump Heads with a Kynar Cylinder Case:

- Q0.SKY
- Q1.CKC
- Q1.CKY
- Q1.SKY
- Q2.CKC
- Q2.CKY
- Q2.SKY
- Q3.CKC

In addition to the tubing mentioned above, these adapters enable the use of other tubing.

Part No.	Description	
TUBING ADAPTERS		
FMI050	R412-0K	For tubing with 3.2 mm ID
FMI051	R412-1K	For tubing with 6.4 mm ID
FMI052	R412-2K	For tubing with 9.5 mm ID
FMI053	R412-5K	For tubing with 1/4–28 ferrule fittings
FMI054	H476K	For tubing with 3.2 mm OD

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VALVES

NEW MANUAL INJECTOR
PAGE 132

RHEBUILD® KITS
PAGE 136

SAMPLE LOOPS
PAGE 139

MICRO VALVES
PAGE 146

SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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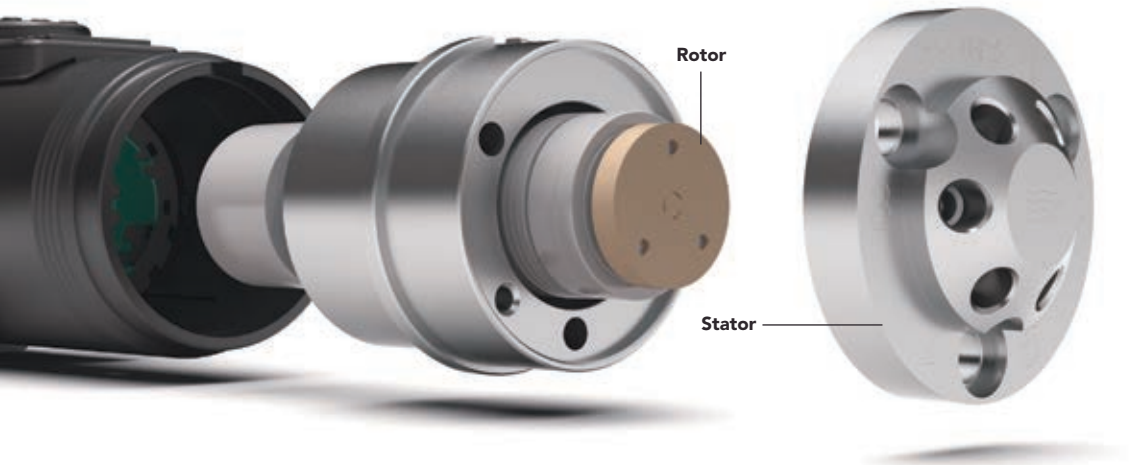
Rotary Shear Valves

Rheodyne® Rotary Shear Valves were developed in tandem with the evolution of liquid chromatography, where combinations of elevated system pressures, aggressive chemicals, and ever-diminishing fluid volumes continually challenged system manufacturers who required highly precise fluid control and delivery. Today, many other disciplines utilize Rotary Shear Valves for their versatility, reliability, repeatability, long system uptime, and easy preventive maintenance.



Valve Overview

Valve Module	Flow Configurations	Page
ACTUATED VALVES		
UP TO 15,000 PSI		
Switching	• 2-Position, 6-Port • 2-Position, 10-Port	130
Injection	• For Injection, add the appropriately sized Sample Loop to the Switching valves above	130
Selection	• 6-Position, 7-Port	130
UP TO 6,000 PSI		
Switching	• 2-Position, 6-Port (Analytical and Nano Scale) • 2-Position, 10-Port (Analytical and Nano Scale)	130
Injection	• For Injection, add the appropriately sized Sample Loop to the Switching valves above • 2-Position, 6-Port (vertical port)	130
Selection	• 6-Position, 7-Port	130
UP TO 125 PSI		
Switching	• 2-Position, 6-Port • 2-Position, 6-Port (Double 3-Way)	130
Selection	• 6-Position, 7-Port • 10-Position, 11-Port	130

Valve Module	Flow Configurations	Page
MANUAL VALVES		
UP TO 15,000 PSI		
NEW! **Injection**	• 2-Position, 6-Port (Front-Loading, 9,000 psi)	132
UP TO 6,000 PSI		
Switching	• 2-Position, 6-Port (Analytical and Micro Scale)	132
Injection	• 2-Position, 6-Port	132
Selection	• 6-Position, 7-Port	
UP TO 1,000 PSI		
Switching	• 2-Way, Right Angle 4-Position, 4-Port • 3-Way, T-Shape 4-Position, 4-Port • 4-Way, Diagonal Flow 4-Position, 4 Port	133
Injection	• 2-Position, 6-Port	133
Selection	• 6-Position, 7-Port	133

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Choosing a Rotary Shear Valve

Evaluating some simple variables will assist you in choosing the best valve for your needs.

Identify the Operating Pressure of Your Instrument or Application

Valves are designed to repeatedly deliver specific fluids to different locations in a fluidic circuit. Achieving fluidic precision at 15,000 psi requires different valve-design features than what's required to achieve fluidic precision at 100 psi. A wide variety of variables such as valve architectures, metals, polymers, coatings, actuation speeds, and manufacturing techniques have been tested to achieve the fluidic accuracy and precision required for the full array of pressure conditions in life science applications. In this catalog, we define four separate pressure groupings:

Up to 15,000 psi (1,035 bar)	UHPLC/Fast Chromatography
Up to 6,000 psi (410 bar)	HPLC
Up to 1,000 psi (69 bar)	Upchurch Scientific®
Up to 125 psi (8.5 bar)	Low Pressure/Atmospheric Pressure

Identify the Range of Flow Rates in Your System

Because Rotary Shear Valves have been used most often in chromatography systems, certain flow rate ranges have evolved functionally. However, these ranges can apply to any system, not just chromatography:

- Micro/Nano Scale — flow rates less than 100 µL per minute
- Analytical Scale — flow rates from 100 µL to 10 mL per minute
- Prep (or Semi-Prep) Scale — flow rates greater than 10 mL per minute

Decide What You Want the Valve to Do

In this chapter Rotary Shear Valves perform three functions:

- Switching one or more flow paths to a different destination under pressure
- Injection into a flowing stream under pressure
- Selection/distribution of a variety of system liquids by means of a common port
- Read more about valve functions on pages 128–129

Identify Whether You Want Automated or Manual Control

An automated valve offers more sophisticated functionality. Choose an automated valve if the application requires fast, consistent flow-stream switching. Some other advantages of automated valves include control options (PC- or instrument-triggered), higher torque operation, valve-position feedback, or very small flow paths.

Choose a manual valve if your application involves low frequency of use, demands operator control, or involves injection of smaller sample volumes. (See page 129 for more on Single Mode vs. Dual Mode operation.)

Identify the Chemical Compatibility Requirements Related to Your Fluids

Consulting the chemical compatibility chart in the Technical Resources section at the back of The IDEX Health & Science Laboratory Products catalog helps identify what valve materials to use—and avoid—in your application. You can also find Chemical Compatibility information at www.idex-hs.com under Materials and Tools.

Identify Fluidic Connection Requirements in Your System

The rotary shear valves in this catalog accommodate one or more of the following tubing outer diameters: 1/8", 1/16", or 1/32".

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Effects of Valves and Tubing on Resolution

The effect of tubing on analytical and microscale analyses can be significant. Since dispersion caused by tubing is proportional to the fourth power of diameter, large bore tubing should be avoided when performing analytical scale or microscale analyses. Tubing ID size ≤ 0.25 mm (0.010") is recommended.

Consider a system with injection and column switching valves and analytical columns with small-bore connecting tubing. The chromatograms below, made using a typical analytical chromatograph, show these effects. Scheme A is the control (injection valve ➔ column ➔ detector) with no valve in the system. In Schemes B and C, two model 7060 Six-Position Switching Valves were placed side by side (injection valve ➔ valve #1 ➔ column ➔ valve #2 ➔ detector).

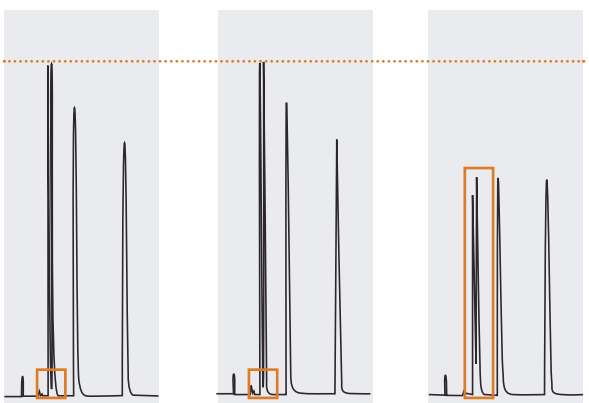
The injection valve and detector were connected to these valves by the same tubing used in the control. The extra tubing pieces required to connect the valves to the column were a 10 cm length for valve #1-to-column, and a 35 cm length for column-to-valve #2. The diameters of these tubes are indicated in the experimental details, below.

Comparison of Observed Column Plates of Rheodyne® Analytical and MicroScale Injection Valves

	7725	8125	Δ
k' = 0.6	2930	5054	72%
k' = 1.5	4653	6904	48%
k' = 7.9	7875	8305	5.0%

UV detector: 1 µL volume, 4 mm path. Sample volume: 2 µL, partial-filling method. Column: 2 mm ID x 100 mm long, 4 µm C-18. True plates of column = 11,570.

Effects of Valves and Tubing on Resolution



A Column Only **B** Valve w/ 0.007" Tubing **C** Valve w/ 0.020" Tubing

Conclusion: These sequential chromatograms show the effect of adding volume to the flow path through the addition of components.

(A) Establishes a baseline quality of separation with the minimum volume of liquid in the flow path.

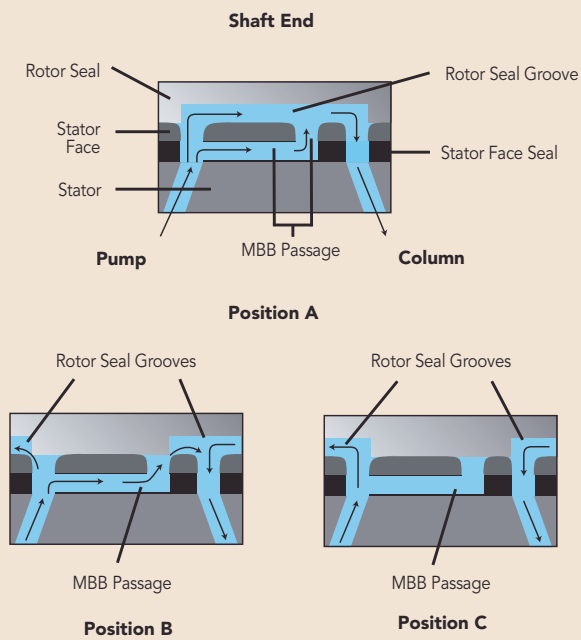
(B) Adding a valve plus smaller-ID tubing, and thereby increasing the liquid volume only marginally, barely affects the separation. However in

(C) Adding a valve plus larger-ID tubing, thereby increasing the liquid volume in the flow path to a greater degree, distinctly impairs the quality of the separation and the detectable sample.

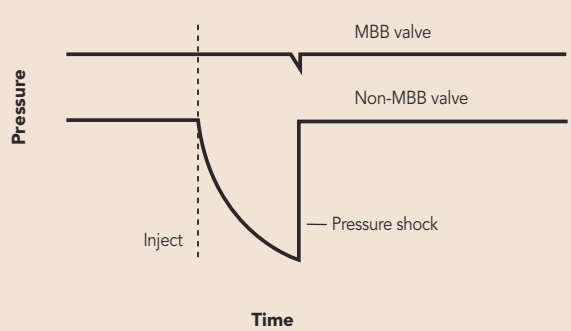
What is Make-Before-Break™, and When Does it Matter?

Make-Before-Break is a unique design feature of certain dual-mode manual injection valves.

Flow paths of model 7725(i) and 9725(i) with MBB design



To maintain a constant, desired high-pressure flow, Rheodyne's Make-Before-Break (MBB®) design creates continuous flow between the LOAD and INJECT positions that virtually eliminates pressure transient shock to the system. A passage in the stator face makes a new connection before old connections break. The MBB design — an improvement over bypass-style injectors — does not dilute the sample and is easy to maintain and troubleshoot.



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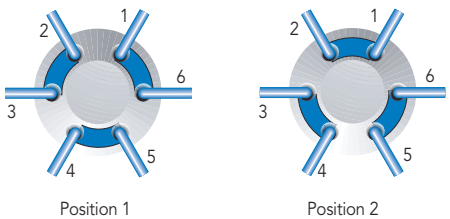
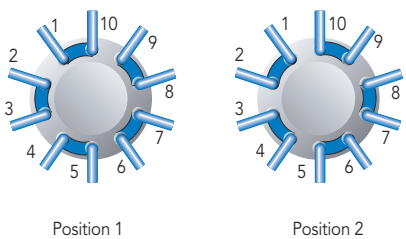
Switching Valves

Switching valves dynamically alternate between two fluid paths without manually disconnecting plumbing. In Chromatography, these valves can be used for column switching, backflushing, sample enrichment, and other techniques. In Diagnostic or Sequencing applications, the switching valve may alternate flow paths to enable back flushing or other fluidic tasks within the instrument.



Flow path of Two-Position, Six-Port Switching Valve

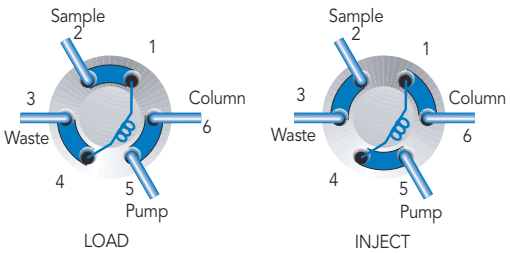


Flow path of Two-Position, Ten-Port Switching Valve

Rheodyne® switching valves operate between two positions, and may have 6 or 10 ports on the face of the stator (2/6 or 2/10). The flow paths connect ports around the circumference of the stator. The Upchurch Scientific® manual switching valves (to 1,000 psi) described on page 133 have different flow path geometry as noted.

Injection Valves

Rheodyne injection valves are a form of switching valve. Injection valves can be automated or manual, and they are generally utilized in the two-position, six-port (2/6) configuration and have a sample loop attached.



Flow path of Two-Position, Six-Port Injection Valve

The purpose of an Injection valve is to introduce a sample of a solution into a flowing stream of liquid. Some Switching valves become Injection valves by the addition of a Sample Loop (a defined length of tubing and fittings configured to match the angle of the valve ports). Sample is loaded and held in the loop until injection is triggered, either manually or mechanically.

Rheodyne injection valves are classified as either Single or Dual Mode, and either Front or Rear-loading, based on how the Sample Loop can be filled. A Single Mode Injection valve requires complete filling of the sample loop and is configured for Rear loading, generally in an auto-sample configuration. A Dual Mode Injection valve allows either partial or complete filling of the loop, and introduces sample by syringe through the needle port built into the valve shaft. Complete filling of the sample loop in both the Dual and Single Mode Injection valves provides greater repeatability injection to injection. (See the Application Note, page 129 for greater detail on partial vs. complete loop filling.)

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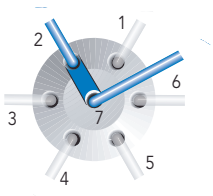
Selection Valves

Selection valves enable discrete connections among multiple system liquids (mobile phase, reagents, buffers) by means of a common port (inlet or outlet) connected to a number of different reciprocal ports. In Diagnostic or Sequencing applications, the selection valve alternates between different reagents or sample streams. Selection valves also enable fractionation for multiple sample analyses.

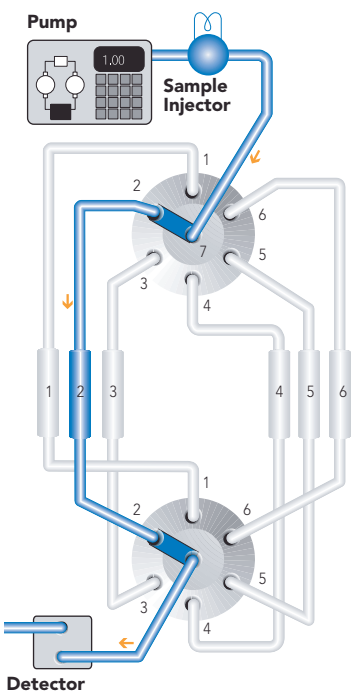


Flow path of Six-Position, Seven-Port Selector Valve

Numerous configurations exist among selection valves (e.g., 6-position 7-port, or 10-position 11-port), but these valves always operate between more than two positions. The ports are usually spaced radially, or outward in some manner around the center port of the stator.

APPLICATION NOTE

Six column selection using two selection valves.



APPLICATION NOTE

Dual Mode Sample Loop Loading: Partial-Filling vs. Complete-Filling

Partial-Filling

Use the partial-filling method if you need to conserve sample, or if you want to vary sample volume frequently.

In partial-filling, the syringe sets the volume injected onto the column. There is no sample waste, and the volume injected onto the column is equal to that dispensed from the syringe. Reproducibility is 1.0% relative standard deviation (RSD). The volume of the sample loaded is limited to half the sample loop volume. For example, the most you can load into a 200 µL sample loop is 100 µL.

Complete-Filling

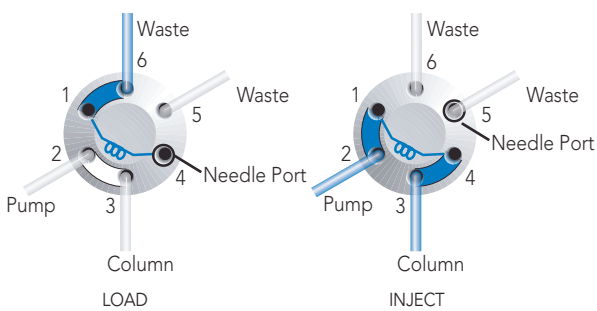
Use the complete-filling method if you have plenty of sample, if you do not vary sample volume, or if you need high reproducibility.

In complete-filling, the loop sets the volume loaded onto the column. Use excess sample (two to five loop volumes) to replace all the mobile phase in the loop. See Figure 2. Change the loop to vary the sample volume. Reproducibility is typically 0.1% RSD for loop sizes ≥ 5 µL. Accuracy is limited as loop volumes are nominal.

Q: "Which method should I use and which Rheodyne® sample injection valves use this method?"

A: There are two types of injection valves available: dual mode and single mode. Dual mode injection valves allow both partial- and complete-filling whereas single mode injection valves allow only complete-filling. See manual injection valves, page 132.

If you are collecting experimental data, sample is scarce, and/or you want to use different sample volumes, a dual mode injector with a large volume sample loop is appropriate. Only dual mode injection valves allow the partial-filling method for easily varying your volumes (up to half your sample loop volume) by setting the syringe volume. Once you begin routine analysis, and/or you have an abundance of sample, either a dual mode or single mode injector is appropriate. Both types of injection valves allow the complete-filling method in which you overfill the sample loop. Complete-filling maximizes the reproducibility of your results.



Flow path for the typical dual mode injector

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Actuated Valves

An automated valve offers more sophisticated functionality. Choose an automated valve if the application requires fast, consistent flow-stream switching. Some other advantages of automated valves include control options (PC- or instrument-triggered), higher torque operation, valve-position feedback, or very small flow paths.

Actuated Valves up to 15,000 psi

Part No.	Description	Ports, Connections	Wetted Material	Rapid Replacement Pod
UP TO 15,000 PSI (1,035 BAR)				
SWITCHING				
MXT715-000	2-Position, 6-Port	10-32 Ports for 1/16" OD Tubing	UltraLife	PD715-000
MXT715-102	2-Position, 10-Port	10-32 Ports for 1/16" OD Tubing	UltraLife	PD715-102
INJECTION	**For Injection, add the appropriately sized Sample Loop to the Switching valves above**			
SELECTION				
MXT715-105	6-Position, 7-Port	10-32 Ports for 1/16" OD Tubing	UltraLife	PD715-105

All of these MXX valves include a set of 1/16" and 1/8" ferrules. Replacement Fittings for MXX valves can be located on page 144.

Actuated Valves up to 6,000 psi

Part No.	Description	Ports, Connections	Wetted Material	Rapid Replacement Pod
UP TO 6,000 PSI (410 BAR)				
SWITCHING				
MXP7900-000	2-Position, 6-Port	10-32 Ports for 1/16" OD Tubing	DuraLife®*	PD7900
MXP7960-000	2-Position, 10-Port	10-32 Ports for 1/16" OD Tubing	DuraLife	PD7960
MXP7980-000	2-Position, 6-Port, Nano, 5,000 psi (345 bar)	M4 Ports for 1/32" OD Tubing	DuraLife II	PD7980
MXP7986-000	2-Position, 10-Port, Nano, 5,000 psi (345 bar)	M4 Ports for 1/32" OD Tubing	DuraLife II	PD7986
MXP9900-000	2-Position, 6-Port, Biocompatible, 5,000 psi (345 bar)	10-32 Ports for 1/16" OD Tubing	PEEK	PD9900
MXP9960-000	2-Position, 10-Port, Biocompatible, 5,000 psi (345 bar)	10-32 Ports for 1/16" OD Tubing	PEEK	PD9960
INJECTION	**For Injection, add the appropriately sized Sample Loop to the Switching valves above**			
MXP7920-000	2-Position, 6-Port, Vertical Port	10-32 Ports for 1/16" OD Tubing	DuraLife	PD7920
SELECTION				
MXP7970-000	6-Position, 7-Port	10-32 Ports for 1/16" OD Tubing	DuraLife II**	PD7970

** DuraLife is a proprietary material combination of SST and an advanced polymer.*
*** DuraLife II is a proprietary material combination consisting of Titanium and an advanced polymer.*
All of these MXX valves include a set of 1/16" and 1/8" ferrules. Replacement Fittings for MXX valves can be located on page 144.

Actuated Valves to 125 psi

Part No.	Description	Ports, Connections	Wetted Material	Ferrule Size
UP TO 125 PSI (8.5 BAR)				
SWITCHING				
MXX777-601	2-Position, 6-Port	Accepts Either 1/16" or 1/8" Tubing	RPC-7*	1/16" and 1/8"
MXX777-603	2-Position, Double Three Way	Accepts Either 1/16" or 1/8" Tubing	RPC-7	1/16" and 1/8"
MXX777-612	2-Position, 6-Port, Large Bore	Accepts Either 1/16" or 1/8" Tubing	RPC-7	1/16" and 1/8"
SELECTION				
MXX777-605	6-Position, 7-Port	Accepts Either 1/16" or 1/8" Tubing	RPC-7	1/16" and 1/8"
MXX777-616	6-Position, 7-Port, Large Bore	Accepts Either 1/16" or 1/8" Tubing	RPC-7	1/16" and 1/8"
MXX778-605	10-Position, 11-Port	Accepts Either 1/16" or 1/8" Tubing	RPC-7	1/16" and 1/8"

** RPC-7 Proprietary Polymer Combination.*
All of these MXX valves include a set of 1/16" and 1/8" ferrules. Replacement Fittings for MXX valves can be located on page 144.

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MX Series II

Actuated Valves

- **MXT** to 15,000 psi (1,035 bar)
- **MXP** to 6,000 psi (410) bar)
- **MXX** to 125 psi (8.5 bar)

Add Rheodyne® MX Series II™ actuated valves to your existing instrument or use in stand-alone lab configurations. MX valves can be controlled remotely or operated manually using the push-button front panel with LED position indicator. MX valves connect to your instrument or PC through contact closure, BCD, serial port, or USB. Commands can be sent to the MX valves using your chromatography software or the included proprietary software for timed-events programmability.

Available flow rates include options for Analytical, Micro/Nano, or Semi-Prep in a range of pressure capabilities. Valve liquid ends are available in materials chosen to be chemically inert and biocompatible. Routine maintenance using authorized RheBuild® kits (page 136) or — for the higher-pressure MXP and MXP valves — the Rapid Replacement Pods™ (page 135) assures optimal performance.

MXX
Up to 125 psi
(9 bar)

MXT
Up to 15,000 psi
(1,034 bar)

MXP
Up to 6,000 psi
(414 bar)

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Manual Valves

Choose a manual valve if your application involves low frequency of use, demands operator control, or involves injection of smaller sample volumes.

NEW!

7725i-188
Manual Injection Valve
Up to 9,000 psi (600 bar)

7060
Manual Switching Valve
Up to 7,000 psi (483 bar)

SPECIFICATIONS & DETAILS

Part No.	Stator Passage Diameter	Factory Set Pressure	Maximum Field Set Pressure	Maximum Temperature (°C)
3000, 3030 (PEEK)	1.0 mm (0.040")	3,000 psi (207 bar)	4,000 psi (276 bar)	50°
3000-038 (SST)	1.0 mm (0.040")	4,000 psi (276 bar)	5,000 psi (340 bar)	50°
7000, 7010 (SST)	0.6 mm (0.024")	5,000 psi (340 bar)	7,000 psi (483 bar)	150°
7000L (SST)	1.0 mm (0.040")	3,000 psi (207 bar)	5,000 psi (340 bar)	150°
7030 (SST)	0.6 mm (0.024")	5,000 psi (340 bar)	7,000 psi (483 bar)	150°
7030L (SST)	1.0 mm (0.040")	3,000 psi (207 bar)	5,000 psi (340 bar)	150°
7060 (SST)	0.4 mm (0.016")	5,000 psi (340 bar)	7,000 psi (483 bar)	80°
7060L (SST)	1.0 mm (0.040")	3,000 psi (207 bar)	5,000 psi (340 bar)	80°

SST = Stainless Steel

Manual Valves up to 15,000 psi

	Part No.	Description	Tubing/Fitting Size	Wetted Material	Configuration
	UP TO 15,000 PSI (1,035 BAR)				
	INJECTION				
NEW!	7725i-188	2-Position, 6-Port, 9,000 psi (600 bar)	10-32 Ports for 1/16" OD Tubing	Stainless Steel, PEEK, Ceramic	Front loading

Manual Valves up to 6,000 psi

	Part No.	Description	Tubing/Fitting Size	Wetted Material	Configuration
	UP TO 6,000 PSI (410 BAR)				
	SWITCHING				—
	3000	2-Position, 6-Port, Prep Scale	5/16-24 Ports for 1/8" Tubing	PEEK	—
	3000-038	2-Position, 6-Port, Prep Scale	5/16-24 Ports for 1/8" Tubing	Stainless Steel & PEEK	—
	3030	2-Position, 6-Port, Prep Scale	5/16-24 Ports for 1/8" OD Tubing	PEEK	Double 3-Way
	7000	2-Position, 6-Port, Large Bore	10-32 Ports for 1/16" OD Tubing	Stainless Steel & Vespel®	—
	7000L	2-Position, 6-Port, Large Bore	10-32 Ports for 1/16" OD Tubing	Stainless Steel & Vespel	—
	7030	2-Position, 6-Port	10-32 Ports for 1/16" OD Tubing	Stainless Steel & Vespel	Double 3-Way
	7030L	2-Position, 6-Port, Large Bore	10-32 Ports for 1/16" OD Tubing	Stainless Steel & Vespel	Double 3-Way
	INJECTION*				
	Part No.	Description	Tubing/Fitting Size	Wetted Material	Sample Loop Volume
	7010	2-Position, 6-Port Single Mode	10-32 Ports for 1/16" OD Tubing	Stainless Steel & Vespel	20 µL*
	9010	2-Position, 6-Port Single Mode (Switching, Injection)	10-32 Ports for 1/16" OD Tubing	PEEK, ETFE, Ceramic	20 µL*
	3725-038	2-Position, 6-Port, Prep Scale Dual Mode	5/16-24 Ports for 1/8" Tubing	Stainless Steel & PEEK	10 mL*
	3725i	2-Position, 6-Port, Prep Scale Dual Mode with Switch	5/16-24 Ports for 1/8" Tubing	PEEK	10 mL*
	3725i-038	2-Position, 6-Port, Prep Scale Dual Mode with Switch	5/16-24 Ports for 1/8" Tubing	Stainless Steel & PEEK	10 mL*
★	7725	2-Position, 6-Port, Analytical Scale Dual Mode	10-32 Ports for 1/16" OD Tubing	Stainless Steel, Ceramic, Vespel	20 µL*
★	7725i	2-Position, 6-Port, Analytical Scale Dual Mode with Switch	10-32 Ports for 1/16" OD Tubing	Stainless Steel, Ceramic, Vespel	20 µL*
	8125**	2-Position, 6-Port, Micro Scale Dual Mode with Switch	10-32 Ports for 0.020" (0.5 mm) or 1/16" Tubing	Stainless Steel, Ceramic, Vespel	5 µL*
	9725	2-Position, 6-Port, Analytical Scale Dual Mode	10-32 Ports for 1/16" OD Tubing	PEEK, ETFE, Ceramic	20 µL*
★	9725i	2-Position, 6-Port, Analytical Scale Dual Mode with Switch	10-32 Ports for 1/16" OD Tubing	PEEK, ETFE, Ceramic	20 µL*
	SELECTION				
	7060	6-Position, 7-Port	10-32 Ports for 1/16" OD Tubing	Stainless Steel & Vespel	6-Way
	7060L	6-Position, 7-Port, Large Bore	10-32 Ports for 1/16" OD Tubing	Stainless Steel & Vespel	6-Way

** Ships with a sample loop attached to ports 1 and 4.*
*** The 8125 requires special ferrules for 0.020" (0.5 mm) tubing. 8125-084–0.5 mm ferrule for 8125; 8125-086–0.5 mm ferrule for 8125 — 4-pk.*

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SPECIFICATIONS & DETAILS

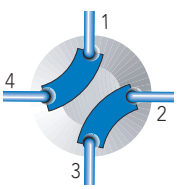
Characteristics of Rheodyne® Manual Sample Injection Valves

Type & Capabilities	Scale	Partial Filling Volumes (Range)	Sample Loop Sizes (Range)	Wetted Materials	Max. psi (bar)[1]	Max. T (°C)	MBB[2]	Model[3]
Dual Mode Can load the loop by two methods: 1) Partial filling–syringe determines volume without wasting sample 2) Complete filling–loop determines volume by over filling loop	Analytical	1 µL–2.5 mL 1 µL–5.0 mL	2 µL–5.0 mL 2 µL–10 mL	316 SST, Vespel® PEEK, ETFE, ceramic	7,000 (483) 5,000 (340)	80° 50°	Yes Yes	7725, 7725i 9725, 9725i
	Micro	0.1 µL–500 µL	5 µL–1.0 mL	316 SST, PEEK, Vespel, ceramic	7,000 (483)	80°	No	8125
	Preparative	100 µL–10 mL	2.0 mL–20 mL	316 SST, PEEK PEEK	5,000 (340) 4,000 (276)	50° 50°	Yes Yes	3725(i)-038, 3725i
Single Mode Can load the loop by one method: Complete filling — loop determines volume by over filling loop	Analytical	Not Applicable	5 µL–5.0 mL 5 µL–10 mL	316 SST, Vespel PEEK, ETFE, Ceramic	7,000 (483) 5,000 (340)	150° 50°	No No	7010 9010

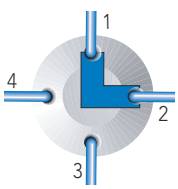
SST = Stainless Steel
[1] This is the maximum pressure to which the valve can be adjusted. Some models are shipped from the factory set for lower pressures.
[2] MBB (Make-Before-Break™) is a design that provides uninterrupted flow when switching between LOAD and INJECT. MBB also greatly reduces transient pressure shocks.
[3] Models with an "i" suffix have a built-in position sensing switch. Models 8125 and 9010 also have a built-in switch.

NOTE

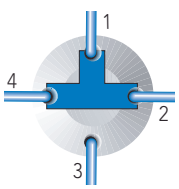
Upchurch Scientific® Switching Valve Options



4-Way Diagonal Flow Switching Valves
(V-100D, V-101D)

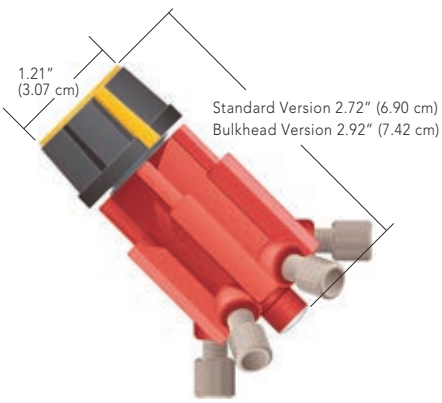


Right Angle Flow Switching Valves
(V-100L, V-101L)



3-Way Flow Switching Valves
(V-100T, V-101T)

V-101L
Manual Switching Valve
Up to 1,000 psi (69 bar)



V-540
Manual Injection Valve
Up to 1,000 psi (69 bar)

Manual Valves up to 1,000 psi

	Part No.	Description	Tubing/Fitting Size	Wetted Material	Configuration	Includes
	UP TO 1,000 PSI (69 BAR) UPCHURCH SCIENTIFIC					
	SWITCHING					
	V-100D	4-Position, 4-Port, 500 psi (34 bar)	1/4-28 Ports for 1/16" OD Tubing	PEEK, PTFE	Double Diagonal	*
★	**V-101D**	4-Position, 4-Port, Bulkhead, 500 psi (34 bar)	1/4-28 Ports for 1/16" OD Tubing	PEEK, PTFE	Double Diagonal	*
★	**V-100L**	4-Position, 4-Port, 500 psi (34 bar)	1/4-28 Ports for 1/16" OD Tubing	PEEK, PTFE	Right-Angle "L"	**
★	**V-101L**	4-Position, 4-Port, Bulkhead, 500 psi (34 bar)	1/4-28 Ports for 1/16" OD Tubing	PEEK, PTFE	Right-Angle "L"	**
	V-100T	4-Position, 4-Port, 500 psi (34 bar)	1/4-28 Ports for 1/16" OD Tubing	PEEK, PTFE	Single "T"	***
	V-101T	4-Position, 4-Port, Bulkhead, 500 psi (34 bar)	1/4-28 Ports for 1/16" OD Tubing	PEEK, PTFE	Single "T"	***
	INJECTION	**For Injection, add the appropriately sized Sample Loop to the Switching valves above**				
	V-450	2-Position, 6-Port, 1,000 psi (69 bar)	1/4-28 Ports for 1/16" OD Tubing	Polyimide, PTFE	Injection	(6) XP-235
★	**V-451**	2-Position, 6-Port, Bulkhead Version, 1,000 psi (69 bar)	1/4-28 Ports for 1/16" OD Tubing	Polyimide, PTFE	Injection	(6) XP-235
	V-540	2-Position, 6-Port, 1,000 psi (69 bar)	1/4-28 Ports for 1/8" OD Tubing	Polyimide, PTFE	Injection	(6) XP-335
★	**V-541**	2-Position, 6-Port, Bulkhead Version, 1,000 psi (69 bar)	1/4-28 Ports for 1/8" OD Tubing	Polyimide, PTFE	Injection	(6) XP-335
	SELECTION					
	V-240	6-Position, 7-Port, 1,000 psi (69 bar)	1/4-28 Ports for 1/16" OD Tubing	Polyimide, PTFE	Multi-port Selection	(6) XP-235
★	**V-241**	6-Position, 7-Port, Bulkhead Version, 1,000 psi (69 bar)	1/4-28 Ports for 1/16" OD Tubing	Polyimide, PTFE	Multi-port Selection	(6) XP-235
	V-340	6-Position, 7-Port, 1,000 psi (69 bar)	1/4-28 Ports for 1/8" OD Tubing	Polyimide, PTFE	Multi-port Selection	(6) XP-335
★	**V-341**	6-Position, 7-Port, Bulkhead Version, 1,000 psi (69 bar)	1/4-28 Ports for 1/8" OD Tubing	Polyimide, PTFE	Multi-port Selection	(6) XP-335

** (4) P-218BLK, (4) P-240.*
*** (4) P-218BLK, (4) P-240, (1) P-309.*
**** (4) P-218BLK, (4) P-240, (1) P-309.*

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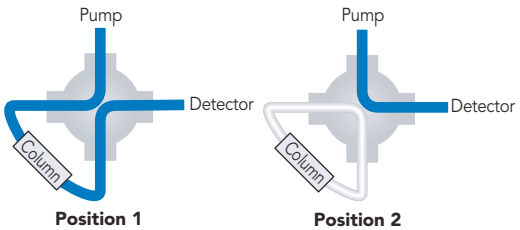
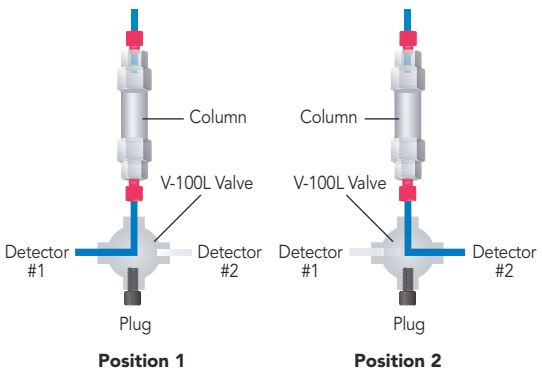
APPLICATION NOTE

Upchurch Scientific® Switching Valve Applications

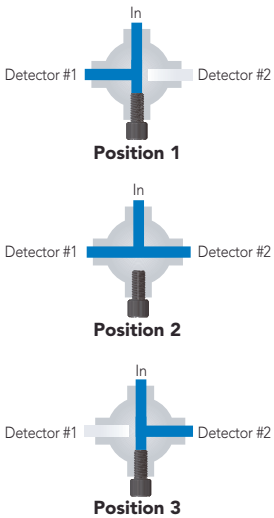
Protect sensitive system components (such as a column) during a cleaning cycle with our Diagonal Flow Switching Valve ("D"). This valve eliminates the need to remove, plug and reconnect a low pressure column (see below).



- A typical application for a Right Angle Flow Switching Valve ("L") is column switching, allowing two columns to use one detector. Detector switching is another common application for this valve (see below). Plug off the extra port with the included plug.



- Your detector switching application may require the flexibility of routing the column effluent to both detectors simultaneously while retaining the ability to isolate each detector. Use our 3-Way Flow Switching Valve ("T"), plugging off the fourth port with the included plug (see right).



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Rapid Replacement Pods™

For Rheodyne® Valves

- Zero downtime maintenance
- Improves lab throughput

To help keep your instrument online and performing at maximum precision, select the exact Rapid Replacement Pod for your higher pressure MX Series II valves. Replacement pods are easily exchanged as part of scheduled preventive maintenance, or in an emergency, a pod can be substituted quickly while the original is examined and cleaned at your convenience. The pod kit contains complete instructions for removal and replacement.

Part No.	Description	For Valve Part No.
TO 15,000 PSI (1,035 BAR)		
SWITCHING		
PD715-000	Rapid Replacement Pod	MXT715-000
PD715-102	Rapid Replacement Pod	MXT715-102
SELECTION		
PD715-105	Rapid Replacement Pod	MXT715-105
UP TO 6,000 PSI (410 BAR)		
SWITCHING		
PD7900	Rapid Replacement Pod	MXP7900-000
PD7960	Rapid Replacement Pod	MXP7960-000
PD7980	Rapid Replacement Pod	MXP7980-000
PD7986	Rapid Replacement Pod	MXP7986-000
PD9900	Rapid Replacement Pod	MXP9900-000
PD9960	Rapid Replacement Pod	MXP9960-000
INJECTION		
PD7920	Rapid Replacement Pod	MXP7920-000
SELECTION		
PD7970	Rapid Replacement Pod	MXP7970-000

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RheBuild® Kits

RheBuild Kits are available for all Rheodyne® brand products. Included in each individualized RheBuild Kit are all parts, tools, and instructions to maintain precision performance of your particular product. RheBuild Kits eliminate individual part ordering.

APPLICATION NOTE

How to Avoid Pressure Transients

Air in the sample loop can cause an instantaneous system pressure drop that eventually returns to a normal level. Air causes the pressure to drop when the injector moves from the LOAD to the INJECT position. When large sample loops (≥ 100 µL) are partially loaded, air present in the needle port tube is pushed into the sample loop (see Figure 1). Air can also enter the sample loop from siphoning which occurs when the vent line is higher than the injection port. In either case, upon injection, the system pressure collapses the air bubble, causing pressure to drop momentarily.

A pressure drop in the system caused by air results in changes in retention time, artifact peaks, and affects column performance.

Avoid pressure drops by removing the air in the needle port tube. Do this by flushing about 1 mL of mobile phase with a luer syringe with needle port cleaner. Keep the needle port tube filled with mobile phase by occasional flushing. Adjust the vent line(s) so the outlet is at the same horizontal level as the needle port (see Figure 2). For additional injection troubleshooting, refer to the Rheodyne Troubleshooting Guide for HPLC Injection Problems. You may download the Guide from the IDEX Health & Science web site: www.idex-hs.com under Support.

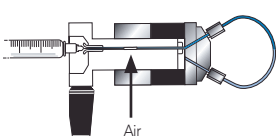

Figure 1 Air present in the needle port tube is pushed by the syringe during loading into the sample loop

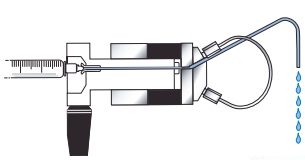

Figure 2 Pathway of the flushing mobile phase using the Needle Port Cleaner, Part # 7125-054 (see page 143) when the injector is in INJECT

Part No.	Description
RHEBUILD KITS FOR MX SERIES II™ VALVES	
7150-999	RheBuild Kit for MXT715-000 (includes 2 rotor seals)
7152-999	RheBuild Kit for MXT715-102 (includes 2 rotor seals)
7155-999	RheBuild Kit for MXT715-105 (includes 2 rotor seals)
7920-999	RheBuild Kit for MXP7920-000 and MXP7900-000
7960-999	RheBuild Kit for MXP9960-000 (includes rotor seal and stator face seal)
7961-999	RheBuild Kit for MXP7960-000
7970-999	RheBuild Kit for MXP7970-000
79801-999	RheBuild Kit for MXP7980-000
79861-999	RheBuild Kit for MXP7986-000
7900-999	RheBuild Kit for MXP9900-000 (includes rotor seal and stator face seal)
RHEBUILD KITS FOR MANUAL VALVES	
3725-999	RheBuild Kit for models 3725, 3725i, 3725-038, 3735i-038
7010-996	Conversion Kit including Stator Face Assembly for model 7010
7010-997	RheBuild Kit including Stator for model 7010
7010-998	RheBuild Kit, pH Upgrade Kit for model 7000
7010-999	RheBuild Kit for model 7010 and 7010-type Valves
7125-999	RheBuild Kit for models 7125 and 7126
7125Ti-999	RheBuild Kit for model 7125-081
7410-999	RheBuild Kit for model 7410
7520-999	RheBuild Kit for models 7520 and 7526 (includes inlet stator and seal)
7725-999	RheBuild Kit for models 7725 and 7725i
7788-999	RheBuild Kit for model 7725i-188
8125-999	RheBuild Kit for models 8125 and 8126
9010-999	RheBuild Kit for model 9010
9125-999	RheBuild Kit for models 9125 and 9126
9725-999	RheBuild Kit for models 9725 and 9725i; 7725(i) pH upgrade kit
RHEBUILD KITS FOR MX SERIES I™ VALVES	
7900-999	RheBuild Kit for models MX7900-000, MX7925-000, MX9900-000, MX9925-000
7960-999	RheBuild Kit for model MX7960-000
7980-999	RheBuild Kit for model MX7980-000
7984-999	RheBuild Kit for model MX7984-000
7986-999	RheBuild Kit for model MX7986-000
RHEBUILD KITS FOR LABPRO™ & EV AUTOMATED FLUIDIC INSTRUMENTS	
1006-999	RheBuild Kit for model PR/EV100-106
5001-999	RheBuild Kit for models PR/EV500-101 and PR/EV550-101
5100-999	RheBuild Kit for models PR/EV500-100 and PR/EV550-100
5104-999	RheBuild Kit for models PR/EV500-104 and PR/EV550-104
7004-999	RheBuild Kit for models PR/EV700-104 and PR/EV750-104
7112-999	RheBuild Kit for models PR/EV700-112 and PR/EV750-112
7501-999	RheBuild Kit for models PR/EV700-100 and PR/EV750-100
7502-999	RheBuild Kit for models PR/EV700-102 and PR/EV750-102
7507-999	RheBuild Kit for models PR/EV700-107 and PR/EV750-107
7531-999	RheBuild Kit for models PR703-100 and PR753-100

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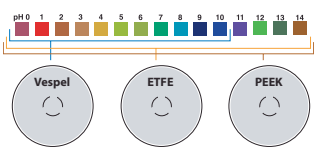
Rotor Seals & Stators

The rotor seal is the polymeric disc that makes a high pressure seal against the stator or stator face seal. The seal wears with use and is one of the only parts that may need routine replacement.

Stators are available in 316 stainless steel, PEEK and proprietary materials. Stators need replacement only if the ports or sealing surfaces become damaged. Avoid damage from use of improper injection needles by referring to the "Using Proper Syringe Needles" Application Note on page 142.

Please Note: Rotor seals for MX Series II™ Modules are available in RheBuild® Kits on page 136. Stators for MX Series II Modules are available on this page. MX (Series I) Module rotor seals are available in RheBuild Kits on page 136.

APPLICATION NOTE



How to Select the Right Rotor Seal

The standard rotor seal in many Rheodyne® manual valves is made from a Vespel® blend. This polyimide has low wear and high chemical resistance. Vespel tolerates a pH range of 0 to 10. Solutions more basic than pH 10 dissolve Vespel which damages the rotor seal. If you use any solutions above pH 10, Rheodyne recommends a PEEK blend rotor seal. PEEK offers a high chemical resistance and versatility, and will tolerate the entire pH range from 0 to 14. ETFE blend rotor seals are appropriate for use in applications where PEEK is not generally acceptable, such as when methylene chloride or DMSO in higher concentrations is being used.

Part No.	For Valve Model No.	Description
VESPEL BLEND ROTOR SEALS		
7000-016	7000L, 7040L	Vespel Rotor Seal
7010-039	7010, 7000, 7040	Vespel Rotor Seal
★ **7030-003**	7030, 9030	Vespel Rotor Seal
7030-014	7030L	Vespel Rotor Seal
7060-070	7060, 7066	Vespel Rotor Seal
7060-064	7060L	Vespel Rotor Seal
7125-047	7125, 7725, 9725	Vespel Rotor Seal
7410-038	7410	Vespel Rotor Seal
7413-013	7413	Vespel Rotor Seal
8125-038	8125	Vespel Rotor Seal

Part No.	For Valve Model No.	Description
ETFE BLEND ROTOR SEALS		
7000-017	7000L, 7040L	ETFE Rotor Seal
7010-071	7010, 7010-087, 7000, 7040	ETFE Rotor Seal
7030-015	7030, 9030	ETFE Rotor Seal
7060-074	7060, 7066, 9060	ETFE Rotor Seal
7060-067	7060L	ETFE Rotor Seal
7125-079	7125, 7125-081, 7725	ETFE Rotor Seal
7410-075	7410	ETFE Rotor Seal
8125-097	8125	ETFE Rotor Seal
9010-051	9010	ETFE Rotor Seal
9125-082	9125, 9725	ETFE Rotor Seal
PEEK BLEND ROTOR SEALS		
3030-005	3030, 3030-038	PEEK Rotor Seal
3710-008	3000, 3000-038, 3710, 3710-038	PEEK Rotor Seal
3725-018	3725, 3725-038	PEEK Rotor Seal
9010-065	7000, 7010, 9010	PEEK Rotor Seal
8125-119	8125	PEEK Rotor Seal
9125-095	7125, 7725, 9125, 9725	PEEK Rotor Seal
STATORS FOR MX SERIES II MODULES		
7123-548	MXT715-000	Stator
7123-550	MXT715-105	Stator
7123-568	MXT715-102	Stator
7770-229	MXP7920-000	Stator
7980-004	MXP7980-000	Stator
7986-004	MXP7986-000	Stator
7900-146	MXP9900-000	Stator
7900-179	MXP7900-000	Stator
7900-183	MXP7970-000	Stator
7960-014	MXP7960-000	Stator
9960-002	MXP9960-000	Stator
STATORS FOR OTHER RHEODYNE VALVES		
3725-006	3725, 3710-038, 3000-038 and 3030-038	Stator
3725-085	3725-038, 3710-038, 3000-038 and 3030-038	Stator
7010-069	7000L, 7030L, 7040L	Stator
7010-040	7010, 7125, 7000, 7030 and 7040	Stator
7010-066	7125-081 and 7010-087	Stator
7060-039	7060 and 7066	Stator
7060-065	7060L, EV501-100	Stator
7123-047	PR/EV500-100	Stator
7123-127	PR/EV750-107	Stator
7123-128	PR/EV700-107	Stator
7123-142	PR/EV500-104, EV501-104	Stator
7123-145	PR/EV550-104, EV551-104	Stator
7123-147	PR/EV550-100	Stator
7123-148	PR/EV500-101	Stator
7123-149	PR/EV550-101	Stator
7123-180	PR703-100 and EV700-105	Stator
7123-221	PR753-100 and EV750-105	Stator
7123-223	PR/EV700-112	Stator
7123-390	EV200-102	Stator
7410-041	7410 and 7413	Stator
7520-030 (inlet)	7520	Stator
7520-035 (outlet)	7520	Stator
7650-002	PR/EV700-102	Stator
7725-010	7725(i)	Stator
7750-070	7750	Stator
7750-038	PR/EV700-100	Stator
8125-098	8125	Stator
9060-016	9060	Stator
9125-043	9125, 9010, 9030 and 9725(i)	Stator
9650-009	PR/EV750-102	Stator
9750-021	PR/EV750-100	Stator

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Stainless Steel Sample Loops

These high quality stainless steel sample loops have burr-free, square-cut ends to ensure a flush connection to valve ports. The size designations of loops are nominal. The actual volumes can differ from the theoretical designations because of the 0.001" (± 0.025 mm) tolerance of the metal tubing bore.

Accuracy of large metal loops (1.0 mm, 0.040" bore) is about ±5%, intermediate loops (0.5 mm, 0.020" bore) ±10%, and small loops (0.2 mm, 0.007" bore) ±30%.

Since both standards and unknowns are usually analyzed using the same sample loop, knowledge of the actual, accurate volume is rarely needed. If the sample loop volume must be known, it is best to calibrate the loop in place on the valve so the flow passages in the valve are also taken into account. An alternative to calibration is to use a dual mode injector and partial-filling method of loading. See the "Sample Loop Loading" Application Note on page 129.

Model 7725 Injector loops are not interchangeable with loops for the model 7125. The port angle for the 7725 is 30° whereas the port angle for the 7125 is 20° requiring the loops to have a different shape.

Model 8125 Micro-Scale Sample Injector requires special loops in the 5.0 µL to 50 µL range. The 8125 sample loops are made with 0.5 mm (0.020") OD tubing.

APPLICATION NOTE

How to Properly Install Sample Loops: Stainless Steel

Stainless steel sample loops are supplied with fittings that are not swaged onto the tube. It is important that the loop be completely bottomed in the injector port before the ferrule is swaged onto the tube. The depth of the tubing holes may vary slightly from port to port and from valve to valve. A fitting made up in one port may leave a small cavity in another port. The cavity causes high dispersion and peak distortion such as fronting, tailing, or broadening. It is good practice to label loop ends so they will be replaced in the same, respective ports that were used in swaging the ferrules. Hint: swaging ferrules separately on each side, into each respective valve port makes loop installation easier.

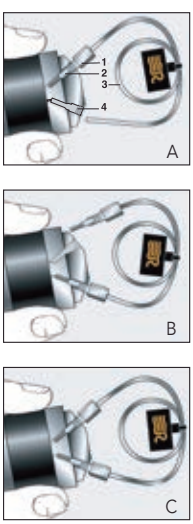

Figure 1 Cut-away view of stainless steel sample loop installation

To install the sample loop:

a) Take one end of the loop and place the nut (1) and ferrule (2) onto the tubing (3) with the threaded portion of the nut and tapered portion of the ferrule toward the end. See Figure A.

b) Insert the tubing into port (4). Confirm that the tubing is bottomed in the valve port as shown in Figure A.

c) While firmly pressing down on the tubing, hand-tighten the nut as tight as possible.

d) With the IDEX Wrench (see pages 33 and 144), designed especially for fittings, tighten one quarter turn past finger tight. Remove the loop to confirm the ferrule is swaged onto the tube.

e) Repeat steps a-d with the other end of the loop while the swaged end remains outside the valve port. See Figure B.

f) Reinstall each end of the loop to their respective ports. See Figure C.

Part No.	Volume	Tubing
RHEODYNE® STAINLESS STEEL LOOPS FOR MXT715-000		
7755-300	5 µL Sample Loop	0.18 mm (0.007") ID x 1/16" OD
7755-301	10 µL Sample Loop	0.30 mm (0.012") ID x 1/16" OD
7755-302	20 µL Sample Loop	0.30 mm (0.012") ID x 1/16" OD
7755-303	50 µL Sample Loop	0.51 mm (0.021") ID x 1/16" OD
7755-304	100 µL Sample Loop	0.51 mm (0.021") ID x 1/16" OD
RHEODYNE STAINLESS STEEL LOOPS FOR 7125, 7010 INJECTION VALVES (DO NOT USE FOR 7725)		
7020	5 µL Sample Loop	0.18 mm (0.007") ID x 1/16" OD
7021	10 µL Sample Loop	0.30 mm (0.012") ID x 1/16" OD
7022	20 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD
7023	50 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD
7024	100 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD
7025	200 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD
7026	500 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD
7027	1.0 mL Sample Loop	0.76 mm (0.030") ID x 1/16" OD
7028	2.0 mL Sample Loop	1.0 mm (0.040") ID x 1/16" OD
7029	5.0 mL Sample Loop	1.0 mm (0.040") ID x 1/16" OD
1876	10 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
1877	20 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
RHEODYNE STAINLESS STEEL LOOPS FOR 3725-038, 3725I-038 INJECTION VALVES		
3065-018	2.0 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
3065-019	5.0 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
3065-023	10 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
3065-025	20 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
RHEODYNE STAINLESS STEEL LOOPS FOR 7725, 7725I, PR/EV700-100, PR/EV703-100, MX MODULE INJECTION VALVES (DO NOT USE FOR 7125)		
7755-020	5 µL Sample Loop	0.18 mm (0.007") ID x 1/16" OD
7755-021	10 µL Sample Loop	0.30 mm (0.012") ID x 1/16" OD
7755-022	20 µL Sample Loop	0.30 mm (0.012") ID x 1/16" OD
7755-023	50 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD
7755-024	100 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD
7755-025	200 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD
7755-026	500 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD
7755-027	1.0 mL Sample Loop	0.76 mm (0.030") ID x 1/16" OD
7755-028	2.0 mL Sample Loop	1.0 mm (0.040") ID x 1/16" OD
7755-029	5.0 mL Sample Loop	1.0 mm (0.040") ID x 1/16" OD
1876	10 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
1877	20 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD
RHEODYNE STAINLESS STEEL LOOPS FOR 8125 INJECTOR (USE 7755-024 TO 7755-029 FOR VOLUMES > 50 µL)		
8020	5 µL Sample Loop	0.20 mm (0.008") ID x 0.020" OD
8021	10 µL Sample Loop	0.20 mm (0.008") ID x 0.020" OD
8022	20 µL Sample Loop	0.25 mm (0.010") ID x 0.020" OD
8023	50 µL Sample Loop	0.30 mm (0.012") ID x 0.020" OD
8125-084	Ferrules for 0.020" (0.5 mm) Tubing	
8125-086	Ferrules for 0.020" (0.5 mm) Tubing, 4 pk	

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PEEK Sample Loops

Flexible PEEK sample loops are alternatives to stainless steel loops. PEEK loop ends are provided with clean, straight cuts for easy valve installation.

PEEK polymer is inert to almost all organic solvents and is biocompatible, giving PEEK loops added versatility. Natural PEEK is used for these sample loops. Like metal loops, the size designations of PEEK loops are nominal. The actual volumes can differ from the theoretical designations because of the ±0.05 mm (0.002") tolerance of the tubing bore. Accuracy of large PEEK loops (0.8 mm, 0.030" bore) is about ±14%, intermediate loops (0.5 mm, 0.020") ±21%, and small loops (0.2 mm, 0.007") ±65%.

PEEK loops are also supplied with unswaged RheFlex® fittings but do not require the same swaging precaution. The fittings can reposition along the loop tubing when the fitting reinserts in the ports for correct loop installation.

Please Note: Several of our PEEK Sample Loops can also be used with Valco/VICI® sample injection valves. Please refer to the product listing on this page to aid selection.

APPLICATION NOTE

PEEK Physical Strength Characteristics

Although PEEK material is compatible with virtually all solvents, there are many factors that affect burst pressure of PEEK tubing. Factors such as increases in inner diameter, temperature, exposure time, and concentration of organic solvents affect the degradation of PEEK. Other solvents such a THF, methylene chloride and DMSO cause PEEK tubing to swell while concentrated nitric acid and sulfuric acid weaken the tubing.

Part No.	Volume	Tubing	Valco No.
PEEK LOOPS FOR 3725, 3725I INJECTION VALVES			
3055-018	2.0 mL Sample Loop	1.6 mm (0.062") ID x 1/8" OD	N/A
3055-019	5.0 mL Sample Loop	1.6 mm (0.062") ID x 1/8" OD	N/A
3055-023	10 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD	N/A
3055-025	20 mL Sample Loop	2.0 mm (0.080") ID x 1/8" OD	N/A
PEEK LOOPS FOR 9725, 9010, PR/EV750-100, PR/EV753-100 INJECTION VALVES			
Part No.	**Volume**	**Bore / Tubing**	**Valco No.**
9055-020	5.0 µL Sample Loop	0.18 mm (0.007") ID x 1/16" OD	SL5CWPK
9055-021	10 µL Sample Loop	0.25 mm (0.010") ID x 1/16" OD	SL10WPK
9055-022	20 µL Sample Loop	0.25 mm (0.010") ID x 1/16" OD	SL20WPK
9055-023	50 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD	SL50WPK
9055-024	100 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD	SL100WPK
9055-025	200 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD	N/A
9055-026	500 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	SL500WPK
9055-027	1.0 mL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	SL1KCWPK
9055-028	2.0 mL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	SL2KCWPK
9055-029	5.0 mL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	N/A
9055-033	10 mL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	N/A
PEEK LOOPS FOR 7725, 7725I, PR/EV700-100			
7123-227	1 µL Sample Loop (models PR/EV700-100 and EV750-100 only)	Internal groove	N/A
7755-015	2 µL Sample Loop (models 7725, 7725i, and 9725(i) only)	Internal groove	N/A
REPLACEMENT RHEFLEX FITTINGS FOR PEEK LOOPS			
Part No.	**Description**		**Qty.**
6000-078	Nut/Ferrule Set, Natural PEEK, 5/16-24, for 1/8" OD loops		ea.
6000-079	Ferrules, Natural PEEK, for 1/8" OD loops		5-pk
6000-251	Ferrules, Natural PEEK, for 1/16" OD loops		10-pk
6000-254	Nut/Ferrule Sets, Natural PEEK, 10-32, for 1/16" OD loops		10-pk

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Valco/VICI-Compatible Stainless Steel Sample Loops

Valco-Compatible Stainless Steel Loops are manufactured by IDEX Health & Science. These loops are designed for use with Valco valve models CW6 and EC6W. Each loop has burr-free, polished ends and is passivated and flushed with reagent-grade methanol to ensure cleanliness.

Loops made with 1/16" OD tubing come complete with F-287 SealTight™ Fittings, which are pressure rated to 9,000 psi (620 bar)[1]. The fittings and adapters that accompany the 1/8" OD sample loops are rated to 1,000 psi (69 bar)[1]. Volumes are stated at ±10%.

[1] These pressure ratings reflect the performance of the fittings, not the port or valve in which they are used. IDEX Health & Science manufactures many products designed as direct replacements for OEM components. Reference to these manufacturers does not imply their endorsement of our products.

Part No.	Volume	Tubing	Valco No.
VALCO/VICI-COMPATIBLE STAINLESS STEEL LOOPS FOR C6W, EC6W INJECTION VALVES			
1750	5 µL Sample Loop	0.18 mm (0.007") ID x 1/16" OD	SL5CW
1751	10 µL Sample Loop	0.25 mm (0.010") ID x 1/16" OD	SL10CW
1752	15 µL Sample Loop	0.25 mm (0.010") ID x 1/16" OD	SL15CW
1755	20 µL Sample Loop	0.51 mm (0.010") ID x 1/16" OD	SL20CW
1758	25 µL Sample Loop	0.51 mm (0.010") ID x 1/16" OD	SL25CW
1759	50 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD	SL50CW
1762	100 µL Sample Loop	0.51 mm (0.020") ID x 1/16" OD	SL100CW
1778	200 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	N/A
1763	250 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	SL250CW
1764	500 µL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	SL500CW
1770	1 mL Sample Loop	0.76 mm (0.030") ID x 1/16" OD	SL1KCW
1772	2 mL Sample Loop	1.02 mm (0.040") ID x 1/16" OD	SL2KCW
1775	5 mL Sample Loop	2.03 mm (0.080") ID x 1/8" OD	SL5KCW
1776	10 mL Sample Loop	2.03 mm (0.080") ID x 1/8" OD	SL10KCW

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APPLICATION NOTE

Fluidic Movement in Tubes

Q: "Why can I load only up to half of the volume of the loop in partial-filling method?"

A: Sample occupies 2 µL of loop for every 1 µL loaded from the syringe. For example, 10 µL of sample spreads out over the entire length of a 20 µL loop. Any additional sample loaded will overflow the end of the loop and exit out to waste. Reproducibility is poor because the volume of sample in the loop is different from the known volume originally loaded by your syringe.

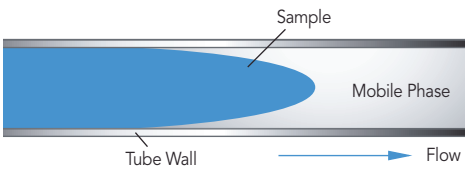

Figure 1 Schematic of sample flow through mobile phase between tubing walls

Fluid spreads in a parabolic shape through a tube instead of moving in one plug because the velocity is different at the center of the tube than at the walls. The velocity at the center of the tube is twice the average velocity, and near the wall the velocity is almost zero, creating a parabolic shape. This fluidic movement is called laminar flow. See Figure 1.

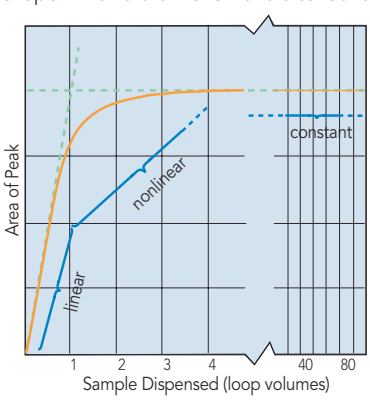

Figure 2 Sample mass (observed peak area) vs. volume of sample dispensed from the syringe, in units of loop volumes, injected onto the column from a Rheodyne® dual mode injector such as model 7725

In dual mode injection valves (see "Sample Loop Loading" Application Note on page 129) the sample from the syringe needle loads directly into the sample loop. The sample volume is known since there is no sample waste. The laminar flow phenomenon accounts for the shape of the plot as shown in Figure 2. Note that the plot has three regions:

a) Partial-Filling Region. When the volume dispensed is less than half the loop volume, the curve is linear. Sample has not reached the end of the loop. Within this region, performance depends on the syringe and operator.

b) Nonlinear Region. When the volume dispensed is between half the loop volume and about two loop volumes, the curve is nonlinear. Sample is lost from the loop, so reproducibility is poor. If you dispense a volume equal to the loop size, you are in this region of poor performance.

c) Complete-Filling Region. When the volume of sample dispensed is several loop volumes, the loop contains only pure sample, undiluted by residual mobile phase. Within this region, reproducibility is highest.

In the single mode injection valves the sample must pass through a connecting passage before it reaches the sample loop. Since some of the sample dispensed from the syringe remains in the connecting passageway, an unknown amount enters the sample loop. Therefore, single mode injection valves achieve high reproducibility only by using the complete-filling method.

APPLICATION NOTE

How to Find and Fix Common Sample Injector Leaks

Leaks cause valuable sample loss. Nobody wants that. The key to the valve holding pressure is the integrity of the sealing surfaces. If there is a scratch on the sealing surface, or the needle seal in the rotor seal is damaged, a leak may appear. It is also important to realize what appears to be a leak can instead be a result of siphoning. The following are the three most common situations in which fluid leaks occur.

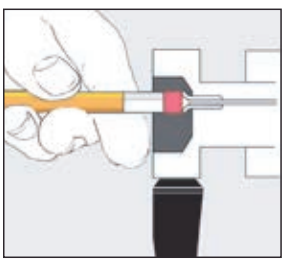

Figure 1 To reform the needle seal, push the eraser end of a pencil against the needle port

1. If fluid leaks out of the needle port only while loading the loop (i.e., while pushing down on the plunger of the syringe), the problem is most likely that the needle seal or the needle port fitting in the loop filler port is not gripping the syringe needle tightly enough. Tighten the needle seal grip by pushing with the eraser end of the pencil on the needle port (See Figure 1). The tightening reduces the hole diameter of the needle seal and port fitting.

2. If fluid leaks continuously from the needle port or vent lines and/or from the stator-to-stator ring interface, replace the rotor seal and/or stator face assembly. Scratches on the rotor seal or cracks in the stator face assembly allow mobile phase to escape and cause cross port leakage. Genuine Rheodyne replacement rotor seals are listed on page 137.

3. If fluid leaks from the needle port and/or vent lines but eventually stops, the cause is most likely siphoning and not a leak. Siphoning occurs if the vent lines are lower or higher than the needle port. Adjust the vent line(s) so that the outlet is at the same horizontal level as the needle port to prevent siphoning. (See Figure 2).

For other leakage or injection troubleshooting, refer to the Rheodyne Troubleshooting Guide for HPLC Injection Problems. You may download the Guide from the Rheodyne web site: www.idex-hs.com under Support.

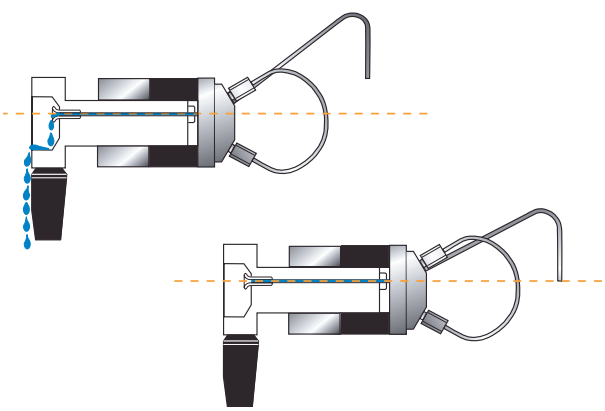

Figure 2 Needle port level compared to the level of vent line outlet:
(A) siphoning occurs when the vent line outlet is above the needle port level
(B) siphoning does not occur if the vent line outlet is the same horizontal level as the needle port

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APPLICATION NOTE

Using Proper Syringe Needles

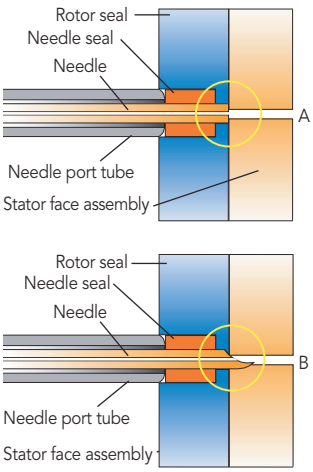

Figure 1 A square cut needle: (A) stops against the stator face assembly; The tip of a pointed needle (B) slips into the stator face and the tip breaks off as the valve rotates

With front-loading injection valves it is important to use the correct needle when loading the sample loop. An incorrect needle will damage the valve and can cause poor reproducibility. When the needle is too short the tip will not reach the needle seal. When the needle is too small in diameter the seal will not grip tightly enough. Needles with a beveled tip can damage the rotor seal and stator face assembly (see Figure 1). The needle should be #22 gauge (0.028"–0.0285"/ 0.72 mm), and 90° point style (square cut end). Model 3725 requires a #16 gauge (0.0645"–0.0655"/ 1.65 mm) needle. Never use a beveled, pointed, or tapered needle.

Needle specifications are not critical when using a Loop Filler Port to load the sample loop. However, it is important to tighten the needle port fitting around the needle if using a syringe needle with a slightly smaller diameter than 0.7 mm (0.028").

If the loading method used is complete-filling, a syringe without a needle can be used. A syringe fitted with a Needle Port Cleaner can be used with a front-loading valve (Figure 2A) or with a Loop Filler Port (Figure 2B).

Needle port accessories are listed on this page.

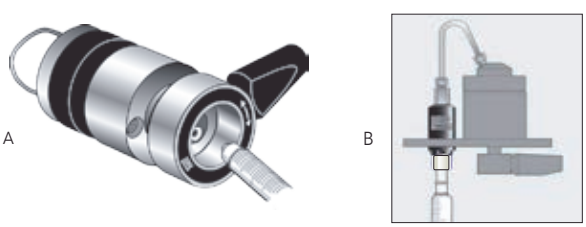

Figure 2
(A) Syringe fitted with Needle Port Cleaner (Part # 7125-054) loading a front-loading valve (model 7725); (B) loading a Loop Filler Port (Part # 7012)

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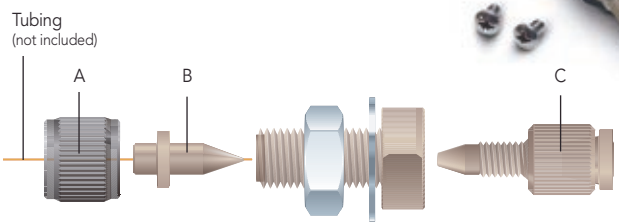
Injection Port Adapters

- For 360 µm OD tubing
- Mount on bracket or bulkhead

To introduce sample, connect 360 µm OD capillary tubing to an Upchurch Scientific® Injection Port Adapter Assembly. This adapter accepts standard 22 gauge Hamilton-style injection syringe needles. No additional swept volume is added to the fluid pathway by this adapter, as the needle butts directly against the connecting tubing during injections. The adapter can be bulkhead mounted or mounted with the V-447 Kits.

To introduce a sample directly into a 10-32 port, purchase a M-432-03 separately.



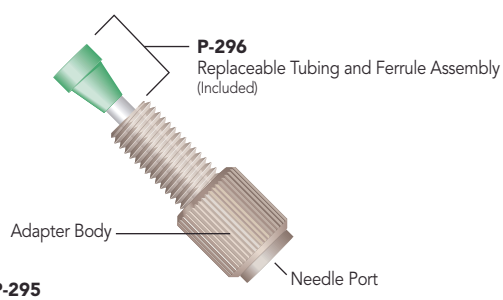
M-432
Micro Injection Port Adapter Assembly

RELATED PRODUCTS

	A	B	C
For 360 µm OD Tubing			
M-432 and V-447	P-416BLK	F-152	M-432-03

- For use with Upchurch Scientific Injection Valves on page 133

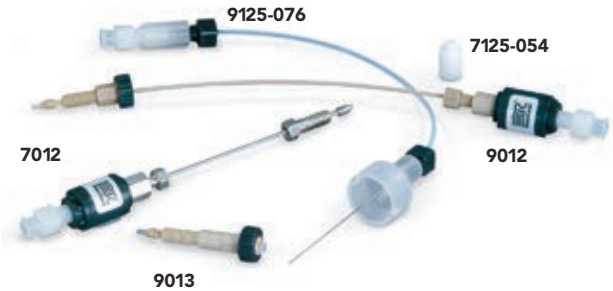
This simple, biocompatible adapter is designed specifically for the Upchurch Scientific Injection Valves on page 133 and can also convert any 1/4-28 flat-bottom port into a port that can accept a standard 22 gauge HPLC injection needle. This injection port adapter is adjustable, so you can create a snug fit around the needle to prevent any leaking of the analyte. In addition, this product features an internal stop that prevents you from inserting the needle too far, eliminating the possibility of damaging the valve with the needle tip.



P-295
1/4-28 Flat-Bottom Injection Port Adapter

Needle Port Accessories

The Rheodyne® adaptable Loop Filler Ports (Part #7012 and 9012) are used to load sample from syringe needles or luer tips. The Needle Port (Part #9013) conserves sample by minimizing the volume between the needle and the valve.



Part No.	Description
MICRO INJECTION PORT ADAPTER	
For 360 µm OD Tubing	
F-152	Replacement MicroFerrule for M-432, Natural PEEK
M-432	Micro Injection Port Adapter Assembly
M-432-03	Replacement Tubing/Fitting Assembly for M-432 & M-433
P-416BLK	Replacement Female Nut for M-432, Black PEEK
V-447	Micro Injection Port Adapter Assembly Actuator Mounting Kit Includes (1) M-432 with mini-actuator bracket and (2) mounting screws
1/4-28 FLAT-BOTTOM INJECTION PORT ADAPTER	
P-295	Adjustable Injection Port Adapter
P-296	Replacement Tubing/Ferrule Assembly
NEEDLE PORT ACCESSORIES	
7012	Stainless Steel Loop Filler Port
7125-054	Needle Port Cleaner
9012	PEEK Loop Filler Port

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Valve Wrenches

- For convenient wrench-tightening of fittings on high pressure rotary shear valves
- For removal of knobs on Upchurch Scientific® Manual Valves

The smartly designed IDEX Wrench is a double-ended slotted socket wrench that fits over 1/16" and 1/8" OD tubing. It easily loosens and tightens 1/4" and 5/16" hex head stainless steel or PEEK fittings. The "Z" shape of the IDEX Wrench provides ideal leverage for changing sample loops and fittings, and keeps one end from restricting the use of the other.

The V-103 is an Allen (hex-key) wrench designed to remove the knob from Upchurch Scientific V-101 valves (page 133). The V-104 is an Allen wrench that can be used to remove the knob from Upchurch Scientific Medium Pressure Selection and Injection Valves (also found on page 133).

MXX Replacement Fittings

Use these replacement Ferrules and O-rings for 1/8" and 1/16" tubing with the MXX Series II valves shown on page 133. Please see the part number chart below for a list of individual part numbers.

Biocompatible

Mounting Brackets

Rheodyne® mounting brackets and panels of different shapes and sizes organize and provide a sturdy support for Rheodyne valves. The Ring Stand Mounting Bracket now allows the valves to mount onto common laboratory equipment.

Part No.	Description	
VALVE WRENCHES		
6810	IDEX Wrench	
V-103	0.050" Allen Wrench (replacement)	
V-104	5/64" Allen Wrench (replacement)	
MOUNTING BRACKET ACCESSORIES		
7160	Mounting Panel	
7160-010	Valve Angle Bracket	
7160-029	Ring Stand Mounting Bracket	
VALVE BRACKET		
M-615-1	Mounting Bracket for Upchurch Scientific® Switching Valves	
M-615-2	Mounting Bracket for Upchurch Scientific Injection and Selection Valves	
REPLACEMENT FITTINGS		
Part No.	**Description**	**Qty.**
7770-039	Ferrules for 1/8" OD Tubing	25-pk
7770-040	Ferrules for 1/8" Tubing	50-pk
7770-041	Ferrules for 1/8" Tubing	100-pk
7770-044	Ferrules for 1/16" OD Tubing	25-pk
7770-045	Ferrules for 1/16" Tubing	50-pk
7770-046	Ferrules for 1/16" Tubing	100-pk
7770-124	O-rings for 1/16" OD Tubing	25-pk

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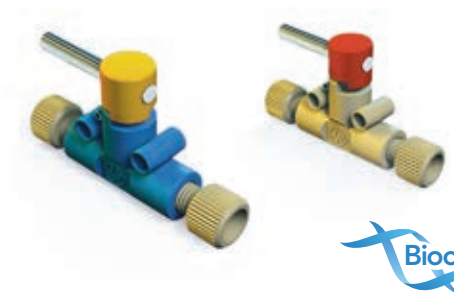
Shut-Off Valves

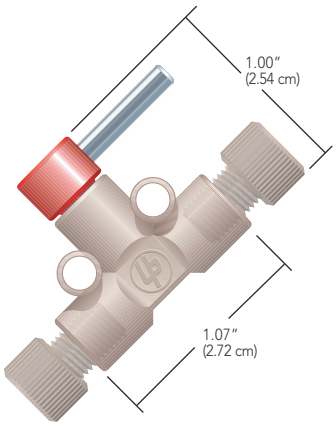
- Biocompatible, all-polymer flow path
- Available for 1/16" and 1/8" OD tubing
- Pressure rated to 500 psi (34 bar)

Stop a flow stream quickly with Upchurch Scientific® biocompatible Shut-Off Valves. The bodies are manufactured from either PEEK or ETFE, and both versions feature a PCTFE rotor, making them highly resistant to chemical attack. The blue colorant used in some valve configurations has proven not to leach out with common HPLC solvents.

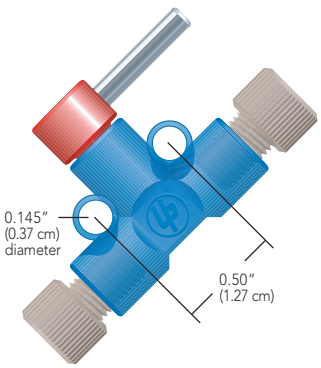
Connect semi-rigid or rigid tubing, such as PEEK, stainless steel or fluoropolymer, with the 1/4-28 Flangeless Fittings provided. Soft tubing, such as PharMed® or Tygon® (see pages 75–89), may be connected to these valves using our 1/4-28 barbed adapters, found on page 58.



Biocompatible



P-733
PEEK Shut-Off Valve



P-783
ETFE Shut-Off Valve

	Part No.	Material	OD Tubing	Thru-hole	Internal Volume*	Includes
	SHUT-OFF VALVES					
	P-721	ETFE, Natural	1/8"	0.040" (1.0 mm)	10.0 µL	(2) P-335, (2) P-300N
★	**P-732**	PEEK, Natural	1/16"	0.020" (0.5 mm)	2.5 µL	(2) XP-235
★	**P-733**	PEEK, Natural	1/8"	0.040" (1.0 mm)	10.0 µL	(2) XP-335
★	**P-782**	ETFE, Blue	1/16"	0.020" (0.5 mm)	2.5 µL	(2) XP-235
★	**P-783**	ETFE, Blue	1/8"	0.040" (1.0 mm)	10.0 µL	(2) XP-335

** Maximum internal volume, with valve fully open.*

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Micro-Splitter Valves

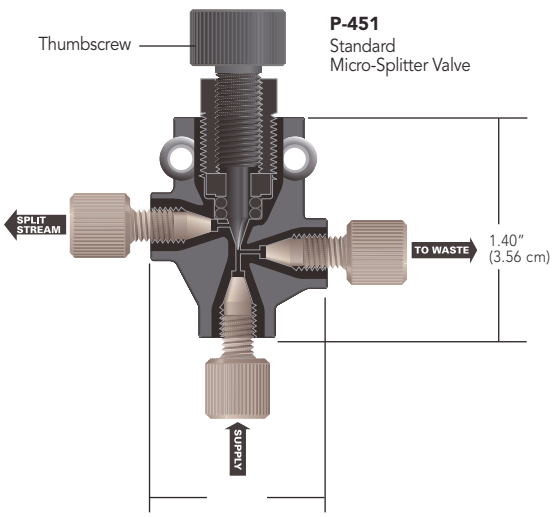
- For interfacing LC-MS systems
- Adjustable split stream flow rates
- Versions for up to 800 psi (55 bar) and up to 4,000 psi (276 bar)

The Upchurch Scientific® line of Micro-Splitter Valves is designed to accurately split and control a low-flow stream off a single incoming supply.

Choose between 1/4-28 flat-bottom and 10-32 coned threaded versions.

The High Pressure Micro-Splitter Valves are designed to operate successfully up to 4,000 psi (276 bar) and the standard Micro-Splitter valves are pressure rated to 800 psi (55 bar).

The Graduated Valve offers many of the benefits and features of Micro-Splitter Valves, plus the ability to adjust and set the split flow to repeatable settings. This allows documentation of settings and the resulting flow rates for easier method development. The graduations also make it easier to employ the valve in a system used to run multiple analyses that require different split flow rates.



APPLICATION NOTE

- With an incoming flow rate of 1 mL/min using room temperature water and equal pressures on both outlet lines, the minimum split flow rate is 2 µL/min for the standard micro-splitter valves and 4.8 µL/min for the high pressure micro-splitter valves.
- All Micro-Splitter Valves have been tested at flow rates to 100 mL/min, with a maximum resulting pressure drop of only 45 psi (3.1 bar) when the valve is fully opened.

SPECIFICATIONS & DETAILS

Part No.	Valve Type	Threads	Internal Volume[1] (closed/fully open)	Max. Operating Pressure
P-450	Standard	1/4-28	2.1 / 4.1 µL	800 psi (55 bar)
P-451	Standard	10-32	1.2 / 2.8 µL	800 psi (55 bar)
P-460S, T	High Pressure	10-32	1.2 / 2.8 µL	4,000 psi (276 bar)
P-470	High Pres. Graduated	10-32	1.2 / 2.8 µL	4,000 psi (276 bar)

[1] The supply and waste port thru-holes have IDs of 0.020" (0.50 mm). The ID for the split-stream port thru-hole is 0.020" (0.50 mm) in standard versions; in capillary versions it is 0.010" (0.25 mm).

Part No.	Description	Includes
MICRO-SPLITTER VALVES		
P-450	Standard, 1/4-28, Biocompatible	(3) XP-235
P-451	Standard, 10-32, Biocompatible	(3) F-120
P-460S	High Pressure, 10-32, with Stainless Steel Needle	(3) F-120
P-460T	High Pressure, 10-32, with Titanium Needle	(3) F-120
GRADUATED MICRO-SPLITTER VALVES		
★ **P-470**	High Pressure Graduated, 10-32, with Stainless Steel Needle	(3) F-120

** Use with the MicroTight Tubing Sleeves, found on page 19.*

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Micro-Metering Valves

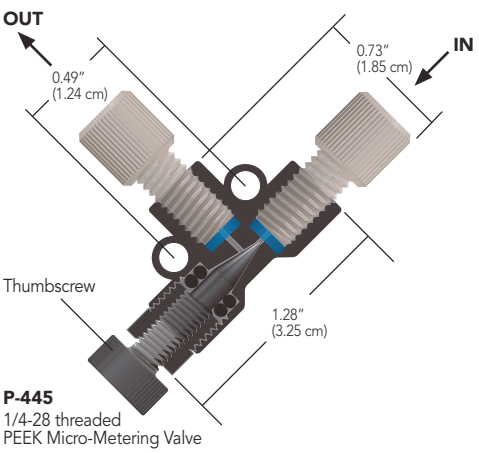
- Flow rates as low as 3.5 µL/min*
- 1/4-28 flat-bottom and 10-32 coned designs available
- Materials of construction: PEEK, PTFE

For fine control of fluid flow rates, Micro-Metering Valves can reduce outgoing flow to as low as 3.5 µL/min*. These needle valves are perfect for use with peristaltic pump fluid-transfer applications, mass spectrometry, and fraction collection.

Upchurch Scientific® Micro-Metering Valves can also be used to regulate gas flow in helium sparging lines and as a flow-dependent variable back pressure regulator. For flow independent regulation of back pressure, please see pages 152–153.

Flow path materials are PEEK polymer and PTFE. All versions of this valve have 0.020" (0.50 mm) thru-holes.

At 1.0 mL/min incoming flow rate with room temperature water.



P-445
1/4-28 threaded
PEEK Micro-Metering Valve

APPLICATION NOTE

Back Pressure Considerations

The Micro-Splitter Valves are designed to work when both effluent flow path pressures are nearly identical. However, the split flow path will often have higher back pressure than the waste flow path, making it hard to achieve any split flow at all. There are two possible solutions. Place a back pressure regulator (see pages 152–153) on the waste flow path that is equal to or slightly greater than the pressure on the split flow path. Or, switch the two effluent pathways such that the split flow pathway is attached to the "waste" port on the valve and the waste flow pathway is attached to the "split" port on the valve. *(Please Note: This second method may result in a loss of adjustment sensitivity.)*

Prime/Purge Valve

Air within the pump head can cause noisy pump operation and flow instability. Solve this problem by placing a High Pressure Micro-Splitter Valve (page 146) inline between the pump and the injector valve. You can then safely divert pump flow to a waste container at a sufficient rate to dislodge the air. Remove air from the solvent line leading to the pump with a Prime/Purge Valve (page 155).

Multi-Column and Detector Systems

Does your work require analyses with multiple columns and detectors that use the same mobile phase? If so, install one of our High Pressure Micro-Splitter Valves after your injector. A single injection can then be split to two separate columns and detector systems, at two different flow rates. This economical set-up eliminates the need for an additional pump and injector valve, while allowing data to be obtained simultaneously.

Post-Detector Interfacing

Use a Standard Micro-Splitter Valve to route fluid exiting an initial detector to other devices, such as a mass spectrometer and a fraction collector. The valve will split and reduce the flow rate to that required for MS interfacing, while diverting the remainder of the flow to the collector (a back pressure regulator may also be required for this set up, available on pages 152–153).

Other Applications

These valves are also suited for other applications, such as adapting a standard HPLC system to handle microbore analyses. For more information and plumbing diagrams for this application and those listed above, please contact your local distributor or IDEX Health & Science directly.

Part No.	Material	OD Tubing	Thru-hole	Internal Volume*	Includes
MICRO-METERING VALVES					
P-445	PEEK, Black	1/16"	0.020" (0.50 mm)	7.7 µL	(2) XP-230
★ **P-446**	PEEK, Black	1/16"	0.020" (0.50 mm)	7.2 µL	(2) F-120
P-447	PEEK, Black	1/8"	0.020" (0.50 mm)	7.7 µL	(2) XP-330

** Maximum internal volume, with valve fully open.*

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CHECK VALVES & PRESSURE REGULATORS

INLINE CHECK VALVES
PAGE 149

BACK PRESSURE REGULATORS
PAGE 152

PRIME/PURGE VALVES
PAGE 155

SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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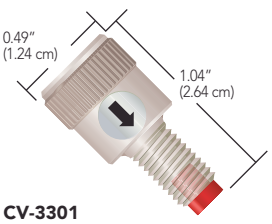
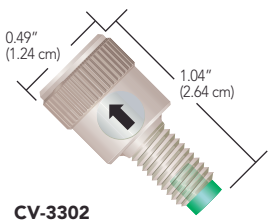
Standard 1/4-28 Inline Check Valves

- Add back-flow protection to any 1/4-28 flat-bottom port
- 15 psi (1 bar) and 3 psi (0.2 bar) cracking pressure versions
- Excellent chemical resistance
- Materials of construction: PEEK; PCTFE; perfluoroelastomer; PTFE (CV-3301 and CV-3302); stainless steel (CV-3301 and CV-3302); or gold-plated stainless steel (CV-3315 and CV-3316)

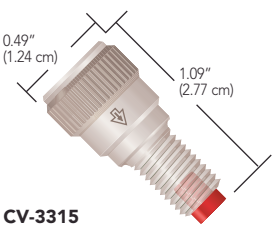
Connect these Upchurch Scientific® Inline Check Valves to any 1/4-28 flat-bottom port. Then thread your 1/4-28 flat-bottom fitting into the check valve to connect the tubing. Once installed, the spring-actuated sealing system eliminates back flow, helping to prevent upstream contamination or damage. In addition, the unique design of this product eliminates the additional tubing cuts and connections required to install conventional inline check valves.



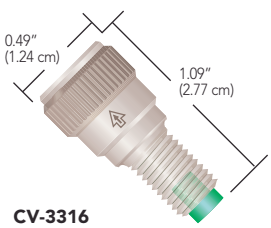
CV-3301
Standard, Inlet
1/4-28 FB Male to 1/4-28 FB Female
15 psi (1 bar) cracking pressure



CV-3302
Standard, Outlet
1/4-28 FB Male to 1/4-28 FB Female
15 psi (1 bar) cracking pressure



CV-3315
Standard, Inlet
1/4-28 FB Male to 1/4-28 FB Female
3 psi (0.2 bar) cracking pressure

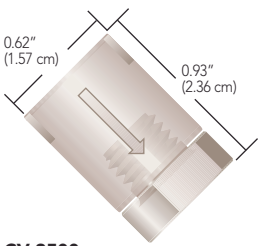


CV-3316
Standard, Outlet
1/4-28 FB Male to 1/4-28 FB Female
3 psi (0.2 bar) cracking pressure

Nonmetallic 10-32 Micro-Volume Inline Check Valve

- Cracking pressure of 8 psi (0.6 bar)
- Excellent chemical resistance
- Materials of construction: PEEK and perfluoroelastomer, suitable for biological applications

With a swept volume of only 7.4 µL, the Upchurch Scientific Inline Micro-Volume Check Valve is perfect for applications where low flow path volume is critical, such as delivery to lab-on-a-chip, single-cell analysis and micro- or nano-LC post-column derivatization. Once installed, this check valve helps prevent back flow and the potential for contamination or damage to sensitive upstream equipment.



CV-3500
Micro-Volume Inline
10-32 C Female to 10-32 C Female

NOTE

Check valves are specified by:

- **Cracking Pressure:** the pressure required for the valve to open in the direction of the arrow.
- **Maximum Pressure:** the maximum pressure the valve can experience in the reverse direction without leaking backwards.
- **Back Pressure Created:** the amount of back pressure generated by the check valve with 50 mL/min room temperature water flowing in the direction of the arrow.

SPECIFICATIONS & DETAILS

	Swept Volume	Thru-Hole	Max. Pressure Rating	Back Pressure Created	Cracking Pressure Tolerance
Standard 1/4-28 FB					
CV-3301, CV-3302	20 µL	0.020" (0.50 mm)	2,000 psi (138 bar)	45 psi (3.1 bar)	± 5 psi (0.34 bar)
CV-3315, CV-3316	16 µL	0.020" (0.50 mm)	2,000 psi (138 bar)	10 psi (0.7 bar)	± 1.5 psi (0.10 bar)
Nonmetallic 10-32 Coned Micro-Volume					
CV-3500	7.4 µL	0.010" (0.25 mm)	3,000 psi (207 bar)	25 psi (1.7 bar)	± 5 psi (0.34 bar)

Part No.	Description	Cracking Pressure
STANDARD 1/4-28 INLINE CHECK VALVES		
CV-3301	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	15 psi (1 bar)
CV-3302	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	15 psi (1 bar)
★ **CV-3315**	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	3 psi (0.2 bar)
CV-3316	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	3 psi (0.2 bar)
NONMETALLIC 10-32 MICRO-VOLUME INLINE CHECK VALVE		
CV-3500	Inlet/Outlet Check Valve, 10-32 C, F to 10-32 C, F*	8 psi (0.6 bar)

** M = Male (external) threads; F = Female (internal) threads; C = Coned; FB = Flat-Bottom*

RELATED PRODUCTS

- 1/4-28 Inline Check Valves and Non-Metallic Check Valves with 1/4-28 flat-bottom ports (next page) can be used with any 1/4-28 Flangeless, Super Flangeless™, and VacuTight™ fitting on pages 21–28 of the Fittings Chapter.
- Micro-Volume Inline Check Valves and Non-Metallic Check Valves with 10-32 coned ports (next page) can be used with any 10-32 polymer Fingertight or SealTight™ fitting on pages 11–15. Connect capillary tubing using the optional ferrules listed on page 15 or the NanoTight™ Fittings and Tubing Sleeves on page 17.

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Nonmetallic 1/4-28 & 10-32 Inline Check Valves

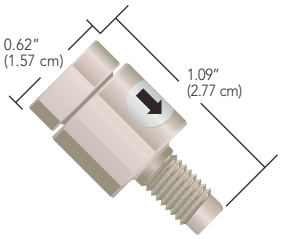
- Low cracking pressure of 1 psi (0.07 bar)
- Multiple configurations for different applications
- Excellent chemical resistance
- Materials of construction: PEEK and perfluoroelastomer

Upchurch Scientific® Nonmetallic Inline Check Valves provide excellent backflow protection for sensitive equipment along with outstanding chemical resistance guaranteed by the PEEK polymer and perfluoroelastomer construction. Metal-free composition makes these check valves perfect for use with corrosive fluids or biological samples.

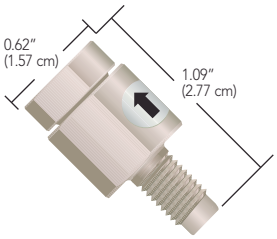
These check valves function well up to moderately-high pressure applications. Low internal volume also allows them to be used in areas where flow path volume is important; however, higher flow rates can pass through with minimal pressure drop.

NOTE

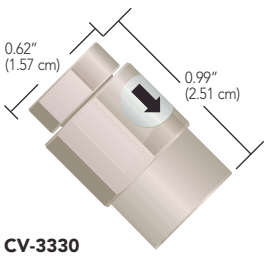
Upon initial use — or following a period of extended inactivity — the cracking pressure for these check valves may be somewhat higher than the stated cracking pressure.



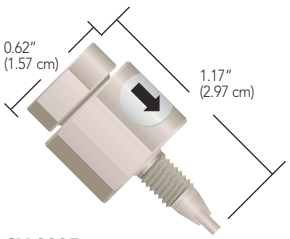
CV-3320, CV-3322, CV-3324
Nonmetallic, Inlet
1/4-28 FB Male to 1/4-28 FB Female



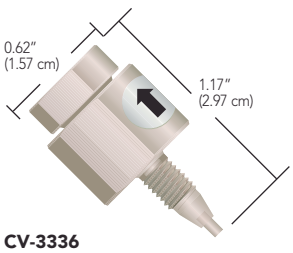
CV-3321, CV-3323, CV-3325
Nonmetallic, Outlet
1/4-28 FB Male to 1/4-28 FB Female



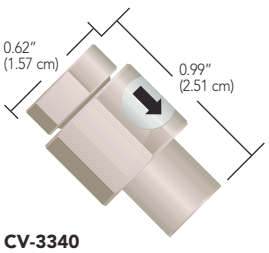
CV-3330
Nonmetallic, Inline
1/4-28 FB Female to 1/4-28 FB Female



CV-3335
Nonmetallic, Inlet
1/4-28 FB Female to 10-32 C Male



CV-3336
Nonmetallic, Outlet
1/4-28 FB Female to 10-32 C Male



CV-3340
Nonmetallic, Inline
10-32 C Female to 10-32 C Female

SPECIFICATIONS & DETAILS

	Swept Volume	Max. Pressure Rating	Back Pressure Created	Cracking Pressure Tolerance
CV-3320, CV-3321	37 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3330	34 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3335, CV-3336	49 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3340	34 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3322, CV-3323	49 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3324, CV-3325	182 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)

	Part No.	Description	Cracking Pressure	Thru-Hole
	NONMETALLIC 1/4-28 AND 10-32 INLINE CHECK VALVES			
★	**CV-3320**	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.020" (0.50 mm)
★	**CV-3321**	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.020" (0.50 mm)
	CV-3322	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.040" (1.0 mm)
	CV-3323	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.040" (1.0 mm)
	CV-3324	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.060" (1.60 mm)
★	**CV-3325**	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.060" (1.60 mm)
	CV-3330	Inlet/Outlet Check Valve, 1/4-28 FB, F to 1/4-28 FB, F*	1 psi (0.07 bar)	0.020" (0.50 mm)
	CV-3335	Inlet Check Valve, 1/4-28 FB, F to 10-32 C, M*	1 psi (0.07 bar)	0.020" (0.50 mm)
★	**CV-3336**	Outlet Check Valve, 1/4-28 FB, F to 10-32 C, M*	1 psi (0.07 bar)	0.020" (0.50 mm)
	CV-3340	Inlet/Outlet Check Valve, 10-32 C, F to 10-32 C, F*	1 psi (0.07 bar)	0.020" (0.50 mm)

** M = Male (external) threads; F = Female (internal) threads; C = Coned; FB = Flat-Bottom*

APPLICATION NOTE

- The CV-3320 or CV-3321 style can be connected to any 1/4-28 flat-bottom port for trouble-free back flow protection.
- When using a pump after the analytical column, consider placing a CV-3330 Check Valve after the column to prevent fluid from the post-column pump from flowing backwards through the column. This product also serves as an excellent nonmetallic alternative to our CV-3010 (page 151) in sparging applications where the mobile phase may be corrosive to the stainless steel or ethylene propylene components inside the CV-3010 assembly.
- The CV-3335 Inlet and CV-3336 Outlet Check Valves allow tubing larger than 1/16" OD (up to 1/8") to be connected into a 10-32 coned internal port. Use both of these check valves when attaching a larger-volume sample loop to an analytical-scale injection valve. This setup limits the flow of the sample into the loop to one direction, minimizing back flow and sample carry-over.
- The CV-3340 is useful in virtually any high pressure fluid pathway using 1/16" or smaller OD tubing, where limiting the direction of flow is desirable.

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Quick-Stop Luer Inline Check Valve

- Check valve protection with luer convenience
- Remains open when engaged
- Materials of construction: PEEK, perfluoroelastomer, and gold-plated stainless steel spring

The Quick-Stop Luer Check Valve is designed to provide inline luer connect/disconnect convenience without the mess and hazard of spills. Just connect the valve assembly to your inline tubing using standard 1/4-28 flat-bottom fittings (see pages 22–29). The check valve is automatically opened once the luer connection is engaged, allowing flow in either direction. Disconnecting the luer union causes the check valve to close. Please see the "Application Note" on this page for specific ideas regarding use of this valve.

P-696 Quick-Stop Luer Check Valve Assembly.

APPLICATION NOTE

Inlet Solvent Reservoir:

Quickly change your solvent on the low pressure end of an HPLC system, while preventing potentially hazardous spills! Just install a Quick-Stop Luer Check Valve Assembly between your solvent reservoir and the pump, with the valve towards the bottle. The valve will prevent solvent leakage from the line coming from the reservoir, while the check valves in your pump prevent spills from the line leading to the pump. With both lines still full of solvent, this system also helps reduce the need to reprime your pump.

FIA Sample Injection:

The Quick-Stop Luer Check Valve provides a practical means to introduce a sample into FIA and other low pressure systems, when used in conjunction with a P-612 Pressure Relief Valve Tee (page 154). Simply connect the Tee into the appropriate flow path line with the included fittings and thread the P-697 Quick-Stop Luer Valve onto the 1/4-28 male end of the Tee. Sample can then be introduced conveniently by using a standard luer-tipped syringe. The check valve is automatically opened when the syringe is attached and closed when the syringe is removed.

Post Column Derivitization:

For post-column derivitization, place a CV-3000 Inline Check Valve on the effluent side of your column to prevent derivatizing agents from flowing backwards and poisoning the column. Placement on the post-column reagent line will also prevent mobile phase from contaminating the reagent if the auxiliary pump fails.

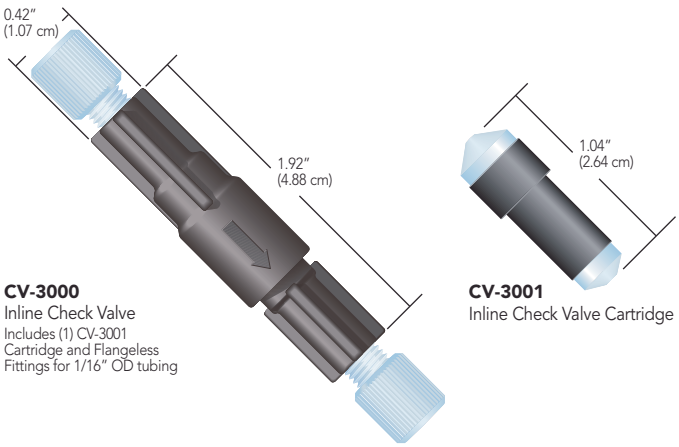
Helium Sparging Tank Protection:

Try the CV-3010 Assembly, designed specifically for degassing (sparging) lines to prevent solvent backup if the sparging gas runs out. This check valve will help prevent potential solvent cross-contamination and damage to the gas regulating valve.

Inline Cartridge Check Valves

- Low cracking pressures
- Less than 150 µL internal volume
- Materials of construction: PEEK; perfluoroelastomer (CV-3001); gold-plated stainless steel spring (CV-3001); ethylene propylene (CV-3011); and stainless steel spring (CV-3011)

Upchurch Scientific® cartridge-style Inline Check Valves are designed to limit flow to one direction. These assemblies withstand system pressures of 1,000 psi (69 bar). The cracking pressures for the Inline Check Valve Cartridges are 1.5 psi (0.1 bar) for the CV-3001 and 3 psi (0.2 bar) for the CV-3011. Tolerance on the cracking pressure for CV-3001 is ± 0.5 psi (0.03 bar) and ± 1.5 psi (0.1 bar) on CV-3011.



	Part No.	Description	Includes	Swept Volume
	QUICK-STOP LUER CHECK VALVE			
	P-696	Quick-Stop Luer Check Valve Assembly	(1) P-697, (1) P-655	127 µL
★	**P-697**	Quick-Stop Luer Check Valve		107 µL
	P-698	Bulkhead Quick-Stop Luer Valve Assembly	(1) P-699, (1) P-655, (1) nut/lock washer set	127 µL
	P-699	Bulkhead Quick-Stop Luer Valve	(1) nut/lock washer set	107 µL
	INLINE CARTRIDGE CHECK VALVES			
★	**CV-3000**	Inline Check Valve Assembly for 1/16" OD tubing	(1) CV-3001, (2) XP-215	96 µL
	CV-3001	Inline Check Valve Cartridge for CV-3000		91 µL
	CV-3010	Inline Check Valve Assembly for 1/8" OD tubing	(1) CV-3011, (2) XP-315	100 µL
	CV-3011	Inline Check Valve Cartridge for CV-3010		92 µL

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Back Pressure Regulators (BPRs)

- Proven outgassing protection
- Flow-independent pump preload for greater pump efficiency
- 5 to 1,000 psi cartridges and assemblies available

Back Pressure Regulators are designed to enhance system performance through outgassing prevention and improved pump check valve efficiency.

Upchurch Scientific® back pressure regulators include:

- 5 and 20 psi assemblies (replacement cartridges not available)
- 40, 75, 100, 250, 500, 750, and 1,000 psi cartridges and assemblies
- PEEK and stainless steel BPR holders
- High pressure adjustable BPR for pressures between 2,000 and 5,000 psi
- Ultra low volume BPRs set to 100 and 500 psi (page 154)

For flow control options try the Micro-Metering Valves found on page 147.

Biocompatible Back Pressure Regulator Holder, shown with available Cartridges

APPLICATION NOTE

Small gas bubbles often form as solvent moves from the high pressure of an HPLC column to the low pressure environment leading to the detector. This outgassing can cause erratic baseline readings and loss of sensitivity. Placing an Upchurch Scientific BPR (usually a 40–100 psi) after the detector provides an excellent, low-cost method for reducing this problem by maintaining enough back pressure on the mobile phase to keep gases dissolved in solution.

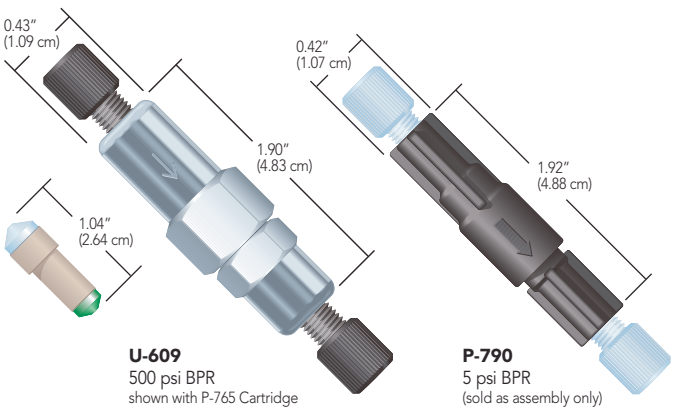
A back pressure regulator can also be used as a pump preload for low and fluctuating pressure applications. Many of today's pumps require a steady back pressure to function properly. Install an Upchurch Scientific BPR (usually 500–1,000 psi) between the pump and the injector to enhance pump performance.

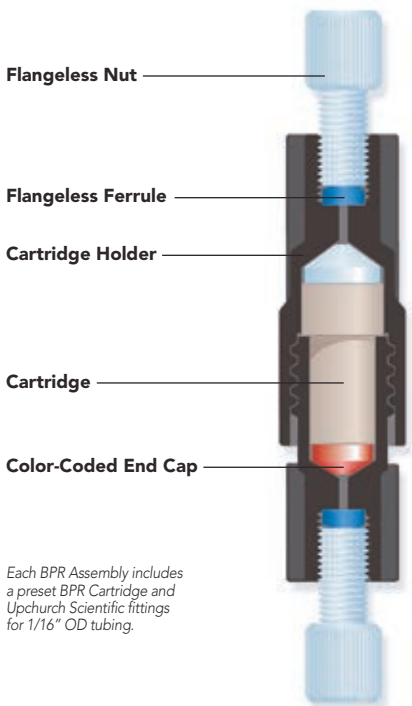
Caution: Do not exceed the maximum operating pressure of your system — please refer to the operating manuals for your system components before choosing the appropriate BPR.

BPR Assemblies

Choose from our line of Biocompatible and Stainless Steel BPR Assemblies, each complete with a replaceable, factory preset cartridge (except the 5 and 20 psi versions).

Upchurch Scientific BPR Assemblies create incremental back pressures ranging from 5 to 1,000 psi (0.3 to 69 bar). The Biocompatible BPR Assemblies feature a PEEK holder; polymer-based fittings; biocompatible BPR cartridges and wrenches for tightening. Stainless Steel BPR Assemblies feature the same biocompatible BPR cartridges with a 316 stainless steel holder and polymer fittings.





Each BPR Assembly includes a preset BPR Cartridge and Upchurch Scientific fittings for 1/16" OD tubing.

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Replacement Back Pressure Regulator (BPR) Cartridges

- Materials of construction: PEEK, ETFE, perfluoroelastomer, and gold-plated stainless steel

These replacement cartridges will operate in any of the standard BPR holders shown on this page. These cartridges create back pressures from 40 to 1,000 psi (2.8 to 69 bar)—all independent of flow except as noted below.

The recommended operating flow rate range for our BPR Cartridges is 0.1 mL–10 mL/min. Within this range, the amount of back pressure created by the BPR Cartridges and Assemblies will not vary more than ±10%. Lower or higher flow rates may result in larger pressure fluctuations.

P-761
40 psi BPR Cartridge

P-796
1,000 psi BPR Cartridge

BPR Holders

Upchurch Scientific® P-465 PEEK and U-469 Stainless Steel BPR Holders work with any of our replacement BPR Cartridges. Each holder comes with fittings for 1/16" OD tubing (see below). The U-469 Holder is surface-treated to prevent galling, a potential problem with large, threaded metal parts.

Please Note: These Back Pressure Regulator Holders are designed to allow each cartridge to operate at its stated pressure setting when tightened to 20 in–lbs. of torque. To approximate this level of torque, first finger tighten the Holder, then tighten an additional 1/8–1/4 turn with the supplied wrenches.

Pressure Rating **3,000 psi (207 bar)***

* Using PEEK tubing and supplied fittings.

Pressure Rating **4,000 psi (276 bar)****

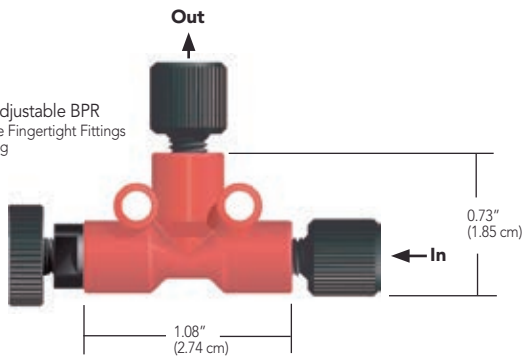
** Using stainless steel tubing and supplied fittings.

High Pressure Adjustable BPR

- Materials of construction: PEEK, perfluoroelastomer, and PTFE

The biocompatible P-880 High Pressure Adjustable BPR offers the flexibility to adjust your system back pressure between 2,000 and 5,000 psi (138 and 345 bar), independent of the flow. Only 10% fluctuation in pressure generally occurs with flow rates of 0.1–10 mL/min. Lower or higher flow rates will lead to greater fluctuations in pressure. To achieve the desired back pressure setting, simply turn the thumbscrew while monitoring your system pressure. Because this product creates such high back pressure, please check system component specifications prior to using to avoid damaging any sensitive components.

P-880
High Pressure Adjustable BPR
Includes One-Piece Fingertight Fittings for 1/16" OD tubing



	Part No.	Pressure Setting	Material	Includes	Volume
	BPR ASSEMBLIES		**Holder**		**Swept**
	P-790	5 psi (0.3 bar)	PEEK	(2) XP-215	134 µL
★	**P-791**	20 psi (1.4 bar)	PEEK	(2) XP-215	134 µL
★	**P-785**	40 psi (2.8 bar)	PEEK	(1) P-761, (2) XP-215	131 µL
★	**P-786**	75 psi (5.2 bar)	PEEK	(1) P-762, (2) XP-215	131 µL
★	**P-787**	100 psi (7 bar)	PEEK	(1) P-763, (2) XP-215	131 µL
	P-788	250 psi (17 bar)	PEEK	(1) P-764, (2) XP-235	102 µL
	P-789	500 psi (34 bar)	PEEK	(1) P-765, (2) P-250, (2) LT-115	96 µL
	P-455	1,000 psi (69 bar)	PEEK	(1) P-796, (2) P-250, (2) LT-115	89 µL
	U-605	40 psi (2.8 bar)	SST	(1) P-761, (2) XP-201	129 µL
	U-606	75 psi (5.2 bar)	SST	(1) P-762, (2) XP-201	129 µL
★	**U-607**	100 psi (7 bar)	SST	(1) P-763, (2) XP-201	129 µL
	U-608	250 psi (17 bar)	SST	(1) P-764, (2) XP-201	99 µL
	U-609	500 psi (34 bar)	SST	(1) P-765, (2) XP-201	93 µL
	U-610	750 psi (52 bar)	SST	(1) P-795, (2) P-250, (2) LT-115	91 µL
	REPLACEMENT CARTRIDGES				
			COLOR CODING		
	Part No.	**Pressure Setting**	**Body**	**End-Cap**	**Swept Volume**
	P-761	40 psi (2.8 bar)	Tan	Blue	125 µL
	P-762	75 psi (5.2 bar)	Tan	Yellow	125 µL
★	**P-763**	100 psi (7 bar)	Tan	Red	125 µL
	P-764	250 psi (17 bar)	Tan	White	95 µL
	P-765	500 psi (34 bar)	Tan	Green	89 µL
	P-795	750 psi (52 bar)	Black	Blue	87 µL
	P-796	1,000 psi (69 bar)	Black	Green	83 µL
	BPR HOLDERS				
	Part No.	**Holder Style**	**Holder Material**	**Includes**	**Swept Volume**
	P-465	Biocompatible BPR	PEEK	(2) P-250, (2) LT-115	7 µL
	U-469	High Pressure BPR	SST	(2) F-300	4 µL
	HIGH PRESSURE ADJUSTABLE BPR ASSEMBLY				
★	**P-880**	2,000–5,000 psi (138-345 bar)		(2) F-120BLK	9 µL

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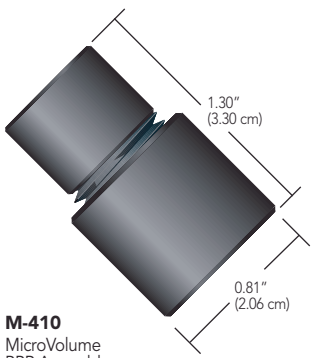
Ultra-Low Volume Back Pressure Regulators (BPR)

- Wetted flow path materials: PEEK, perfluoroelastomer, and ETFE
- Available pressure settings of 100 or 500 psi (7 or 34 bar)
- Low swept volume of only 6 µL

Ultra-Low Volume Back Pressure Regulators (BPRs) were developed to minimize swept volume, which is especially important for multi-detector applications. With a maximum swept volume of only 6 µL*, it is nearly impossible to detect these BPRs as part of your fluid pathway. To minimize the swept volume added to your flow path, we recommend trimming the length of the attached tubing. And because the flow path is completely polymeric, you are assured of biocompatibility.

Please Note: Our Ultra-Low Volume Back Pressure Regulators cannot be used as check valves due to their unique internal design. Try our Micro-Volume Inline Check Valve on page 149.

** The maximum internal swept volume listed above is for the back pressure regulator only and does not include the volume of the attached tubing lines.*



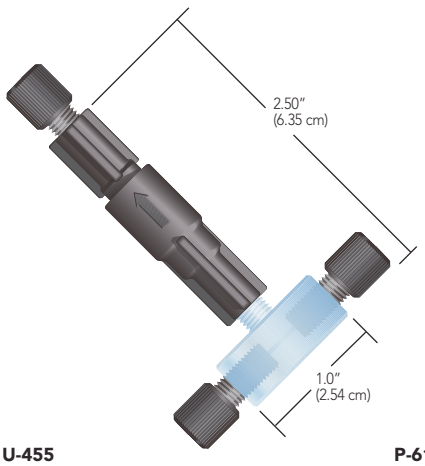
M-410
MicroVolume
BPR Assembly
Attached tubing not shown

Pressure Relief Valves

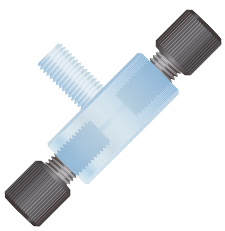
- Prevent system over-pressurization

Upchurch Scientific® Pressure Relief Valves are ideal for preventing system over-pressurization. These products protect system components by diverting fluid flow automatically when inline pressure exceeds the set limit. Choose between preset 100 psi (7 bar) and 5 psi (0.3 bar) assemblies, both shipped with Flangeless Fittings. The 100 psi version is a good, general purpose valve, while the 5 psi version is perfect for protecting syringe and peristaltic pump systems (see pages 93–108). The void volume of both relief valves is low due to the small 0.020" (0.50 mm) thru-holes in the valve tee body.

If you wish to have the Pressure Relief Valve open at a different pressure than 5 or 100 psi, simply combine one of the other replacement Back Pressure Regulator Assemblies listed on page 152 with the P-612 Pressure Relief Valve Tee. Choose the P-612S for larger bore tubing and higher flow applications.



U-455
Pressure Relief Valve
Includes Flangeless Fittings
for 1/16" OD tubing
(Drawing is not actual size)



P-612
Pressure Relief Valve Tee
Includes Flangeless Fittings
for 1/16" OD tubing
(Drawing is not actual size)

SPECIFICATIONS & DETAILS

	Back Pressure Setting psi (bar)	Flow Rate Recommendations	Recommended Pressure Range psi (bar)	1/16" OD Tubing
M-410	100 [2] (7)[2]	Optimal: 100 µL–1 mL/min Max.: 4 mL/min	40–150 (3–10)	PEEK, 0.010" ID
M-412	500 [2] (34)[2]	Optimal: 100 µL–1 mL/min Max.: 4 mL/min	250–525 (17–36)	PEEK, 0.010" ID
M-420	100 [3] (7)[3]	Optimal: 3–8 mL/min Max.: 10 mL/min	40–150 (3–10)	PEEK, 0.020" ID

[1] All data generated using water at room temperature.
[2] Set at a flow rate of 0.5 mL/min.
[3] Set at a flow rate of 5 mL/min.

	Part No.	Description	Pressure Setting	Tubing OD	Includes	Swept Volume
	ULTRA-LOW VOLUME BPRs					
	M-410	Low Flow	100 psi (7 bar)	1/16"	XP-230	6 µL
★	**M-412**	Low Flow	500 psi (34 bar)	1/16"	XP-230	6 µL
	M-420	High Flow	100 psi (7 bar)	1/16"	XP-230	6 µL
	PRESSURE RELIEF VALVES					
	U-455	Pressure Relief Assembly	5 psi (0.3 bar)	1/16"	XP-201	148 µL
★	**U-456**	Pressure Relief Assembly	100 psi (7 bar)	1/16"	XP-201, wrenches	139 µL
★	**P-612**	Pressure Relief Tee		1/16"	XP-201	14 µL
	P-612S	Pressure Relief Tee		3/16"	XP-201	348 µL

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Prime/Purge Valve for Waters® Pumps

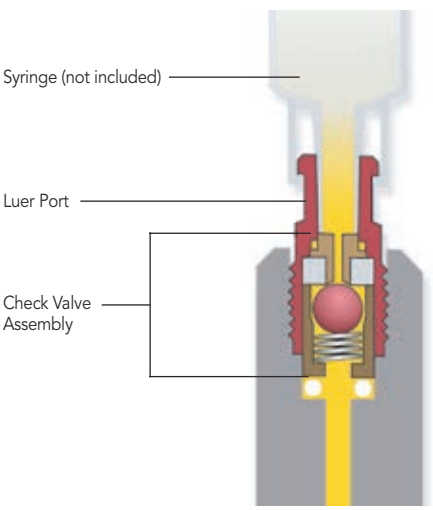
- Automatic valve operation with a simple twist of a luer lock syringe
- No tubing to cut or ferrules to swage
- No wear on the internal seal
- Materials of construction: ruby, sapphire, PEEK, PTFE, and stainless steel

The Upchurch Scientific® Prime/Purge Valve for Waters pumps automatically opens when a luer syringe is attached and closes when the syringe is removed. No valve rotation is required after the initial installation, so wear on the internal seal is eliminated.

In addition, our Waters-compatible Prime/Purge Valve is simpler to operate and more economically priced than alternative valves available for Waters systems.

A Waters-compatible internal PTFE seal is included with the valve. This seal can also be purchased separately. It can be used both with the Upchurch Scientific valve and the original valve supplied with the pump.

Attaching/Removing the Syringe Automatically Opens and Closes the Valve

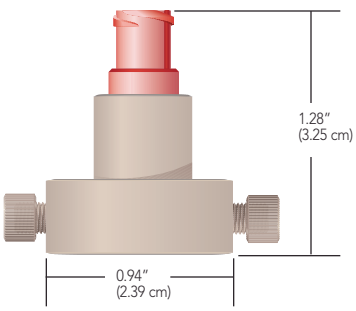


Universal Prime/Purge Valve

- For any style HPLC system
- Automatic luer syringe operation
- Featuring handy mounting holes
- Materials of construction: ruby, sapphire, PEEK, PTFE, and stainless steel

The Upchurch Scientific Universal Prime/Purge Valve is easy to operate. Simply install a valve along the flow path with the included fittings and attach a luer-tipped syringe. Then, withdraw the plunger and watch as solvent and residual bubbles are removed from the solvent line. The valve automatically closes when the syringe is removed.

The valve is designed to be used with 1/8" OD tubing. Optional mounting is made easy by the handy holes in the body of each unit.



V-321
Universal Prime/Purge Valve
Mounting holes are 0.75" (1.91 cm) apart

APPLICATION NOTE

Air in the Inlet Solvent Line

Install the Low Pressure Universal Prime/Purge Valve along the inlet solvent path near the pump to remove bubbles from the inlet solvent line. The valve can also be used to rapidly "wet" your solvent inlet filter. When a new filter is installed, it often contains a substantial amount of air within its pores. At standard flow rates, it may require several minutes before the inlet fluid pathway is completely free of gas. Using this valve you are able to rapidly draw solvent through the inlet filter, dislodging the gas and minimizing downtime.

Part No.	Description	Includes
PRIME/PURGE VALVES		
B-310	10 cc Disposable Luer-Tipped Syringe	
V-320	Prime/Purge Valve for Waters Pumps	(1) V-320-06
V-320-06	Replacement PTFE Seal (for V-320)	
V-321	Universal Prime/Purge Valve	(2) P-300N, (2) P-335

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FILTERS & COLUMN ACCESSORIES

INLET SOLVENT FILTERS
PAGE 157

INLINE SOLVENT FILTERS
PAGE 160

PRECOLUMN FILTERS
PAGE 163

FRITS
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GUARD COLUMNS
PAGE 170

SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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General Use Inlet Solvent Filters

- Large surface areas prevent pump cavitation
- Disposable
- 2 µm, 10 µm, and 20 µm pore sizes available
- General use and prep filters for higher flow applications

It is good practice to filter your solvents to prevent pump damage. Upchurch Scientific® 316 stainless steel filters provide that protection.

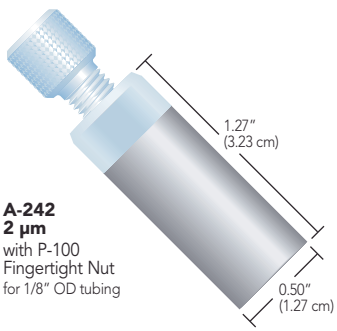
Because filters should be changed periodically, we make it easy to replace them without tools. For those filters using a plastic fitting, the tubing can be reconnected by finger tightening the fitting into the new filter. The filters with stems allow easy insertion into the inlet tubing.

APPLICATION NOTE

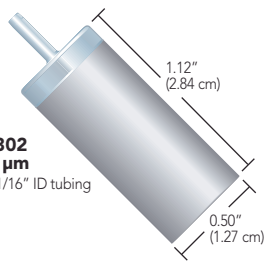
Why Use An Inlet Solvent Filter?

- To filter out particulate matter from the solvent that may otherwise damage expensive hardware. (Use a 10 µm or 20 µm version for this purpose. The A-309 and A-230A filters have an added "Bottom of the Bottle™" feature to help draw solvent to within 1/8" of the bottom of your solvent bottle.)
- To prevent particulates originating from the sparging system from entering the mobile phase reservoir and to help disperse the sparging gas efficiently. (Use a 2 µm filter for this purpose.)
- To hold your tubing in place at the bottom of the bottle. (Most stainless steel filter options work best for this purpose.)

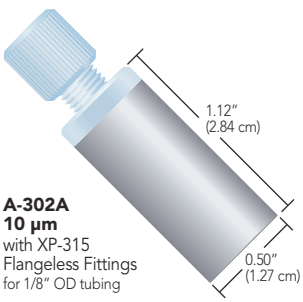
Note: It is usually a good idea to change the inlet filter as part of your semi-annual or annual preventative maintenance program.



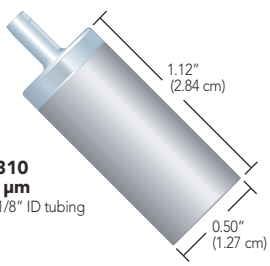
A-242
2 µm
with P-100
Fingertight Nut
for 1/8" OD tubing



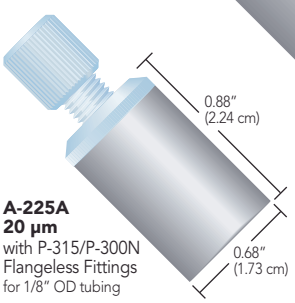
A-302
10 µm
for 1/16" ID tubing



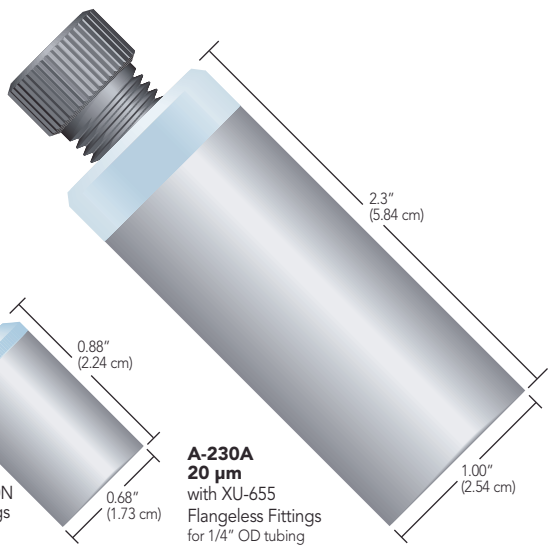
A-302A
10 µm
with XP-315
Flangeless Fittings
for 1/8" OD tubing



A-310
10 µm
for 1/8" ID tubing



A-225A
20 µm
with P-315/P-300N
Flangeless Fittings
for 1/8" OD tubing



A-230A
20 µm
with XU-655
Flangeless Fittings
for 1/4" OD tubing

	Part No.	Description	Porosity	Material	For Tubing Size	Includes	Max. Suggested Flow Rate*
	GENERAL USE INLET SOLVENT FILTERS						
	For Analytical HPLC						
	A-242	Inlet Solvent Filter with One-Piece Fitting	2 µm	PCTFE, SST	1/8" OD	(1) P-100	10 mL/min
	A-243	A-242, 5-pack	2 µm	PCTFE, SST	1/8" OD	(5) P-100	10 mL/min
	A-228	Inlet Solvent Filter with stem	2 µm	SST	1/8" ID	—	80 mL/min
★	**A-302**	Inlet Solvent Filter with stem	10 µm	SST	1/16" ID	—	40 mL/min
★	**A-302A**	Inlet Solvent Filter with Flangeless Fittings	10 µm	PCTFE, SST	1/8" OD	(1) XP-315	40 mL/min
	A-309	Inlet Solvent Filter with stem	10 µm	SST	1/16" ID	—	40 mL/min
	A-231A	Inlet Solvent Filter with Flangeless Fittings	20 µm	PCTFE, SST	3/16" OD	(1) XP-132	100 mL/min
★	**A-310**	Inlet Solvent Filter with stem	10 µm	SST	1/8" ID	—	40 mL/min
	For Preparative HPLC Systems						
	A-225	Inlet Solvent Filter with stem	20 µm	SST	1/16" ID	—	100 mL/min
★	**A-225A**	Inlet Solvent Filter with Flangeless Fittings	20 µm	PCTFE, SST	1/8" OD	(1) P-315, (1) P-300N	100 mL/min
	A-227A	Inlet Solvent Filter with Flangeless Fittings	10 µm	PCTFE, SST	1/4" OD	(1) XU-655	100 mL/min
	A-230A	Inlet Solvent Filter with Flangeless Fittings	20 µm	PCTFE, SST	1/4" OD	(1) XU-655	100 mL/min
	A-311	Inlet Solvent Filter with stem	10 µm	SST	1/16" ID	—	100 mL/min
	A-311A	Inlet Solvent Filter with Flangeless Fittings	10 µm	PCTFE, SST	1/8" OD	(1) XP-315	100 mL/min

** Maximum suggested flow rates are determined by porosity and surface area.*

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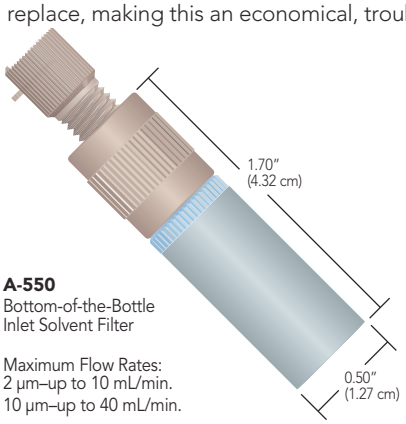
Stainless Steel Bottom-of-the-Bottle™ Solvent Filters

- Draws solvent from within 1/8" of the bottom of the bottle
- Replaceable stainless steel filter cups
- Versions for 1/8" and 3/16" OD tubing
- Materials of construction: PEEK, ETFE, and 316 Stainless Steel

Patented Stainless Steel Bottom-of-the-Bottle Solvent Filter Assemblies feature a 2 µm or 10 µm replaceable stainless steel filter cup and a design that allows solvent to be drawn from within 1/8" of the bottom of your solvent bottle. The filter cups are inexpensive and easy to replace, making this an economical, trouble-free choice.



A-550
Bottom-of-the-Bottle
Inlet Solvent Filter

Maximum Flow Rates:
2 µm–up to 10 mL/min.
10 µm–up to 40 mL/min.

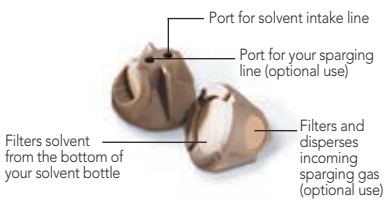
All-PEEK Bottom-of-the-Bottle Solvent Filters

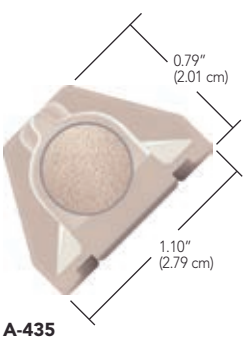
- Most recommended filtering unit
- 100% PEEK polymer construction
- Easy operation — no fittings required

Biocompatible

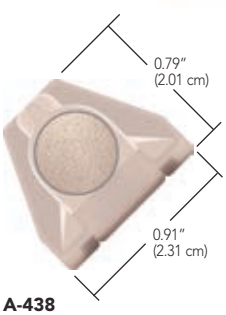
These biocompatible filters are made from 100% PEEK polymer, including the two built-in PEEK frits. The bottom frit (2 µm or 10 µm) will draw solvents from within 0.080" (2.0 mm) of the bottom of the solvent bottle. The 2 µm frit on the side may be used for a 1/8" OD helium sparging line.

To use, simply press fit your appropriately sized fluoropolymer tubing firmly into the top holes. That's it!





A-435
Bottom-of the-Bottle Filter



A-438
Bottom-of the-Bottle Filter
(for small neck bottles)

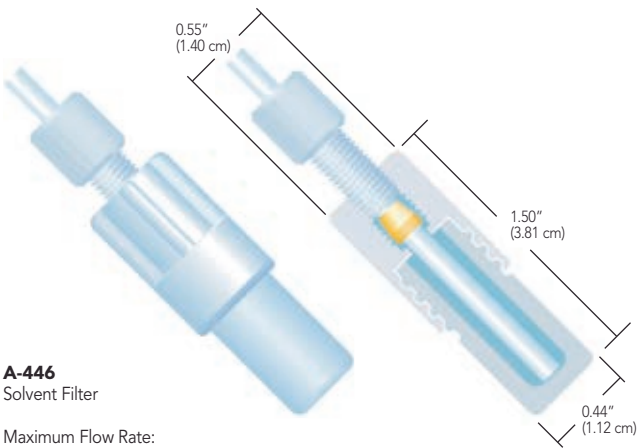
Maximum Flow Rate: up to 30 mL/min

UHMWPE Bottom-of-the-Bottle Solvent Filters

- Replaceable filter cup
- Economical
- Materials of construction: UHMWPE, ETFE
- Versions for 1/16" and 1/8" OD tubing

The design of the UHMWPE solvent filters allows tubing to pass through to the bottom of the filter cup, enabling the filter to draw solvent from within 0.10" (2.5 mm) of the bottom of your solvent bottle.

Please Note: UHMWPE is a hydrophobic material. To establish proper surface wetting, you may need to prime the filter with methanol or acetonitrile.



A-446
Solvent Filter

Maximum Flow Rate:
up to 5 mL/min

	Part No.	Description	Porosity	For Tubing Size	Includes
	STAINLESS STEEL BOTTOM-OF-THE-BOTTLE SOLVENT FILTERS				
★	**A-550**	SST Filter Assembly, with A-520 filter cup	10 µm	1/8" OD	(1) XP-130
	A-551	SST Filter Assembly, with A-522 filter cup	2 µm	1/8" OD	(1) XP-130
	A-520x	SST Replacement Solvent Filter Cups, 10-pk	10 µm	—	—
	A-522x	SST Replacement Solvent Filter Cups, 10-pk	2 µm	—	—
	ALL-PEEK BIOCOMPATIBLE BOTTOM-OF-THE-BOTTLE SOLVENT FILTERS				
	A-435	PEEK Filter	2 µm	1/8" OD	—
	A-437	PEEK Filter, for small-neck (GL-38) bottles	2 µm	1/8" OD	—
	A-438	PEEK Filter, for small-neck (GL-38) bottles	10 µm	1/8" OD	—
★	**A-440**	PEEK Filter	10 µm	1/8" OD	—
	A-441	PEEK Filter	10 µm	3/16" OD	—
	A-451	PEEK Filter	10 µm	1/16" OD	—
	UHMWPE BIOCOMPATIBLE BOTTOM-OF-THE-BOTTLE SOLVENT FILTERS				
	A-445	UHMWPE Filter Assembly	10 µm	1/16" OD	(1) XP-245
★	**A-446**	UHMWPE Filter Assembly	10 µm	1/8" OD	(1) XP-345
	A-427	UHMWPE Replacement Solvent Filter Cups, 5-pk	10 µm	—	—

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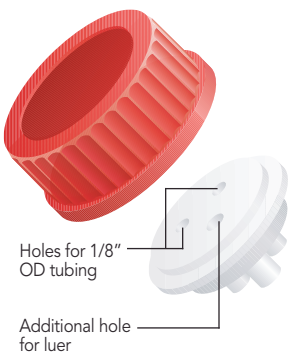
Bottle Caps

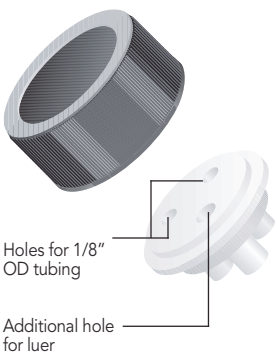
- Extremely simple — no threaded ports or fittings
- Manufactured from ETFE and Polypropylene

If you are looking for a bottle cap that is quick and easy to use, but still allows many connection options, we have just what you need! The Bottle Caps fit standard GL-45 (1 L) or smaller-neck GL-38 (4 L) glass bottles.

Each cap has three holes. With two of the holes you simply push your tubing straight through. The third hole, with a luer taper, can be used for a number of options. Any male luer (such as a luer-lock syringe) will fit snugly in this hole, or you can use the A-626 or A-627 Plug. Exceptions are the A-610 and A-610B Bottle Caps. Please see the note below.



A-620
GL-45 Bottle Cap
for 1/8" tubing



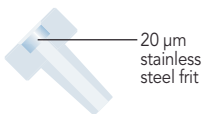
A-622
GL-38 Bottle Cap
for 1/8" tubing

Bottle Cap Plugs & Adapters

Use the A-626 Bottle Cap Plug to seal the third "tapered" luer hole found in most Upchurch Scientific® Bottle Caps. Or, use the A-628 Plug to seal any unused 1/16" or 1/8" bottle cap holes.

Alternatively, try the A-627 or A-629 Filter Bottle Cap Plug to cap an unused hole in your bottle cap. The 20 µm stainless steel frit in these products prevents foreign matter from contaminating your solvent while leaving the bottle open to the atmosphere, thus allowing fluid to be pulled out without creating a vacuum (generally not used with sparging applications). All plug bodies are manufactured from ultra-high molecular weight polyethylene (UHMWPE).

A-626
Bottle Cap Plug



A-629
Filter Bottle Cap Plug

APPLICATION NOTE

- A self-regulating sparging system can help reduce helium consumption and improve pump performance. Set this up by pressing your tubing through the appropriate holes in your bottle cap and attaching each line to a filter. Sparge your mobile phase with an inert gas (preferably helium) for 15–20 minutes. Then reduce the outlet pressure of the sparging gas to a maximum of 5 psi (0.34 bar) and insert a plug (A-626 or A-628) into the remaining port of the cap. The sparging gas will shut off once the incoming pressure equals the pressure inside the reservoir. As the mobile phase is consumed and the internal pressure lowers, sparging gas will enter to keep the system pressurized and degassed. Please Note: If gas leaks while pressurizing the bottle, try removing the sealing ring from the bottle, as it sometimes interferes with the sealing of these bottle caps.
- One concern with sparging systems is the possibility of solvent backing up the sparging inlet line. This can occur if the gas tank completely evacuates with the regulating valves open, creating a vacuum in the tubing. Solvent backup may damage sparging system components and cause cross-contamination of mobile phase reservoirs. To help prevent solvent backup, install the CV-3010 Inline Check Valve (page 151) along the tubing line that runs between the gas supply and the solvent bottle.
- For a more efficient degassing system, please see the Systec® HPLC Vacuum Degassing Systems on page 178.
- Please see the Quick-Stop Luer Check Valve on page 151 for another solvent inlet Application Note.

NOTE

The A-610 and A-610B Bottle Caps have a slightly different configuration than the other caps. One hole accepts 3/16" OD tubing, the typical size used with some Waters® systems. The remaining two holes accept 1/8" OD tubing. Unlike the other caps, the A-610 does not have a tapered luer hole. If desired, use our A-628 Plug or A-629 Filter Plug for one of the 1/8" holes.

RELATED PRODUCTS

To ensure a tight seal, use Upchurch Scientific fluoropolymer tubing with these bottle caps (pages 70–73).

	Part No.	Description
	BOTTLE CAPS FOR GL-45, 1 L BOTTLES	
	A-610	for 3/16" OD tubing, Red
	A-610B	for 3/16" OD tubing, Blue
★	A-620	for 1/8" OD tubing, Red
★	A-620B	for 1/8" OD tubing, Blue
	A-630	for 1/16" OD tubing, Red
	A-630B	for 1/16" OD tubing, Blue
	BOTTLE CAPS FOR GL-38, 4 L BOTTLES	
★	A-622	for 1/8" OD tubing, Black
	BOTTLE CAP PLUGS AND ADAPTER	
★	A-626	Bottle Cap Plug for luer hole, UHMWPE
	A-627	Filter Bottle Cap Plug for luer hole, UHMWPE with 20 µm stainless steel frit
★	A-628	Bottle Cap Plug for 1/16", 1/8" or 3/16" hole, UHMWPE
	A-629	Filter Bottle Cap Plug for 1/16", 1/8" or 3/16" hole, UHMWPE with 20 µm stainless steel frit

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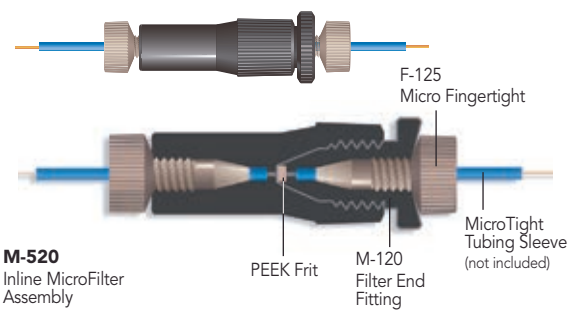
Inline Solvent Filters

- Specially engineered for inline filtration
- Versions include Micro, Standard, and Semi-Preparative
- Bio-inert and stainless steel options offered
- Variety of porosities, application appropriate

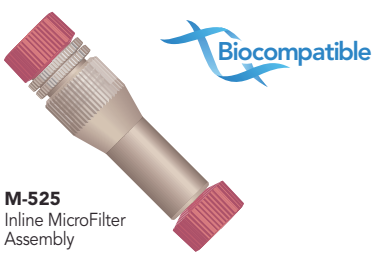
Inline MicroFilters

- 100% biocompatible PEEK polymer option available
- Miniscule 240 nL void volume
- Two versions: direct connect 1/32" OD tubing or use MicroTight® tubing sleeves for 70–520 µm OD capillary tubing

Upchurch Scientific® Inline MicroFilters protect your column from particles originating in the mobile phase or sample, or from pump seal and sample injection valve wear. These filters have a 0.006" (150 µm) thru-hole. Choose the M-520 with a 0.5 µm 100% PEEK frit to connect to capillary tubing using the MicroTight tubing sleeves (page 19). You may also directly connect 1/32" OD tubing using the M-525 which contains a 0.5 µm PEEK frit.



M-520
Inline MicroFilter Assembly

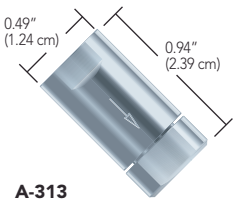


M-525
Inline MicroFilter Assembly

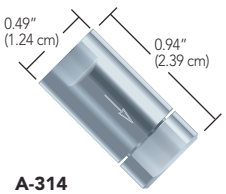
Standard Inline Solvent Filters

- For 1/16" OD tubing
- Versions for Standard HPLC (6,000 psi/414 bar) and UHPLC (25,000 psi/1,725 bar)
- Replacement frits available
- Help prevent particulate contamination from clogging sensitive equipment
- Ideally suited for placement along the flow path line between the pump and injection valve/autosampler

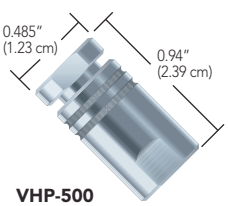
Inline filter assemblies that begin with the letter "A" are engineered for standard HPLC applications (up to 6,000 psi/414 bar). Inline Filter Assemblies that begin with the "VHP" prefix are suitable for use in UHPLC systems, where pressures can reach 25,000 psi (1,725 bar).



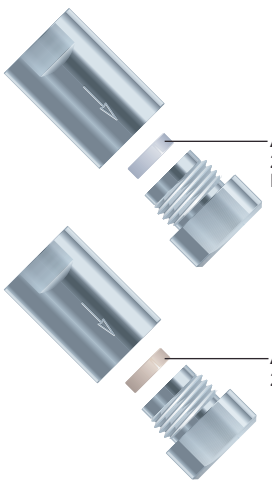
A-313
Inline Solvent Filter



A-314
Inline Solvent Filter



VHP-500
Inline VHP Filter



RELATED PRODUCTS

Fittings

All Standard Inline Solvent Filters have 10-32 threads for 1/16" OD tubing, allowing the use of most standard chromatography high pressure fittings.

	Part No.	Description	Porosity	For Tubing Size	Threads	Includes	Swept Volume	Pressure Rating	Qty.
	INLINE MICROFILTERS								
★	**M-520**	Inline MicroFilter Assembly, PEEK Frit	0.5 µm	MicroTight Tubing Sleeve	MicroTight Tubing Sleeve	(5) M-120, (2) F-125	240 nL	4,000 psi (276 bar)	ea.
	M-525	Inline MicroFilter Assembly, PEEK Frit	0.5 µm	1/32" OD	1/32" OD	(5) M-140, (2) F-126	240 nL	4,000 psi (276 bar)	ea.
	REPLACEMENT INLINE MICROFILTER END-FITTINGS								
★	**M-120x**	End-Fittings, Black, with PEEK Frit	0.5 µm	MicroTight Tubing Sleeve	MicroTight Tubing Sleeve	N/A	216 nL	N/A	10-pk
	M-140x	End-Fittings, Natural, with PEEK Frit	0.5 µm	1/32" OD	1/32" OD	N/A	216 nL	N/A	10-pk
	INLINE SOLVENT FILTERS								
	A-313	Solvent Filter Assembly	20 µm	1/16" OD	10-32 Coned	(1) A-224	12.3 µL	6,000 psi (414 bar)	ea.
★	**A-314**	Solvent Filter Assembly	2 µm	1/16" OD	10-32 Coned	(1) A-100	4 µL	6,000 psi (414 bar)	ea.
	A-100x	Replacement Frits, Stainless Steel, 10-pk	2 µm	N/A	—	—	1.4 µL	N/A	10-pk
	A-224	Replacement Frits, Stainless Steel, ea.	20 µm	N/A	—	—	9.7 µL	N/A	ea.
	VHP-500	Inline VHP Filter	0.5 µm	1/16" OD	10-32 Coned	(5) VHP-501	1.2 µL	25,000 psi (1,725 bar)	ea.
	VHP-505	Inline VHP Filter	0.2 µm	1/16" OD	10-32 Coned	(5) VHP-506	1.1 µL	25,000 psi (1,725 bar)	ea.
	VHP-501x	Replacement Inline VHP Frit	0.5 µm	N/A	N/A	N/A	0.60 µL	N/A	10-pk
	VHP-506x	Replacement Inline VHP Frit	0.2 µm	N/A	N/A	N/A	0.54 µL	N/A	10-pk

**Swept volumes include/reflect theoretical frit volume values.*
SST = Stainless Steel

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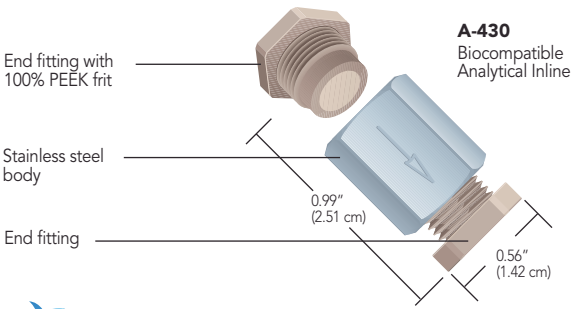
Biocompatible Standard Inline Filters

- 0.5 µm and 2 µm versions available
- Features 100% PEEK flow path

Upchurch Scientific® A-430 and A-431 Inline Filters consist of a stainless steel body and two PEEK end fittings. Maximum recommended flow rate is 25 mL/min for the A-430 Filter and 10 mL/min for the A-431 Filter. And, you get the added benefit of biocompatibility since all wetted surfaces are PEEK. When you need to replace the frit, simply dispose of the end fitting that contains the frit and replace it with a new one.

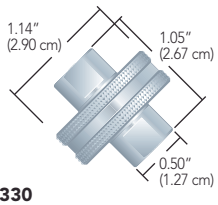


A-430
Biocompatible Analytical Inline Filter

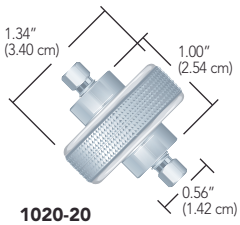
Biocompatible

Semi-Prep Inline Filters

- Designed for high-flow applications
- Economical protection for larger columns and injections
- SFC and HPLC compatible



A-330
High Pressure Semi-Prep Inline Filter

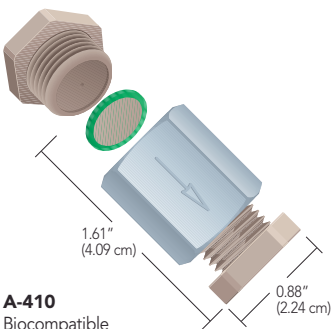


1020-20
Iso-Prep Filter
Shown with standard 10-32 stainless steel nuts and ferrules (not included)

Biocompatible Semi-Prep Inline Filters

- Versions for 1/16", 1/8", 3/16", 1/4", and 5/16" OD tubing
- 100% PEEK flow path

Biocompatible Semi-Prep Filters consist of a stainless steel body, two PEEK end fittings, and a separate PEEK frit. These filters are ideal for many higher flow analytical, semi-prep and preparative applications. Best of all, if the filter becomes clogged, simply unscrew the assembly, remove the frit and replace it. The frits are interchangeable.



A-410
Biocompatible

	Part No.	Description	Porosity	Threads	Includes	Swept Volume*	Pressure Rating	Qty.
	BIOCOMPATIBLE INLINE FILTERS							
★	**A-430**	Biocompatible Filter Assembly	2 µm	10-32 Coned	(1) A-429	7.1 µL	6,000 psi (414 bar)	ea.
	A-431	Biocompatible Filter Assembly	0.5 µm	10-32 Coned	(1) A-428	5.9 µL	6,000 psi (414 bar)	ea.
	A-428x	PEEK Filter End Fittings, Black PEEK body, 10-pk	0.5 µm	10-32 Coned	—	5.7 µL	N/A	10-pk
★	**A-429x**	PEEK Filter End Fittings, Natural PEEK body, 10-pk	2 µm	10-32 Coned	—	6.9 µL	N/A	10-pk
	SEMI-PREP INLINE FILTERS							
★	**A-330**	Semi-Prep Filter Assembly	10 µm	10-32 Coned	(1) A-331	223 µL	7,500 psi (517 bar)	ea.
	A-360	Semi-Prep Filter Assembly	10 µm	5/16-24 Flat Bottom	(1) A-331	235 µL	3,500 psi (207 bar)	ea.
	A-331x	Stainless Steel Frits, Natural ETFE ring	10 µm	N/A	N/A	142 µL	N/A	10-pk
	A-332x	Stainless Steel Frits, Natural ETFE ring	2 µm	N/A	N/A	122 µL	N/A	10-pk
	A-337x	Stainless Steel Frits, Natural ETFE ring	20 µm	N/A	N/A	152 µL	N/A	10-pk
	ISO-PREP FILTERS							
	1020-05	21.2 mm Filter Holder	0.5 µm	10-32 Coned	(1) 7031-05	203 uL	8,000 psi (552 bar)	ea.
	1020-20	21.2 mm Filter Holder	2 µm	10-32 Coned	(1) 7031-20	196 uL	8,000 psi (552 bar)	ea.
	7031-05	21.2 mm Replacement Filter	0.5 µm	N/A	N/A	122 uL	8,000 psi (552 bar)	ea.
	7031-20	21.2 mm Replacement Filter	2 µm	N/A	N/A	115 uL	8,000 psi (552 bar)	ea.
	BIOCOMPATIBLE SEMI-PREP INLINE FILTERS							
★	**A-410**	Biocompatible Filter Assembly	2 µm	10-32 Coned	(1) OC-802	89 µL	6,000 psi (414 bar)	ea.
	A-411	Biocompatible Filter Assembly	10 µm	10-32 Coned	(1) OC-803	103 µL	6,000 psi (414 bar)	ea.
	A-510	Biocompatible Filter Assembly	5 µm	5/16-24 Flat Bottom	(1) OC-805	89 µL	500 psi (34 bar)	ea.
	OC-802	PEEK Frit, Green PCTFE ring	2 µm	N/A	N/A	46 µL	N/A	ea.
	OC-803	PEEK Frit, Natural PCTFE ring	10 µm	N/A	N/A	57 µL	N/A	ea.
	OC-805	PEEK Frit, Natural PCTFE ring	5 µm	N/A	N/A	50 µL	N/A	ea.

**Swept volumes include/reflect theoretical frit volume values.*

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Mini MicroFilters

- Total volume as low as 10 nL
- Conductive version for CEC and mass spectrometry applications
- Three styles available: direct connect 1/32" OD or 360 µm OD tubing and a variety of capillary sizes using MicroTight® tubing sleeves (70–520 µm)

Upchurch Scientific® Inline Mini MicroFilter Assemblies filter effectively with internal volumes low enough to ensure reliable chromatographic results — even at nanoliter per minute flow rates! Internal volumes of these encapsulated filters are as low as 85 nL with the micro-screen and 10 nL to 22 nL with the frit disc option.

Apply voltage to the stainless steel filter holder body of the Conductive Mini MicroFilter for applications such as mass spectrometry and CEC analysis. The voltage is conducted through to the stainless steel portion of the 1 µm NanoFilter™ Capsule and on to the fluid stream. Try our Insulating Mounting Bracket on page 39 to apply voltage easily and more safely.

M-530
Mini MicroFilter Assembly

M-534
Conductive Mini MicroFilter Assembly

APPLICATION NOTE

The Mini MicroFilters can be used to pack capillary tubing. Simply place one of these filters on the effluent side of the capillary tubing, then slurry pack. Once packed, place a filter at the head of the tubing. This creates a reliable capillary column without fusing the silica to make frits or pressing filter paper inside the capillary tubing.

Increase the Life of Your Column

Why use a Precolumn Filter when there is a frit at the head of the column itself? Changing the column frit is extremely difficult to do without disturbing the column packing. A Precolumn Filter provides relatively inexpensive insurance against column damage, and changing its frit is easy. A Precolumn Filter placed between the sample injection valve and the HPLC column protects the column from particles originating in the sample and from pump and valve seal wear.

SPECIFICATIONS & DETAILS

Because of the size-specific nature of the ferrules included with each Mini MicroFilter assembly, please note that these ferrules are not interchangeable with other MicroFerrules for different tubing sizes.

Filter Capsule Color Identification

What's the Difference Between Precolumn & Inline Filters?

You may have noticed that the bodies of Precolumn and Inline Filters look similar, and as such, you may have wondered what the differences are. Because Precolumn Filters, by definition, are typically placed in a volume-sensitive area immediately preceding the column, these filters usually feature smaller thru-holes and smaller frit diameters. In contrast, Inline Filters are often placed where the internal volume is not as critical and where longer life and less fluid restriction is more important.

Part No.	Description	Porosity	Frit Type	For use with Tubing	Includes	Swept Volume	Pressure Rating
MINI MICROFILTER ASSEMBLY							
M-530	Mini MicroFilter Assembly	2 µm	SST Screen	MicroTight tubing sleeves	(5) M-122, (2) F-172, (2) P-416	85 nL	4,000 psi (276 bar)
M-531	Mini MicroFilter Assembly	1 µm	SST Screen	MicroTight tubing sleeves	(5) M-121, (2) F-172, (2) P-416	85 nL	4,000 psi (276 bar)
M-532	Mini MicroFilter Assembly	2 µm	SST Screen	360 µm OD	(5) M-124, (2) F-152, (2) P-416BLK	85 nL	4,000 psi (276 bar)
M-537	Mini MicroFilter Assembly	1 µm	SST Frit	360 µm OD	(5) M-125, (2) F-152, (2) P-416BLK	10 nL	4,000 psi (276 bar)
★ **M-538**	Mini MicroFilter Assembly	1 µm	Ti Frit	360 µm OD	(5) M-126, (2) F-152, (2) P-416BLK	10 nL	4,000 psi (276 bar)
M-543	Mini MicroFilter Assembly	1 µm	SST Screen	1/32" (790 µm) OD	(5) M-131, (2) F-112, (2) P-416	97 nL	4,000 psi (276 bar)
M-547	Mini MicroFilter Assembly	1 µm	SST Frit	1/32" (790 µm) OD	(5) M-133, (2) F-112, (2) P-416	22 nL	4,000 psi (276 bar)
M-548	Mini MicroFilter Assembly	1 µm	Ti Frit	1/32" (790 µm) OD	(5) M-134, (2) F-112, (2) P-416	22 nL	4,000 psi (276 bar)
M-534	Conductive Mini MicroFilter Assembly	1 µm	SST Frit	360 µm OD	(5) M-128, (2) F-152, (2) P-416BLK	10 nL	4,000 psi (276 bar)
REPLACEMENT MINI MICROFILTER CAPSULES							
Part No.	**Description**	**Porosity**	**Frit Type**	**For Use With**	**Material**	**Swept Volume**	**Qty.**
M-121	Filter Capsule	1 µm	SST Screen	M-530 and M-531	PEEK	85 nL	2-pk
M-122	Filter Capsule	2 µm	SST Screen	M-530 and M-531	PEEK	85 nL	2-pk
M-124	Filter Capsule	2 µm	SST Screen	M-532	PEEK	85 nL	2-pk
M-125	NanoFilter Capsule	1 µm	SST Frit	M-537 and M-538	PEEK	10 nL	2-pk
★ **M-126**	NanoFilter Capsule	1 µm	Ti Frit	M-537 and M-538	PEEK	10 nL	2-pk
M-131	Filter Capsule	1 µm	SST Screen	M-543	PEEK	85 nL	2-pk
M-132	Filter Capsule	2 µm	SST Screen	M-543	PEEK	85 nL	2-pk
M-133	NanoFilter Capsule	1 µm	SST Frit	M-547 and M-548	PEEK	10 nL	2-pk
M-134	NanoFilter Capsule	1 µm	Ti Frit	M-547 and M-548	PEEK	10 nL	2-pk
M-128	Conductive NanoFilter Capsule	1 µm	SST Frit	M-534	SST/PEEK	10 nL	2-pk

SST = Stainless Steel; Ti = Titanium

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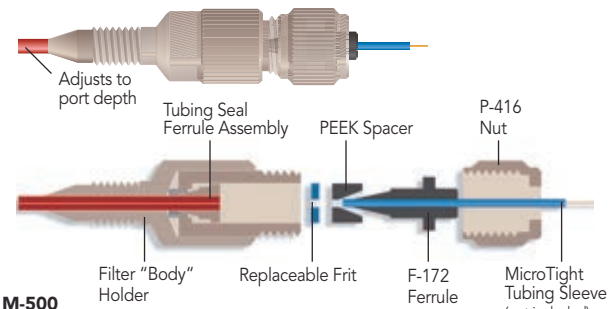
Precolumn MicroFilters

- Direct connects to columns with 10-32 threads
- Total void volume of 0.5 µL
- Two versions: direct connect 1/16" OD tubing or use MicroTight® tubing sleeves for 70–520 µm OD capillary tubing

The Precolumn MicroFilters directly connect into your microbore or analytical column. Total theoretical void volume is only 0.5 µL (includes frit volume) and the PEEK tubing used in the assembly of these units has a 0.005" (125 µm) ID, virtually eliminating any mixing of the sample with the mobile phase.



M-500
Precolumn MicroFilter Assembly
(Includes indicated products)

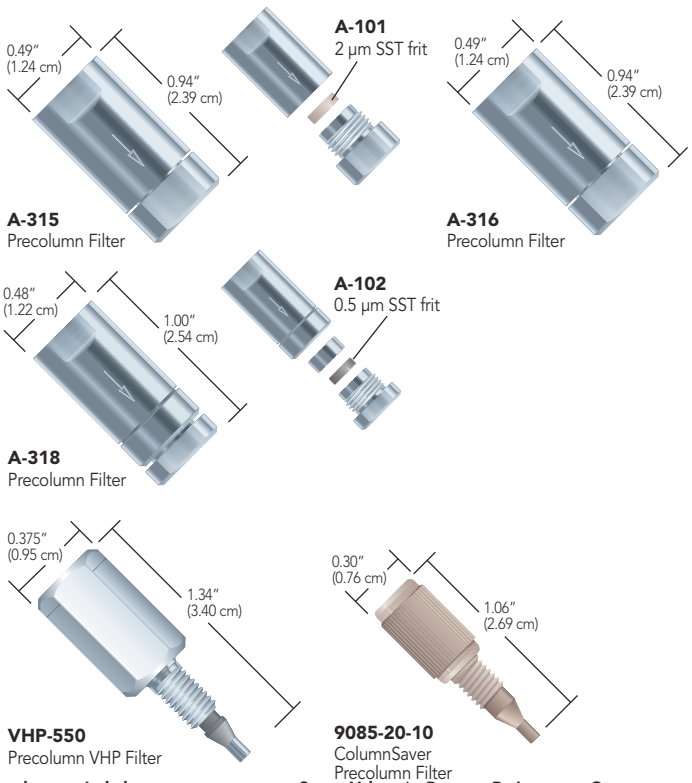
VHP-550 and VHP-551
VHP Precolumn Filter Assembly and replaceable frit assembly

Standard Precolumn Filters

- Economical protection for analytical columns in HPLC and UHPLC
- Traditional versions connect tubing on both sides
- Direct-connect versions attach to the inlet port of most standard columns
- All versions feature 10-32 coned ports for 1/16" OD tubing

These are designed to protect columns by filtering out particulate matter originating from the sample or from rotor seal wear.

- Assemblies that begin with the letter "A" are traditional versions for standard HPLC
- Assemblies that begin with "VHP" are direct-connect versions for UHPLC applications
- Versions that begin with "9085" are direct-connect for standard HPLC and must be used with polymer fittings



	Part No.	Description	Porosity	For Tubing Size	Threads	Includes	Swept Volume*	Pressure Rating	Qty.
	PRECOLUMN MICROFILTER ASSEMBLIES								
	M-500	Precolumn MicroFilter Assembly, SST Frit	0.5 µm	MicroTight Tubing Sleeve	10-32 Coned	(5) C-425, (1) F-172, (1) P-416	0.5 µL	4,000 psi (276 bar)	ea.
	M-510	Precolumn MicroFilter Assembly, PEEK Frit	0.5 µm	MicroTight Tubing Sleeve	10-32 Coned	(5) A-735, (1) F-172, (1) P-416	0.5 µL	4,000 psi (276 bar)	ea.
	M-550	Precolumn MicroFilter Assembly, SST Frit	0.5 µm	1/16" OD	10-32 Coned	(5) C-425, (1) F-132, (1) P-416	0.5 µL	4,000 psi (276 bar)	ea.
★	**M-560**	Precolumn MicroFilter Assembly, PEEK Frit	0.5 µm	1/16" OD	10-32 Coned	(5) A-735, (1) F-132, (1) P-416	0.5 µL	4,000 psi (276 bar)	ea.
	REPLACEMENT PRECOLUMN MICROFILTER FRITS (FRIT DIAMETER X FRIT THICKNESS X OVERALL DIAMETER)								
★	**A-735x**	PEEK Frits, 0.045" x 0.031" x 0.192"	0.5 µm	N/A	N/A	N/A	216 nL	N/A	10-pk
	C-420x	SST Frits, 0.038" x 0.028" x 0.192"	2 µm	N/A	N/A	N/A	101 nL	N/A	10-pk
	C-425x	SST Frits, 0.038" x 0.028" x 0.192"	0.5 µm	N/A	N/A	N/A	101 nL	N/A	10-pk
	PRECOLUMN FILTERS								
★	**A-315**	Solvent Filter Assembly	2 µm	1/16" OD	10-32 Coned	(1) A-101	1.4 µL	6,000 psi (414 bar)	ea.
★	**A-316**	Solvent Filter Assembly	0.5 µm	1/16" OD	10-32 Coned	(1) A-102	1.3 µL	6,000 psi (414 bar)	ea.
★	**A-318**	Solvent Filter Assembly	0.5 µm	1/16" OD	10-32 Coned	(1) A-102	0.84 µL	6,000 psi (414 bar)	ea.
	A-101x	Replacement Frits, Stainless Steel, 10-pk	2 µm	N/A	—	—	0.74 µL	N/A	10-pk
	A-102x	Replacement Frits, Stainless Steel, 10-pk	0.5 µm	N/A	—	—	0.61 µL	N/A	10-pk
	VHP-550	Precolumn VHP Filter	0.5 µm	1/16" OD	10-32 Coned	(5) VHP-551	1.9 µL	20,000 psi (1,380 bar)	ea.
	VHP-555	Precolumn VHP Filter	0.2 µm	1/16" OD	10-32 Coned	(5) VHP-556	1.8 µL	20,000 psi (1,380 bar)	ea.
	VHP-551x	Replacement Precolumn VHP Frit Assembly	0.5 µm	N/A	N/A	N/A	1.9 µL	N/A	10-pk
	VHP-556x	Replacement Precolumn VHP Frit Assembly	0.2 µm	N/A	N/A	N/A	1.8 µL	N/A	10-pk
	9085-05-10	ColumnSaver Precolumn Filter, with SST frit	0.5 µm	1/16" OD	10-32 Coned	N/A	3.1 µL	6,000 psi (414 bar)	10-pk
	9085-20-10	ColumnSaver Precolumn Filter, with SST frit	2 µm	1/16" OD	10-32 Coned	N/A	3.1 µL	6,000 psi (414 bar)	10-pk

SST = Stainless Steel
**Swept volumes include/reflect theoretical frit volume values.*

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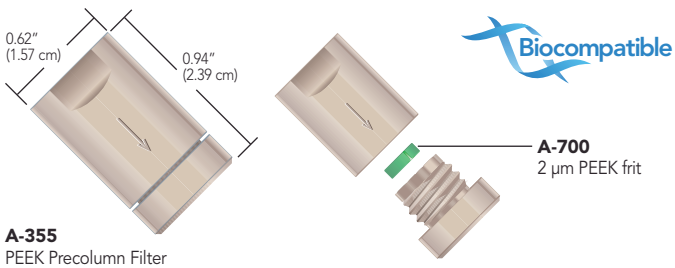
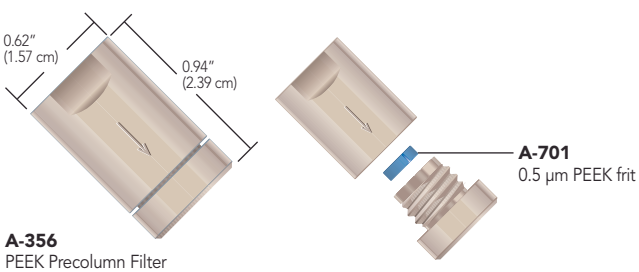
Biocompatible Precolumn Filters

- Pre-assembled with either 0.5 µm or 2 µm porosity frits
- Great column protection
- Feature PEEK bodies and PCTFE-surrounded PEEK frits

Upchurch Scientific® Biocompatible Precolumn Filters have 0.020" (0.50 mm) diameter thru-holes and 8° distribution cones for minimal band spreading and mixing. The bodies of these filters are manufactured from biocompatible PEEK polymer and are pressure rated to 5,000 psi (345 bar). These filters are designed for use with 1/16" OD tubing, which can be connected to these filters using standard Fingertight fittings.



A-355
PEEK Precolumn Filter



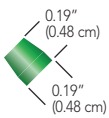
A-356
PEEK Precolumn Filter

Frit-In-A-Ferrule™

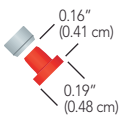
- Seals and filters simultaneously
- Less expensive and more convenient than traditional inline filter systems
- Available in both Flangeless and Super Flangeless™ versions

Now you can filter at any point in your system where 1/16" or 1/8" OD tubing is used in a flat-bottom 1/4-28, M6 or 5/16-24 connection.

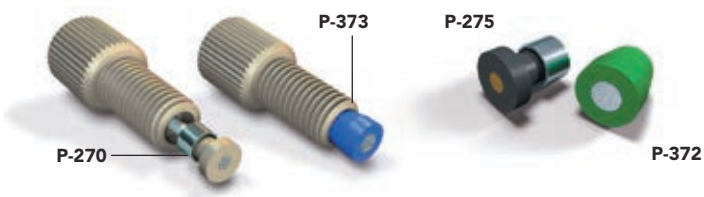
The Upchurch Scientific® Frit-In-A-Ferrule product line is designed to seal and filter simultaneously by incorporating a frit into the body of a flat-bottom ferrule. This simple design allows you to eliminate traditional inline filters and reduce the number of additional connections in your system.



P-372
Flangeless Frit-In-A-Ferrule
for 1/8" OD tubing



P-276
Super Flangeless Frit-In-A-Ferrule
for 1/16" OD tubing



Disposable Sample Filters

- Excellent system protection
- Ultra-low hold-up volume
- 0.5 µm and 2 µm porosity

B-100 and B-101
Disposable Sample Filters

These Disposable Sample Filters are designed to remove particles from analytical HPLC samples. The polypropylene holder incorporates a 1/32" thick, 1/8" diameter stainless steel frit, which causes very little back pressure. To use, just attach one of these filters onto the end of any standard luer syringe, such as our B-310 found on page 155.

	Part No.	Description	Porosity	Threads	Includes	Swept Volume*	Pressure Rating
	BIOCOMPATIBLE PRECOLUMN FILTERS						
★	**A-355**	Solvent Filter Assembly, Biocompatible	2 µm	10-32 Coned	(1) A-700	1.4 µL	5,000 psi (345 bar)
★	**A-356**	Solvent Filter Assembly, Biocompatible	0.5 µm	10-32 Coned	(1) A-701	1.3 µL	5,000 psi (345 bar)
	A-700	Replacement Frit, PEEK Polymer, ea.	2 µm	—	—	0.74 µL	N/A
	A-701	Replacement Frit, PEEK Polymer, ea.	0.5 µm	—	—	0.61 µL	N/A

	Part No.	Description	Porosity	Frit Material	Frit Diameter	Frit Thickness	Swept Volume	Maximum Pressure	Qty.
	FRIT-IN-A-FERRULE FOR 1/16" OD TUBING								
	P-270x	Super Flangeless, Natural PEEK, SST lock ring	2 µm	SST	0.062"	0.062"	0.74 µL	2,500 psi (172 bar)	10-pk
	P-272x	Flangeless, Green PCTFE	2 µm	SST	0.062"	0.062"	0.74 µL	2,000 psi (138 bar)	10-pk
	P-273x	Flangeless, Blue PCTFE	0.5 µm	SST	0.062"	0.062"	0.61 µL	2,000 psi (138 bar)	10-pk
	P-274x	Super Flangeless, Natural PEEK, SST lock ring	2 µm	PEEK	0.046"	0.030"	0.20 µL	2,500 psi (172 bar)	10-pk
★	**P-275x**	Super Flangeless, Black PEEK, SST lock ring	0.5 µm	PEEK	0.046"	0.030"	0.16 µL	2,500 psi (172 bar)	10-pk
	P-276	Super Flangeless, Red ETFE, SST lock ring	10 µm	SST	0.062"	0.062"	0.90 µL	2,500 psi (172 bar)	ea.
	FRIT-IN-A-FERRULE FOR 1/8" OD TUBING								
★	**P-372x**	Flangeless, Green PCTFE	2 µm	SST	0.094"	0.062"	1.69 µL	500 psi (34 bar)	10-pk
	P-373x	Flangeless, Blue PCTFE	0.5 µm	SST	0.094"	0.062"	1.41 µL	500 psi (34 bar)	10-pk
	P-374x	Super Flangeless**, Natural PEEK, SST lock ring	2 µm	PEEK	0.094"	0.042"	1.15 µL	2,500 psi (172 bar)	10-pk
	DISPOSABLE HPLC SAMPLE FILTERS								
	B-100	Disposable Filters	2 µm	SST	0.125"	0.031"	15.8 µL	N/A	100-pk
★	**B-101**	Disposable Filters	0.5 µm	SST	0.125"	0.031"	15.6 µL	N/A	100-pk

** Swept volumes include/reflect theoretical frit volume values.*
*** The 1/8" Super Flangeless versions cannot be used in M6 ports.*

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PEEK Frits

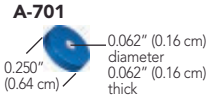
- Inert, biocompatible, and metal-free
- Uniform porosity, longer filtration life
- Sealing rings manufactured from PCTFE

Patented Upchurch Scientific® PEEK Frits offer exceptionally uniform porosity. This property ensures longer filtration life and consistent frit-to-frit swept volumes. The PEEK polymer frit discs are biocompatible and inert to most solvents, making them well-suited for bioanalytical applications. PEEK's robust properties make these products suitable for low and high pressure applications.

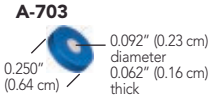
Disc rings, included on most PEEK frits, are made of PCTFE and are slightly thicker than the frit disc, providing enhanced sealing and excellent chemical resistance. PCTFE surrounded PEEK frits can be used up to 80 °C, and PEEK frits alone are a good choice for applications up to 100 °C.

0.5 µm PEEK Frits

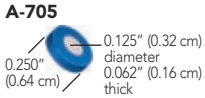
A-701



A-703



A-705



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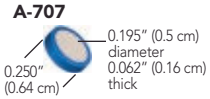

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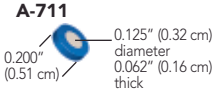
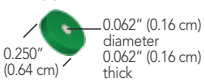


2 µm PEEK Frits

A-700



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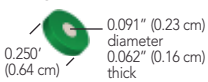

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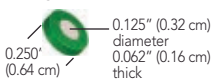
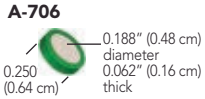
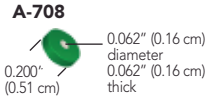


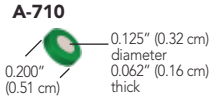
A-706



A-708

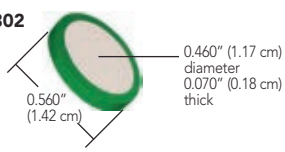


A-710



2 µm Semi-Prep PEEK Frits

OC-802

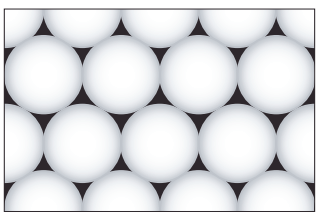


Biocompatible

APPLICATION NOTE

Frit Volume

The term "frit volume" refers to the volume of the various fluid pathways that comprise the matrix of a frit. A standard frit is a mass of small particles fused together through a controlled process of compression and heat. Because of their shape, there are gaps between the fused particles. Fluid makes its way through these gaps, creating a pathway from one side of the frit to the other (see the diagram, below, where the white circles represent frit particles, and the black area represents the void between the particles.)



Generally, when the frit particles increase in size, the frit's porosity increases as well. The larger the particles, the larger the gaps between particles. Cumulatively, these gaps comprise what is known as "frit volume." Using gravimetric determination, it has been experimentally shown that the total volume of any given frit may range from 18%–30%, depending upon the porosity of the frit.

Frit volume is calculated by determining what the mass of the frit would be if it were a solid block of material of equal size. Then the solid mass of the frit is multiplied by the percentage assigned to the porosity to determine the theoretical frit volume.

18% for 0.2 µm frits
20% for 0.5 µm frits
24% for 2 µm frits
26% for 5 µm frits
28% for 10 µm frits
30% for 20 µm frits

From a chromatographic perspective, it's important to know the volume of the frit used in your system. It is possible for a frit to negatively impact your chromatography if the total frit volume is too large and if it is placed in an area through which the sample will pass. To avoid frit-related problems like band broadening and loss of resolution, most inline filters placed after the sample introduction point (e.g., between the injection valve and the column) are smaller in size and porosity than inline filters that are placed in areas before the sample is introduced into the flow path (e.g., between the pump and the injection valve).

	Part No.	Porosity	Disc Diameter	Disc Thickness	Ring OD	Ring Material	Frit Volume	Qty.
	PEEK FRITS							
★	A-700	2 µm	0.062" (0.16 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	0.7 µL	ea.
★	A-701	0.5 µm	0.062" (0.16 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	0.6 µL	ea.
	A-702	2 µm	0.091" (0.23 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	1.7 µL	ea.
	A-703	0.5 µm	0.092" (0.23 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	1.4 µL	ea.
	A-704	2 µm	0.125" (0.32 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	3.0 µL	ea.
	A-705	0.5 µm	0.125" (0.32 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	2.4 µL	ea.
★	A-706	2 µm	0.188" (0.48 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	7.1 µL	ea.
★	A-707	0.5 µm	0.195" (0.5 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	6.1 µL	ea.
	A-708	2 µm	0.062" (0.16 cm)	0.062" (0.16 cm)	0.200" (0.51 cm)	PCTFE	0.7 µL	ea.
	A-710	2 µm	0.125" (0.32 cm)	0.062" (0.16 cm)	0.200" (0.51 cm)	PCTFE	3.0 µL	ea.
	A-711	0.5 µm	0.125" (0.32 cm)	0.062" (0.16 cm)	0.200" (0.51 cm)	PCTFE	2.5 µL	ea.
	SEMI-PREP PEEK FRITS							
★	OC-802	2 µm	0.460" (1.17 cm)	0.070" (0.18 cm)	0.560" (1.42 cm)	PCTFE	46.4 µL	ea.

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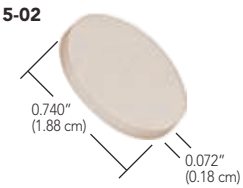
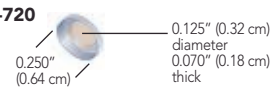
PEEK Frits (cont.)

5 µm and 10 µm PEEK Frits

A-715-02



A-720



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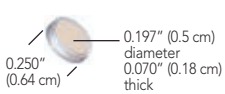
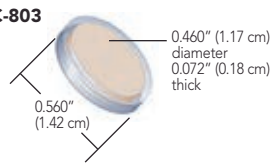


OC-803



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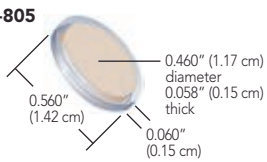

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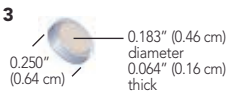
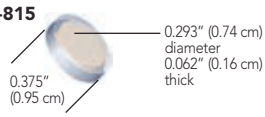


OC-815



NOTE

- The thickness dimension in the part drawings and the pricing tables represents the thickness of the frit disc not the frit ring. Frit rings are often slightly thicker to ensure a proper seal. When tightened into a filter holder the ring compresses to nearly match the thickness of the frit disc.
- The manufacturing process may cause some slight color variance in our PEEK frits. This does not affect their quality or performance. Frit dimensions are approximate. Actual batch-to-batch frit dimensions may vary slightly.

RELATED PRODUCTS

Any 0.247″ to 0.254″ diameter frit (including polymer ring) can be used with the Standard HPLC Inline Solvent Filters on page 160 and the Standard Precolumn Filters on page 163.

Part No.	Porosity	Disc Diameter	Disc Thickness	Ring OD	Ring Material	Frit Volume	Qty.
SEMI-PREP PEEK FRITS							
A-715-02	10 µm	0.740″ (1.88 cm)	0.072″ (0.18 cm)	N/A	N/A	142.1 µL	ea.
★ A-720	10 µm	0.125″ (0.32 cm)	0.070″ (0.18 cm)	0.250″ (0.64 cm)	PCTFE	4.2 µL	ea.
★ A-722	10 µm	0.197″ (0.5 cm)	0.070″ (0.18 cm)	0.250″ (0.64 cm)	PCTFE	9.9 µL	ea.
OC-803	10 µm	0.460″ (1.17 cm)	0.072″ (0.18 cm)	0.560″ (1.42 cm)	PCTFE	57.2 µL	ea.
OC-805	5 µm	0.460″ (1.17 cm)	0.058″ (0.15 cm)	0.560″ (1.42 cm)	PCTFE	41.1 µL	ea.
OC-813	5 µm	0.183″ (0.46 cm)	0.064″ (0.16 cm)	0.250″ (0.64 cm)	PCTFE	7.2 µL	ea.
OC-815	5 µm	0.293″ (0.74 cm)	0.062″ (0.16 cm)	0.375″ (0.95 cm)	PCTFE	17.8 µL	ea.

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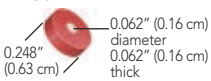
Titanium Frits

- Excellent alternative to stainless steel
- PEEK or PCTFE polymer rings

Titanium is a biocompatible alternative to stainless steel. Our 0.2 µm, 0.5 µm, and 2 µm porosity titanium frits are surrounded by PEEK or PCTFE polymer rings for enhanced sealing. The dimensions of most of these frits make them suitable replacement frits for most Upchurch Scientific® standard inline and precolumn filters.

0.2 µm Titanium Frits

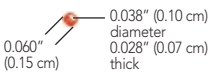
A-501



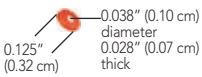
A-503

A-504

A-505

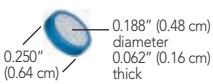


A-507



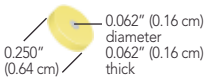
0.5 µm Titanium Frit

A-131

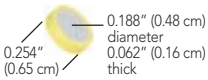


2 µm Titanium Frits

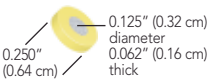
A-108



A-110



A-111



A-342-02

NOTE

- While all of the frits listed in this chapter are capable of withstanding high pressures (> 5,000 psi or 345 bar), the actual pressure holding capability of each frit is usually dependent on the filter body in which it is placed.

Part No.	Porosity	Disc Diameter	Disc Thickness	Ring OD	Ring Material	Frit Volume	Qty.
TITANIUM FRITS							
A-108x	2 µm	0.062″ (0.16 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PCTFE	0.7 µL	10-pk
A-110x	2 µm	0.188″ (0.48 cm)	0.062″ (0.16 cm)	0.254″ (0.65 cm)	PCTFE	7.1 µL	10-pk
A-111	2 µm	0.125″ (0.32 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PCTFE	2.7 µL	ea.
A-131	0.5 µm	0.188″ (0.48 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PCTFE	5.6 µL	ea.
A-342-02	2 µm	0.730″ (1.85 cm)	0.062″ (0.16 cm)	N/A	N/A	93.6 µL	ea.
A-501	0.2 µm	0.062″ (0.16 cm)	0.062″ (0.16 cm)	0.248″ (0.63 cm)	PEEK	0.6 µL	ea.
A-503	0.2 µm	0.188″ (0.48 cm)	0.062″ (0.16 cm)	0.247″ (0.63 cm)	PCTFE	5.1 µL	ea.
A-504	0.2 µm	0.118″ (0.30 cm	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PCTFE	2 µL	ea.
A-505	0.2 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.060″ (0.15 cm)	PCTFE	0.1 µL	ea.
A-507	0.2 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.125″ (0.32 cm)	PCTFE	0.1 µL	ea.

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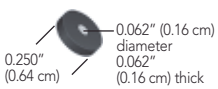
Stainless Steel Frits

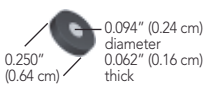
Upchurch Scientific® Analytical-scale 316 Stainless Steel Frits are available in 0.5 µm or 2 µm porosity—the most common HPLC filtration ratings. Each frit includes a PCTFE or PEEK polymer sealing ring. Many of the frits shown have the common 0.250″ (0.64 cm) and 0.254″ (0.64 cm) ODs, which allow them to be used in many of the Precolumn and Inline Filters found starting on page 160. Choose the larger diameter faces and/or larger porosity frits for faster flow rates. Choose frits with a smaller diameter face and/or smaller porosity for applications sensitive to extra flow path volume.

0.5 µm Stainless Steel Frits

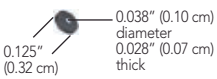
A-102



A-103

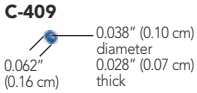


C-128-31

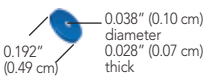


C-140-30

C-409

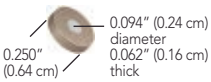


C-425

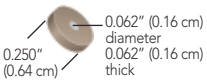


2 µm Stainless Steel Frits

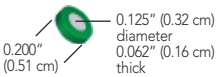
A-100



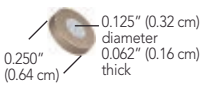
A-101



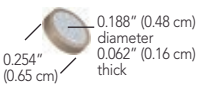
A-420



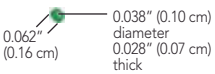
C-401



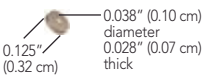
C-402



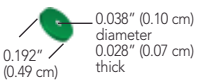
C-407



C-408



C-420



APPLICATION NOTE

To Clean Or Not To Clean?

It is rarely worth the time and effort to clean frits, given the relatively low cost of replacements. Furthermore, cleaning may leave some debris embedded in the frit pores. If the washed frit is accidently returned to your instrument in a reverse orientation, any remaining debris could be flushed out and deposited further down the fluid path. If this frit is being used as a column head frit, the debris may be washed directly onto the column bed.

	Part No.	Porosity	Disc Diameter	Disc Thickness	Ring OD	Ring Material	Frit Volume	Qty.
	STAINLESS STEEL FRITS							
★	**A-100x**	2 µm	0.094″ (0.24 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PEEK	1.7 µL	10-pk
★	**A-101x**	2 µm	0.062″ (0.16 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PEEK	0.7 µL	10-pk
★	**A-102x**	0.5 µm	0.062″ (0.16 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PEEK	0.6 µL	10-pk
★	**A-103x**	0.5 µm	0.094″ (0.24 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PEEK	1.4 µL	10-pk
	A-420	2 µm	0.125″ (0.32 cm)	0.062″ (0.16 cm)	0.200″ (0.51 cm)	PCTFE	3.0 µL	ea.
	C-128-31	0.5 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.125″ (0.32 cm)	PEEK	0.1 µL	ea.
	C-140-30x	0.5 µm	0.188″ (0.48 cm)	0.062″ (0.16 cm)	0.254″ (0.65 cm)	PCTFE	6.5 µL	10-pk
	C-401x	2 µm	0.125″ (0.32 cm)	0.062″ (0.16 cm)	0.250″ (0.64 cm)	PEEK	3.0 µL	10-pk
	C-402x	2 µm	0.188″ (0.48 cm)	0.062″ (0.16 cm)	0.254″ (0.65 cm)	PEEK	7.8 µL	10-pk
	C-407x	2 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.062″ (0.16 cm)	PCTFE	0.1 µL	10-pk
	C-408x	2 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.125″ (0.32 cm)	PEEK	0.1 µL	10-pk
	C-409x	0.5 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.062″ (0.16 cm)	PCTFE	0.1 µL	10-pk
	C-420x	2 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.192″ (0.49 cm)	PCTFE	0.1 µL	10-pk
	C-425x	0.5 µm	0.038″ (0.10 cm)	0.028″ (0.07 cm)	0.192″ (0.49 cm)	PCTFE	0.1 µL	10-pk

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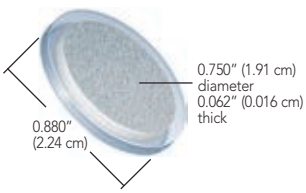
Stainless Steel Semi-Prep Frits

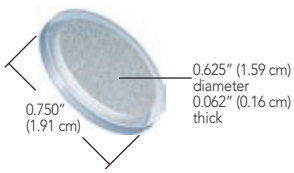
Many of these frits come complete with a PCTFE, ETFE, or PTFE sealing ring. Choose from 2 µm, 5 µm, 10 µm, and 20 µm filtration porosities and a range of diameters to match your intended flow rate and filtration requirements.

2 µm Semi-Prep Stainless Steel Frits

A-332

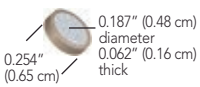


A-343



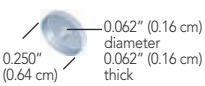
5 µm Semi-Prep Stainless Steel Frits

C-417

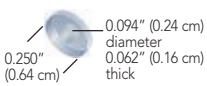


10 µm Semi-Prep Stainless Steel Frits

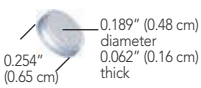
A-105



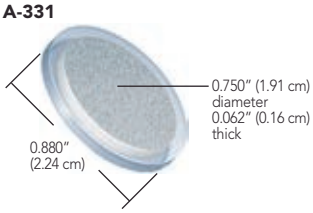
A-106



A-107

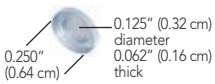


A-331

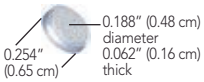


20 µm Semi-Prep Stainless Steel Frits

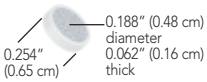
A-120



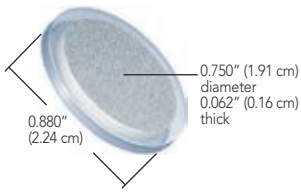
A-122



A-224

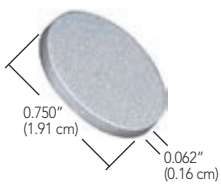


A-337

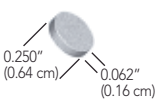


Stainless Steel Frit Discs

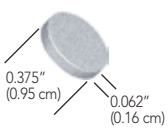
A-337-02



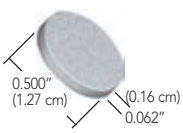
C-413



C-414



C-415



NOTE

Frits without the polymer rings cannot be used with our standard Precolumn and Inline Filter assemblies.

Part No.	Porosity	Disc Diameter	Disc Thickness	Ring OD	Ring Material	Frit Volume	Qty.
SEMI-PREP STAINLESS STEEL FRITS							
			0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE		
A-105x	10 µm	0.062" (0.16 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	0.9 µL	10-pk
A-106x	10 µm	0.094" (0.24 cm)	0.062" (0.16 cm)	0.254" (0.65 cm)	PCTFE	2.0 µL	10-pk
A-107x	10 µm	0.189" (0.48 cm)	0.062" (0.16 cm)	0.250" (0.64 cm)	PCTFE	9.1 µL	10-pk
A-120x	20 µm	0.125" (0.32 cm)	0.062" (0.16 cm)	0.254" (0.65 cm)	PCTFE	3.7 µL	10-pk
A-122x	20 µm	0.188" (0.48 cm)	0.062" (0.16 cm)	0.254" (0.65 cm)	PTFE	9.7 µL	10-pk
A-224	20 µm	0.188" (0.48 cm)	0.062" (0.16 cm)	0.880" (2.24 cm)	ETFE	9.7 µL	ea.
★ A-331x	10 µm	0.750" (1.91 cm)	0.062" (0.16 cm)	0.880" (2.24 cm)	ETFE	141.9 µL	10-pk
★ A-332x	2 µm	0.750" (1.91 cm)	0.062" (0.16 cm)	0.880" (2.24 cm)	ETFE	141.9 µL	10-pk
A-337x	20 µm	0.750" (1.91 cm)		0.750" (1.91 cm)	PCTFE	152 µL	10-pk
A-343	2 µm	0.625" (1.59 cm)	0.062" (0.16 cm)			112.6 µL	ea.
C-417	5 µm	0.187" (0.48 cm)	0.062" (0.16 cm)	0.254" (0.65 cm)	PEEK	7.2 µL	ea.
STAINLESS STEEL FRIT DISCS (NO POLYMER RINGS)							
A-337-02	20 µm	0.750" (1.91 cm)	0.062" (0.16 cm)	N/A	N/A	134.7 µL	ea.
C-412	5 µm	0.250" (0.64 cm)	0.062" (0.16 cm)	N/A	N/A	13 µL	ea.
C-413	10 µm	0.250" (0.64 cm)	0.062" (0.16 cm)	N/A	N/A	14 µL	ea.
C-414	2 µm	0.375" (0.95 cm)	0.062" (0.16 cm)	N/A	N/A	26.9 µL	ea.
C-415	2 µm	0.500" (1.27 cm)	0.062" (0.16 cm)	N/A	N/A	47.9 µL	ea.

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Iso-Prep™ Guard

- 21.2 mm and 30 mm ID column protection
- Improves plate count and symmetry
- New anti-rotation feature aids guard holder assembly

Iso-Prep Guard is a guard cartridge system designed to protect valuable prep columns. It offers superior column protection for adsorptive samples and a proven sample distribution mechanism via a precision machined holder. Iso-Prep Guard is ideal for protecting prep columns with no degradation of peak shape or plate count.

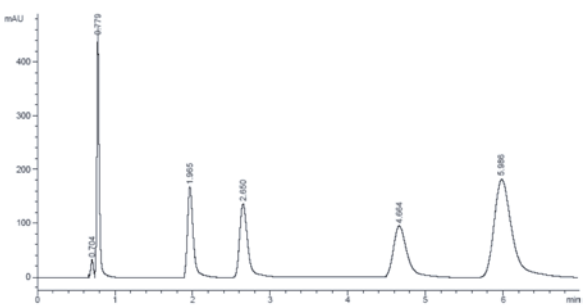
The high-performance guard protects columns in two ways. First, it acts as a filter, trapping particles in the frits. Second, when the guard cartridge is packed with the same material as the prep column, it removes compounds that irreversibly adsorb to the packing material.

APPLICATION NOTE

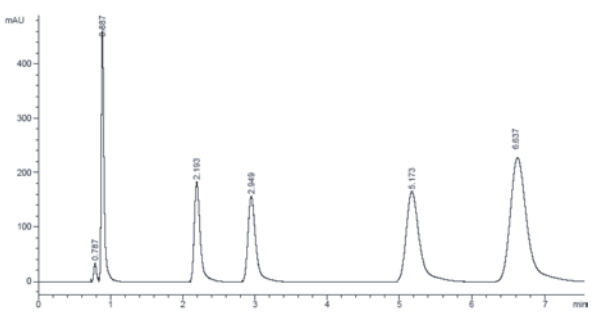
Low Pressure Drop

- 60:40 Acetonitrile:Water
- 50 mL/min
- Kromasil 10 µm C18
- Backpressure: 100 psi

10 µ C18 100 x 21.2 mm, 60:40 Acetonitrile:Water, 20 mL/min



Without Iso-Prep Guard — 38,150 Plates/M 1.24 As



With Iso-Prep Guard — 41,920 Plates/M 1.20 As

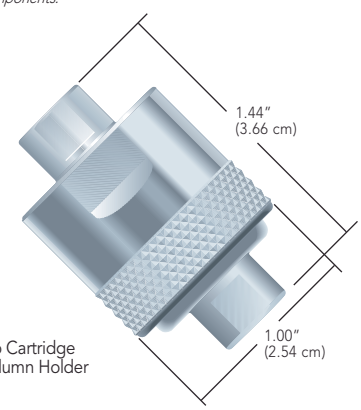
Unpacked Semi-Prep Guard Column

- 10 mm ID column protection
- Convenient cartridge system
- Easy to pack

The internal volume of this Upchurch Scientific® semi-prep guard column is just 780 µL, which only requires approximately 1.50 g of packing material — ideally the same material used in your semi-prep column. The C-1000 Holder will hold to high pressures, and is specially treated to prevent galling.* Use standard 10-32 coned fittings (not included) to connect your 1/16" OD tubing.

C-1000 Semi-Prep Guard Column
Fittings, tubing and column shown are not included.

** Galling is a form of "cold welding." When two fittings manufactured from the same metal are wrench-tightened too tightly, they can "weld" together, making it virtually impossible to separate the two components.*



C-1000
Semi-Prep Cartridge Guard Column Holder

Part No.	Description
ISO-PREP GUARD ORDERING INFORMATION	
9197-P	Iso-Prep Guard Holder
9197-P-AR	Iso-Prep Guard Holder, 21.2mm, Anti Rotation
9197-20	Iso-Prep Guard Cartridge, 21.2 mm x 1 cm, 1 Frit
8056-MOD	Iso-Prep Guard, 21.2 mm Frit, 2 µm
9197-S	Iso-Prep Guard Finishing Tool
9196-P	Iso-Prep Guard Holder, 30 mm
9196-P-AR	Iso-Prep Guard Holder, 30 mm, Anti Rotation
9196-20	Iso-Prep Guard Cartridge, 30 mm x 1 cm, 2 µm Frit
8083-MOD	Iso-Prep Guard, 30 mm Frit, 2 µm
9196-S	Iso-Prep Guard Finishing Tool, 30 mm
10 mm ID x 1 cm	
C-1000	Semi-Prep Cartridge Guard Column Holder
C-1035	Semi-Prep Cartridge
C-1030	Threaded Frit Cap with 2 µm Stainless Steel Frit
C-1031	Threaded Frit Cap with 2 µm Titanium Frit

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Cartridge Guard Columns

- 100% biocompatible flow path
- Pressure rated to 4,000 psi (276 bar)
- Wetted materials are Titanium and PEEK
- Reusable holder complete with fingertight fittings

Insert one of these Upchurch Scientific® analytical guard columns between the injection valve and column of your HPLC system to extend the life of your column and help ensure reproducible results. Convenient, prepacked PEEK polymer cartridges complete the system and are available in a variety of bonded phases to match your column chemistry held in place by Titanium frits.

The C-270 Stainless Steel Guard Column Holder is engineered for high-pressure applications to 4,000 psi (276 bar). Each of these holders is surface treated to prevent galling*, a potential problem with threaded metal parts.

The flow path of the C-270 Guard Column Holder is biocompatible. Each comes complete with fittings for 1/16" OD tubing, and can be used with any of the C-28X or C-7XX guard column cartridges listed on this page.

** Galling is a form of "cold welding." When two fittings manufactured from the same metal are wrench-tightened too tightly, they can "weld" together, making it virtually impossible to separate the two components.*

Biocompatible

APPLICATION NOTE

Why Use A Guard Column?

A guard column can increase the life of your analytical column up to five-fold[1]. Use a guard column with the same packing as your column — it will act as a chemical filter, removing strongly retained materials in your sample that might otherwise contaminate your analytical column. And, it is more economical to replace a guard column cartridge than to buy a new analytical column.

[1]Uwe D. Neue, HPLC Troubleshooting – Column Durability, American Laboratory, 1999; 22:44-7.

SPECIFICATIONS & DETAILS

Packing Material Specifications: The cartridges on this page are packed with 5 µm or 10 µm base-deactivated 80 Å spherical silica.

Part No.	Description	
CARTRIDGE GUARD COLUMN KITS		
C-281	2.0 mm ID C18 Cartridges (6-pk) with (1) C-270 Assembly	
C-751	4.3 mm ID C18 Cartridges (6-pk) with (1) C-270 Assembly	
GUARD COLUMN CARTRIDGE HOLDERS, BIOCOMPATIBLE		
C-270	High Pressure, Stainless Steel, with (2) F-200 Fittings	
GUARD COLUMN CARTRIDGES, BIOCOMPATIBLE		
2.0 mm ID x 1 cm, 10 µm Silica		**Qty.**
C-280	Reversed Phase C18	3-pk
★ C-282	Reversed Phase C18	10-pk
C-753	Adsorption Silica	3-pk
4.3 mm ID x 1 cm, 5 µm Silica		
C-750	Reversed Phase C18	3-pk
★ C-752	Reversed Phase C18	10-pk
C-759	Adsorption Silica	3-pk
C-760	Adsorption Silica	10-pk
C-763	Cyano Phase CN	3-pk
C-764	Cyano Phase CN	10-pk

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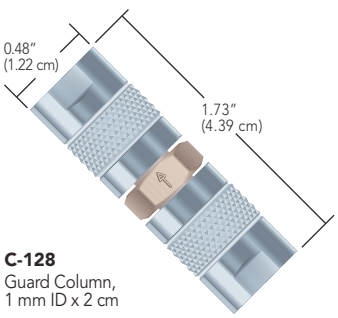
Microbore Guard Columns

- Ideal for Microbore HPLC
- Easily dry packed (or slurry packed with adapter)
- Made of PEEK polymer and stainless steel

This Upchurch Scientific® ultralow volume guard column (1.0 mm ID x 2 cm length) is ideal for narrow-bore chromatography. The unpacked guard column allows you to exactly match the chemistry of your column, resulting in optimum column protection. The total packing volume of 16.2 µL ensures maximum column efficiency and analytical column protection. The column can be easily dry packed using the specially designed funnel (C-128-20). A 3 g bottle of our C18 packing material will pack this column more than 120 times.

Frits often become plugged before a guard column is contaminated. The two 0.5 µm frits included with this guard column can be changed in minutes. Optional 2 µm frits may be purchased separately (C-408).



C-128
Guard Column,
1 mm ID x 2 cm

APPLICATION NOTE

Signs Indicating the Guard Column Needs to be Changed

- System pressure build-up
- Faster than usual retention times
- Reduced resolution

Part No.	Description	Includes
MICROBORE GUARD COLUMNS		
1.0 mm ID x 2 cm Unpacked		
C-128	Guard Column	(2) C-128-31
C-128-20	Packing Funnel	
C-128-31	0.5 µm Stainless Steel Replacement Frit	
C-408	2 µm Stainless Steel Replacement Frit	
C-128-40	Slurry Packing Adapter	
C-128-50	Guard Column Kit	(2) C-128, (1) C-128-20, (10) C-128-31
ANALYTICAL GUARD COLUMNS		
2.0 mm ID x 2 cm Unpacked		
C-130B	Guard Column	(2) A-100
C-130-20	Packing Funnel	
A-100	2 µm Stainless Steel Replacement Frit	
A-103	0.5 µm Stainless Steel Replacement Frit	
C-130-40	Slurry Packing Adapter	
C-135B	Guard Column Kit	(2) C-130B, (1) C-130-20, (10) A-100
1602	Guard Column Kit with Reversed Phase C18	(2) C-130B, (1) C-130-20, (10) A-100, 3 g C18 packing material

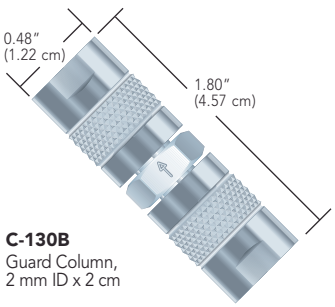
PACKING MATERIAL		
Part No.	**Particle Size**	**Qty.**
C-603	Reversed Phase C18, 30–40 µm pellicular	3 g

Analytical Guard Columns

- Easy to pack
- Available as a kit with funnel and extra frits

The C-130B is our most popular guard column. HPLC users find this column easy to pack and extremely economical. This narrow-bore short column (2.0 mm ID x 2 cm length) creates only a slight pressure increase with virtually no detectable theoretical plate loss when used with a 3 mm ID or larger column. The 2 µm frits are easy to change, prolonging the life of the guard column. With only 62 µL packing volume per guard column, a 3 g bottle of packing material will pack about 30 guard columns.

For convenience, we offer the C-135B kit with two unpacked guard columns and a ten pack of frits. With two guard columns, there is always a back-up available to help eliminate downtime.



C-130B
Guard Column,
2 mm ID x 2 cm

Analytical Guard Column Kit

For complete convenience, try the Upchurch Scientific guard column kit with packing material. This kit contains 10 replacement frits, a packing funnel and 3 g of C18 reversed phase.

RELATED PRODUCTS

- All Guard Columns featured on this page include 10-32 Coned threads. Use any of the 10-32 coned fittings on pages 9–17 to connect tubing to these guard columns.

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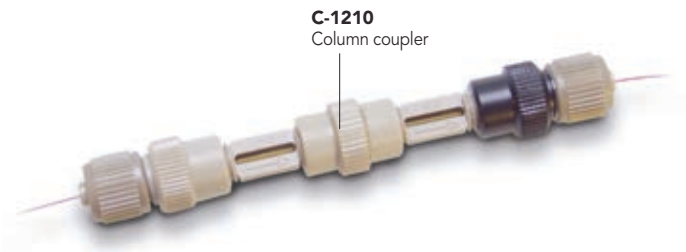
Capillary Sample Trap Columns

- Packed and unpacked columns
- Pressure rated to 5,000 psi (345 bar)
- Direct connect 360 µm OD capillary tubing

Upchurch Scientific® Capillary Sample Trap Columns are ideal for separating and concentrating and/or purifying biological samples.

Capillary Sample Trap Column Assemblies include one or more 1 µm NanoFilter™ Capsules, each containing either a stainless steel (SST) or biocompatible titanium (Ti) frit. The swept volume of these unique filters is only 10 nL each. Connect your 360 µm OD capillary tubing directly to our Sample Trap Column Assemblies using the fittings provided. The maximum flow rate for these products is 10 µL/min; 250 nL is the optimal flow rate.

Please Note: Reversing flow in these columns can result in loss of packing material. For more information regarding the proper setup involving these Sample Trap Columns, please contact your local distributor or IDEX Health & Science customer service.



SPECIFICATIONS & DETAILS

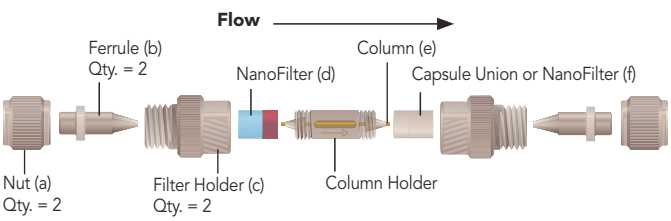
- Packing material specifications: C18, high carbon load, 5 µm/300A spherical silica and SCX, 5 µm 85A material.
- Maximum sample loading capacity of 0.1 µg and capillary bed volume of 0.19 µL or less.

RELATED PRODUCTS

- Use the P-116 MicroFerrule Plug on page 18 to plug a Sample Trap Column for storage.
- Find 360 µm OD PEEK polymer and fused silica tubing on page 67.

Components Chart

Please refer to the drawing and part numbers below when ordering replacement components:



Column Assembly	Nuts (a)	Ferrules (b)	Filter Holder Color(c)	NanoFilter (d)	Column (e)	Capsule Union or NanoFilter (f)
C-1200	P-416	F-152	Tan	M-125 (SST)	C-1250 (C18)	M-124NF (no frit)
C-1300	P-416BLK	F-152	Tan	M-126 (Ti)	C-1250 (C18)	M-124NF (no frit)
C-1500	P-416	F-152	Tan	M-125 (SST)	FS-1000-25 (unpacked)	M-125 (SST)
C-1600	P-416BLK	F-152	Tan	M-126 (Ti)	FS-1000-25 (unpacked)	M-126 (Ti)

All nuts, ferrules, and column holders are made of PEEK polymer. Filter holders are made of PEEK polymer (non-conductive) or stainless steel (conductive). NanoFilter Capsule bodies are made of PEEK polymer (non-conductive) or stainless steel and PEEK (conductive). See page 162 for NanoFilter Capsule color coding. Abbreviation Key: SST = stainless steel; Ti = titanium; SCX = Strong Cation Exchange

Part No.	Description	Frit Material	Includes
CAPILLARY SAMPLE TRAP COLUMNS			
Assemblies			
C-1200	C18 Column	SST	(1) 2-pk C-1250, (1) M-125, (2) P-416, (2) F-152, (1) M-124NF
C-1300	C18 Column	Ti	(1) 2-pk C-1250, (1) M-126, (2) P-416BLK, (2) F-152, (1) M-124NF
C-1500	Unpacked Column	SST	(1) FS-1000-25, (2) M-125, (2) P-416, (2) F-152
C-1600	Unpacked Column	Ti	(1) FS-1000-25, (2) M-126, (2) P-416BLK, (2) F-152

Part No.	Description	Swept Volume	Qty.
Column Coupler and Replacement Parts			
C-1210	Column Coupler, PEEK	—	ea.
C-1250	C18 Columns, 100 µm ID x 2.5 cm x 360 µm OD	—	2-pk
★ **F-152**	MicroFerrule for 360 µm OD tubing, PEEK	—	ea.
FS-1000-25	Unpacked Column, 100 µm ID x 2.5 cm x 360 µm OD	—	ea.
M-124NF	Capsule Union, no Frit, PEEK	9.5 nL	ea.
M-125	1 µm NanoFilter Capsules, with SST Frits	10 nL	2-pk
★ **M-126**	1 µm NanoFilter Capsules, with Ti Frits	10 nL	2-pk
★ **P-416**	Female Nut, Natural PEEK	—	ea.
P-416BLK	Female Nut, Black PEEK	—	ea.
P-416G	Female Nut, Green PEEK	—	ea.

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DEBUBBLERS & DEGASSERS

ACTIVE DEBUBBLERS
PAGE 175

APPLICATION NOTE — WHY DEGAS YOUR MOBILE PHASE?
PAGE 177

STAND ALONE DEGASSERS
PAGE 178

SEE STARRED PRODUCTS FOR **TOP SELLERS!**

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Systec® Debubbler Series

Remove Bubbles, Dissolved Gas, or Both!

Dissolved gases and bubbles in system liquids cause dispense volume anomalies in many instruments, negatively affecting both dispense precision and analytical accuracy. Now you have a choice of components for actively removing bubbles with or without also removing dissolved system gases. Online Vacuum Degassing offers operating convenience, high efficiency and low operating costs compared to other common degassing technologies.

Debubbler/Degasser

Combines Vacuum Degassing with Active Bubble Removal

- Improves instrument performance — reduces downtime due to bubble formation.
- Fewer false positives due to reduction of partial reagent dispenses.
- Easily integrates into any pump, degassing tray, or stand-alone degassing application.

Active Debubbler

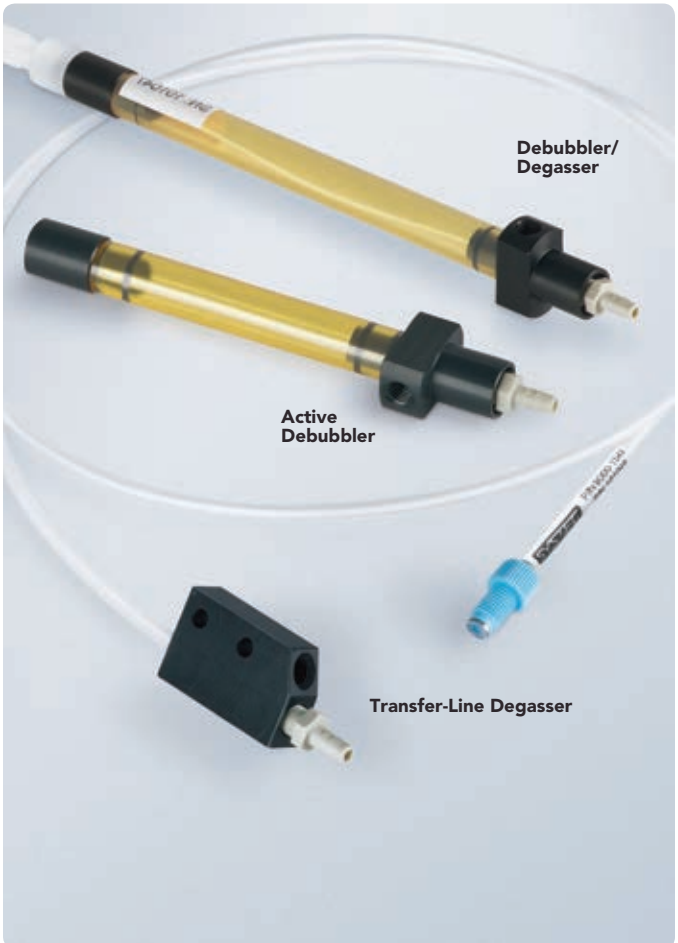
Remove Bubbles in Fluid Stream Before or After the Pump

- Improves instrument performance — reduces downtime due to bubble formation.
- Fewer false positives due to reduction of partial reagent dispenses.
- Easily integrates into any pump, degassing tray, or stand-alone degassing application.

Transfer-Line Degasser

Removes Dissolved Gases During Fluid Transfer

- Eliminates baseline fluctuations for improved detector sensitivity.
- Coaxial design reduces number of connections, improves reliability.
- Single lumen design increases degassing reliability.



APPLICATION NOTE

- Liquid handling
- IVD
- HPLC/UHPLC
- O_2 and CO_2 removal

In medical analyzers, bubbles interfere with critical volumetric reagent dispenses and cause sample failures, wasting time and money. Because bubbles adhere to nearly every part of a dispensing system, high velocity or induced turbulent flow is often used to displace and discharge bubbles from the flow stream and into a waste area. These alternative processes waste reagents and are time consuming, unpredictable, and may additionally require designing the system to recognize bubbles are present. Regardless of how the systems are designed, aqueous systems will always be subject to the laws of physics that cause out-gassing during changes in fluid temperature, pressure, or chemicals mixture. In fluid applications like these, debubblers are the optimal solution to capture and remove formed bubbles to prevent sample dispense inaccuracies, and degassing is ideal to prevent downstream bubble formation from recurring.

Part No.	Description	Standard Bubble Trap Size	Transfer Line Length	Internal Volume	Max Bubble Capacity
DEBUBBLER SERIES – AVAILABLE STANDARD CONFIGURATION					
9000-1540	2.5 mL Active Debubbler	2.5 mL	—	2.5 mL	2.5 mL
9000-1541	5 mL Active Debubbler	5 mL	—	5 mL	5 mL
9000-1544	2.5 mL Debubbler/ Degasser	2.5 mL	17.5" (444.5 mm)	2.5 mL in transfer line + 2.5 mL in bubble trap	2.5 mL
9000-1545	5 mL Debubbler/ Degasser	5 mL	34" (863.6 mm)	5 mL in transfer line + 5 mL in bubble trap	5 mL
★ **9000-1549**	1.1 m Transfer-Line Degasser	—	1.1 m (43")	4 mL	N/A

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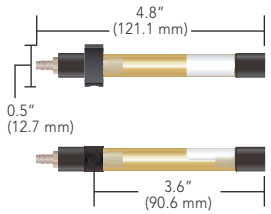
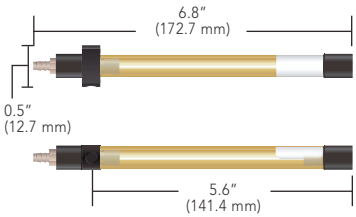
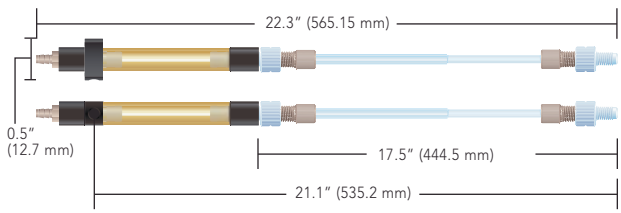
Overall Dimensions



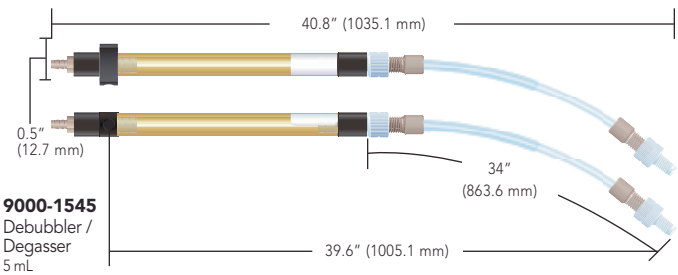
9000-1540
Active Debubbler
2.5 mL



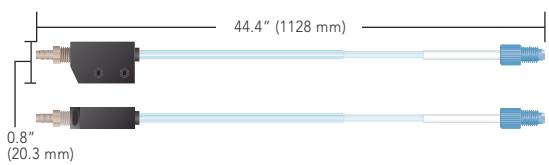
9000-1541
Active Debubbler
5 mL



9000-1544
Debubbler / Degasser
2.5 mL



9000-1545
Debubbler / Degasser
5 mL



9000-1549
Transfer-Line Debubbler
1.1 meter

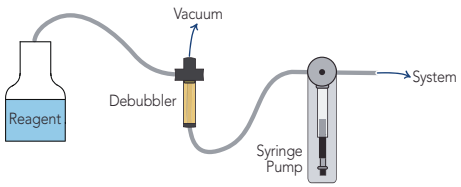
Please note: These drawings are not actual size.

BENEFITS

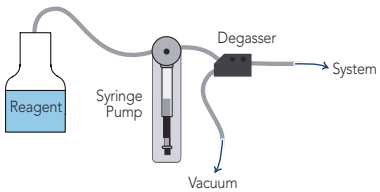
	Active Debubbler	Debubbler/ Degasser	Transfer-Line Degasser
Perfect for applications that require dissolved gas like oxygen for reaction kinetics	✓		
Improves dispense precision by capturing and removing bubbles	✓	✓	
Eliminates false positives and reduces reagent waste by improving instrument performance	✓	✓	
Easily integrates into fluidic path	✓	✓	✓
Creates stable instrument performance across system and environmental fluctuations	✓	✓	✓
Prevents the formation of bubbles downstream of the degasser		✓	✓
Eliminates fluctuations for improved detector sensitivity and accuracy by preventing bubble formation		✓	✓
Improves fluidic system reliability because coaxial design reduces the number of connections			✓
Flexible design can be implemented as transfer line in new instruments or existing instruments that don't have space available			✓
Minimizes fluidic system internal volumes to reduce reagent cost			✓

IMPLEMENTATIONS

Typical Debubbler Implementation



Transfer-Line Degasser Implementation



Gas bubbles are actively removed from a flowing liquid stream by vacuum via the PORIDEX membrane.

NOTE

Degassing tubing is flexible and therefore can be coiled to shorten the overall length or used to transfer the fluid within an instrument to the next desired location.

SPECIFICATIONS (ALL PLATFORMS)

	Active Debubblers	Degasser/ Debubblers	Transfer-Line Degasser
Bubble Removal (volume of air removed/min @ 10 mL/min H_2O)	Up to 30 cc	Up to 30 cc	N/A
Degassing Efficiency† @ 1 mL/min H_2O	N/A	2.5 mL size: 36% O_2 removal 5.0 mL size: 55% O_2 removal	< 4 ppm dissolved O_2 at 5 mL/min
Membrane Material	PORIDEX®	PORIDEX	PORIDEX
Wetted Materials	PORIDEX, Polyolefin, FEP, ETFE, Ultem®	PORIDEX, Polyolefin, FEP, ETFE, Ultem	PORIDEX, Polyolefin, FEP, ETFE
Solvent Compatibility	Solutions > 50% aqueous. Not compatible with detergent concentrations > 0.05%.		
Standard Bubble Trap Volume	2.5 / 5.0 mL	2.5 / 5.0 mL	N/A
Transfer-Line Volume	N/A	2.5 / 5.0 mL	< 4 mL
Maximum Operating Pressure	200 kPa (30 psi) @ 25 °C		
Maximum Operating Temperature	40 °C		
Recommended Vacuum Level	Minimum 16 kPa absolute		
Liquid Connection	1/4-28 fitting system		
Vacuum Connection	Tubing vacuum port(s) for 1/8" (3 mm) ID elastomeric tubing		
Pressure Drop	0.8 mm Hg / mL / min (assumes laminar flow and viscosity of 1 cP)		

† Debubbling / degassing efficiency can be optimized based on flow rate, fluid to be degassed, and gas to be removed.

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APPLICATION NOTE

Why Degas Your Mobile Phase?

Dissolved air in HPLC mobile phases can result in flow rate instability and baseline disturbance.

Flow rate instability: Non-degassed mobile phase can outgas in the pump head, causing bubbles to be formed and trapped inside the head or check valves. These bubbles can cause flow disturbances and pressure fluctuations, resulting in flow rate instability.

Baseline disturbance: As the mobile phase passes through the column, it experiences a large pressure drop. Non-degassed mobile phase can outgas due to this pressure differential, causing air bubbles to form. Air bubbles passing through or lodging in the flow cell cause detection disturbances, exhibited as baseline noise.

Why Use a Degassing System?

Helium sparging is a common means of degassing HPLC solvents. This method has its drawbacks, however. Helium tanks are expensive and bulky, and solvent backup and contamination are concerns. In addition, helium sparging can change the composition of a premixed mobile phase over time, due to the difference in the evaporation rates of mobile phase components.

In contrast, the Systec® Degassing System has none of these drawbacks, and it is extremely fast and efficient at removing dissolved gases — more efficient than helium sparging or PTFE-based degassing systems.

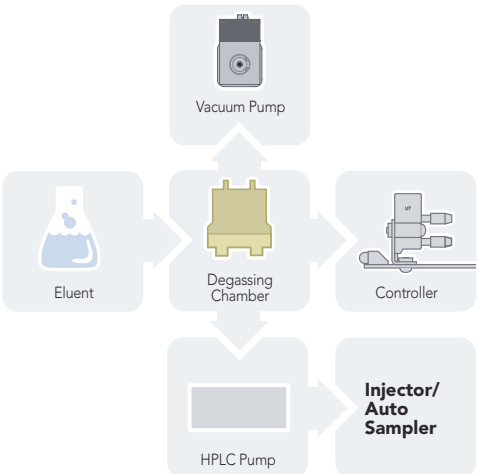
Tubing Connections

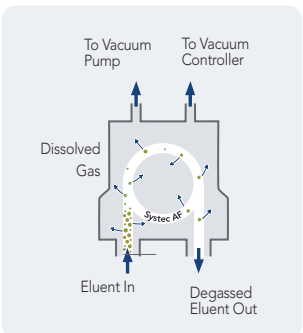
We recommend ETFE tubing (page 73) be used to limit regassing of mobile phase between the degasser and your pump. ETFE is recommended because of its superior impermeability to gases (compared to PTFE, FEP, and PFA tubing). Applicable flangeless fittings for 1/8" OD tubing are found on page 26.

GPC and HFIP Applications

Standard degassing chambers, with PEEK bulkhead unions, are not recommended for GPC applications or for use with HFIP (hexafluoroisopropanol). Special GPC "hardened" versions are available. Please contact us for more information.

TYPICAL DEGASSER IMPLEMENTATION





Dissolved gases are actively removed from a flowing liquid stream by vacuum via the Systec AF® membrane.

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Systec® Stand Alone MINI & Prep Scale Vacuum Degassing Systems

- Analytical and Prep scale models
- Ultra-high degassing efficiency
- Low volume, easy to prime
- Patented control eliminates baseline fluctuations
- Inert flow path
- 5+ year lifetime

The Systec Stand-Alone MINI and Prep-Scale HPLC vacuum degassing systems are high-efficiency, in-line modules that remove dissolved gases from the mobile phase. Their unique design assures reliable continuous operation and the highest level of performance available without the need for helium sparging. Up to five solvent lines may be degassed simultaneously by one unit.

ZHCR® Control with Built-in Test Diagnostics

- Microcontroller self-test vacuum sensor validation on power-up
- Continuous vacuum system monitoring to ensure optimum operational conditions are maintained
- Vacuum system fault detection and shutdown function indicators

AF / ZHCR Degassing Technology

Flow-through vacuum degassing chamber with a single amorphous perfluorinated copolymer (Systec AF®) degassing membrane, enabling degassing efficiency 50 times that of PTFE.

The ZHCR (Zero Hysteresis / Constant Run) vacuum pump employs a patented closed-loop, micro-stepping rpm control strategy permitting the pump to run with continuously variable speed, providing quick pull-down at high rpm, and then sustaining a consistent vacuum level at low rpm.

Fluctuations in detector baseline due to changes in vacuum level are eliminated by not having to repeatedly stop and start a single-speed pump. This also greatly reduces wear and noise.

The brushless motor enables quiet operation and is appropriate for environments where solvent vapors may be present.

SPECIFICATIONS

Stand-Alone Degassing Modules	
Maximum Number of Degassing Channels	5
Degassing Efficiency† @ 1 mL / min MeOH	> 70% O_2 Removal
Membrane Material	SYSTEC AF
Other Wetted Materials	PEEK, PPS(GF), PTFE(GF), FEP
Solvent Compatibility	Not compatible with fluorinated solvents. Special version available for GPC solvents.
Flow Path ID	1.14 mm (0.045")
Internal Volume	480 µL (standard)
Maximum Pressure (@ 25 °C)	0.5 MPa (70 psi)
Pressure Drop	0.18 kPa/mL/min

† Degassing efficiency can be optimized based on flow rate, fluid to be degassed, and gas to be removed.
[1] Standard ID; other sizes available.

NOTE

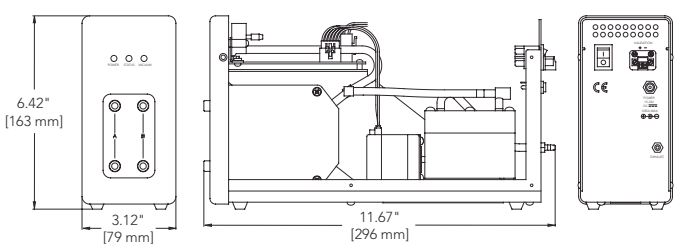
Power Requirement

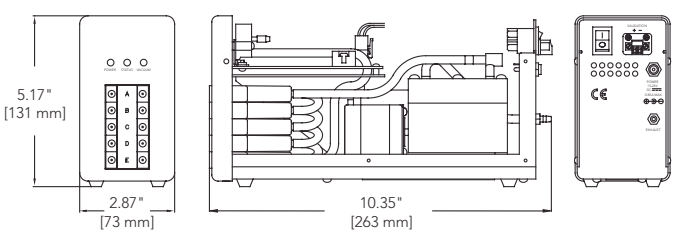
Input Power required with AC Adapter (included): 100 to 240 V AC (±10%), 1A, 50 to 60 Hz (±3 Hz). Four interchangeable wall sockets are supplied with the AC Adapter: North America/Japan, U.K., Continental Europe, Australia.

CE Certification

This product has been certified under the following CE testing standards: EN61326-1; EN55011; EN61300-3-2; EN61300-3-3, & EN61010-1.

Overall Dimensions





	Part No.	Number of Channels	Channel Volume	Max HPLC Gradient Flow Capability	Pressure Drop[E]	Degassing Flow Path ID
	SYSTEC STAND ALONE MINI VACUUM DEGASSING SYSTEMS — AVAILABLE CONFIGURATIONS[A]					
★	**0001-6500**	2	480 µL	2.0 mL/min[C]	0.18 kPa/mL/min	0.045" (1.14 mm)
★	**0001-6501**	4	480 µL	2.0 mL/min[C]	0.18 kPa/mL/min	0.045" (1.14 mm)
	SYSTEC STAND ALONE PREP SCALE VACUUM DEGASSING SYSTEMS — AVAILABLE CONFIGURATIONS[A, B]					
	0001-6482	2	8.4 mL	20 mL/min[D]	0.04 kPa/mL/min	0.065" (1.65 mm)
★	**0001-6484**	2	13.8 mL	40 mL/min[D]	0.06 kPa/mL/min	0.065" (1.65 mm)

A. Custom configurations are available. Consult us for your own OEM solution to your specific application.
B. The standard prep scale chambers are not recommended for GPC applications or for use with HFIP (hexafluoroisopropanol).
C. The flow rates given are for a gradient mixture of 50/50 MeOH/H_2O, with a typical low pressure gradient mixing valve. Higher flow rates are possible with high pressure mixing.
D. The flow rates given are for a gradient mixture of 60/40 MeOH/H_2O, with a typical low pressure gradient mixing valve. Higher flow rates are possible with high pressure mixing.
E. Estimated tubing pressure per unit change in flow assuming laminar flow with a viscosity of 1.0 cP

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PUMPS REFERENCE
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Technical Resources available at www.idex-hs.com

Help is only a click away at www.idex-hs.com! To access a wealth of product and application support information, including:

Fittings Primer

Learn how to:

- Describe the fittings needed for your application
- Classify your fitting needs

Visit **www.idex-hs.com/fittings_primer**

Materials Guide

- Material Properties Guide
- Chemical Compatibility
- Polymer Information Summary

Visit **www.idex-hs.com/materials**

Conversion Tools

- Calculator to help determine volumes and tubing sizes to achieve specific volume requirements
- Conversion calculators for pressure, temperature and length

Visit **www.idex-hs.com/conversions**

Standard Port Drawings

- 6-40 flat-bottom
- 6-32 coned
- 10-32 coned and flat-bottom
- 1/4-28 coned and flat-bottom
- 5/16-24 flat-bottom
- 1/2-20 flat-bottom
- M6 flat-bottom

Visit **www.idex-hs.com/standard_ports**

Visit our column hardware website with interactive column selector guides!

www.idexcolumnhardware.com

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Please Note: For more information regarding the properties of the polymers listed below, please refer to www.idex-hs.com/materials. Find refractive index data on pages 62 and 70; gas permeability data on pages 75–76.

Delrin® (acetal). Delrin exhibits excellent chemical resistance to most organic solvents as well as to most neutral-pH aqueous solvents. However, it is not suitable for use with acids, bases or oxidizing agents. This polymer's high tensile strength yields superior, highly wear-resistant threads and excellent thread strength.

FEP (fluorinated ethylene-propylene) and **PFA** (perfluoroalkoxy alkane). Both of these polymers are in the same family as PTFE, and as such are inert to virtually all chemicals used in HPLC. However, because of their relative softness and low durability, these polymers are generally used for low pressure applications. Choose PFA for high purity applications, or choose FEP as a general, all-purpose material. Both FEP and PFA have good thread strength.

Halar® ECTFE (ethylene-chlorotrifluoroethylene). Halar is a member of the fluoropolymer family. It offers excellent chemical resistance coupled with a mechanical strength superior to many other fluoropolymers. Halar also outperforms PTFE and similar fluoropolymers in ability to withstand radiation, making it an attractive alternative for medical applications. Its exceptionally smooth surface enhances optical clarity while also helping prevent the shedding of microparticles into the fluid stream.

PCTFE (polychloro-trifluoroethylene). PCTFE has excellent chemical resistance. In general, only THF and a few halogenated solvents will react with it. This resilient fluoropolymer is ideal for fittings and sealing surfaces and also has good thread strength.

PEEK (polyetheretherketone). PEEK polymer is the flagship member of the poly(aryl)ether ketone family of polymers. It has excellent chemical resistance to virtually all commonly used solvents. However, the following solvents are usually not recommended for use with PEEK: nitric acid; sulfuric acid; halogenated acids, such as hydrofluoric acid and hydrobromic acid (hydrochloric acid is approved for use in most applications); and pure halogenated gases. Additionally, due to a swelling effect, be cautious in using the following solvents with PEEK tubing: methylene chloride, THF, and DMSO in any concentration and acetonitrile in higher concentrations. Excellent thread strength.

PK A proprietary polymer blend comprised mainly of polyether-etherketone (PEEK). PK demonstrates all of the superior chemical resistance of PEEK (see PEEK above). The proprietary blend however, will allow a fitting to attain a higher pressure while reducing the cold flow properties of pure PEEK. CAUTION: some fittings molded of PK are known to be conductive. Use caution when employing PK fittings in high voltage applications.

Polypropylene Polypropylene is a relatively soft polymer commonly used in low pressure applications, and is especially prevalent in IVD and similar equipment. Polypropylene is excellent for aqueous solutions; however, it should not be used with chlorinated, aromatic, and some organic solvents. Fair thread strength.

PPS (polyphenylene sulfide). PPS is a resilient polymer known for its high tensile strength and excellent chemical resistance. PPS may be safely used at room temperature with most organic solvents and neutral-to-high pH aqueous solvents. However, it is not recommended for use with chlorinated solvents, inorganic acids, or any solvent at elevated temperatures.

Radel® (polyphenylsulphone). Radel is an amorphous thermopolymer that is mechanically strong and offers good chemical resistance. This polymer withstands repeated autoclave sterilization cycles without suffering thermal breakdown. This property, coupled with its optical clarity, makes Radel tubing an excellent choice for medical and other applications where visual monitoring is essential. Radel is also a readily wetted material, minimizing air bubble accumulation on the inner walls of tubing manufactured with this polymer.

ETFE (ethylene-tetrafluoroethylene). As a member of the fluoropolymer family, ETFE has excellent solvent resistance. Its physical properties make it ideal for demanding sealing applications. While most commonly used solvents do not interact with ETFE, take caution when using some chlorinated chemicals. ETFE has good thread strength.

UHMWPE (ultra-high molecular weight polyethylene). UHMWPE is a well-known and durable manufacturing polymer. Its physical properties make it ideal for general, aqueous-based environments. Take caution when using this polymer in heavily organic-based applications. Good thread strength.

Ultem® PEI (polyetherimide). An amorphous thermoplastic offering high heat resistance, high strength, and broad chemical resistance. Tubing made from Ultem offers a high degree of transparency. This polymer withstands various sterilization methods, such as repeated autoclaving as well as gamma radiation, ethylene oxide gas, and dry heat. Ultem meets the criteria for ISO10993, FDA, and USP Class VI certification.

Vespel® (polyimide). Vespel thermoplastic offers high heat resistance, high mechanical strength, and broad chemical resistance in most common liquid chromatography applications. However, it is particularly susceptible to attack by high pH chemical environments. Vespel can be autoclaved and sterilized using gamma radiation. Vespel offers inherent lubricity, making it ideal as a chemically resistant bearing surface.

RoHS Compliance Search for RoHS at www.idex-hs.com. For items not included in the catalog, please contact IDEX Health & Science directly.

Download the Lab Assistant for chemical compatibility to your iPad or iPhone

www.idex-hs.com/labassistant

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The fluid transfer community uses both the International System of Units (Metric System) and the U.S. Customary System. To access automatic conversion calculation tools, please go to **www.idex-hs.com/conversions**.

Dimensions — Inches to Metric

Decimal Inches	Fractional Inches	Metric
0.031″	1/32″	0.79 mm
0.062″	1/16″	1.57 mm
0.125″	1/8″	3.18 mm
0.188″	3/16″	4.78 mm
0.250″	1/4″	6.35 mm
0.313″	5/16″	7.95 mm
0.375″	3/8″	9.53 mm
0.438″	7/16″	11.13 mm
0.500″	1/2″	12.70 mm
0.563″	9/16″	14.30 mm
0.625″	5/8″	15.88 mm
0.688″	11/16″	17.48 mm
0.750″	3/4″	19.05 mm
0.813″	13/16″	20.65 mm
0.875″	7/8″	22.23 mm
0.938″	15/16″	23.83 mm
1″	1″	2.54 cm
2″	2″	5.08 cm
3″	3″	7.62 cm
4″	4″	10.16 cm
5″	5″	12.70 cm
6″	6″	15.24 cm
7″	7″	17.78 cm
10″	10″	25.40 cm

Dimensions — Metric to Inches

Metric	Decimal Inches
1.0 mm	0.039″
1.8 mm	0.071″
2.0 mm	0.079″
3.0 mm	0.118″
3.2 mm	0.126″
4.0 mm	0.157″
4.3 mm	0.169″
4.6 mm	0.181″
5.0 mm	0.197″
6.0 mm	0.236″
7.0 mm	0.276″
8.0 mm	0.315″
9.0 mm	0.354″
1.0 cm	0.394″
2.0 cm	0.787″
3.0 cm	1.181″
4.0 cm	1.575″
5.0 cm	1.969″
6.0 cm	2.362″
7.0 cm	2.756″
8.0 cm	3.150″
9.0 cm	3.543″
10.0 cm	3.937″

Conversion Factors

Conversion Desired	Formula
Inches to millimeters	Inches x 25.4 mm/in.
Inches to centimeters	Inches x 2.54 cm/in.
Inches to microns	Inches x 25.4 mm/in. x 1,000 µm/mm
Diameter in inches to linear volume (µL/inch)*	12870.4 (d2)
Diameter in µm to linear volume (µL/cm)*	7.85 x 10-6 (d2)
Celsius to Fahrenheit	(Celsius x 9/5) + 32
Fahrenheit to Celsius	(Fahrenheit - 32) x 5/9
psi to bar	psi x 0.06894757
psi to MPa	psi x 0.00689476
psi to torr	psi x 51.7150733
psi to ATM	psi x 0.06804596
**d = internal diameter*	

Temperature

Celsius (°C)	Fahrenheit (°F)
0	32
1	34
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104
45	113
50	122
55	131
60	140
65	149
70	158
75	167
80	176
85	185
90	194
95	203
100	212
105	221
110	230
115	239
120	248
125	257
130	266
135	275
140	284
145	293
150	302
155	311
160	320
165	329
170	338
175	347
180	356
185	365
190	374
195	383
200	392
205	401
210	410
215	419

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What Threads Do I Have?

Hold your fitting over the thread silhouettes below to identify the threads.

U.S. Customary Threads

6-40	
6-32	
10-32	
1/4-28	
5/16-24	
1/2-20	

Metric Threads

M4 x 0.7	
M6 x 1	

Refer to page 223 for an explanation of thread nomenclature.

Pressure Conversion

psi	bar	MPa	ATM
100	6.9	0.7	6.8
500	34.5	3.4	34.0
1,000	68.9	6.9	68.0
1,500	103.4	10.3	102.1
2,000	137.9	13.8	136.1
2,500	172.4	17.2	170.1
3,000	206.8	20.7	204.1
3,500	241.3	24.1	238.2
4,000	275.8	27.6	272.2
4,500	310.3	31.0	306.2
5,000	344.7	34.5	340.2
5,500	379.2	37.9	374.3
6,000	413.7	41.4	408.3
6,500	448.2	44.8	442.3
7,000	482.6	48.3	476.3
7,500	517.1	51.7	510.3
8,000	551.6	55.2	544.4
8,500	586.1	58.6	578.4
9,000	620.5	62.1	612.4
10,000	689.5	68.9	680.5

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Fittings Primer

Fittings

Fittings — typically comprised of a nut and ferrule — are designed to connect and seal tubing. While simple in function, fittings can be complex in description and use. General descriptive terms include: the geometry of the receiving port (coned or flat-bottom); the tubing size for which the fitting is designed; and a description of the threads on the nut, e.g., 10-32, 1/4-28, etc. Fittings may also be classified by dimensions and by the type of material from which they are manufactured. Additional information — such as tubing and port material, solvent(s) to be used, and expected system pressure — is required to determine which fittings are best suited for a particular application.

Threads

Several thread sizes are commonly used in analytical fluid transfer. The most common sizes are 1/4-28, 10-32, and M6. The first two are U.S. Customary System measurements. The third, M6, is measured in the Metric System.

U.S. Customary System Two numbers are used to describe a thread size. The first number indicates the diameter of the threaded portion of the nut. Thread diameter numbers range from gauge 1 (0.073") to gauge 12 (0.216"). Beyond 0.216" the thread diameter is given as the actual diameter in fractions of an inch. The second number indicates the threads-per-inch count. Thus, a 1/4-28 nut (Figure 1) has a 1/4" (0.250") diameter thread barrel and 28 threads-per-inch. A 10-32 male nut (Figure 2) has a gauge 10 (0.190") thread barrel with 32 threads-per-inch.

Metric System The Metric System also uses a two number system to describe the threads. The first number, preceded by the letter M (for metric), indicates the diameter of the threads in millimeters. The second number indicates how many millimeters between each thread. When the spacing between threads is 1 mm, the callout for the thread often excludes that second number. Thus, an M6x1 thread is often denoted by a simple M6 (Figure 3).

Please see the previous page for a visual comparison of common threads.

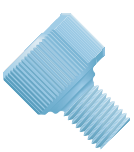

Figure 1
1/4-28 Nut

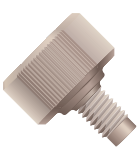

Figure 2
10-32 Nut

Figure 3
M6 Nut

MATERIAL STRUCTURAL COMPATIBILITY

Fitting	Tubing	Port	Recommended?
Plastic	Plastic	Plastic	Yes
Plastic	Steel	Plastic	Yes
Plastic	Steel	Steel	Yes
Plastic	Plastic	Steel	Yes
Steel	Steel	Steel	Yes
Steel	Plastic	Steel	Sometimes
Steel	Plastic	Plastic	No
Steel	Steel	Plastic	No

Stainless Steel Fittings

Although restrictive in use and application (see the Fittings Applications table, bottom left), stainless steel fittings remain popular for many analytical applications due to their chemical inertness and high pressure-holding capabilities.

The dimensions and shapes of stainless steel fittings vary and can be manufacturer specific (Figures 4 and 5). Even so, the most commonly-used stainless steel fittings for chromatography employ 10-32 threads, allowing many stainless steel fittings to be paired with a variety of receiving ports prior to being swaged onto a tube.

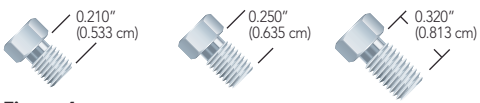

Figure 4

Figure 5

To be used properly stainless steel fittings must be swaged (permanently attached) to the tubing they are connecting. To do this correctly, IDEX Health & Science recommends the following procedure:

Place the nut and ferrule, in that order, on the tubing. Place this loose assembly into a mating port and tighten the nut finger tight, while ensuring the tubing is bottomed out inside the port. Now wrench tighten the nut an additional 3/4 turn. ***Please Note:*** *The ferrule is now permanently attached to the tubing and should only be used in the port into which it was swaged. Attempting to use a pre-swaged ferrule in a receiving port that is different from the one into which it was initially swaged may result in dead volume or leaks (see the Interchangeability section, next page).*

To properly tighten a pre-swaged stainless steel fitting, IDEX Health & Science recommends wrench tightening only an additional 1/4 to 1/2 turn past finger tight. Should any leaking occur, continue tightening the fitting a little at a time until the leak stops. If the fitting requires more than one complete revolution past finger tight, we recommend it be replaced, as excessive tightening typically indicates a damaged product.

Polymer-Based Fittings

Unlike their stainless steel counterparts, polymer fittings are nearly universal in application (see the Fittings Applications table) and are comparatively easy to use. Polymer fittings do not permanently attach to tubing, and they usually do not require any tool (besides your fingers!) to properly tighten. Additionally, these fittings come in a variety of polymers, providing several cost, pressure and chemical-resistance options.

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Fittings Primer

Interchangeability

Because swaged stainless steel ferrules are permanently attached to the tubing, interchangeability is almost impossible with stainless steel fittings. The key factor that limits interchangeability of stainless steel fittings is "Dimension X"—the length of tubing that extends past a swaged ferrule (Figure 6; see page 184 for details on swaging a ferrule into place).

Dimension X varies among manufacturers (Figure 7). Dimension X can also vary for the same manufacturer due to production tolerances. Because of these differences, if you are using all stainless steel fittings we recommend you only use swaged fittings in the port where they were initially swaged (Figure 8a). Interchanging fitting assemblies and receiving ports can introduce leaks and/or dead-volume chambers to the flow path (Figure 8b). Therefore, for stainless steel fittings, we generally recommend new fittings, new ferrules, and new connections each time receiving ports are changed.

Even though interchangeability is a problem with stainless steel fittings, it is generally not a problem with polymer fittings. Because polymer ferrules don't permanently attach to the tubing wall, Dimension X can be adjusted each time the fitting assembly is connected to a receiving port. This helps ensure a good connection with minimal dead volume.

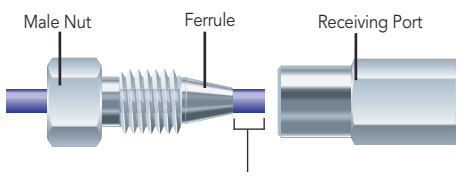
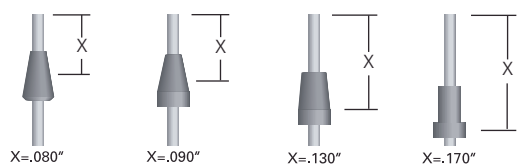


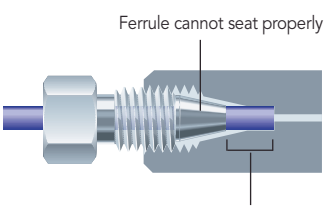
Figure 6



X = 0.080" X = 0.090" X = 0.130" X = 0.170"

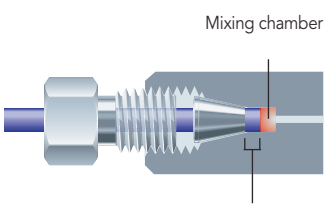
Dimension X can range from 0.080" to 0.170" among various manufacturers.

Figure 7



If Dimension X is too long, leaks will occur

Figure 8a



If Dimension X is too short, a dead-volume, or mixing chamber, will occur

Figure 8b

If Your Fittings Leak

1. Check to make sure your tubing is seated properly. When using universal Fingertight fittings, the tubing must bottom out in the receiving port before the nut and ferrule are tightened. If a gentle tug disengages your tubing after the fittings have been tightened, loosen the nut and ferrule and try again.

2. The fitting may not be tightened enough. Stainless steel nuts and ferrules require a wrench to tighten them, even after repeated use. Fingertight fittings also require a good turn; however, using tools may lead to over-tightening and damage to the fitting, and as such, tools should be used with caution on Fingertight fittings.

3. You may be using incompatible fittings. Make sure you are using a nut and ferrule that are compatible with each other and with the components of your system. To avoid this problem and ensure compatibility, use IDEX Health & Science universal Fingertight fittings. Because the ferrule does not permanently swage onto your tubing, a Fingertight can be used repeatedly for several cycles in most systems.

4. Check the condition of the sealing area. After repeated use, a fitting's "sealing area" (at the tip of the fitting or ferrule), will gradually become deformed to the point of being incapable of creating a seal. As such, it is a good idea to keep an extra supply of the fittings you are using so you can replace them quickly and avoid unnecessary downtime.

5. Check the receiving port for damage. Sometimes a leaking connection has nothing at all to do with the nut and ferrule, but with the receiving port. Ports that have had stainless steel fittings swaged into them are especially susceptible to damage. Check the receiving port for visible burrs or scratches and replace if necessary.

6. Evaluate chemical compatibility. Using fittings made of material incompatible with your mobile phase is a sure way of creating leaks. Please visit the IDEX Health & Science website, www.idex-hs.com, for more information about chemical compatibility.

TELLTALE SIGNS OF SYSTEM LEAKS

Before you see the first drip of mobile phase, your system can warn you that a problem exists. The most common signs of system leaks are:

1. No flow or pressure
2. Pump pressures up, but there is no flow
3. Noisy baseline
4. Baseline drift

While all of these symptoms could also indicate problems unrelated to leaking connections, it is always easiest to start there. Not only are leaking connections usually easy to repair, they are also typically the least expensive option.

Download a copy of All About Fittings for your lab!

www.idex-hs.com/AllAboutFittings

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Adapters & Unions

With all the different tubing sizes and threaded port configurations, scientists frequently use adapters to make connections. However, adapters are not always the only choice, or even the best choice, when making connections between dissimilar components.

Adapters have two different thread configurations, such as 1/4-28 flat-bottom to 10-32 coned, or 1/4-28 male flat-bottom to luer. Unions have the same thread on both sides, such as 10-32 coned to 10-32 coned. Please refer to Figure 9 for examples of adapters and unions.

Unions are typically less expensive than adapters while performing equally as well. Thus, it is often advantageous to use a union wherever possible. To determine whether a union or an adapter is appropriate for a particular connection, first determine if the connection is designed for low pressure or high pressure. This is not always obvious, but you can make some assumptions.

(For example, when connecting 1/16" OD PEEK tubing to 1/8" OD FEP or PFA tubing, you likely have a low pressure connection since the connection pressure is limited by the amount of pressure the fluoropolymer tubing can withstand.)

Once you know the pressure classification for your connection, determine what connectors are available for that classification. For the low pressure example given, there are a number of unions available with 1/4-28 internal flat-bottom geometry on both sides (see pages 40 – 41). Other options with matching M6 and 5/16-24 internal threads are also available (pages 40 and 50, respectively).

After you identify the connector needed, the focus turns to finding fittings that work with your tubing sizes to mate with each side of the selected union. In our example, the connection is between 1/16" OD and 1/8" OD tubing, and there are several 1/4-28 flat-bottom fittings for both 1/16" and 1/8" OD tubing, such as those on pages 22 – 28.

Of course, a number of cases remain where only an adapter will do. For recommendations on making typical threaded connections, please see the "Connections Reference" on page 35.

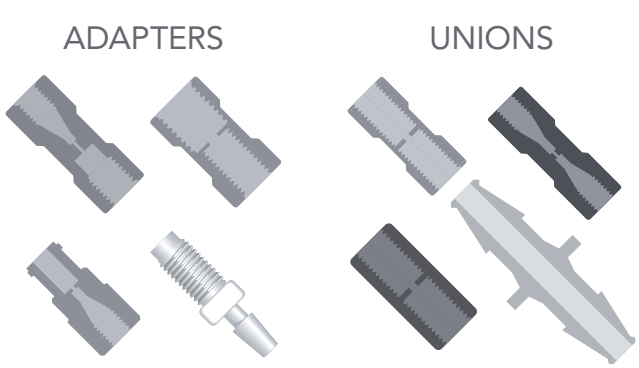

Figure 9 — Adapters and Unions

Connectors

Void, Dead, and Swept Volume

When making connections, in most instances, what is of primary importance is how much internal volume exists within a connection and how that internal volume will impact chromatographic results.

Three terms describe the internal volume of a product: void volume, dead volume, and swept volume. Void volume is simply another way of describing the total internal space within a connection into which fluid can flow. Dead volume is that portion of the void volume that is out of the intended flow path, while swept volume is that portion of the void volume which is in the intended flow path (see Figure 10). Therefore, Void Volume = Dead Volume + Swept Volume.

Dead volume, particularly in capillary connections, can cause undesirable chromatographic effects, including:

- Analysis delays
- Broadened peaks
- Poor resolution
- Sample carry-over
- Split peaks
- Gas collection

Because of the negative impact of dead volume in a connection, all dead volume should be removed from the connection if possible.

To keep most of the void volume truly swept volume, match the tubing ID as closely as possible with the diameter of the holes in your equipment. This ensures the fluid runs completely through the entire passageway. Matching internal diameters also helps reduce turbulence as the fluid passes through the connection.

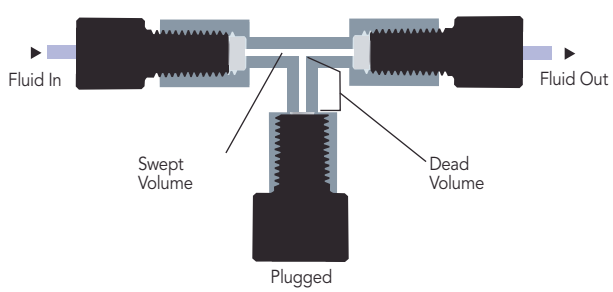

Figure 10 — Internal Volume Defined

See the full range of Micro/Nano connections!

www.idex-hs.com/microfluidic

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Differential Pressure Per 5–Foot Length

Which ID is best for your application? Refer to flow rates (using water as the solvent) and tubing IDs below and the corresponding differential pressure per 5-foot length.

These theoretical data are presented in psi with the bar equivalent in parentheses, and were calculated using the formula presented to the right.

	Tubing ID						
Flow Rate	**0.0025"**	**0.005"**	**0.007"**	**0.010"**	**0.020"**	**0.030"**	**0.062"**
0.1 mL/min	923	58	15	4	0	0	0
	(64)	(4.0)	(1.0)	(0.3)	(0)	(0)	(0)
1.0 mL/min	NR*	577	150	36	2	0	0
		(40)	(10)	(2.5)	(0.1)	(0)	(0)
2.0 mL/min	NR*	1,154	300	72	5	1	0
		(80)	(21)	(5.0)	(0.3)	(0.1)	(0)
10.0 mL/min	NR*	5,770	1,502	361	23	5	0
		(398)	(103)	(25)	(1.6)	(0.3)	(0)
25.0 mL/min	NR*	NR*	3,755	902	56	11	0
			(259)	(62)	(3.9)	(0.8)	(0)

**Not Recommended — Exceeds the pressure rating of the tubing.*

Theoretical Pressure Drop Along a Length of Tubing

$$\Delta P = \left(9.86 \times 10^{-8}\right)\left(\frac{F\,L\,V}{d^4}\right)$$

Where: ΔP = pressure drop in psi
F = flow rate in mL/min
L = tubing length in cm
V = viscoscity in centipoise (cp)
d = tubing inside diameter in cm

(See table above for data calculated using this formula.)

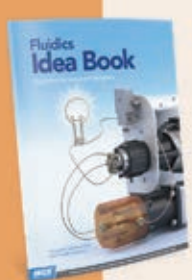
Tubing Internal Diameters & Volumes

Tubing Internal Diameter (d) in inches to Linear Volume (µL/inch): 12870.4 (d2)

Tubing Internal Diameter (d) in µm to Linear Volume (µL/cm): 7.85 x 10-6 (d2)

Internal Diameters				Linear Volumes	
Inches	**Wire Gauge***	**Millimeters**	**Microns**	**µL/in**	**µL/cm**
0.0008	—	0.020	20	0.008	0.003
0.001	—	0.025	25	0.013	0.005
0.002	—	0.051	51	0.051	0.020
0.0025	—	0.064	64	0.081	0.032
0.003	—	0.076	76	0.116	0.046
0.004	36	0.102	102	0.206	0.081
0.005	35	0.127	127	0.322	0.127
0.006	—	0.152	152	0.463	0.182
0.007	34	0.178	178	0.631	0.248
0.008	33	0.203	203	0.824	0.324
0.009	32	0.229	229	1.042	0.410
0.010	31	0.254	254	1.287	0.507
0.012	30	0.305	305	1.853	0.730
0.014	28	0.356	356	2.523	0.993
0.015	—	0.381	381	2.896	1.140
0.018	26	0.457	457	4.170	1.642
0.020	25	0.508	508	5.148	2.027
0.028	22	0.711	711	10.090	3.973
0.030	—	0.762	762	11.583	4.560
0.032	21	0.813	813	13.179	5.189
0.040	—	1.016	1016	20.593	8.107
0.042	19	1.067	1067	22.703	8.938
0.046	—	1.168	1168	27.234	10.722
0.055	—	1.397	1397	38.933	15.328
0.062	—	1.575	1575	49.474	19.478
0.080	14	2.032	2032	82.370	32.429
0.093	—	2.362	2362	111.316	43.825
0.120	9	3.048	3048	185.333	72.966
0.125	—	3.175	3175	201.099	79.173

** Wire Gauge numbers are referencing Birmingham or Stub's Iron Wire Gauge values, which are commonly used by most stainless steel syringe manufacturers.*



Advanced fluidic design for OEMs:

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Rating Comparison

All information has been supplied to IDEX Health & Science by the tubing manufacturers. It is for your guidance only. We recommend that you test the tubing before use.

Rating: + meets the stated property
± meets the stated property to limited extent
– does not meet the stated property

1 not recommended
10 excellent

Properties		Tygon® LMT-55	Tygon E-LFL	Pharmed®	Tygon 2001	Tygon MHLL
FDA		+	+	+	+	+
US Pharmacopoeia Class VI		–	+	+	–	+
Transparency		+	+	–	+	–
Long Life		1	7	10	3	10
Gas Permeability	**CO_2**	7	8	5	5	5
	O_2	9	9	8	9	8
	N_2	9	10	8	6	8
Temperature, above 0 °C		2	2	7	1	7
Temperature, below 0 °C		4	3	8	7	8
Pressure		5	9	1	1	1
Absorption / Adsorption		6	6	9	10	9
Chemical Resistance						
Acids (H2SO4)	**10%**	10	10	10	10	10
	30%	10	7	10	10	10
	95–98%	1	1	1	7	1
Bases (NaOH)	**10–15%**	10	10	10	10	10
	30–40%	4	2	10	10	10
Hydrocarbons (aliphatic)		1	1	1	1	1
Mineral Salts		10	10	10	10	10
Alcohols		1	1	10	10	10
Ketones (Acetone)		1	1	1	7	1

Maximum recommended operating pressure

Wall Thickness	Inner Diameter	bar (psi)	bar (psi)	bar (psi)	bar (psi)	bar (psi)
1.6 mm	0.8 mm	8.7 (126)	8.7 (126)	3.7 (54)	N/A	N/A
1.6 mm	1.6 mm	4.8 (70)	4.8 (70)	2.1 (30)	3.1 (45)	N/A
1.6 mm	2.4 mm	3.8 (55)	3.8 (55)	1.6 (23)	N/A	N/A
1.6 mm	3.2 mm	3.0 (44)	3.0 (44)	1.3 (19)	2.0 (29)	N/A
1.6 mm	4.8 mm	2.2 (32)	2.2 (32)	0.9 (13)	1.5 (22)	N/A
1.6 mm	6.4 mm	1.8 (26)	1.8 (26)	0.8 (12)	1.1 (16)	N/A
1.6 mm	8.0 mm	1.5 (22)	1.5 (22)	0.6 (9)	0.9 (13)	N/A
1.6 mm	9.5 mm	1.3 (19)	1.3 (19)	0.5 (7)	0.8 (12)	N/A
1.6 mm	11.1 mm	1.2 (17)	1.2 (17)	0.5 (7)	N/A	N/A
1.6 mm	12.7 mm	1.1 (16)	1.1 (16)	0.5 (7)	N/A	N/A
1.6 mm	15.9 mm	1.0 (15)	1.0 (15)	0.4 (6)	N/A	N/A
2.4 mm	4.8 mm	3.0 (44)	3.0 (44)	1.3 (19)	N/A	N/A
2.4 mm	6.4 mm	2.4 (35)	2.4 (35)	1.0 (15)	N/A	N/A
2.4 mm	8.0 mm	2.0 (29)	2.0 (29)	0.8 (12)	N/A	N/A
2.4 mm	9.5 mm	1.8 (26)	1.8 (26)	0.8 (12)	N/A	N/A
2.4 mm	11.1 mm	1.5 (22)	1.5 (22)	0.6 (9)	N/A	N/A
2.4 mm	12.7 mm	1.3 (19)	1.3 (19)	0.6 (9)	N/A	N/A
2.4 mm	15.9 mm	1.2 (17)	1.2 (17)	0.5 (7)	N/A	N/A
3.2 mm	6.4 mm	3.0 (44)	3.0 (44)	1.3 (19)	N/A	N/A
3.2 mm	9.6 mm	2.2 (32)	2.2 (32)	0.9 (13)	N/A	N/A
3.2 mm	12.7 mm	1.8 (26)	1.8 (26)	0.8 (12)	1.1 (16)	N/A
3.2 mm	15.9 mm	1.5 (22)	1.5 (22)	0.6 (9)	0.9 (13)	N/A

N/A = Not applicable

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Rating Comparison

All information has been supplied to IDEX Health & Science by the tubing manufacturers. It is for your guidance only. We recommend that you test the tubing before use.

Rating: + meets the stated property
± meets the stated property to limited extent
– does not meet the stated property

1 not recommended
10 excellent

Properties	Tygon® HC F-4040-A	Tygon 3350	Silicone Peroxide	Norprene® A-60-G	Fluran® F-5500-A
FDA	–	+	+	–	–
US Pharmacopoeia Class VI	–	+	+	–	–
Transparency	±	±	±	–	–
Long Life	2	4	4	10	3
Gas Permeability CO_2	9	1	1	5	10
O_2	10	1	1	8	10
N_2	10	1	1	8	10
Temperature, above 0 °C	2	10	10	7	9
Temperature, below 0 °C	1	10	10	8	4
Pressure	7	1	1	1	1
Absorption / Adsorption	6	1	1	9	7
Chemical Resistance					
Acids (H2SO4) 10%	10	10	10	10	10
30%	7	7	8	10	10
95–98%	1	1	1	1	10
Bases (NaOH) 10–15%	1	10	10	10	10
30–40%	1	10	10	10	10
Hydrocarbons (aliphatic)	7	1	1	1	7
Mineral Salts	10	7	7	10	10
Alcohols	7	7	10	10	1
Ketones (Acetone)	1	4	1	1	1

Maximum recommended operating pressure

Wall Thickness	Inner Diameter	bar (psi)	bar (psi)	bar (psi)	bar (psi)	bar (psi)
1.6 mm	0.8 mm	10.9 (158)	1.9 (28)	1.9 (28)	3.7 (54)	3.7 (54)
1.6 mm	1.6 mm	6.1 (88)	1.0 (15)	1.0 (15)	2.1 (30)	2.1 (30)
1.6 mm	2.4 mm	4.8 (70)	0.8 (12)	0.8 (12)	1.6 (23)	1.6 (23)
1.6 mm	3.2 mm	3.8 (55)	0.6 (9)	0.6 (9)	1.3 (19)	1.3 (19)
1.6 mm	4.8 mm	2.7 (39)	0.5 (7)	0.5 (7)	0.9 (13)	0.9 (13)
1.6 mm	6.4 mm	2.2 (32)	0.4 (6)	0.4 (6)	0.8 (12)	0.8 (12)
1.6 mm	8.0 mm	1.8 (26)	0.3 (4)	0.3 (4)	0.6 (9)	0.6 (9)
1.6 mm	9.5 mm	1.6 (23)	0.3 (4)	0.3 (4)	0.5 (7)	0.5 (7)
1.6 mm	11.1 mm	1.5 (22)	0.3 (4)	0.3 (4)	0.5 (7)	0.5 (7)
1.6 mm	12.7 mm	1.4 (20)	0.2 (3)	0.2 (3)	0.5 (7)	0.5 (7)
1.6 mm	15.9 mm	1.2 (17)	0.2 (3)	0.2 (3)	0.4 (6)	0.4 (6)
2.4 mm	4.8 mm	3.8 (55)	0.6 (9)	0.6 (9)	1.3 (19)	1.3 (19)
2.4 mm	6.4 mm	3.0 (44)	0.5 (7)	0.5 (7)	1.0 (15)	1.0 (15)
2.4 mm	8.0 mm	2.5 (36)	0.4 (6)	0.4 (6)	0.8 (12)	0.8 (12)
2.4 mm	9.5 mm	2.2 (32)	0.4 (6)	0.4 (6)	0.8 (12)	0.8 (12)
2.4 mm	11.1 mm	1.8 (26)	0.3 (4)	0.3 (4)	0.6 (9)	0.6 (9)
2.4 mm	12.7 mm	1.7 (25)	0.3 (4)	0.3 (4)	0.6 (9)	0.6 (9)
2.4 mm	15.9 mm	1.5 (22)	0.3 (4)	0.3 (4)	0.5 (7)	0.5 (7)
3.2 mm	6.4 mm	3.8 (55)	0.6 (9)	0.6 (9)	1.3 (19)	1.3 (19)
3.2 mm	9.6 mm	2.7 (39)	0.5 (7)	0.5 (7)	0.9 (13)	0.9 (13)
3.2 mm	12.7 mm	2.2 (32)	0.4 (6)	0.4 (6)	0.8 (12)	0.8 (12)
3.2 mm	15.9 mm	1.8 (26)	0.3 (4)	0.3 (4)	0.6 (9)	0.6 (9)

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Pumps Reference

Part No.	Pump ID	Model Description	Min*	Max*	Differential Pressure Max bar*	Gear Material	Seals	Housing Material	Temp Min	Temp Max	System Pressure Max bar	Type	Cross Reference Part Number
MI0006	Z-186	GA-X21.CFS.B	1	99	1.4	Graphite	PTFE	SS - 316	- 46	+ 177	21	Suction Shoe	82092
MI0007	Z-181	GA-V21.CFS.B	2	252	2.8	Graphite	PTFE	SS - 316	- 46	+ 177	21	Suction Shoe	82114
MI0008	Z-183	GA-V23.CFS.B	4	504	2.8	Graphite	PTFE	SS - 316	- 46	+ 177	21	Suction Shoe	82115
MI0013	Z-120	GJ-N23.FF1S.B.B1	32	3950	3.5	PTFE	PTFE	SS - 316	- 46	+ 54	21	Cavity Style	82004
MI0015	Z-122	GJ-N25.FF1S.B.B1	455	5460	3.5	PTFE	PTFE	SS - 316	- 46	+ 54	21	Cavity Style	82006
MI0016	Z-140	GJ-N23.FF1S.B	32	3950	3.5	PTFE	PTFE	SS - 316	- 46	+ 54	21	Cavity Style	82001
MI0018	Z-142	GJ-N25.FF1S.B	455	5460	3.5	PEEK	PTFE	SS - 316	- 46	+ 54	21	Cavity Style	82003
MI0019	Z-130	GJ-N23.PF1S.B.B1	32	3950	5.2	PPS	PTFE	SS - 316	- 46	+ 54	21	Cavity Style	81529
MI0020	Z-150	GJ-N23.PF1S.B	32	3950	5.2	PPS	PTFE	SS - 316	- 46	+ 54	21	Cavity Style	81531
MI0022	Z-200	GB-P25.PVS.A.B1	292	3509	3.5	PPS	Viton®	SS - 316	- 29	+ 177	21	Suction Shoe	81281
MI0023	Z-201	GB-P35.PVS.A.B1	585	7020	3.5	PPS	Viton	SS - 316	- 29	+ 177	21	Suction Shoe	81282
MI0131	Z-1830	GA-T23.PFS.B	5	460	5.2	PPS	PTFE	SS - 316	- 46	+ 177	21	Suction Shoe	81473
MI0280	Z-1830	GA-T23.JFS.B	5	460	5.2	PEEK	PTFE	SS - 316	- 46	+ 177	21	Suction Shoe	L18489
MI0284	Z-140 HC	GJ-N23.FF1C.B	32	3950	3.5	PTFE	PTFE	Hastelloy®-C276	- 46	+ 54	21	Cavity Style	L20284
MI0306	Z-200	GB-P25.JVS.B	35	3480	3.5	PEEK	Viton	SS - 316	- 29	+ 177	21	Suction Shoe	220004
MI0310	Z-183	GA-V23.CFC.B	4	504	2.8	Graphite	PTFE	Hastelloy-C276	- 46	+ 177	21	Suction Shoe	L2383
MI0311	Z-142 HC	GJ-N25.FF1C.B	55	5480	3.5	PTFE	PTFE	Hastelloy-C276	- 46	+ 54	21	Cavity Style	L21812
MI0312	Z-186	GA-X21.JFS.B	1	99	2.3	PEEK	PTFE	SS - 316	- 46	+ 177	21	Suction Shoe	L20820
MI0313	Z-140	GJ-N23.JF1S.B	32	3950	5.6	PEEK	PTFE	SS - 316	- 46	+ 54	21	Cavity Style	L197735
MI0378	Z-201	GB-P35.JKS.B	73	7241	3.5	PEEK	Kalrez®	SS - 316	- 29	+ 177	21	Suction Shoe	L22609

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Norprene®	Norton Company Corporation
PEEKsil™	SGE International Pty. Ltd.
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SealTight™	IDEX Health & Science LLC
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Super Flangeless™	IDEX Health & Science LLC
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TinyTight™	IDEX Health & Science LLC
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Viton®	E.I. du Pont de Nemours and Company
Waters®	The Waters Corporation
Windows®	Microsoft Corporation

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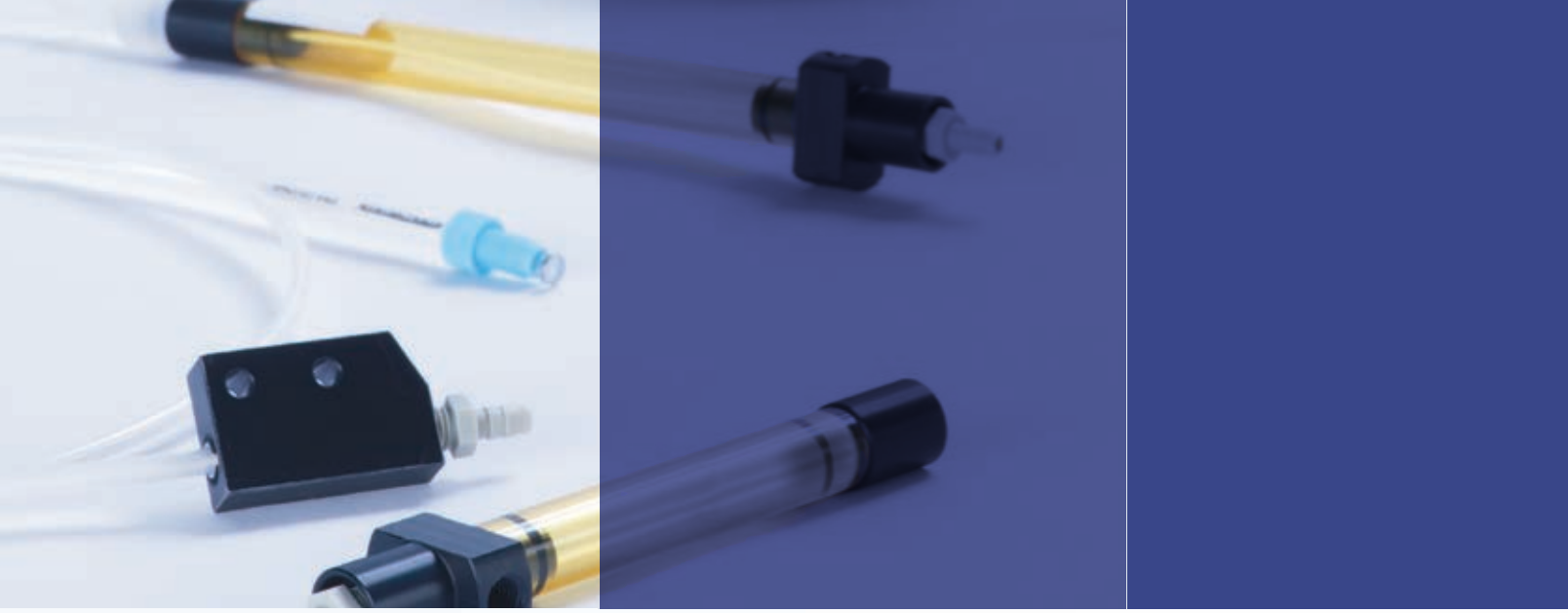

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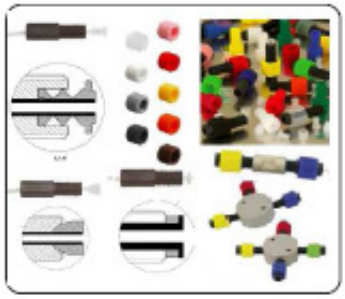
GC & HPLC Fittings

- VICI Valco/Cheminert

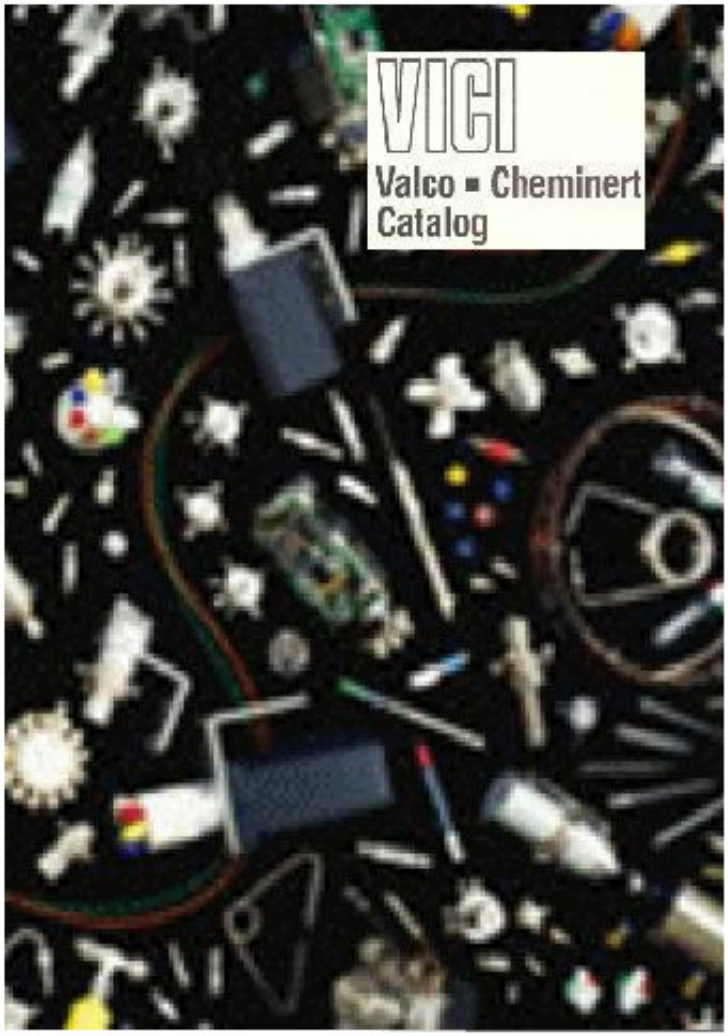
PEEK Fittings High Pressure

360um & 1/32 Fittings



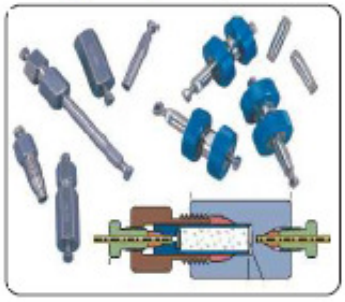
PEEK/PPS Low Pressure

Stainless steel Fittings



Adaptors, Tees, Crosses

Filters & Frits

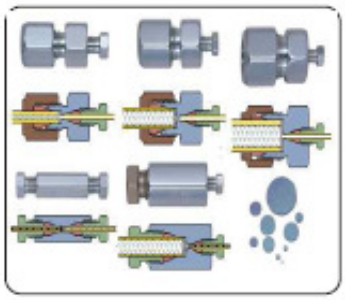


PreColumns FT Cartridge

Nuts M&F, Caps,Plugs

Ferrules/Reducers/FS

Pipe Adaptors



HPLC End-Fittings

Injection Valves / Loops

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GC & HPLC Fittings

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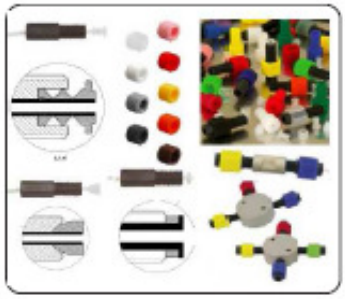
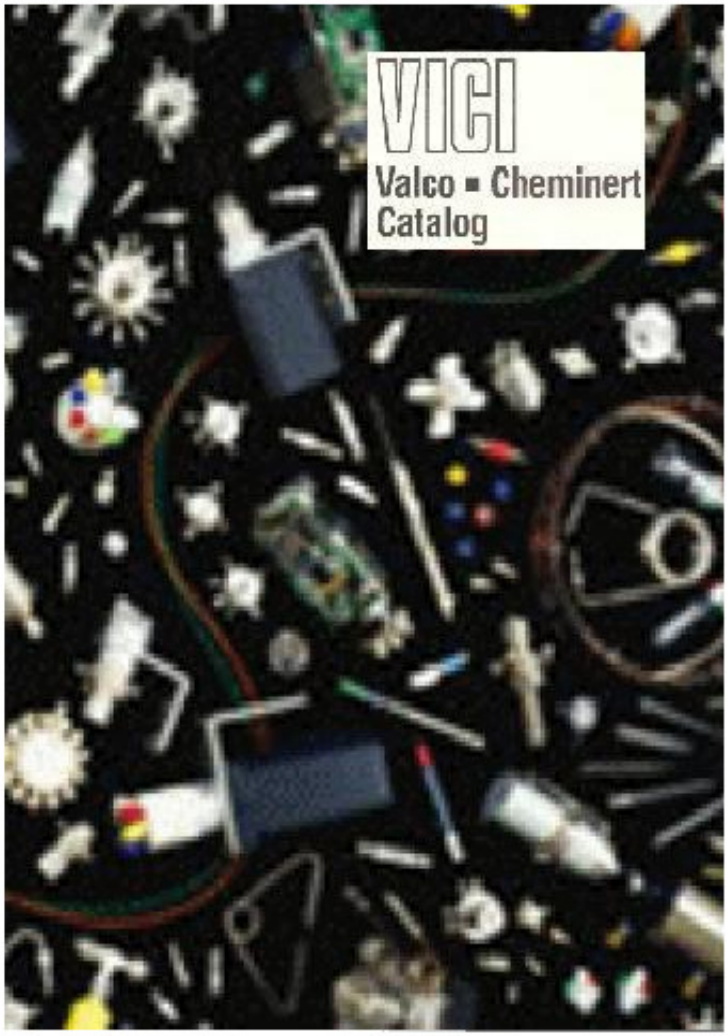
PEEK Fittings High Pressure

360um & 1/32 Fittings



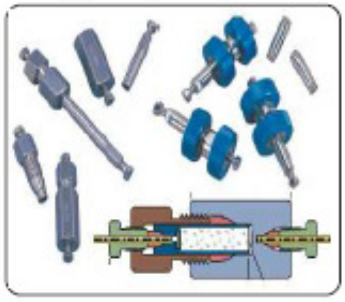
PEEK/PPS Low Pressure

Stainless steel Fittings



Adaptors, Tees, Crosses

Filters & Frits

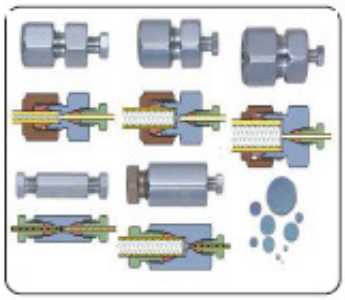


PreColumns FT Cartridge

Nuts M&F, Caps,Plugs

Ferrules/Reducers/FS

Pipe Adaptors



HPLC End-Fittings

Injection Valves / Loops

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Valco Fittings

The two piece compression fitting (**Figure 1**), in which a ferrule is compressed onto the tube as a nut is tightened, offers reliability in high pressure situations and in connecting metal tubing. Valco excels in all critical areas of the design and manufacture of such fittings. Quality considerations, which cannot be ignored if an analytical system is to reach and maintain optimum performance levels, include interchangeability, counterbore tolerances, ID/OD concentricity, mixing potential, cleaning procedures, and the method employed to "make up" the ferrule on the tube.

No Tubing Deformation

The basic concept of compression fittings carries the inherent danger of tube deformation (**Figure 2**). While some manufacturers emphasize this positively as a method of ensuring that the tubing doesn't blow out of the ferrule, the flow anomalies introduced by the restricted ID make these fittings a poor choice for many instrument applications.

Valco metal ferrules cut a ring near the end of the tube (**Figure 3**), which prevents tube release at high pressures without significantly deforming and restricting the tube interior. Because our ferrules have a sharp edge at the ID near the nose, this usually takes only about 1/4 turn beyond the point where the ferrule first starts to grab the tubing. There is so little tube distortion that they are routinely used with glass-lined tubing! Only Valco's polymer fittings rely on friction to hold a tube.

CAUTION!
The analytical devices market has attracted numerous companies which copy Valco/Cheminert designs. Please exercise caution in the use of copies, which may not be compatible with the original versions in this catalog.

Because of VICI's high volume production and dedicated machinery, our fittings are often less expensive and of consistently higher quality than competing copies.

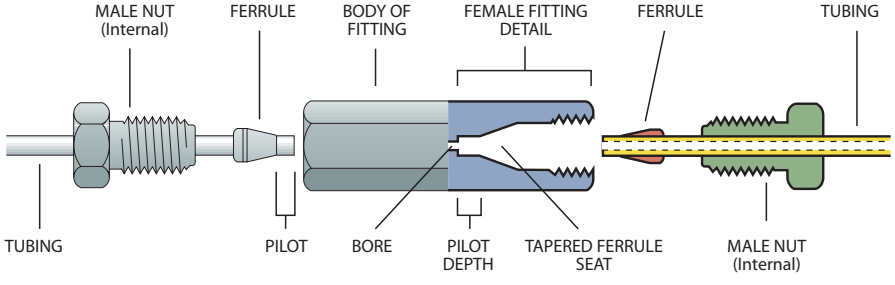

Figure 1
Valco compression fitting

TECH TIP
For optimal zero dead volume connections, make sure your tubing meets the best industry standards—OD tolerance should be nominal dimension ± .002".

Fractional dimension	Nominal dimension
1/32"	.031
1/16"	.062
1/8"	.125
1/4"	.250
3/8"	.375
1/2"	.500

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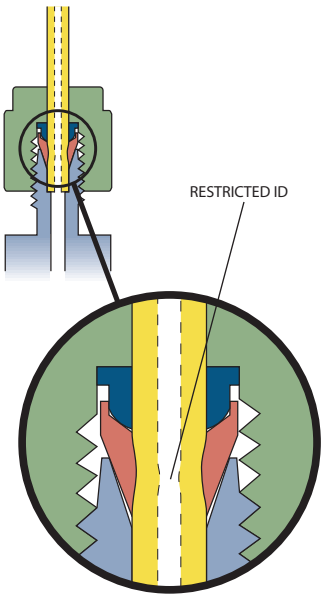


Figure 2
ID restriction
in common compression fitting

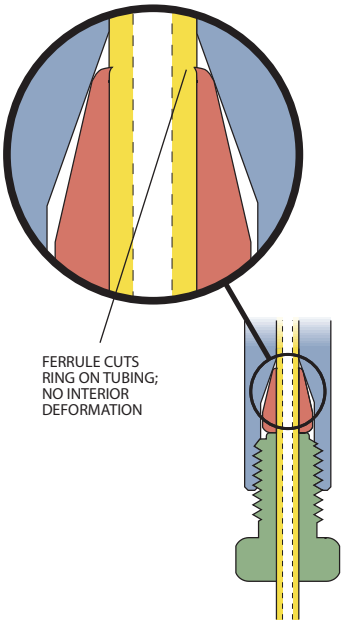


Figure 3
No ID restriction
in Valco compression fitting

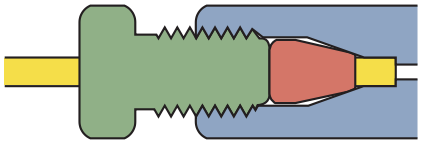
Interchangeability

Valco fitting details are designed with a consistent pilot depth, permitting reliable interchangeability as connections are revised or fittings are replaced. This interchangeability extends throughout the Valco and Cheminert fitting and valve product lines. Indeed, the Valco standard has been so widely copied that Valco and Cheminert fittings are, in general, fully interchangeable with those of our major competitors. In initial installations, Valco ferrules will often improve other manufacturers' fitting connections.

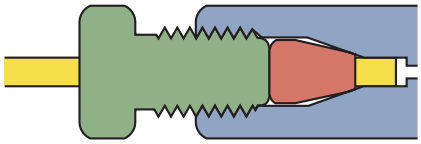
Because of variations in tubing OD and in pilot and taper designs from manufacturer to manufacturer, the amount of tubing extending beyond the made up ferrule can vary. (The most radical variation is in the fittings manufactured by Waters. Based on the old Swagelok design, they have a pilot depth considerably longer than standard.) **Figure 4a** shows a properly made up fitting. If that same fitting is installed in a detail which was designed for a slightly longer tube extension (as in **Figure 4b**), dead volume will be introduced. In the opposite case, with the pilot shorter than the pilot depth (**Figure 4c**), the tube will bottom out before the ferrule has sealed. However, our tests prove that except in the most extreme cases, a Valco ferrule will "creep" on the tubing until it reaches the bottom of the ferrule taper, making a proper seal.

Reliably Clean

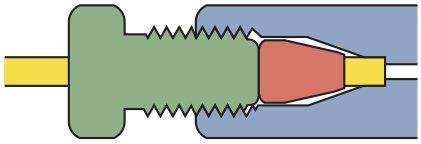
Most of our state of the art CNC machines use water-based lubricants. After each part comes off the machine, it is cleaned with water-soluble detergents and then rinsed in hot deionized water. Finally, every metal fitting that we make is given a thorough cleaning with steam from deionized water at 140°C. Any critical parts processed with oil-based lubricants are baked to remove all traces. The practical result of the extra effort is this: you don't have to be concerned about solvent residues.



a. Tubing seats correctly at bottom of detail



b. Tubing doesn't reach bottom of detail, introducing dead volume



c. Tubing reaches bottom of detail before ferrule seats

Figure 4

Introduction

Precision Machining, Finishing, and Tolerances

The machining methods used by different manufacturers to finish the detail of compression fittings vary in several ways that affect performance, as shown below. The fitting in **Figure 5** is the best choice for high performance fittings, as the tube fits squarely into the bottom of the detail. This is the detail used in Valco and Cheminert high pressure fittings.

Some fitting manufacturers omit a critical finishing operation which makes the bottom of the detail square, leaving the shape of the typical tapered drill bit instead. This results in the fitting shown in **Figure 6**, which introduces extra volume and mixing potential. VICI uses proprietary tooling specifically designed to produce the same high precision detail in every Valco and Cheminert fitting.

Although sometimes the tube end may seal in the bottom of the detail, the intent is for the seal to be made at the ferrule. This leaves the possibility of seepage up around the tube and into the minute cavities between the end of the ferrule and the bottom of the ferrule seat. The probability of this seepage increases when there is an excessive variance between the tubing OD and the diameter of the counterbored pilot in which it sits, and between the ferrule OD and the ferrule ID at the point where it "bites" or crimps the tubing. The possibility is virtually eliminated in VICI's fittings, which are manufactured with the precise dimensions that chromatographic applications demand. Use of VICI precut tubing, which is manufactured to quality standards in excess of most commercial tubing, further assures the best fitting connection.

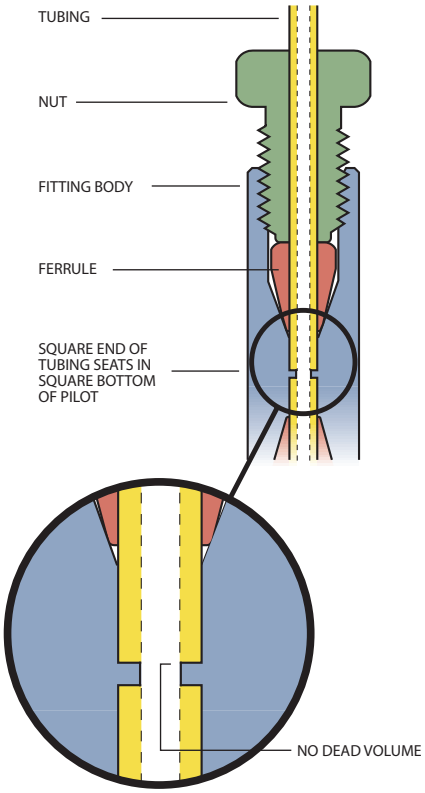


Figure 5
Valco/Cheminert high pressure compression fitting

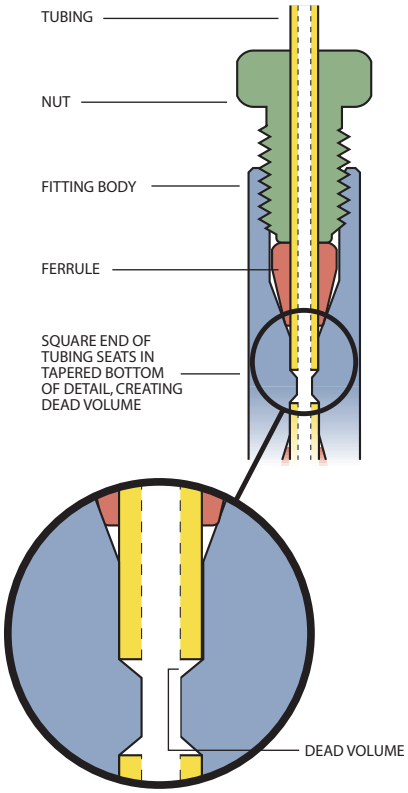


Figure 6
Poor quality compression fitting

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Comparison of Compression Fitting Designs

The potential for dead volume and mixing is a consideration in other aspects of fitting design as well, and varies considerably among manufacturers. For example, the common gas distribution reducing union in **Figure 7** illustrates two problems for instrumentation: a large connecting volume, and various steps and restrictions which cause mixing. While there are many uses for these fittings upstream of the analytical system (such as bulk gas distribution), they cause problems when used downstream in critical applications.

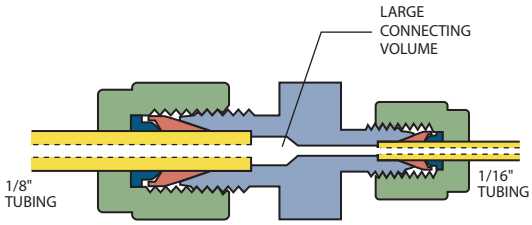

Figure 7
Common commercial reducing union

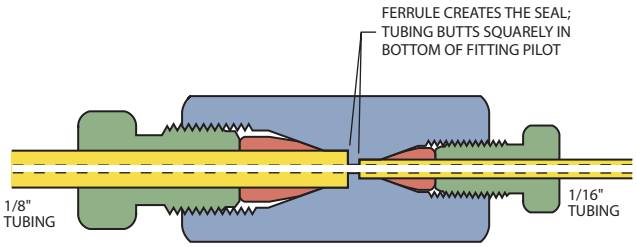

Figure 8
Valco zero dead volume reducing union

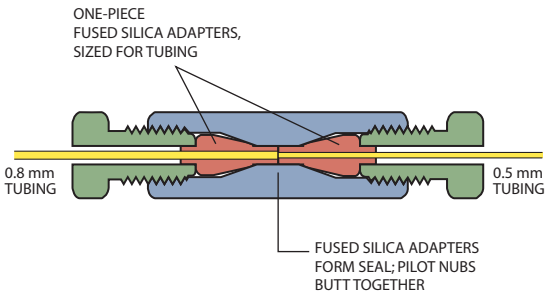

Figure 9
Valco zero dead volume through-bore union

Additional difficulties may be encountered if this type of fitting is loosened and retightened repeatedly. The male threaded part can become flared to the point where it is impossible to get the nut on, and the tube end often flares out in the fitting detail so that it's difficult to remove the tube.

The Valco internal union (**Figure 8**) has a larger mass surrounding the ferrule, so that even with repeated remakes or overtightening, it's impossible to flare the fitting as in the external design. When a union is selected with a bore to match the ID of the connecting tubing, mixing and dead volume are virtually eliminated.

For connection of fused silica tubing of the same or differing sizes, the through-bore union shown in **Figure 9** is recommended. This fitting permits the use of our one-piece fused silica adapters to effect a true zero dead volume connection. The ferrule features an integrated pilot which adapts to the ID of the unions, resulting in an inert, zero volume connection.

Every Valco and Cheminert fitting is manufactured to exacting specifications. Fitting concentricity – the relationship of the center of one fitting to another – is held to within 10% of the bore size (0.05 mm in a typical 1/16" union with 0.5 mm bore), which is better than that of commonly used *tubing*. This results in fittings which contribute no "extra column effects" or loss of efficiency to the chromatographic system.

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Nuts

Internal nuts – stainless steel

Nuts with product numbers starting with Z are for use with all standard Valco internal fittings and most valves. They may be used with fittings from other manufacturers as well. The L (long) and XL (extra-long) types are for situations where the fitting head may be otherwise inaccessible or where interference between fittings exists, as on many Valco multiposition valves. Standard material is 300 series stainless.

Stainless nuts

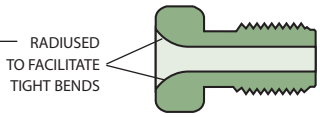
Package of 10:	*Length*	*Prod No*	*Price*
1/32" nut	.30"	ZN.5-10	
1/32" nut	.45"	LZN.5-10	
1/16" nut	.43"	ZN1-10	
1/16" nut	.50"	MZN1-10	
1/16" nut	.75"	LZN1-10	
1/16" nut	1.00"	XLZN1-10	
1/8" nut	.57"	ZN2-10	
1/8" nut	.82"	LZN2-10	
1/8" nut	1.07"	XLZN2-10	
1/4" nut	.70"	ZN4-10	
1/4" nut	1.11"	LZN4-10	

NEW Specialty nuts – stainless steel

These special purpose nuts facilitate a tight bend as the tube exits the fitting, and can also help prevent kinks in very thin wall tubing. Quick bend nuts are available in standard length (.43") and in a short version (.30") for certain custom applications. Note that the short version (ZSN1) can *only* be used in certain applications. Call for more information.

Stainless nuts

Description	*Length*	*Prod No*	*Price*	
1/16", standard	.43"	ZN1Q		
1/16", short	.30"	ZSN1		



Specialty nut
Standard length

MORE INFORMATION

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External 30
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Internal/external.....31
Unions
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External 27
External/internal.....27

TECH TIP
Fittings for **360 micron** tubing are available on pages 57-58.

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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External nuts – stainless steel

External nuts are used with external fittings, such as our column end fittings (ECEF series) and external unions (EZU and EZRU series). They may also be used with Valco ferrules on Parker CPI and Swagelok type fittings. Standard material is 300 series stainless.

* PTFE-coated threads standard.

	Stainless nuts	
Description	*Prod No*	*Price*
1/32″ external nut	EN.5	
1/32″ external nut, knurled	EN.5KN	
1/16" external nut	EN1	
1/8" external nut	EN2	
1/4" external nut	EN4 *	
3/8" external nut	EN6 *	
1/2" external nut	EN8 *	
1" external nut	EN1K *	

Plugs – stainless steel and high pressure

Stainless plugs consist of a zero volume nut with a ferrule made up on a solid rod. For high pressure applications such as UHPLC, SFE, and SFC (>7000 psi), we recommend the special high pressure plugs with the ferrule and rod machined as a single, solid piece.

		Stainless plugs		High pressure Stainless plugs	
Description	*Length of nut**	*Prod No*	*Price*	*Prod No*	*Price*
1/32"	.30"	ZP.5		ZP.5H	
1/16"	.43"	ZP1		ZP1H	
1/16"	.75"	LZP1		LZP1H	
1/8"	.57"	ZP2		ZP2H	
1/8"	.82"	LZP2		LZP2H	
1/4"	.70"	ZP4		–	

Caps – stainless steel

A cap is essentially a piece of hex stock with a zero volume fitting detail machined into it, but with no through-hole.

		Stainless caps	
Description	*Length of nut**	*Prod No*	*Price*
1/32"	.30"	ZC.5	
1/16"	.43"	ZC1	
1/8"	.57"	ZC2	
1/4"	.70"	ZC4	

MORE INFORMATION

PEEK plugs . . pages 64, 71
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Ferrules

Valco metal ferrules cut a ring near the end of the tube, preventing tube release at high pressures without significantly deforming and restricting the tube interior. (However, if the hardness of the tubing is equal to or greater than that of the ferrule, deformation of the tube rather than a cut ring is likely.) Make up usually takes only about a 1/4 turn beyond the point where the ferrule first starts to grab the tubing. Polymeric ferrules seal by the increased friction from compression.

Valco zero volume ferrules may be used with all Valco fittings and with those of most other manufacturers. The maximum pressure limit is generally determined by the yield strength of the tubing. The maximum pressure for softer materials (such as brass and polymers) is lower, and depends on the tubing used. If in doubt about a particular combination, consult our technical staff.

For trace gas analysis, use gold-plated ferrules to achieve sealing with $<10^{-9}$ cc/atm/sec leakage.

MORE INFORMATION
For more detailed information on metals, refer to the discussion on pages 254-255.

Metal ferrules

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 10:	**Stainless, Type 303**		**Stainless, Type 316**		**Stainless, Gold-plated**	
1/32"	ZF.5-10		ZF.5S6-10	$40	ZF.5GP-10	
1/16"	ZF1-10		ZF1S6-10	30	ZF1GP-10	
1/8"	ZF2-10		ZF2S6-10	22	ZF2GP-10	
1/4"	–		ZF4S6-10	19	ZF4GP-10	
Sold individually:	**Hastelloy C**		**Nickel**		**Titanium**	
1/32"	ZF.5HC		ZF.5NI	$9	ZF.5TI	
1/16"	ZF1HC		ZF1NI	8	ZF1TI	
1/8"	ZF2HC		ZF2NI	8	ZF2TI	
1/4"	ZF4HC		ZF4NI	9	ZF4TI	
Package of 10:	**Brass**					
1/32"	ZF.5B-10					
1/16"	ZF1B-10					
1/8"	ZF2B-10					
1/4"	ZF4B-10					

– Not available
Larger sizes and/or specific materials may be available on special order.

METALS AT A GLANCE

Hastelloy C ® .....HC
Resistant to pitting; Resists oxidizing atmospheres

Nickel ..... NI
Resistant to caustics, high temp halogens, and hydrogen halides

Stainless steel, Gold-plated .....GP
More inert than standard stainless

Stainless steel, Type 303
GC, gas lines, general purpose

Stainless steel, Type 316 ..... S6
LC with high chloride ion in solutions

Titanium .....TI
Outstanding resistance to most media except hydrofluoric acids

Brass ..... B
Not recommended for most chromatographic applications

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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Polymeric ferrules

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 10:	**PTFE, Virgin**		**PTFE, Glass-filled**		**FEP**	
1/32"	ZF.5TF-10		ZF.5TFG-10		ZF.5FEP-10	
1/16"	ZF1TF-10		ZF1TFG-10		ZF1FEP-10	
1/8"	ZF2TF-10		ZF2TFG-10		ZF2FEP-10	
1/4"	ZF4TF-10		ZF4TFG-10		ZF4FEP-10	
3/8"	ZF6TF-10		ZF6TFG-10		ZF6FEP-10	
1/2"	ZF8TF-10		ZF8TFG-10		ZF8FEP-10	

Package of 10:	**PFA**	**CTFE**
1/32"	ZF.5PFA-10	ZF.5KF-10
1/16"	ZF1PFA-10	ZF1KF-10
1/8"	ZF2PFA-10	ZF2KF-10
1/4"	ZF4PFA-10	ZF4KF-10
3/8"	ZF6PFA-10	ZF6KF-10
1/2"	ZF8PFA-10	ZF8KF-10

Package of 5:	**Polyimide, Graphite**	**Polyimide, Valcon**	**Polyimide, Virgin**
1/32"	ZF.5GV-5	ZF.5V-5	ZF.5V1-5
1/16"	ZF1GV-5	ZF1V-5	ZF1V1-5
1/8"	ZF2GV-5	ZF2V-5	ZF2V1-5
1/4"	ZF4GV-5	ZF4V-5	ZF4V1-5
3/8"	ZF6GV-5	ZF6V-5	ZF6V1-5
1/2"	ZF8GV-5	ZF8V-5	ZF8V1-5

MORE INFORMATION

PEEK ferrules .... page 63
Grooved PEEK ferrules..... 63

For more detailed information on polymers, refer to the discussion on page 256.

POLYMERS AT A GLANCE

CTFE ..... KF
Resists all inorganic corrosives. Produced as Kel-F ®

FEP ..... FEP
Chemical resistance equals PTFE, but lower creep and higher friction

PTFE, Glass-filled..... TFG
Inert, mechanically stable

PTFE, Virgin..... TF
Inert; very soft, easily cold flows. Produced as Teflon ®

Polyimide, Graphite....GV
Soft, easy to form ferrules

Polyimide, Valcon..... V
High temp, graphite reinforced

Polyimide, Virgin..... V1
High temp, electrical insulator

FERRULE IDENTIFICATION

To differentiate among the most commonly ordered metal ferrules, ring(s) are engraved on the non-sealing surfaces.

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Reducing Ferrules

Reducing ferrules provide an inexpensive way to connect small temporary transfer lines to valves or fittings designed for larger tubing. For long term use, we recommend our reducing unions, internal reducers (IZRs), or external reducers (EZRs), as appropriate.

Internal ZDV (zero dead volume) reducing ferrules are designed for use with all standard Valco internal style fittings – that is, those with a male nut and female fitting detail. The ferrule features an integral pilot which fills the pilot cavity (the space between the end of the ferrule and the bottom of the detail), yielding a zero dead volume fitting.

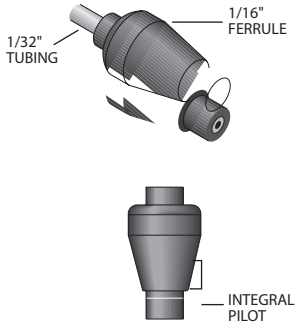
External ZDV reducing ferrules are designed for use with all standard external style fittings – that is, those with a female nut and a male fitting detail. This ferrule has a slightly longer pilot than the internal version, to accommodate the longer external detail. The result is a zero dead volume fitting. A single groove indicates that the ferrule has the longer pilot and is for use in an external detail.

Standard reducing ferrules can be used where mixing is not a problem, such as with liquid or gas delivery. A 1/16" to 1/32" ferrule of this style is simply a 1/16" ferrule with a 1/32" hole.

nternal reducing ferrules

Use these ferrules in internal type fitting details, with nuts that have external threads.

	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Package of 5:	**PTFE, Glass-filled**		**PEEK**		**Polyimide, Valcon**	
1/16" to 1/32"	ZRF1.5TFG-5		ZRF1.5PK-5		ZRF1.5V-5	
1/8" to 1/32"	ZRF2.5TFG-5		ZRF2.5PK-5		ZRF2.5V-5	
1/8" to 1/16"	ZRF21TFG-5		ZRF21PK-5		ZRF21V-5	
1/4" to 1/16"	ZRF41TFG-5		ZRF41PK-5		ZRF41V-5	
1/4" to 1/8"	ZRF42TFG-5		ZRF42PK-5		ZRF42V-5	
Package of 5:	**CTFE**		**Polyimide, Virgin**			
1/16" to 1/32"	ZRF1.5KF-5		ZRF1.5V1-5			
1/8" to 1/32"	ZRF2.5KF-5		ZRF2.5V1-5			
1/8" to 1/16"	ZRF21KF-5		ZRF21V1-5			
1/4" to 1/16"	ZRF41KF-5		ZRF41V1-5			
1/4" to 1/8"	ZRF42KF-5		ZRF42V1-5			



Internal reducing ferrule
(ZRF)

PEEK reducing ferrule and internal nut
(Order nut separately.)

MORE INFORMATION
Internal reducers (IZR) . . . . . page 34
External reducers (EZR) 35
Ferrule removal kits. . . . 16

For 1/16" and 1/32" reducing ferrules with smaller ODs for use with fused silica, see the FS and FSR adapters on pages 16-17.

TECH TIP
Fittings for **360 micron** tubing are available on pages 57-58.

TECH TIP
If you are doing resistive heating of traps or columns, note that our virgin polyimide reducing ferrules are effective electrical insulators.

Virgin polyimide is produced as Vespel ®.

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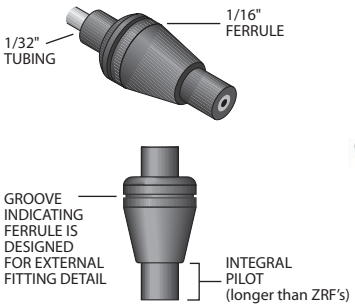
OPTION
Available in Virgin Polyimide.

External reducing ferrules

Use these ferrules in external type fitting details, with nuts that have internal threads.

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 5:	**PTFE, Glass-filled**		**PEEK**		**Polyimide, Valcon**	
1/16" to 1/32"	EZRF1.5TFG-5		EZRF1.5PK-5		EZRF1.5V-5	
1/8" to 1/32"	EZRF2.5TFG-5		EZRF2.5PK-5		EZRF2.5V-5	
1/8" to 1/16"	EZRF21TFG-5		EZRF21PK-5		EZRF21V-5	
1/4" to 1/16"	EZRF41TFG-5		EZRF41PK-5		EZRF41V-5	
1/4" to 1/8"	EZRF42TFG-5		EZRF42PK-5		EZRF42V-5	
Package of 5:	**CTFE**					
1/16" to 1/32"	EZRF1.5KF-5					
1/8" to 1/32"	EZRF2.5KF-5					
1/8" to 1/16"	EZRF21KF-5					
1/4" to 1/16"	EZRF41KF-5					
1/4" to 1/8"	EZRF42KF-5					



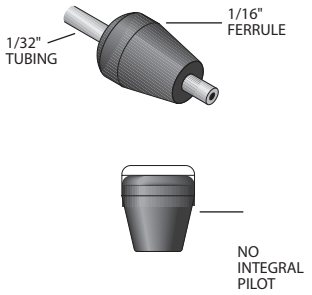
External reducing ferrule
(EZRF)

PEEK reducing ferrule and external nut
(Order nut separately.)

Standard reducing ferrules

Use these ferrules for bulk distribution only, since the resulting connection will not be zero dead volume. These ferrules can be used in either internal or external type fitting details.

	Prod No	Price	Prod No	Price	Prod No	Price
Package of 5:	**PTFE, Glass-filled**		**PEEK**		**Polyimide, Valcon**	
1/16" to 1/32"	RF1.5TFG-5		RF1.5PK-5		RF1.5V-5	
1/8" to 1/32"	RF2.5TFG-5		RF2.5PK-5		RF2.5V-5	
1/8" to 1/16"	RF21TFG-5		RF21PK-5		RF21V-5	
1/4" to 1/16"	RF41TFG-5		RF41PK-5		RF41V-5	
1/4" to 1/8"	RF42TFG-5		RF42PK-5		RF42V-5	
Package of 5:	**CTFE**					
1/16" to 1/32"	RF1.5KF-5					
1/8" to 1/32"	RF2.5KF-5					
1/8" to 1/16"	RF21KF-5					
1/4" to 1/16"	RF41KF-5					
1/4" to 1/8"	RF42KF-5					



Standard reducing ferrule
(RF)

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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Fused Silica Adapters

Fused silica adapters are available in Valcon polyimide for use up to 350°C and in PEEK for lower temperature applications (up to 175°C). Valcon polyimide is a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at high temperatures. Small blocks are subjected to extreme loads by a process known as hot isostatic pressing, with individual ferrules subsequently machined from these blocks. The result of this two-step process is a fused silica adapter with high temperature stability which far exceeds that of parts produced by conventional molding. Note that the determining factor in adapter size selection is the fused silica tubing's outer diameter, or OD. Typical ODs for common columns are included in the product number tables.

One piece fused silica adapter (FS)

The one piece FS adapter, essentially a reducing ferrule, is recommended for use in fittings where the polyimide ferrule will not be removed. Connections are made and disconnected by loosening the fitting nut and sliding the tube out.

Package of 5:		Polyimide, Valcon		PEEK		Polyimide, Virgin	
		Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/32" Adapters	Tubing OD:						
	< 0.25 mm	FS.25-5		FS.25PK-5		FS.25V1-5	
	0.25 ≤ 0.40 mm	FS.4-5		FS.4PK-5		FS.4V1-5	
	0.40 ≤ 0.50 mm	FS.5-5		FS.5PK-5		FS.5V1-5	
	0.50 ≤ 0.80 mm	ZF.5V-5		ZF.5PK-5		ZF.5V1-5	
1/16" Adapters	Tubing OD:						
	<0.25 mm	FS1.2-5		FS1.2PK-5		FS1.2V1-5	
	0.25 ≤ 0.30 mm	FS1.25-5		FS1.25PK-5		FS1.25V1-5	
	0.30 ≤ 0.35 mm	FS1.3-5		FS1.3PK-5		FS1.3V1-5	
	0.35 ≤ 0.40 mm	FS1.4-5		FS1.4PK-5		FS1.4V1-5	
	0.40 ≤ 0.50 mm	FS1.5-5		FS1.5PK-5		FS1.5V1-5	
	0.50 ≤ 0.80 mm	FS1.8-5		FS1.8PK-5		FS1.8V1-5	
	0.80 ≤ 0.90 mm	FS1.9-5		FS1.9PK-5		FS1.9V1-5	
	0.90 ≤ 1.0 mm	FS11.0-5		FS11.0PK-5		FS11.0V1-5	

Ferrule removal kit

These tapered tools have teeth designed to grip and remove fused silica adapters if they get stuck in a fitting detail. Each kit has two sizes of tools, so they can retrieve 1/32" and 1/16" adapters.

Prod No	*Price*
FRK1	$23

TEMPERATURE RATINGS
Polyimide adapters can be used at temperatures up to 350°C.

PEEK adapters are not recommended for use above 175°C.

TECH TIP
Virgin polyimide adapters are effective electrical insulators, making them the ideal choice for capillary electrophoresis.

Virgin polyimide is produced as Vespel®.

TECH TIP
If a fused silica tube breaks off in a through-type union, remove the nuts and the tube opposite the broken one. Clear the fitting by passing a drill or wire of the appropriate diameter into the unbroken side and through the center of the fitting.

Our **ferrule removal kit**, left, can be used to remove ferrules from all types of fittings.

WHICH ADAPTER FOR WHICH COLUMN?

Column ID	Typical column OD	1/32" adapter	1/16" adapter
< 0.20 mm	0.25 mm	FS.25	FS1.25
0.25 mm	0.4 mm	FS.4	FS1.4
0.32 mm	0.5 mm	FS.5	FS1.5
0.53 mm	0.8 mm	ZF.5V	FS1.8

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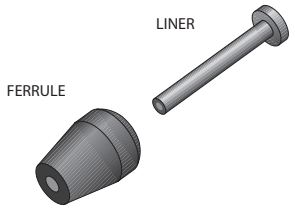
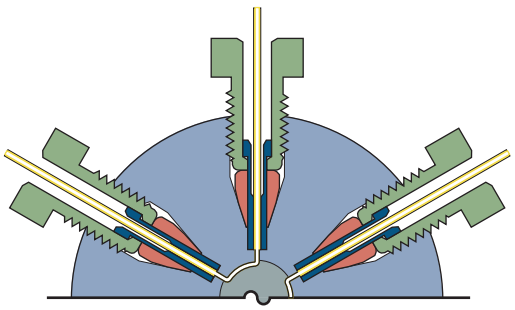


Removable fused silica adapters (FSR)

The FSR adapter is the only adapter recommended for use in valves. It consists of a liner which slides over the fused silica tubing and a ferrule which makes up on the liner. The polyimide liner has an enlarged diameter at one end which is captured by the nut, so the liner and the tube within it are removed as the nut is unscrewed from the valve. The 1/16" FSR adapter includes a special counter-bored 1/16" nut. The 1/32" FSR adapter uses standard Valco 1/32" nuts.

Package of 5:		**Polyimide, Valcon** *Prod No*	*Price*
1/32" Removable adapters	Tubing OD:		
	< 0.25 mm	FSR.25-5	
	0.30 ≤ 0.35 mm	FSR.3-5	
	0.35 ≤ 0.40 mm	FSR.4-5	
	0.40 ≤ 0.50 mm	FSR.5-5	
1/32" Replacement liners	Tubing OD:		
	< 0.25 mm	FSL.25-5	
	0.25 ≤ 0.40 mm	FSL.4-5	
	0.40 ≤ 0.50 mm	FSL.5-5	

Package of 5:		**Polyimide, Valcon** *Prod No*	*Price*	**PEEK** *Prod No*	*Price*
1/16" Removable adapters	Tubing OD:				
	< 0.15 mm	–		FS1R.15PK-5	
	< 0.20 mm	FS1R.2-5		FS1R.2PK-5	
	0.20 ≤ 0.40 mm	FS1R.4-5		FS1R.4PK-5	
	0.40 ≤ 0.50 mm	FS1R.5-5		FS1R.5PK-5	
	0.50 ≤ 0.80 mm	FS1R.8-5		FS1R.8PK-5	
	0.90 ≤ 1.0 mm	FS1R1.0-5		FS1R1.0PK-5	
1/16" Replacement liners	Tubing OD:				
	< 0.15 mm	–		FS1L.15PK-5	
	< 0.20 mm	FS1L.2-5		FS1L.2PK-5	
	0.20 ≤ 0.40 mm	FS1L.4-5		FS1L.4PK-5	
	0.40 ≤ 0.50 mm	FS1L.5-5		FS1L.5PK-5	
	0.50 ≤ 0.80 mm	FS1L.8-5		FS1L.8PK-5	
	0.90 ≤ 1.0 mm	FS1L1.0-5		FS1L1.0PK-5	



Removable FSR adapters in a valve

MORE INFORMATION

Fused silica
Unions . pp 18-19, 58, 61
Fittings 18-21
A pin vise and drill index are useful for enlarging the inner diameters of the FS adapters.
Pin vise and drill index 55

REPLACEMENT PARTS

Ferrules	*(package of 5)*	
1/32" Polyimide	ZF.5V-5	$30
1/16" Polyimide	ZF1V-5	25
	(package of 10)	
1/16" PEEK	ZF1PK-10	33
Nuts	*(package of 10)*	
1/32" SS	ZN.5-10	29
Special nuts for FSRs:		
1/16" SS	ZCN1-10	30
1/16" SS long	LZCN1-10	45

100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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Fused Silica Fittings

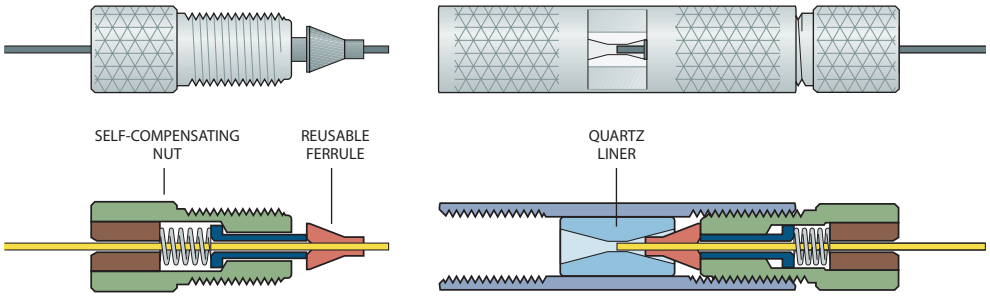
The patented design of our fused silica fittings ensures stable, leak-free connections at temperatures up to 400°C, and undistorted ferrules that are easily removed and reused. Columns may be changed without the risk of the leaks which can devastate systems such as mass spectrometers or atomic emission detectors. This is accomplished with a spring-loaded self-compensating nut which provides a constant sealing force as the temperature varies.

Self-compensating nuts are currently employed in two basic designs: a fused silica-lined union and an injector/detector nut for Agilent 6890 and 5890 GCs.

Fused silica unions

The fused silica union* has a quartz liner, providing an inert connection zone of minimal volume. Since the seal occurs only at the ferrule tip, the total sealing force is minimized, leaving the ferrule undistorted and reusable.
Note: The ferrules used in this union are unique, due to the seal at the tip. Standard ferrules will not work in this union.

Description	*Prod No*	*Price*
Fused silica union	FSKZU1	
Replacement liner	FSQ1	
Replacement nut	FSZN1	



Fused silica union
with self-compensating nut

Replacement ferrules for fused silica unions and self-compensating nuts (Agilent injector nuts)

These reusable ferrules seal at the tip, and are different from standard ferrules. Order for use with FSKZU1 fused silica unions and FSZNA-HP nuts on these two pages.

Package of 10:		*Prod No*	*Price*
Column ID:	.20 –.25 mm	FS1.35-R10	
	.32 mm	FS1.45-R10	
	.53 mm	FS1.75-R10	

*U.S. patent numbers 5,234,235 and 4,991,883.

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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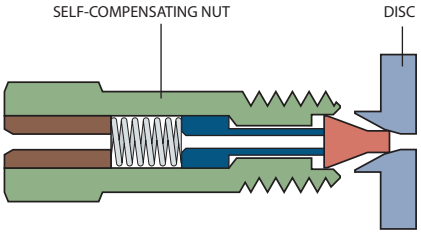
Injector nut for Agilent 6890 and 5890, Series I and II

This self-compensating nut is a direct replacement for the standard nut on the split/splitless injectors of Agilent 6890 and 5890 series GCs. This retrofit offers enhanced ferrule reusability and temperature stability, resulting in fingertight leak-free connections over the full programmed temperature range of mass spectrometry and gas chromatography. To use this nut, the split/splitless disk must also be upgraded; the new disk will also work with older HP nuts and ferrules.

	Prod No	*Price*
Injector nut system Includes nut and seal disk	FSZA-HP	
Replacement parts		
Self-compensating nut	FSZNA-HP	
HP-5890 split/splitless seal disk	SEAL1-HP	

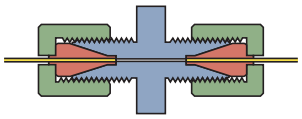


Self-compensating nut
for the 6890/5890 GC

1/32" Ultra low mass external unions

The 1/32" external union is specially designed for use with capillary columns in GC. It has very low mass and does not require wrenches to seal. Use only with one-piece fused silica adapters, since metal ferrules will distort the detail. Order fused silica adapters separately *(see box at left)*.

Bore	*Prod No*	*Price*
0.25 mm	EU.5	
0.50 mm	EU.5L	
1/32"	EU.5T	



1/32" external union
for use with capillary columns in GC

MORE INFORMATION
1/32" fused silica adapter ferrules..... page 16

1/32" FUSED SILICA FERRULES
(package of 5)

Tubing OD:

	≤ 0.25 mm	FS.25-5	$25
0.25 mm	≤ 0.4 mm	FS.4-5	25
0.4 mm	≤ 0.5 mm	FS.5-5	25
0.5 mm	≤ 0.8 mm	ZF.5V-5	25

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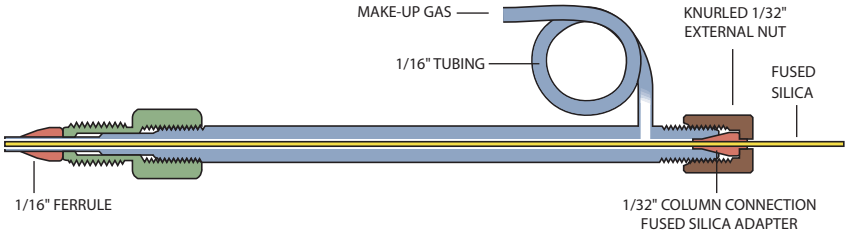
Fused Silica Adapters

Fused silica make-up adapters

The fused silica make-up adapter connects a fused silica capillary column to a valve or detector while adding a make-up gas. In the reverse mode it works like a splitter, without the uneven or erratic split seen with basic tees. Two lengths are available. Order 1/32" fused silica adapter ferrules separately *(see box on facing page)*.

Description	*Length*	*Bore*	*Prod No*	*Price*
1/16" to 1/32"	1.5"	0.5 mm	FSMUAS1.5M	
	1.5"	0.75 mm	FSMUAS1.5	
	1.5"	1.0 mm	FSMUAS1.5L	
	3.5"	0.75 mm	FSMUA1.5	



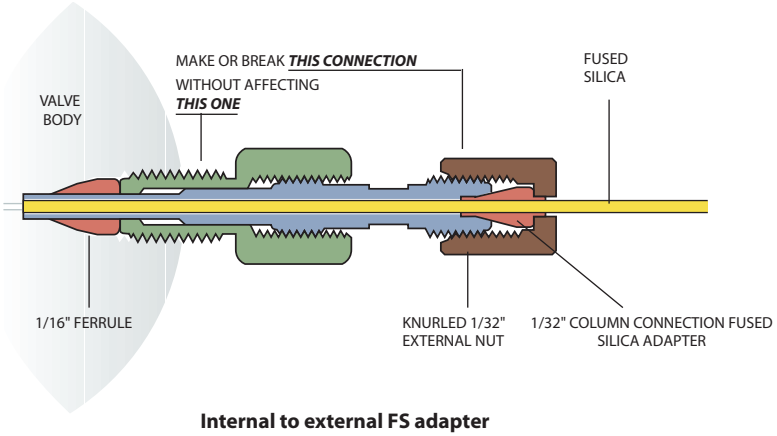
Fused silica make-up adapter
(FSMUA1.5)

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

Internal to external reducer/adapters

Internal fittings provide the smallest possible fitting volume. But there are situations, such as when you're using graphite ferrules which tend to become lodged in internal details, when an external fitting might be more desirable. A typical situation of that nature is the connection of a fused silica capillary to a valve. Our unique design permits the 1/32" nut to be tightened without affecting the 1/16" connection. Order 1/32" fused silica adapter ferrules separately *(see box below)*.

Description	*Bore*	*Prod No*	*Price*
1/16" to 1/32"	0.25 mm	IZERA1.5C	
	0.5 mm	IZERA1.5M	
	1.0 mm	IZERA1.5	



Internal to external FS adapter
(IZERA1.5)
shown installed in a valve

MORE INFORMATION
1/32" fused silica adapter ferrules..... page 16

CAUTION
Polymeric ferrules are strongly recommended for 1/16" and 1/32" external details. Metal ferrules may distort the fitting.

1/32" FUSED SILICA FERRULES
(package of 5)

Tubing OD:

	≤ 0.25 mm	FS.25-5	$30
0.25 mm	≤ 0.4 mm	FS.4-5	30
0.4 mm	≤ 0.5 mm	FS.5-5	30
0.5 mm	≤ 0.8 mm	ZF.5V-5	30

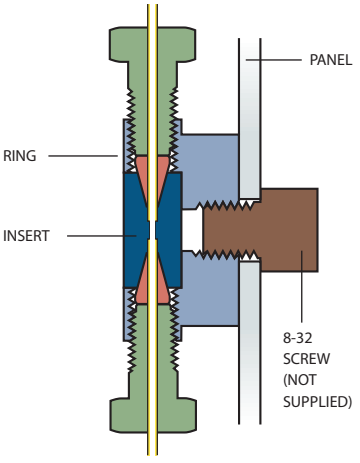
Microvolume Connectors

Micro-unions, -tees, -crosses, and -Y's have a unique two-piece design which allows us to provide an extremely small bore in a conventional ferrule and nut fitting. The actual connection area is separated from the nut threads, with the ferrule detail in a metal or polymer insert and the threads machined into a stainless steel or polymer ring. Since the insert has a much smaller diameter than a standard one-piece fitting, it can be drilled with much shorter tools; and, since a shorter drill has less tendency to wander or break, holes as small as .006" (0.15 mm) can be machined with the same high degree of concentricity found in all Valco fittings.

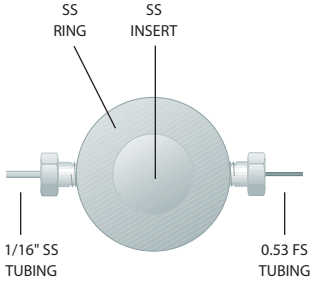
Valco microvolume fittings make it possible to couple 100 micron ID capillary GC, HPLC, or CZE columns without special nuts and ferrules. A stainless ring with one of the plastic inserts provides electrical insulation within the insert, while the PEEK ring achieves total isolation.

The ring containing the threads is made from PEEK or stainless steel. Inserts are made of stainless steel, Hastelloy C, Titanium, PEEK, or CTFE. PEEK rings are not as robust as stainless steel, and are not usable above 75°C. The stainless steel ring with a metal insert can operate at up to 10,000 psi for HPLC or SFC.

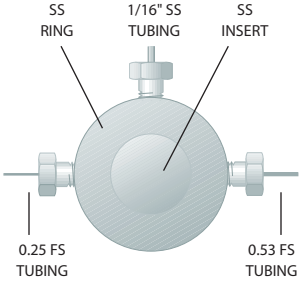
All standard Valco zero dead volume reducing ferrules (ZRF, FS, and FSR) will work in these fittings. They are uniquely designed to fill the void between the fitting pilot and the smaller tubing OD, eliminating any dead volume in the fitting. (Reducing ferrules such as Valco's RF series should be avoided, since they leave dead volume.)



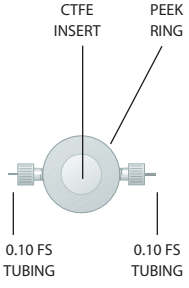
Panel mounting



Stainless to fused silica union
1/16" fittings



Make-up adapter
1/16" fittings



CZE union
1/32" fittings

MORE INFORMATION

FS fused silica adapters. . . . . page 16
FSR fused silica adapters. 17
ZRF internal reducing ferrules 14

Ferrules
Metal. 12
Polymeric 13

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
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1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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1/32" Microvolume connectors

Includes ring, nuts, and ferrules. With metal inserts: ferrules are the same material as the insert, and ring and nuts are stainless steel. With polymer inserts: ferrules are the same material as the insert, and ring and nuts are PEEK.

Insert Material:	Stainless steel		Hastelloy C		Titanium		PEEK		CTFE	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
0.15 mm bore										
Union	MU.5XCS6		MU.5XCHC		MU.5XCTI		MU.5XCPK		MU.5XCKF	
Tee	MT.5XCS6		MT.5XCHC		MT.5XCTI		MT.5XCPK		MT.5XCKF	
Y	MY.5XCS6		MY.5XCHC		MY.5XCTI		MY.5XCPK		MY.5XCKF	
Cross	MX.5XCS6		MX.5XCHC		MX.5XCTI		MX.5XCPK		MX.5XCKF	
0.25 mm bore										
Union	MU.5CS6		MU.5CHC		MU.5CTI		MU.5CPK		MU.5CKF	
Tee	MT.5CS6		MT.5CHC		MT.5CTI		MT.5CPK		MT.5CKF	
Y	MY.5CS6		MY.5CHC		MY.5CTI		MY.5CPK		MY.5CKF	
Cross	MX.5CS6		MX.5CHC		MX.5CTI		MX.5CPK		MX.5CKF	

1/16" Microvolume connectors

Includes ring, nuts, and ferrules. With metal inserts: ferrules are the same material as the insert, and ring and nuts are stainless steel. With polymer inserts: ferrules are the same material as the insert, and ring and nuts are PEEK.

Insert Material:	Stainless steel		Hastelloy C		Titanium		PEEK		CTFE	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No.*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
0.15 mm bore										
Union	MU1XCS6		MU1XCHC		MU1XCTI		MU1XCPK		MU1XCKF	
Tee	MT1XCS6		MT1XCHC		MT1XCTI		MT1XCPK		MT1XCKF	
Y	MY1XCS6		MY1XCHC		MY1XCTI		MY1XCPK		MY1XCKF	
Cross	MX1XCS6		MX1XCHC		MX1XCTI		MX1XCPK		MX1XCKF	
0.25 mm bore										
Union	MU1CS6		MU1CHC		MU1CTI		MU1CPK		MU1CKF	
Tee	MT1CS6		MT1CHC		MT1CTI		MT1CPK		MT1CKF	
Y	MY1CS6		MY1CHC		MY1CTI		MY1CPK		MY1CKF	
Cross	MX1CS6		MX1CHC		MX1CTI		MX1CPK		MX1CKF	

Replacement components

	1/32" connectors		1/16" connectors	
Description	*Prod No*	*Price*	*Prod No*	*Price*
SS ring for union, tee, or cross	MRX.5S6		MRX1S6	
SS ring for Y	MRY.5S6		MRY1S6	
PEEK ring for union, tee, or cross	MRX.5PK		MRX1PK	
PEEK ring for Y	MRY.5PK		MRY1PK	
Nuts for SS ring	ZN.5		ZN1	
Nuts for PEEK ring	ZN.5FPK		ZN1FPK	

Inserts for any connector:
To order an insert, add an "I" after the "M" in the product number, and deduct $5 from the connector price.
For example, to order an insert for a 1/16" microvolume union MU1CS6, order part number MIU1CS6.

OPTIONS
0.50, 0.75, and 1.0 mm bores are available in most materials and configurations.

NANOVOLUME CONNECTIONS
For 0.10 mm (100 µm) bore fittings, see pages 57- 60.

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Unions

Unions join two pieces of tubing of the same OD. Select the union with the bore that matches the ID of the tubing. If the IDs are different, choose the union with a bore which matches the smaller tube bore. Standard material is 300 series stainless steel.

- **Internal** unions have female threads and a fitting detail for zero volume fittings. The nuts have male (external) threads.
- **External** unions have male threads, requiring a nut with internal threads.
- **External/internal** unions have male threads on one end and female threads on the other, for connecting a standard zero dead volume fitting to an existing tube which already has an external nut made up on it.

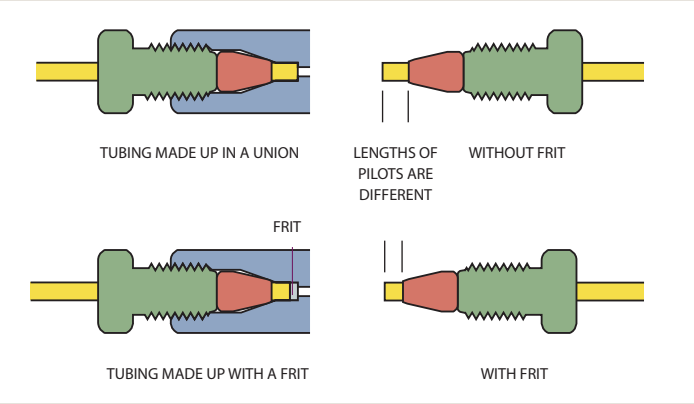
Internal fittings are almost always the best with tubing of 1/8" OD or smaller. They make a stronger connection and offer the lower volume necessary for high performance instrumentation. Also, because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. In sizes larger than 1/8", external fittings are generally easier to make up because of less thread friction.

Bulkhead versions can be mounted through an instrument panel or on a bracket. The fitting body is undercut so that it bites into the panel when the mounting nut is tightened, eliminating the need for a lock washer. An O-ring can be installed between the body and the panel to allow operation in purged environments. Typically the mounting nut goes inside the instrument, so that the long threaded portion will be out of sight. In the external/internal bulkhead unions, the mounting nut is on the side with the Valco internal fitting.

TECH TIP

Filtering capability can be added to a union by inserting a screen or frit into it before making up the fittings. However, when a fitting detail has a screen or frit in it, the pilot depth is reduced, so that the ferrule makes up closer to the tube end than it otherwise would. If that tube is used in any other Valco fitting, it will introduce unswept volume. Our filter design takes this into account, allowing our fittings to remain truly interchangeable.

Filters . . . . . pages 50-52
Frits and screens. 53



0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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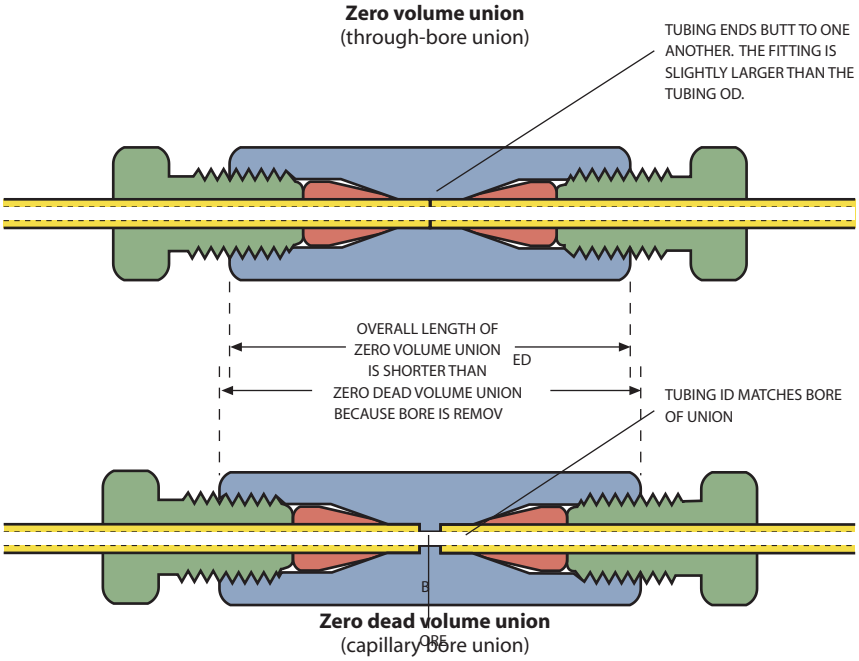
Zero Volume vs. Zero Dead Volume

A true zero volume fitting is one in which no part of the fitting actually becomes a part of the flow path. The only Valco fittings which fit this description are our through-bore unions, which allow tubing to butt end-to-end. (So these are only zero volume if the tube ends are perfectly square.)

All other fittings are designed with zero *dead* volume: that is, there is no volume introduced by the fitting which is not cleanly swept.



MORE INFORMATION

Reducing unions to connect two tubes with different ODs . . . . . p 29-31
Unions with 1/4-28 fittings 72

TECH TIP
Through-bore Union Installation
Because the tubing will pass all the way through a through-bore union, we suggest making up the first tube in a standard Valco fitting to establish the proper length of tubing extending beyond the ferrule. Install this made-up connection in the through-bore union; then the second tube can be butted against it for a zero volume connection.

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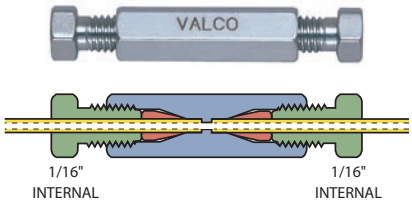
Unions

Internal unions – stainless steel

Standard material is 300 series stainless. Also available in Hastelloy C, gold-plated stainless, and titanium.

Standard internal unions

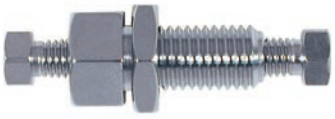
Tubing OD	*Bore*	*Prod No*	*Price*
1/32"	0.15 mm	ZU.5XC	
	0.25 mm	ZU.5	
	0.50 mm	ZU.5L	
	1/32"	ZU.5T	
1/16"	0.15 mm	ZU1XC	
	0.25 mm	ZU1C	
	0.50 mm	ZU1M	
	0.75 mm	ZU1	
	1.0 mm	ZU1L	
	1/16"	ZU1T	
1/8"	0.75 mm	ZU2	
	2.0 mm	ZU2L	
	1/8"	ZU2T	
1/4"	0.75 mm	ZU4	
	4.6 mm	ZU4L	
	1/4"	ZU4T	



Internal union – metal
Standard bore version
(ZU1)
Ends of tubing seat squarely
at bottoms of fitting details

Bulkhead internal unions

Tubing OD	*Bore*	*Prod No*	*Price*	**Bulkhead panel hole diameter**
1/32"	0.15 mm	ZBU.5XC		5/16"
	0.25 mm	ZBU.5		5/16"
	0.50 mm	ZBU.5L		5/16"
	1/32"	ZBU.5T		5/16"
1/16"	0.15 mm	ZBU1XC		5/16"
	0.25 mm	ZBU1C		5/16"
	0.50 mm	ZBU1M		5/16"
	0.75 mm	ZBU1		5/16"
	1.0 mm	ZBU1L		5/16"
	1/16"	ZBU1T		5/16"
1/8"	0.75 mm	ZBU2		7/16"
	2.0 mm	ZBU2L		7/16"
	1/8"	ZBU2T		7/16"
1/4"	0.75 mm	ZBU4		5/8"
	4.6 mm	ZBU4L		5/8"
	1/4"	ZBU4T		5/8"



Bulkhead internal union – metal
(ZBU1)

MORE INFORMATION
Internal unions, high pressure PEEK . . p 57, 65

For special materials and/or smaller bores:
Microvolume connectors offer a complete range of 1/32" and 1/16" unions in various metals and polymers, with bore sizes ranging from .006" (0.15 mm) to .040" (1.0 mm). Refer to pages 22-23.

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

5/16" = .312" = 7.9 mm
3/8" = .375" = 9.5 mm
7/16" = .437" = 11.1 mm

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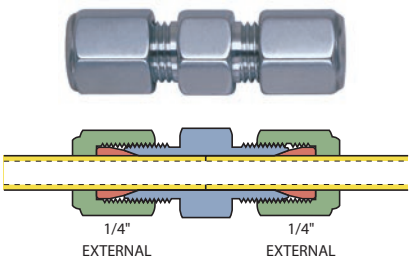


External union
Through-bore version
(EU4T)
Ends of tubing butt together

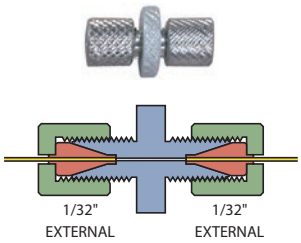
Bulkhead external union
(EBU2L)

External unions

Standard material is 300 series stainless. Also available in Hastelloy C and gold-plated stainless.

Note: Because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. We recommend the use of external/internal unions (below) when connecting to an installed external nut.

Tubing OD	*Bore*	**Standard** *Prod No*	*Price*	**Bulkhead** *Prod No*	*Price*	**Bulkhead panel hole diameter**
1/16"	See note above					
1/8"	1.0 mm	EU2		–		–
	2.0 mm	EU2L		EBU2L		5/16"
	1/8"	EU2T		EBU2T		5/16"
1/4"	2.0 mm	EU4		EBU4		7/16"
	4.6 mm	EU4L		EBU4L		7/16"
	1/4"	EU4T		EBU4T		7/16"

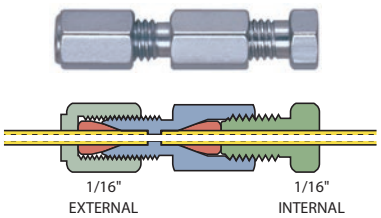


1/32" external union
(EU.5)
For use with GC capillary columns

External unions – 1/32" ultra low mass

The 1/32" external union is specially designed for use with capillary columns in GC. It is very low mass and does not require wrenches to seal. Use *only* with one-piece fused silica adapters, since metal ferrules will distort the detail. Order fused silica adapters separately *(page 16)*. Standard material is 300 series stainless.

Bore	*Prod No*	*Price*
0.25 mm	EU.5	
0.50 mm	EU.5L	
1/32"	EU.5T	



External/internal union
Standard bore
(EZU1)
Adapts existing external fittings
to Valco zero volume internal fittings

Bulkhead external/internal union
(EZBU1)

External/internal unions

Standard material is 300 series stainless. Also available in Hastelloy C and gold-plated stainless.

Tubing OD	*Bore*	**Standard** *Prod No*	*Price*	**Bulkhead** *Prod No*	*Price*	**Bulkhead panel hole diameter**
1/32"	0.25 mm	EZU.5		–		–
	0.50 mm	EZU.5L		–		–
1/16"	0.25 mm	EZU1C		EZBU1C		5/16"
	0.50 mm	EZU1M		EZBU1M		5/16"
	0.75 mm	EZU1		EZBU1		5/16"
	1/16"	EZU1T		EZBU1T		5/16"
1/8"	1.0 mm	EZU2		EZBU2		7/16"
	2.0 mm	EZU2L		EZBU2L		7/16"
	1/8"	EZU2T		EZBU2T		7/16"

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Reducing Unions

Reducing unions join two tubes of different outside diameters. Standard material is 300 series stainless.

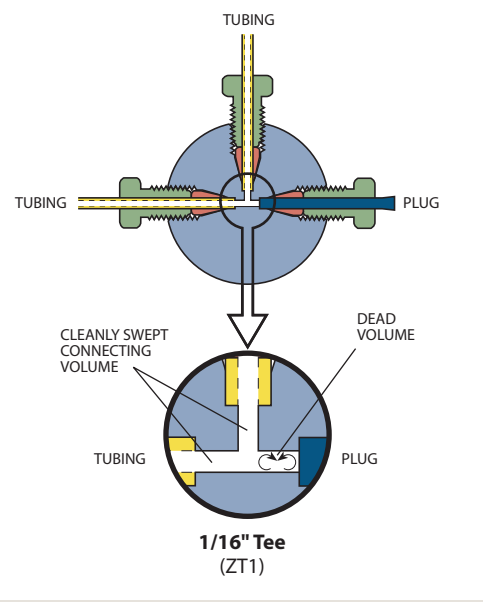
- Internal reducing unions have female threads and a fitting detail for zero volume fittings. The nuts have male (external) threads.
- External reducing unions have male threads, requiring a nut with internal threads.
- External/internal and internal/external reducing unions have male threads on one end and female threads on the other. We recommend the use of external/internal fittings when connecting to an existing external nut.

Internal fittings are almost always the best with tubing of 1/8" OD or smaller. They make a stronger connection and offer the lower volume necessary for high performance instrumentation. Also, because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. In sizes larger than 1/8", external fittings are generally easier to make up because of less thread friction.

Bulkhead versions can be mounted through an instrument panel or on a bracket. The fitting body is undercut so that it bites into the panel when the mounting nut is tightened, eliminating the need for a lock washer. An O-ring can be installed between the body and the panel to allow operation in purged environments. Typically the mounting nut goes inside the instrument, so that the long threaded portion will be out of sight. In the external/internal bulkhead unions, the mounting nut is on the side with the Valco internal fitting.

DEAD VOLUME

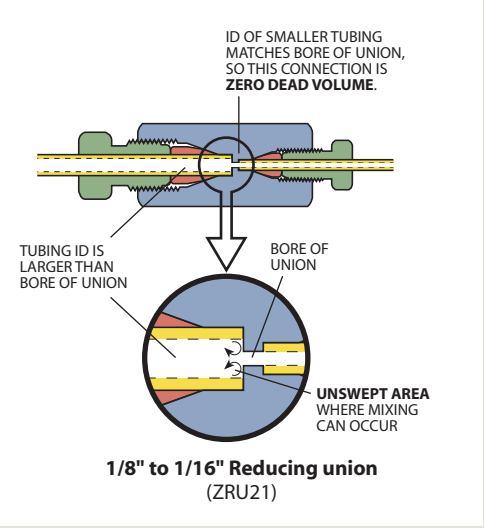
"Dead volume" is created in obvious situations such as the one shown.



1/16" Tee
(ZT1)

UNSWEPT VOLUME

Even in connections which are by most definitions "zero dead volume", unswept volume may be created where large ID transitions occur. The amount of mixing depends on the amount of mismatch in the IDs.



1/8" to 1/16" Reducing union
(ZRU21)

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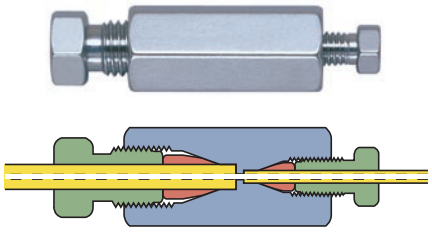


Internal reducing union – metal
Standard bore
(ZRU21)

Internal reducing unions – stainless steel

These unions connect two sizes of tubing, using zero dead volume internal fittings on each end. In the bulkhead version, the bulkhead nut is on the side with smaller tubing.

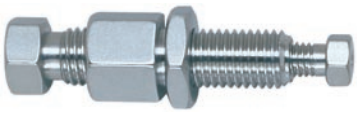
Standard material is 300 series stainless. Also available in Hastelloy C, gold-plated stainless, and titanium.

Standard internal reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*
1/16" to 1/32"	0.15 mm	ZRU1.5XC	
	0.25 mm	ZRU1.5	
	0.50 mm	ZRU1.5L	
	1/32"	ZRU1.5T	
1/8" to 1/32"	0.25 mm	ZRU2.5	
	0.50 mm	ZRU2.5L	
	1/32"	ZRU2.5T	
1/8" to 1/16"	0.25 mm	ZRU21C	
	0.75 mm	ZRU21	
	1/16"	ZRU21T	
1/4" to 1/16"	0.25 mm	ZRU41C	
	0.75 mm	ZRU41	
	1/16"	ZRU41T	
1/4" to 1/8"	0.75 mm	ZRU42	
	2.0 mm	ZRU42L	
	1/8"	ZRU42T	

Bulkhead internal reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*	**Bulkhead panel hole diameter**
1/16" to 1/32"	0.25 mm	ZBRU1.5		5/16"
	0.50 mm	ZBRU1.5L		5/16"
	1/32"	ZBRU1.5T		5/16"
1/8" to 1/32"	0.25 mm	ZBRU2.5		5/16"
	0.50 mm	ZBRU2.5L		5/16"
	1/32"	ZBRU2.5T		5/16"
1/8" to 1/16"	0.25 mm	ZBRU21C		5/16"
	0.75 mm	ZBRU21		5/16"
	1/16"	ZBRU21T		5/16"
1/4" to 1/16"	0.25 mm	ZBRU41C		7/16"
	0.75 mm	ZBRU41		7/16"
	1/16"	ZBRU41T		7/16"
1/4" to 1/8"	0.75 mm	ZBRU42		7/16"
	2.0 mm	ZBRU42L		7/16"
	1/8"	ZBRU42T		7/16"



Bulkhead internal reducing union – metal
(ZBRU21)

MORE INFORMATION

Internal reducing unions, high pressure PEEK ..... page 65
External/internal reducing unions 31
Internal/external reducing unions 31
Standard unions 26
Unions with 1/4-28 fittings 72

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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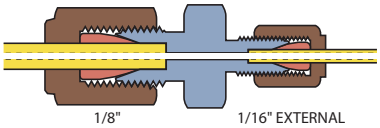
Reducing Unions

External reducing unions

These unions connect two sizes of tubing, using external fittings on each end. Standard material is 300 series stainless. Custom bulkhead versions are available in OEM quantities.



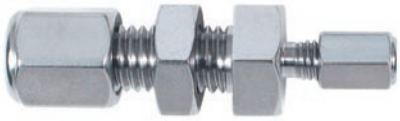
External reducing union
Standard bore
(ERU21)

Standard external reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*
1/8" to 1/16"	0.75 mm	ERU21	
	1.00 mm	ERU21L	
	1/16"	ERU21T	
1/4" to 1/16"	0.75 mm	ERU41	
	1/16"	ERU41T	
1/4" to 1/8"	1.0 mm	ERU42	
	2.0 mm	ERU42L	
	1/8"	ERU42T	

Bulkhead external reducing unions

Tubing OD	*Bore*	*Prod No*	*Price*	**Bulkhead panel hole diameter**
1/8" to 1/16"	1.0 mm	EBRU12L		5/16"
	1/16"	EBRU12T		5/16"
1/4" to 1/16"	1.0 mm	EBRU14L		7/16"
	1/16"	EBRU14T		7/16"
1/4" to 1/8"	2.0 mm	EBRU24L		7/16"



Bulkhead external reducing union
(EBRU12L)

TECH TIP
Note: Because 1/16" external fittings have very thin, easily distorted walls, they are not as durable as 1/16" internal fittings. We recommend the use of 1/16" internal fittings when possible.

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

5/16" = .312" = 7.9 mm
3/8" = .375" = 9.5 mm
7/16" = .437" = 11.1 mm

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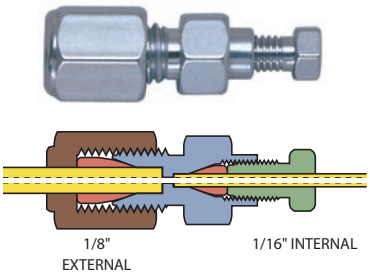
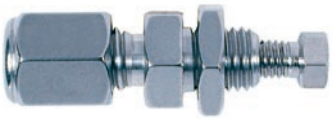
External/internal reducing unions



External/internal reducing union
Standard bore
(EZRU21)



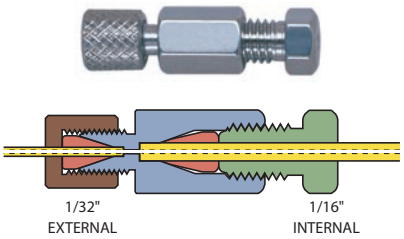
Bulkhead external/internal reducing union
(EZBRU21)

In these reducing unions, the larger size tubing is made up with an external fitting and the smaller size tubing is made up with an internal fitting. In the bulkhead version, the bulkhead nut is on the side with the internal fitting. Other configurations, such as an external nut on the locking nut side, are available on special request.

Standard material is 300 series stainless. Also available in Hastelloy C, gold-plated stainless, and titanium.

		Standard		Bulkhead		Bulkhead
Tubing OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	**panel hole diameter**
1/16" to 1/32"	0.25 mm	EZRU1.5		–		–
	0.50 mm	EZRU1.5L		EZBRU1.5L		5/16"
	1/32"	EZRU1.5T		EZBRU1.5T		5/16"
1/8" to 1/32"	0.25 mm	EZRU2.5		–		–
	0.50 mm	EZRU2.5L		EZBRU2.5L		5/16"
	1/32"	EZRU2.5T		EZBRU2.5T		5/16"
1/8" to 1/16"	0.25 mm	EZRU21C		–		–
	0.75 mm	EZRU21		EZBRU21		5/16"
	1/16"	EZRU21T		EZBRU21T		5/16"
1/4" to 1/16"	0.25 mm	EZRU41C		–		–
	0.75 mm	EZRU41		EZBRU41		7/16"
	1/16"	EZRU41T		EZBRU41T		7/16"
1/4" to 1/8"	1.0 mm	EZRU42		EZBRU42		7/16"
	2.0 mm	EZRU42L		EZBRU42L		7/16"
	1/8"	EZRU42T		EZBRU42T		

Internal/external reducing unions



Internal/external reducing union
Standard bore
(EZRU.51)

Bulkhead internal/external reducing union
(EZBRU.51)

These reducing unions are the opposite of the ones above. The larger size tubing is made up with an internal fitting and the smaller size tubing is made up with an external fitting. In the bulkhead version, the bulkhead nut is on the side with the internal fitting. Standard material is 300 series stainless.

Internal/external reducing unions are typically used to connect 1/16" stainless steel tubing to fused silica tubing.

Only polymeric ferrules should be used with 1/32" external details – metal ferrules will distort them. These unions include a stainless steel ferrule for the 1/16" SS tube, but because of the variety of fused silica ODs and corresponding ferrules, a 1/32" fused silica adapter must be ordered separately. *(See page 16.)*

		Standard		Bulkhead		Bulkhead
Tubing OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	**panel hole diameter**
1/16" to 1/32"	0.25 mm	EZRU.51		EZBRU.51		5/16"
	0.50 mm	EZRU.51L		EZBRU.51L		5/16"
	1/32″	EZRU.51T		EZBRU.51T		5/16"

MORE INFORMATION

Fused silica adapters. . . . page 16-17
Polymeric ferrules 13
External unions. 27
Internal reducing unions 29
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Tees and Crosses

Tees

Tees connect three lines. Standard material is 300 series stainless. Also available in Hastelloy C, gold plated stainless, and titanium.

Tubing OD	*Bore*	*Prod No*	*Price*
1/32"	0.25 mm	ZT.5	
	0.50 mm	ZT.5L	
1/16"	0.25 mm	ZT1C	
	0.50 mm	ZT1M	
	0.75 mm	ZT1	
	1.00 mm	ZT1L	
1/8"	0.75 mm	ZT2	
	2.00 mm	ZT2L	
1/4"	1.00 mm	ZT4	
	4.60 mm	ZT4L	

Crosses

Crosses connect four lines. Standard material is 300 series stainless. Also available in Hastelloy C, gold plated stainless, and titanium.

Tubing OD	*Bore*	*Prod No*	*Price*
1/32"	0.25 mm	ZX.5	
	0.50 mm	ZX.5L	
1/16"	0.25 mm	ZX1C	
	0.50 mm	ZX1M	
	0.75 mm	ZX1	
	1.00 mm	ZX1L	
1/8"	0.75 mm	ZX2	
	2.00 mm	ZX2L	
1/4"	1.00 mm	ZX4	
	4.60 mm	ZX4L	

MORE INFORMATION

PEEK tees. . . . pages 57, 64
PEEK crosses 57, 64

SPECIAL METALS AND/OR SMALLER BORES

See microvolume connectors: 1/32" and 1/16" tees, crosses, Y's, and unions in various metals and polymers, with smaller bores.

Microvolume connectors . . . .pp 22-23
High pressure PEEK connectors. . 63-66
Nanovolume connectors 57-61

TECH TIP

To join tubes of different ODs, use the fitting sized for the largest tube along with IZR reducers for the smaller tubes.

IZR reducer. . . . . page 34

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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1/16" Manifolds

1/16" manifolds connect 4 - 16 inlet lines to a single outlet, and are often used to connect the outlets from several columns to a single detector. The unique angled entry of our design reduces dispersion to a minimum. Available with 1.00 mm inlet/outlet bore. Standard materials are PEEK or 300 series stainless.

	Inlet bore	*Outlet bore*	*Material*	*Prod No*	*Price*
4 inlets	0.25 mm	0.75 mm	Stainless steel	Z4M1	
	0.25 mm	0.75 mm	PEEK	Z4M1PK	
6 inlets	0.25 mm	0.75 mm	Stainless steel	Z6M1	
	0.25 mm	0.75 mm	PEEK	Z6M1PK	
8 inlets	0.25 mm	0.75 mm	Stainless steel	Z8M1	
	0.25 mm	0.75 mm	PEEK	Z8M1PK	
10 inlets	0.25 mm	0.75 mm	Stainless steel	Z10M1	
	0.25 mm	0.75 mm	PEEK	Z10M1PK	
12 inlets	0.25 mm	0.75 mm	Stainless steel	Z12M1	
	0.25 mm	0.75 mm	PEEK	Z12M1PK	
14 inlets	0.25 mm	0.75 mm	Stainless steel	Z14M1	
	0.25 mm	0.75 mm	PEEK	Z14M1PK	
16 inlets	0.40 mm	0.75 mm	PEEK	Z16M1PK	

1/8" Manifolds

1/8" manifolds connect 4 - 12 inlet lines to a single outlet, and are typically used in a gas distribution system to minimize the number of fitting connections. A manifold pipe fitting version is also available. (*See page 37.*) Standard material is 300 series stainless steel.

	Inlet bore	*Outlet bore*	*Prod No*	*Price*
4 inlets	2.00 mm	2.00 mm	Z4M2	
6 inlets	2.00 mm	2.00 mm	Z6M2	
8 inlets	2.00 mm	2.00 mm	Z8M2	
10 inlets	2.00 mm	2.00 mm	Z10M2	
12 inlets	2.00 mm	2.00 mm	Z12M2	

TECH TIP
A manifold used with an SD flowpath multiposition valve allows HPLC column selection with a single valve. See page 139 for an illustration.

SD UW valves. . . . . .pg 132

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Internal Reducers

NEW Internal reducers *for 360 µm tubing*

Directly connect 360 µm tubing into a 1/32" Valco valve or fitting detail, providing a positive leak-free seal with zero dead volume. The same patented design as our larger internal reducers (below). Both versions have a stainless steel body.

Tubing OD	*Nut/ferrule material*	*Prod No*	*Price*
1/32" to 360 µm	Stainless	C360IZR.5S6	
	PEEK	C360IZR.5S6PKG	

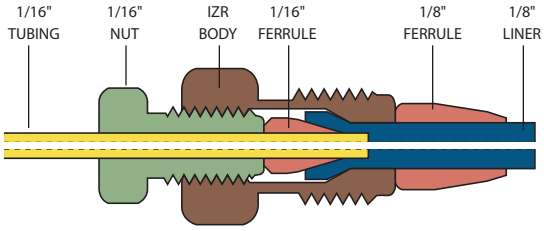
Internal reducers

Valco's patented internal reducer (IZR) allows smaller tubing to be used in valves with fitting details for larger tubing, forming a positive leak-free seal with zero dead volume. The small line from your system goes directly into the IZR and the sample goes directly into the valve, without the short pieces of connecting tubing required if a reducing union was used instead. (A reducing ferrule would also work, but makes a seal of less integrity.) Once the fitting is installed, only one wrench is required to remove and reinstall it.

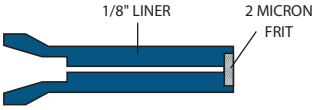
A second version has a 2 micron stainless steel frit pressed into the end of the liner, adding filtering capability. However, we suggest using these only as a final or backup filter, with a standard filter (*see page 52*) as the primary filter. Because IZRs have a much smaller surface area than the standard filter, they tend to plug too often if used in a stand-alone capacity.

Patent No. 4,173,363.

		Without frit		**With 2µ frit**	
Tubing OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/16" to 1/32"	0.25 mm	IZR1.5		IZR1.5F	
	0.50 mm	IZR1.5L		IZR1.5LF	
	1/32"	IZR1.5T		–	
1/8" to 1/16"	0.25 mm	IZR21C		IZR21CF	
	0.50 mm	IZR21		IZR21F	
	1.00 mm	IZR21L		IZR21LF	
	1/16"	IZR21T		–	
1/4" to 1/16"	1.00 mm	IZR41		IZR41F	
1/4" to 1/8"	1.00 mm	IZR42		IZR42F	
1/4" to 1/8"	2.00 mm	IZR42L		IZR42LF	



Valco's unique internal reducer
(IZR21)



IZR liner with pressed-in frit

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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External to internal adapters (injector/detector adapters)

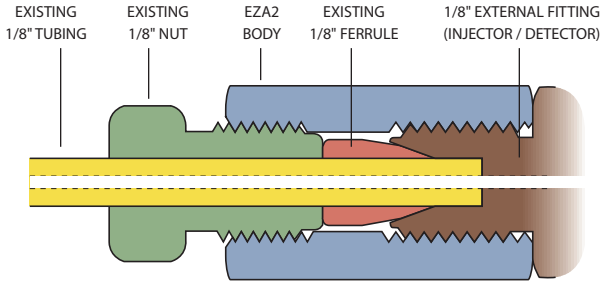
EZAs (external adapters) and EZRs (external reducers) adapt an external tee or union or the external type fittings common on injectors and detectors to Valco zero dead volume connections. Since EZAs are commonly used to connect an external fitting to an existing tube already made up with a Valco internal fitting, a nut and ferrule are not included.

Only one wrench is required to change tubes after the fitting is made up. While an external to internal union or reducing union plus a length of tubing can accomplish the same thing, these adapters do the trick with a single fitting.

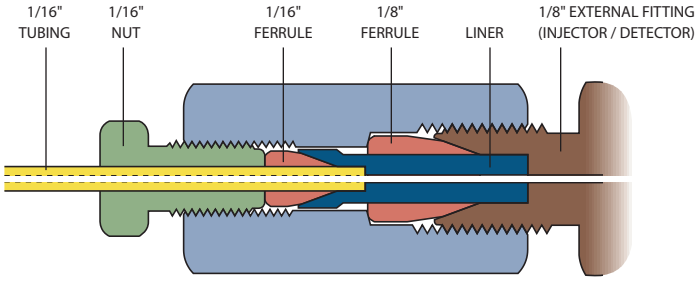
Standard material is 300 series stainless. The EZA does not include a nut or ferrule. The EZR includes a liner, one nut, and two ferrules.

Patent No. 4,173,363

Description	*Bore*	*Prod No*	*Price*
External to internal adapters			
1/16" ext. to 1/16" int.	–	EZA1	
1/8" ext. to 1/8" int.	–	EZA2	
External reducers			
1/16" ext. to 1/32" int.	0.25 mm	EZR1.5	
	1/32"	EZR1.5T	
1/8" ext. to 1/32" int.	0.25 mm	EZR2.5	
1/8" ext. to 1/16" int.	0.50 mm	EZR21	
	1/16"	EZR21T	
1/4" ext. to 1/16" int.	1.00 mm	EZR41	
	1/16"	EZR41T	
1/4" ext. to 1/8" int.	1.00 mm	EZR42	
	1/8"	EZR42T	



External to internal adapter (EZA2)



External to internal reducer (EZR21)

MORE INFORMATION

Ferrules ..... page 12
Nuts 10

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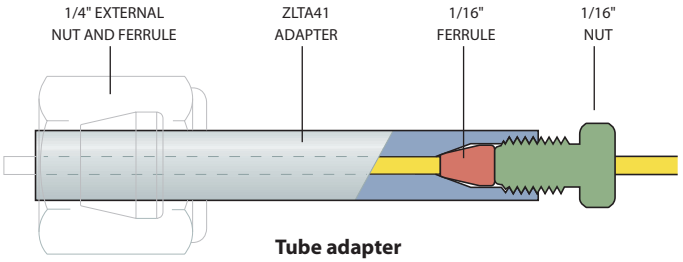
Special Fittings

Tube adapters

These external adapters are ideal for connecting 1/16" tubing to a detector or injector with a 1/4" fitting. The shorter size is used with 1/4" external fittings while the longer works with 1/4" internal or external fittings. (1/16" nut and ferrule are included; 1/4" nut and ferrule are not.) Standard material is 300 series stainless.

Description	*Bore*	*Prod No*	*Price*
1/4" to 1/16"			
0.975" long	1/16"	ZTA41	
2.075" long	1/16"	ZLTA41	
2.800" long	1/16"	ZXLTA41	



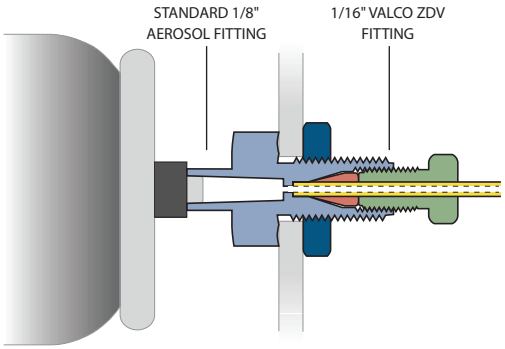
Tube adapter
(ZLTA41)

Aerosol adapter bulkhead union

This unique fitting provides an easy, direct method of connecting the nozzle of a standard aerosol can to a 1/16" Valco zero dead volume fitting.

As with all Valco bulkhead fittings, the flange is undercut to act as a "lock nut" against the instrument wall. Standard material is 300 series stainless.

Description	*Prod No*	*Price*
Aerosol adapter bulkhead union	ZBAA1	



Aerosol adapter bulkhead union
(ZBAA1)

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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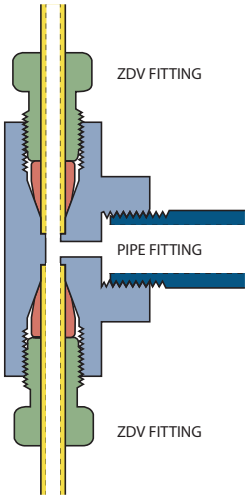
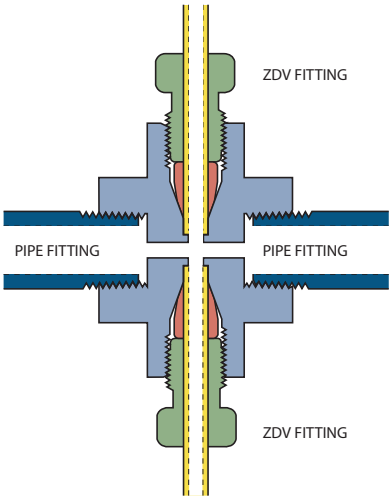
Manifold pipe adapters

These manifolds, which go from one or two pipe fittings to three or more Valco zero dead volume fittings, minimize the number of connections between a regulator and the various carrier gas lines in a chromatographic system. The models with two pipe fittings go a step further, allowing the support of a gauge, a second regulator, or a valve leading to a separate system. Additional Valco zero dead volume fittings can be machined on a special order basis. Standard material is 300 series stainless. Also available in Hastelloy C and titanium by special order.

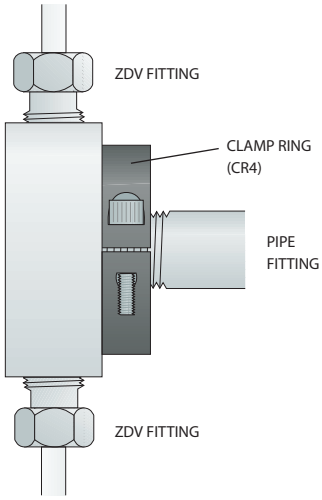
Description	*Bore*	*Prod No*	*Price*
One 1/8" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP1Z3M21	
three 1/8" ZDV fittings	2.0 mm	FP1Z3M22	
three 1/4" ZDV fittings	4.6 mm	FP1Z3M24	
One 1/4" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP1Z3M41	
three 1/8" ZDV fittings	2.0 mm	FP1Z3M42	
three 1/4" ZDV fittings	4.6 mm	FP1Z3M44	
Two 1/8" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP2Z3M21	
three 1/8" ZDV fittings	2.0 mm	FP2Z3M22	
three 1/4" ZDV fittings	4.6 mm	FP2Z3M24	
Two 1/4" female pipe to:			
three 1/16" ZDV fittings	1.0 mm	FP2Z3M41	
three 1/8" ZDV fittings	2.0 mm	FP2Z3M42	
three 1/4" ZDV fittings	4.6 mm	FP2Z3M44	



One pipe fitting
to Valco ZDV fittings



Two pipe fittings
to Valco ZDV fittings



Adapter with optional mounting clamp ring

Pipe Adapters

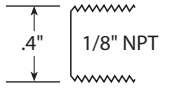
Male pipe to Valco internal adapters

Male pipe adapters make a minimum volume connection from the female pipe fittings on pressure gauges and regulators to Valco zero dead volume internal fittings. Standard material is 300 series stainless. Also available in Hastelloy C and titanium.

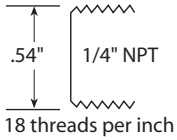
Description	*Bore*	*Prod No*	*Price*
1/8" NPT male to:			
1/16" ZDV fitting	1.0 mm	PZA21	
1/16" ZDV fitting	1/16"	PZA21T	
1/8" ZDV fitting	1.0 mm	PZA22	
1/4" NPT male to:			
1/16" ZDV fitting	1.0 mm	PZA41	
1/8" ZDV fitting	1.0 mm	PZA42	
1/8" ZDV fitting	2.0 mm	PZA42L	
1/4" ZDV fitting	4.6 mm	PZA44L	
1/2" NPT male to:			
1/16" ZDV fitting	1.0 mm	PZA81	
1/8" ZDV fitting	1.0 mm	PZA82	
1/8" ZDV fitting	2.0 mm	PZA82L	
1/4" ZDV fitting	4.6 mm	PZA84L	

MORE INFORMATION
Our manifold pipe adapters on page 37 allow you to connect one or two pipe fittings to three Valco zero dead volume fittings.

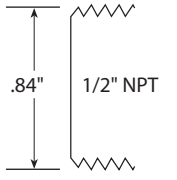
TECH TIP
NPT, National Pipe Thread, is a standard developed a long time ago by people without rulers. 1/8" NPT is nowhere close to 1/8"! Measure the diameter of the fitting across the narrow end. You can also count the number of threads in a 1" section. Then look at the diagrams below to determine the correct size needed.



27 threads per inch



18 threads per inch



14 threads per inch

Female pipe to Valco internal adapters

Female pipe adapters make a minimum volume connection from the male pipe fittings typically found in gas distribution plumbing to Valco zero dead volume internal fittings. Standard material is 300 series stainless. Also available in Hastelloy C and titanium.

Description	*Bore*	*Prod No*	*Price*
1/8" NPT female to:			
1/16" ZDV fitting	1.0 mm	FPZA21	
1/8" ZDV fitting	1.0 mm	FPZA22	
1/8" ZDV fitting	2.0 mm	FPZA22L	
1/4" NPT female to:			
1/16" ZDV fitting	1.0 mm	FPZA41	
1/8" ZDV fitting	1.0 mm	FPZA42	
1/8" ZDV fitting	2.0 mm	FPZA42L	
1/4" ZDV fitting	4.6 mm	FPZA44L	
1/2" NPT female to:			
1/16" ZDV fitting	1.0 mm	FPZA81	
1/8" ZDV fitting	1.0 mm	FPZA82	
1/8" ZDV fitting	2.0 mm	FPZA82L	
1/4" ZDV fitting	4.6 mm	FPZA84L	

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Male pipe to Valco external adapters

Male pipe adapters make a minimum volume connection from the female pipe fittings typically found on pressure gauges and regulators to Valco external fittings. Standard material is 300 series stainless.

Note: We do not manufacture adapters with 1/16" external fittings because they have very thin, easily distorted walls. We recommend use of the PZAs on the facing page.

Description	*Bore*	*Prod No*	*Price*
1/8" NPT male to:			
1/8" external fitting	2.0 mm	PEA22	
1/4" external fitting	4.6 mm	PEA24	
1/4" NPT male to:			
1/8" external fitting	2.0 mm	PEA42	
1/4" external fitting	4.6 mm	PEA44	
1/2" NPT male to:			
1/8" external fitting	2.0 mm	PEA82	
1/4" external fitting	4.6 mm	PEA84	

TECH TIP
Because of their dead volume and the risk of thread leaks, pipe fittings are a poor choice for trace gas analysis. Thread sealants, particularly PTFE tape, cannot boost their performance to adequate levels. For trace gas applications, choose Valco zero dead volume fittings with gold-plated stainless ferrules. *(See page 12.)*

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

Female pipe to Valco external adapters

Female pipe adapters make a minimum volume connection from the male pipe fittings typically found in gas distribution plumbing to Valco external fittings. Standard material is 300 series stainless.

Note: We do not manufacture adapters with 1/16" external fittings because they have very thin, easily distorted walls. We recommend use of the FPZAs on the facing page.

Description	*Bore*	*Prod No*	*Price*
1/8" NPT female to:			
1/8" external fitting	2.0 mm	FPEA22	
1/4" external fitting	4.6 mm	FPEA24	
1/4" NPT female to:			
1/8" external fitting	2.0 mm	FPEA42	
1/4" external fitting	4.6 mm	FPEA44	
1/2" NPT female to:			
1/8" external fitting	2.0 mm	FPEA82	
1/4" external fitting	4.6 mm	FPEA84	

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Syringe Adapters

NEW Zero dead volume fill ports

The ZVISF-1 is a unique fill port fitting designed so that a leaktight seal is formed against the face of the bottom of the fitting detail instead of at the end of an angular ferrule, resulting in a true zero dead volume connection with no carry over or sample loss. The polymer bushing snaps into the knurled PEEK nut, providing the convenience of a one-piece fitting. An ultrathin metal sleeve surrounds and supports the portion of the bushing which extends into the pilot of the fitting detail, preventing the bushing from mushrooming and getting stuck in the pilot as the fitting is tightened.

For use with 22 gauge blunt tip needle.

Description		*Prod No*	*Price*
For high pressure 1/16" Cheminert injectors with polymeric stators (C2, C3, C4, and C52 series)			
Most applications	PFA bushing	ZVISF-1PFAH	
High throughput applications	High density polyethylene bushing	ZVISF-1PEH	
For low pressure 1/16" Cheminert injectors, fittings, and most Valco injectors			
Most applications	PFA bushing	ZVISF-1PFA	
High throughput applications	High density polyethylene bushing	ZVISF-1PE	

Fill ports *for 1/16" polymeric Cheminert valves*

These fill ports provide direct syringe connections to polymeric valves and fittings. Since the fitting detail in the high pressure Cheminert valve is unique, be sure to order the high pressure version for polymeric HPLC injectors. For use with 22 gauge blunt tip needle.

Description	*Prod No*	*Price*
For high pressure injectors (C2, C3, C4, and C52 series injectors)	C-VISF-1H	
For fittings and low pressure injectors (C22Z and C62Z series injectors)	C-VISF-1	
Replacement liners and ferrules		
Liner for C-VISF-1	VISL-1	
Liner for C-VISF-1H	VISL-1H	
Ferrule for C-VISF-1 (or 1H)	ZF1VISF	

Fill ports *for metal Valco and Cheminert valves*

Fill ports provide direct syringe connections to valves and fittings, with the polymeric ferrule compressing a liner to seal around the needle. These fill ports are for use with metal valves.

Description	*Prod No*	*Price*
For use with blunt tip needle		
For 1/16" fittings and injectors - 22 ga	VISF-1	
For 1/32" fittings and injectors - 26 ga	VISF.5FPK	
For use with 2" 22 gauge blunt tip needle		
For 1/16" fittings and injectors	VISF-2	
For 1/8" fittings and injectors	VISF-A	
Replacement liners and ferrules		
Liner for VISF-1	VISL-1	
Liner for VISF-2 or VISF-A	VISL-2	
Ferrule for VISF-1 or VISF-2	ZF1VISF	

TECH TIP
When using Cheminert Nanovolume® CN2 injectors and valves, use fill ports designed just for them.

Nanovolume fill ports . . . . . page 60

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Syringe Adapters

for Cheminert C2 and C4 valves

Loop fill port assembly

The loop fill port assembly, for use with Cheminert high pressure valves (C2 and C4 series), permits sample loading and manual injection from the front of the valve. It includes an aluminum bracket, two syringe fill ports (for 3/4" or 2" needles), a bulkhead union, and two pieces of stainless tubing: one piece is 0.013" ID with a volume of 7 µl, and the other is 0.50 mm ID and 17 µl.

Description	*Prod No*	*Price*
Loop fill port assembly	C-LFP	

Female luer adapters

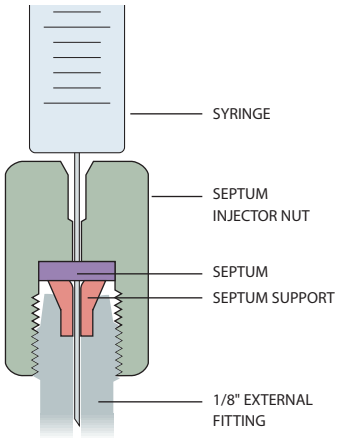
Female luer adapters provide direct syringe connections to zero dead volume fittings and valves.

Description		*Prod No*	*Price*
Female luer to:	1/32" fitting	ZLA-.5	
	1/16" fitting	ZLA-1	
	1/8" fitting	ZLA-2	

Septum injector nuts

Septum injector nuts are a simple way to provide syringe access to any point of a gas or liquid system. The injector nut includes a Valcon T polyimide septum support which accepts a standard 1/4" GC septum. The nut's 1/8" external fitting detail can connect directly to common external type fittings, or can be adapted to Valco internal fittings using an external/internal union or reducing union.

Description	*Prod No*	*Price*
Septum injector nut with support	EN2SI	
Replacement support	ZF2SI	
Septum, low bleed, pkg. of 10	SI4G	



Septum injector nut
with septum and support (EN2SI)

MORE INFORMATION

External/internal reducing unions . . pg 31
External/internal unions 27

Cheminert valves

Model C2 . . . . . 158, 161
Model C4 . . . . . 159, 162

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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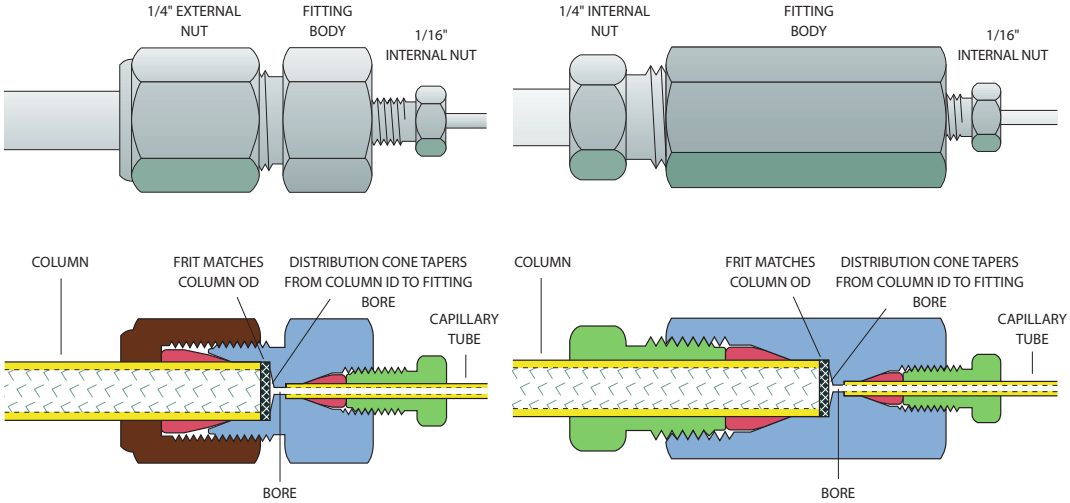
HPLC Column End Fittings

Although our column end fittings look like ordinary reducing unions, they are machined with a conical recess to match a specific column ID so that there are no abrupt or irregular diameter changes which can cause loss of theoretical plates. *(See illustrations, below.)* This optimization results in an assortment of column end fittings for each column OD. To receive full benefit of this design, use column end fittings only with the specific column ID for which they are intended. We can design special fittings for unusual sizes or OEM use.

If a temporary frit is used during column packing, the frit OD should match the column OD. Permanent frits should have an OD matched to the column ID, and should be pressed in to give the lowest dead volume. Our frits are available in a variety of pore sizes, and we offer titanium and Hastelloy C frits for systems sensitive to exposed stainless steel.

All column end fittings are rated to 10,000 psi. However, the functional limit is dictated by the yield strength of the tubing used with the fitting. Standard 1/4", 3/8", and 1/2" columns are usually packed at 8,000-10,000 psi, which is right at the yield strength for the tubing commonly used. Columns with 1" ID have a yield strength of 6,000-8,000 psi, and the fitting will not hold if the system pressure exceeds that limit.

The newest addition to the line is the Nanovolume® column end fitting. *(See page 62.)* These all-PEEK fittings feature fingertight zero dead volume connections with 100 or 150 micron bore. PEEK sleeves permit use with any fused silica tubing.



External column end fitting
1/4" to 1/16", 4.6 mm column ID, with removable frit
(ECEF414.6F)

Internal column end fitting
1/4" to 1/16", 4.6 mm column ID, with removable frit
(CEF414.6F)

MORE INFORMATION
Frits..... page 45

TECH TIP
Standard column end fittings are Type 316 stainless, but since the column wall and frit form over 99% of the column surface area, standard fittings with titanium frits can generally be used on inert columns.

TECH TIP
When packing columns, use Valco "through-type" unions to couple the column to the packing reservoir.

Size	*Prod No*
1/16" union	ZU1T
1/8" union	ZU2T
1/4" union	ZU4T

Through-type unions for packing columns..... page 26

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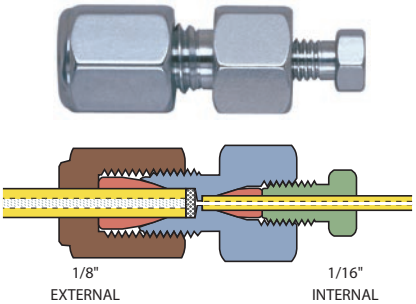
Microbore column end fittings *(1.0 mm – 2.0 mm column ID)*

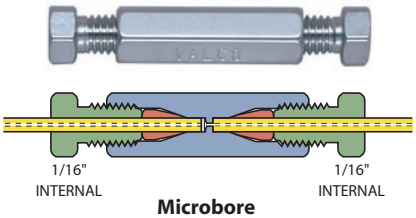
Standard material is Type 316 stainless.

	Bore	Column ID	Without frit Prod No	Price	Removable 2µ frit Prod No	Price
External column end fittings						
1/16" to 1/16"	0.25 mm	1.0 mm	ECEF111.0		ECEF111.0F	
1/8" to 1/16"	0.25 mm	1.0 mm	ECEF211.0		ECEF211.0F	



Microbore external column end fitting
(ECEF211.0F)

	Bore	Column ID	Without frit Prod No	Price	Removable 2µ frit Prod No	Price
Internal column end fittings						
1/16" to 1/32"	0.25 mm	1.0 mm	CEF1.5		CEF1.5F	
1/16" to 1/16"	0.25 mm	1.0 mm	CEF1		CEF1F	
1/8" to 1/32"	0.25 mm	1.0 mm	CEF2.51.0		CEF2.51.0F	
1/8" to 1/16"	0.25 mm	1.0 mm	CEF211.0		CEF211.0F	
1/8" to 1/16"	0.25 mm	2.0 mm	CEF212.0		CEF212.0F	



Microbore internal column end fitting
(CEF1F)

NANOBORE COLUMN END FITTINGS
See our complete line of 100 µm and 150 µm bore fittings on page 62.

100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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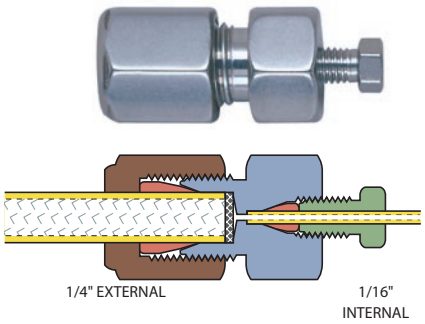
HPLC Column End Fittings

Analytical column end fittings *(2.0 mm – 4.6 mm column ID)*

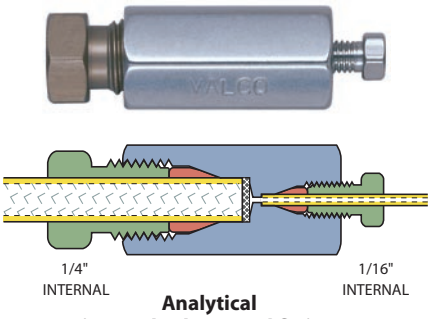
Standard material is Type 316 stainless.

			Without frit		Removable 2µ frit	
	Bore	*Column ID*	*Prod No*	*Price*	*Prod No*	*Price*
External column end fittings						
1/4" to 1/16"	0.4 mm	2.1 mm	ECEF412.1		ECEF412.1F	
1/4" to 1/16"	0.4 mm	3.0 mm	ECEF413.0		ECEF413.0F	
1/4" to 1/16"	0.4 mm	4.0 mm	ECEF414.0		ECEF414.0F	
1/4" to 1/16"	0.4 mm	4.6 mm	ECEF414.6		ECEF414.6F	



Analytical external column end fitting
with removable frit (ECEF414.6F)

			Without frit		Removable 2µ frit	
	Bore	*Column ID*	*Prod No*	*Price*	*Prod No*	*Price*
Internal column end fittings						
1/4" to 1/16"	0.4 mm	2.1 mm	CEF412.1		CEF412.1F	
1/4" to 1/16"	0.4 mm	3.0 mm	CEF413.0		CEF413.0F	
1/4" to 1/16"	0.4 mm	4.0 mm	CEF414.0		CEF414.0F	
1/4" to 1/16"	0.4 mm	4.6 mm	CEF414.6		CEF414.6F	



Analytical internal column end fitting
with removable frit (CEF414.6F)

NANOBORE COLUMN END FITTINGS
See our complete line of 100 µm and 150 µm bore fittings on page 62.

100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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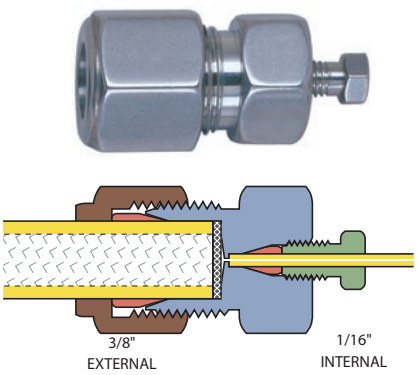
Semi-preparative and preparative column end fittings

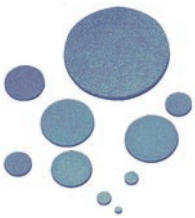
Standard material is Type 316 stainless.

			Without frit		Removable 2µ frit	
	Bore	*Column ID*	*Prod No*	*Price*	*Prod No*	*Price*
External column end fittings						
3/8" to 1/16"	0.40 mm	6.0 mm	ECEF616.0		ECEF616.0F	
3/8" to 1/16"	0.40 mm	7.0 mm	ECEF617.0		ECEF617.0F	
1/2" to 1/16"	0.75 mm	9.0 mm	ECEF819.0		ECEF819.0F	
1/2" to 1/16"	0.75 mm	10.0 mm	ECEF8110.0		ECEF8110.0F	
1" to 1/16"	0.75 mm	20.0 mm	ECEF1K1		ECEF1K1F	



Semi-preparative external column end fitting
(ECEF616.0F)

Replacement frits



1/16", 1/8" and 1/4" frits are sold in packages of 10. 3/8", 1/2", and 1" frits are sold individually. Other sizes may be available or special-ordered in OEM quantities.

			Stainless steel		Hastelloy C		Titanium	
	Pore Size	*Frit thickness*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Package of 10:								
1/16" frits	0.5µ	0.75 mm	.5FR1-10		.5FR1HC-10		–	
	2µ	0.75 mm	2FR1-10		2FR1HC-10		2FR1TI-10	
	10µ	0.75 mm	10FR1-10		–		–	
1/8" frits	0.5µ	1.00 mm	.5FR2-10		–		–	
	2µ	1.00 mm	2FR2-10		2FR2HC-10		2FR2TI-10	
	10µ	1.00 mm	10FR2-10		–		–	
1/4" frits	0.5µ	1.00 mm	.5FR4-10		–		–	
	2µ	1.00 mm	2FR4-10		2FR4HC-10		2FR4TI-10	
	10µ	1.00 mm	10FR4-10		10FR4HC-10		–	
Each:								
3/8" frits	2µ	1.00 mm	2FR6		2FR6HC		2FR6TI	
1/2" frits	2µ	1.00 mm	2FR8		2FR8HC		2FR8TI	
1" frits	2µ	1.50 mm	2FR1K		2FR1KHC		2FR1KTI	

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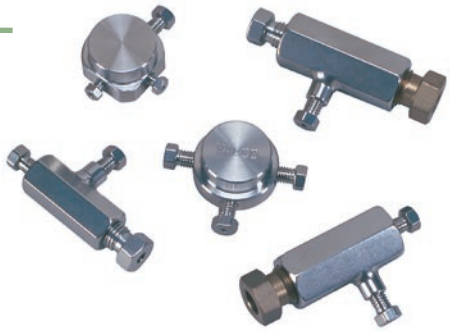
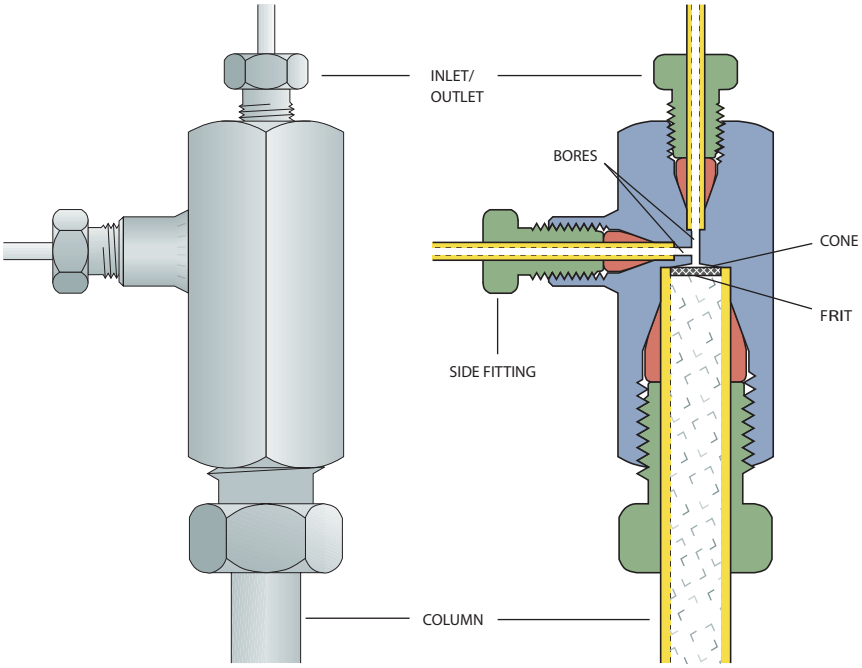
Post-Column Reaction Tee Fittings

Post-column reaction tee fitting



The tee column end fitting (TCEF) has a third connection perpendicular to the normal flowpath. The TCEF permits post-column derivation, or may be used as a curtain flow column inlet fitting. Standard material is Type 316 stainless.

Column OD	*Cone OD*	*Inlet/outlet OD*	*Bore*	*Side OD*	*Bore*	*Prod No*	*Price*
1/16"	1.0 mm	1/32"	0.25 mm	1/32"	0.25 mm	TCEF1.5.5C	
1/16"	1.0 mm	1/32"	0.90 mm	1/32"	0.25 mm	TCEF1.5.5T	
1/16"	1.0 mm	1/16"	0.25 mm	1/16"	0.25 mm	TCEF111	
1/8"	1.0 mm	1/16"	0.50 mm	1/16"	0.50 mm	TCEF211	
1/8"	1.0 mm	1/16"	1.65 mm	1/16"	0.40 mm	TCEF211T	
1/4"	4.6 mm	1/16"	0.25 mm	1/16"	0.25 mm	TCEF411C	
1/4"	4.6 mm	1/16"	0.75 mm	1/16"	0.75 mm	TCEF411	
1/4"	4.6 mm	1/16"	1.65 mm	1/16"	0.75 mm	TCEF411T	
1/4"	4.6 mm	1/8"	0.75 mm	1/16"	0.75 mm	TCEF421	
3/8"	6.0 mm	1/16"	0.75 mm	1/16"	0.75 mm	TCEF611	
3/8"	6.0 mm	1/16"	1.65 mm	1/16"	0.75 mm	TCEF611T	
1/2"	9.0 mm	1/16"	0.75 mm	1/16"	0.75 mm	TCEF811	
1/2"	9.0 mm	1/16"	1.65 mm	1/16"	0.75 mm	TCEF811T	



Post-column reaction fitting
(TCEF411)

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
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1/4" = 6.4 mm
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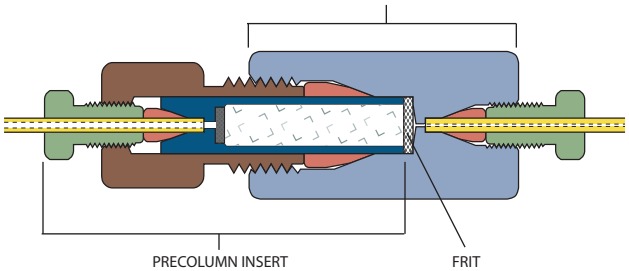
Precolumns (guard columns)

Precolumns are available in 2 cm and 5 cm lengths, and can be filled with either 5µ packing or 37 - 44µ pellicular packing. Both lengths are used in conjunction with a column end fitting. When packed for high efficiency they can be used as analytical columns, but a more typical use is as a guard column installed between the injector and the analytical column. Standard material is Type 316 stainless.

Description	*Prod No*	*Price*
1/4" x 2 cm precolumn system	PCS412F	
Includes:		
One precolumn insert		
One internal column end fitting		
One 2µ frit		
1/4" x 5 cm precolumn system	PCS415F	
Includes:		
One precolumn insert		
One external column end fitting		
One 2µ frit		
Precolumns (for use with existing column end fittings)		
1/4" x 2 cm precolumn insert	PCL412	
1/4" x 5 cm precolumn insert	PCL415	



1/4" x 2 cm precolumn system
(PCS412F)

Fingertight HPLC cartridge precolumns

This cartridge-based system is designed for use as a precolumn or concentrator column in HPLC and FIA applications. It is particularly suited to applications requiring frequent changes: snap-on seals are replaceable, the cartridge is reusable, and the tubing connections are stable since the end fittings do not rotate as the assembly is tightened. Standard material is Type 316 stainless, with PEEK seals and 2µ titanium frits.

Description	*Prod No*	*Price*
0.25 ml (4.0 mm ID x 2 cm)		
Fin gertight cartridge assembly	SFECH412	
Replaceable cartridge	SFEC42	

NOTE:
As a courtesy to our OEM customers, VICI does not supply pre-packed columns.

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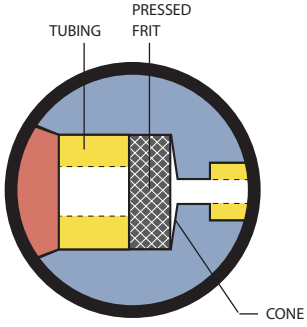
Filters

There are many flow elements of analytical instruments which require protection from foreign particles, such as orifices that may become plugged or surfaces that may get scratched. However, conventional filtering devices may have too large a volume to be consistent with good system performance – particularly in chromatographic applications.

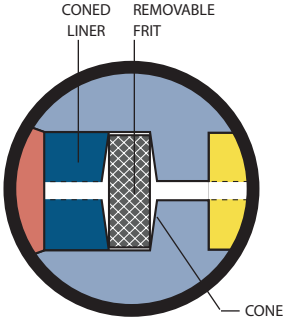
Valco's unique patented* filter design results in extremely low internal volume and simplifies filter element replacement. Filter bodies are "coned" for uniform flow and maximum filter surface area. The filters are made entirely of metal, so they can be used at any instrumentation temperature. While the standard metal is 316 series stainless, filters can be made from alloys that can be used in virtually any application.

We offer a choice of three different filtering elements. All styles are available in bulkhead configurations for mounting on a panel or instrument wall. (Please note that since frits and screens have significantly different thicknesses, they cannot be used interchangeably in the same filter body.)

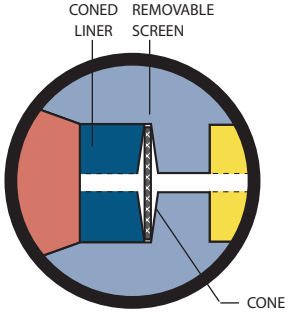
- **Pressed frits**, permanently installed in the filter, are recommended where contaminants are the exception and not the rule. The frits are 2µ stainless.
- **Removable frits** are the best choice for maximum filtration, or if the application requires Hastelloy C or titanium. However, they allow more mixing and tend to clog more than screens. A 2µ frit is included with the filter, but 0.5, 2, and 10µ replacement frits are available in three materials.
- **Removable screens** plug less rapidly and provide lower pressure drop than frits. Since they are thinner, there is less mixing and dispersal than might occur with a frit, but frits provide better filtration. A 2µ screen is included with the filter, and 2 and 10µ stainless replacement screens may be ordered.



Pressed frit



Removable frit



Removable screen

* Patent Numbers 4,281,679 and 4,173,363

MORE INFORMATION

Biocompatible filter . p 78
In-line filters for 1/4-28 fittings 78
Mobile phase filters. 79

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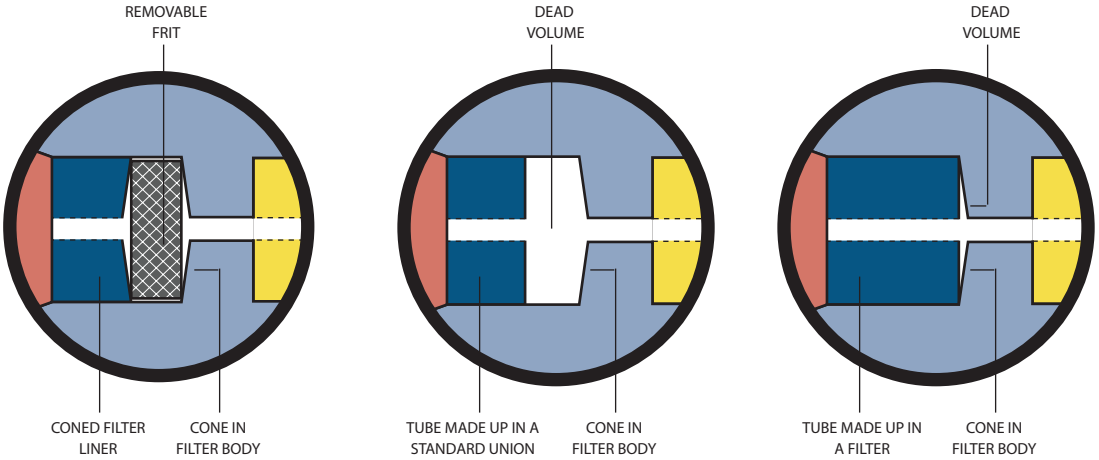
Filters with removable frits are designed to compensate for the thickness of the filter element – the resulting pilot depths are identical with the rest of the Valco product line, facilitating interchangeability of *made up* fittings. Therefore, although our filters look very much like our unions, they are not interchangeable with unions; a filter with its frit removed should not be substituted for a union, because the space designed for the frit introduces dead volume into the system. In addition, since filter bodies are coned, they will have dead volume when used as a union even if the tubing is made up in the filter with a longer, non-standard pilot length.

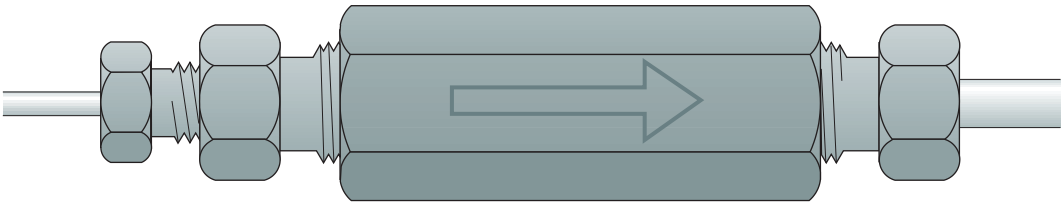
An arrow imprinted on all filter bodies serves to differentiate them from unions and to indicate recommended flow direction.



Filter with removable frit
Coned for uniform flow and maximum filter surface

Filter with frit removed being used as a reducing union
Dead volume is created where frit should be

Filter with frit removed being used as a reducing union
Cone in filter body creates dead volume



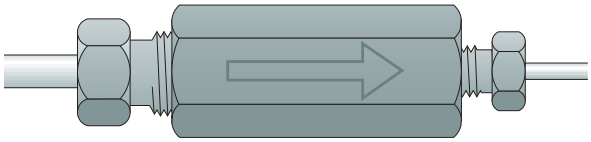
Arrow imprinted on filter body showing recommended direction of flow

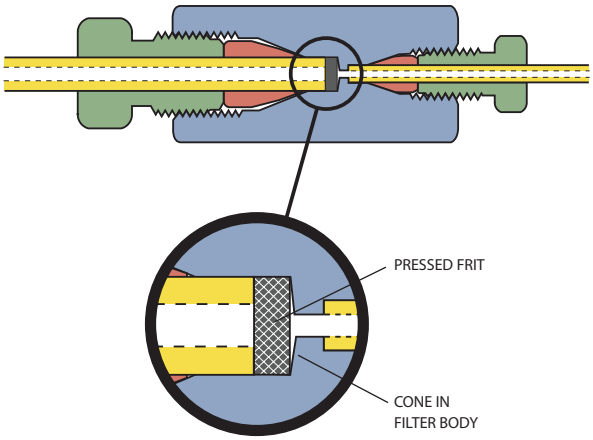
Filters

Filters with a pressed frit

Pressed frit filters contain a permanently installed stainless steel 2µ frit, and are recommended for applications where contaminants are the exception and not the rule – that is, when the sample is generally clean but you wish to guard against the stray burr from a carelessly prepared tube end that might find its way into the flowpath. Standard material is Type 316 stainless.

		Standard		Bulkhead	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/16" to 1/32"	0.25 mm	ZRUF1.5		ZBRUF1.5	
1/16" to 1/16"	0.75 mm	ZUF1		ZBUF1	
1/8" to 1/16"	0.75 mm	ZRUF21		ZBRUF21	
1/8" to 1/8"	0.75 mm	ZUF2		ZBUF2	
1/4" to 1/8"	2.00 mm	ZRUF42		ZBRUF42	
1/4" to 1/4"	4.60 mm	ZUF4		ZBUF4	





Reducing filter with a pressed frit
1/8" to 1/16"
(ZRUF21)

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
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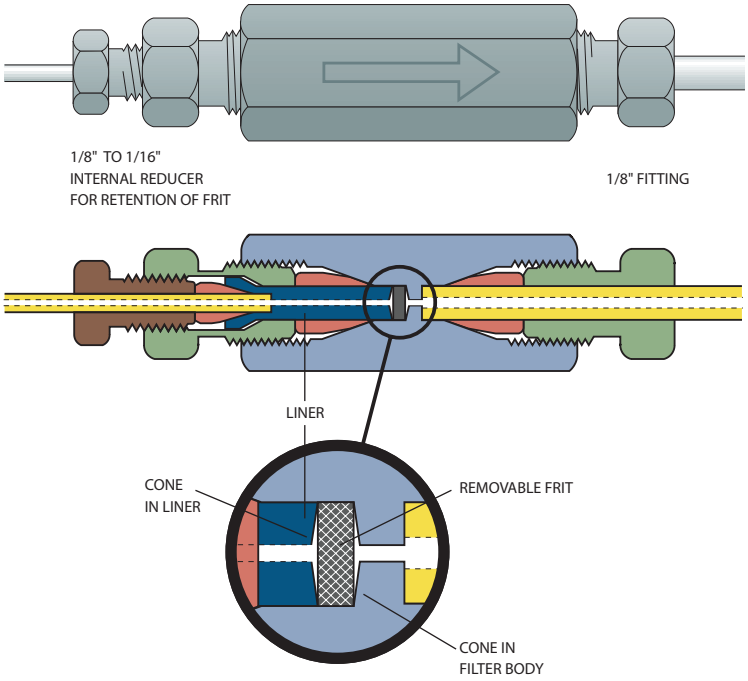
Filters with a removable frit

These filters come with a removable 2µ frit. The standard frit can be replaced with any frit of the proper diameter, *but not by a screen*. These filters are suitable for streams with frequent contamination, since the filtering element is easily changed. Standard material is Type 316 series stainless.

Patent Numbers 4,281,679 and 4,173,363

		Standard		Bulkhead	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/32" to 1/32"	0.25 mm	ZUFR.5F		ZBUFR.5F	
1/16" to 1/32"	0.25 mm	ZRUFR1.5F		ZBRUFR1.5F	
1/16" to 1/16"	0.25 mm	ZUFR1CF		ZBUFR1CF	
	0.50 mm	ZUFR1F		ZBUFR1F	
1/8" to 1/16"	0.75 mm	ZRUFR21F		ZBRUFR21F	
1/8" to 1/8"	2.00 mm	ZUFR2F		ZBUFR2F	
1/4" to 1/16"	1.00 mm	ZRUFR41F		ZBRUFR41F	
1/4" to 1/8"	2.00 mm	ZRUFR42F		ZBRUFR42F	



Reducing filter with a removable frit
1/8" to 1/16"
(ZRUFR21F)

TECH TIP
Should you use a filter with a frit or one with a screen?

Screens have much higher flow capacity (Cv), but frits are the best choice for maximum filtration or if your application requires Hastelloy C or titanium. However, since they are thicker than screens, frits allow more mixing, and the downside of their superior filtration is that they clog more often than screens.

Note! The difference in thickness also means that frits and screens cannot be used interchangeably in the same fitting body:

A frit must always be replaced with a frit.

A screen must always be replaced with a screen.

Replacement frits ..... page 53

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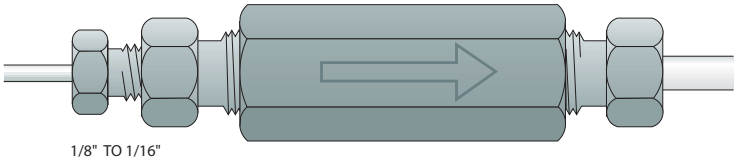
Filters

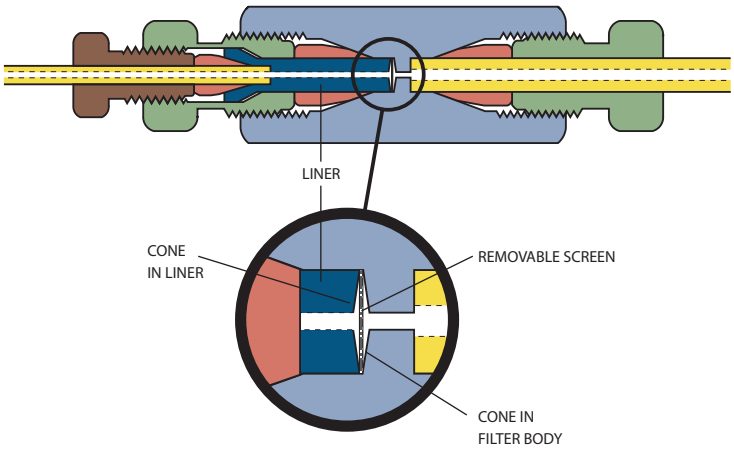
ilters with a removable screen

Fhese filters come with a removable 2µ screen. The standard screen can be replaced with any screen of the proper diameter, *but not by a frit*. These filters are suitable for streams with frequent contamination, since the filtering element is easily changed. Standard material is Type 316 series stainless.

Patent Numbers 4,281,679 and 4,173,363

		Standard		Bulkhead	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/32" to 1/32"	0.25 mm	ZUFR.5		ZBUFR.5	
1/16" to 1/32"	0.25 mm	ZRUFR1.5		ZBRUFR1.5	
1/16" to 1/16"	0.25 mm	ZUFR1C		ZBUFR1C	
	0.50 mm	ZUFR1		ZBUFR1	
1/8" to 1/16"	0.75 mm	ZRUFR21		ZBRUFR21	
1/8" to 1/8"	2.00 mm	ZUFR2		ZBUFR2	
1/4" to 1/16"	1.00 mm	ZRUFR41		ZBRUFR41	
1/4" to 1/8"	2.00 mm	ZRUFR42		ZBRUFR42	





Reducing filter with a removable screen
1/8" to 1/16"
(ZRUFR21)

TECH TIP
Should you use a filter with a frit or one with a screen?

Screens have much higher flow capacity (Cv), but frits are the best choice for maximum filtration or if your application requires Hastelloy C or titanium. However, since they are thicker than screens, frits allow more mixing, and the downside of their superior filtration is that they clog more often than screens.

Note! The difference in thickness also means that frits and screens cannot be used interchangeably in the same fitting body:

A frit must always be replaced with a frit.

A screen must always be replaced with a screen.

Replacement screens..... page 53

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
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7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

5/16" = .312" = 7.9 mm
3/8" = .375" = 9.5 mm
7/16" = .437" = 11.1 mm

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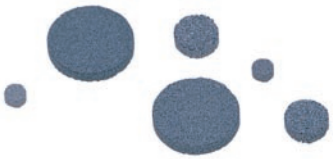
Replacement frits

Other sizes may be available or special ordered in OEM quantities.
Note: If a filter was ordered with a removable frit, the frit ***cannot*** be replaced with a screen.



Package of 10:	Pore Size	Frit Thickness	Stainless Steel Prod No	Stainless Steel Price	Hastelloy C Prod No	Hastelloy C Price	Titanium Prod No	Titanium Price
1/16" frits	0.5µ	0.75 mm	.5FR1-10		.5FR1HC-10		–	
	2µ	0.75 mm	2FR1-10		2FR1HC-10		2FR1TI-10	
	10µ	0.75 mm	10FR1-10		–		–	
1/8" frits	0.5µ	1.00 mm	.5FR2-10		.5FR2HC-10		–	
	1µ	1.00 mm	1FR2-10		1FR2HC-10		–	
	2µ	1.00 mm	2FR2-10		2FR2HC-10		2FR2TI-10	
	10µ	1.00 mm	10FR2-10		–		–	
1/4" frits	0.5µ	1.00 mm	.5FR4-10		–		–	
	2µ	1.00 mm	2FR4-10		2FR4HC-10		2FR4TI-10	
	10µ	1.00 mm	10FR4-10		10FR4HC-10		–	

WHICH FRIT FITS MY FILTER?

1/16" frit fits:
ZUFR.5F
ZBUFR.5F

ZRUFR1.5F
ZBRUFR1.5F

1/8" frit fits:
ZUFR1CF
ZBUFR1CF

ZUFR1F
ZBUFR1F

ZRUFR21F
ZBRUFR21F

1/4" frit fits:
ZUFR2F
ZBUFR2F

ZRUFR41F
ZBRUFR41F

ZRUFR42F
ZBRUFR42F

Replacement screens

Other sizes may be available or special ordered in OEM quantities.
Note: If a filter was ordered with a removable screen, the screen ***cannot*** be replaced with a frit.

Package of 10:	Pore Size	Screen Thickness	Stainless Steel Prod No	Stainless Steel Price
1/32" screens	0.5µ	0.040 mm	.5SR.5-10	
	1µ	0.050 mm	1SR.5-10	
	2µ	0.075 mm	2SR.5-10	
	10µ	0.125 mm	10SR.5-10	
1/16" screens	0.5µ	0.040 mm	.5SR1-10	
	1µ	0.050 mm	1SR1-10	
	2µ	0.075 mm	2SR1-10	
	10µ	0.125 mm	10SR1-10	
1/8" screens	0.5µ	0.040 mm	.5SR2-10	
	1µ	0.050 mm	1SR2-10	
	2µ	0.075 mm	2SR2-10	
	10µ	0.125 mm	10SR2-10	
1/4" screens	0.5µ	0.040 mm	.5SR4-10	
	1µ	0.050 mm	1SR4-10	
	2µ	0.075 mm	2SR4-10	
	10µ	0.125 mm	10SR4-10	

WHICH SCREEN FITS MY FILTER?

1/16" screen fits:
ZUFR.5
ZBUFR.5

ZRUFR1.5
ZBRUFR1.5

1/8" screen fits:
ZUFR1C
ZBUFR1C

ZUFR1
ZBUFR1

ZRUFR21
ZBRUFR21

1/4" screen fits:
ZUFR2
ZBUFR2

ZRUFR41
ZBRUFR41

ZRUFR42
ZBRUFR42

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Tools

Custom socket wrench

This 1/4" socket wrench with a slot to slip over 1/16" tubing works great for all types of 1/4" hex nuts (such as Valco 1/16" ZDV fitting nuts). It's especially useful when nuts are difficult to access with an open end wrench.

Prod No	*Price*
SWH4	

Ferrule removal kit

When polymeric ferrules get stuck in a fitting detail, these little ferrule spears will save you from becoming so irritated that you tear up your entire lab in frustration. Each kit includes two sizes of tapered stabbers for retrieving capillary size ferrules.

Prod No	*Price*
FRK1	

Hex key set

The hex key set has a wrench to fit any socket head screw on any VICI valve or actuator. Includes the following sizes: .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", and 5/32".

Prod No	*Price*
HKS	

TECH TIP
If a fused silica tube breaks off in a through-type union, remove the nuts and the tube opposite the broken one. Clear the fitting by passing a drill or wire of the appropriate diameter into the unbroken side and through the center of the fitting.

Our ferrule removal kit can be used to remove ferrules from tee and cross fittings.

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Open end wrenches

Size	*For use with*	*Prod No*	*Price*
3/16" x 1/4"	1/32" and 1/16" nuts	OEW	
3/8" x 7/16"	1/8" nuts	OEW-2	
1/2" x 9/16"	1/4" nuts	OEW-3	

Pin vise and drill index

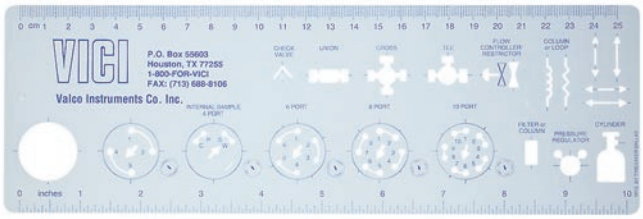
The drill index has drills sized from 0.0135" to 0.039" (0.34 to 1 mm). These are useful tools when a fused silica tube breaks in a union (see Tech Tip on the facing page) and for enlarging the inner diameter of fused silica adapters.

Prod No	*Price*
PV	

Template

This tool is just what you need when you're working out plumbing and valve switching schematics. It features templates for two position valves with 4, 6, 8, and 10 ports with indications of both positions, as well as various flow symbols. For added convenience, the sides are edged with metric and inch rulers.

Prod No	*Price*
TEMPLATE1	



MORE INFORMATION

Tools for valves
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Valve spanner handle. 211
Tightening tools for PEEK fittings. 67
Tubing accessories 90

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Cheminert® Fittings and Accessories

Cheminert fittings are ideally suited for applications requiring an inert, biocompatible, metal-free flowpath. Wetted materials are PFA, FEP, CTFE, or PEEK, and uniform flow passages minimize mixing. All connections have zero dead volume.

MORE INFORMATION

High pressure Cheminert fittings.....pp 63-67
Low pressure Cheminert fittings 68-81
Nanovolume fittings 57-62
Valco fittings 6-55

TECH TIP

For optimal zero dead volume connections, make sure your tubing meets the best industry standards. OD tolerance should be nominal dimension ± .002".

Fractional dimension	Nominal dimension
1/32"	.031
1/16"	.062
1/8"	.125
1/4"	.250
3/8"	.375
1/2"	.500

10,000 psi = 689.5 bar
20,000 psi = 1,378.9 bar

50 µm = .002"
100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

High Pressure Fittings

Cheminert high pressure fittings are rated at 5000 psi with fingertight nuts, well beyond the burst strength of most PEEK tubing. These fittings are machined from high quality inert polymers to the same exacting tolerances as our popular Valco zero dead volume fittings, and the taper angle and detail design conform to the industry standard established by the Valco line.

High Pressure Nanovolume® Fittings

Nanovolume generally refers to components with bore sizes of 100-150 µm (.004" - .006"). The minimal transfer volume contributed by nanovolume components makes them especially beneficial in applications with flow rates in the µl/min range, when the transfer volume can be critical.

NEW 360 Micron Nanovolume Fittings

Our newest high pressure fittings permit direct connection of 360 micron OD fused silica, PEEK, stainless, or electroformed nickel tubing without the use of liners. The ferrule snaps into the nut so that the fitting is "one-piece", but the ferrule remains free to rotate as the nut is tightened so that the tube doesn't twist. Because of the compact size and fine 2-56 threads, a leak-free connection that seals at pressures in excess of 20,000 psi can be easily formed with the available manual tool.

1/32" Nanovolume Fittings

1/32" Cheminert nanovolume fittings, with 100 µm or 150 µm bore, are ideal for high resolution capillary chromatography. Rated at 5,000 psi with fingertight nuts, they will remain leak-tight well beyond the burst strength of most PEEK tubing. These fittings are machined from high quality inert polymers to the same exacting tolerances as our popular Valco zero dead volume fittings, and the taper angle and detail design conform to the industry standard established by the Valco line.

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360 µm Nanovolume Fittings *NEW*

- For direct connection of 360 µm tubing
- Work with metal, fused silica, or PEEK
- Up to 20,000 psi with metal tubing
- Snap-in rotating ferrule for "one-piece" fitting with no tubing twist
- Eliminate use of troublesome liners

Our new high pressure fittings permit direct connection of 360 micron OD fused silica, PEEK, stainless, or electroformed nickel tubing without the use of liners. The ferrule snaps into the nut so that the fitting is "one-piece", but the ferrule remains free to rotate as the nut is tightened so that the tube doesn't twist. Because of the compact size and fine 2-56 threads, a leak-free connection that seals at pressures in excess of 20,000 psi can be easily formed with the available manual tool.

360 µm fittings are dedicated for use with either fused silica, metal, or PEEK tubing; components cannot be mixed or used with a different tubing material.

Tees and crosses offer a choice of three bore sizes, and feature a "quick-mount" base with adhesive backing to make sure that the fitting is stable and fragile tubing doesn't get broken. There is also a quick-mount PEEK union.

MORE INFORMATION
Nanovolume fittings
For fused silica tubing, 10,000+ psi . . . . . pg 58
For metal tubing, up to 20,000 psi. . . . 58

1/32" Nanovolume fittings 59-60
Injectors with 360 micron fittings. . 152

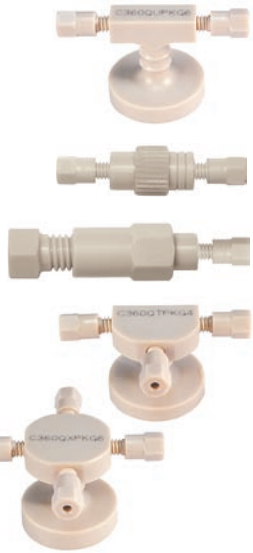
For PEEK or fused silica tubing — up to 10,000 psi

These fittings are constructed from premium grade natural PEEK material. They are intended for use with PEEK or fused silica tubing at pressures up to 10,000 psi, or the maximum pressure for which the tubing is rated, whichever is lower. Quick-mount versions have integral base with double stick tape to secure fittings to a surface.

Nut/ferrules, caps, plugs, tightening tool *for 360 µm tubing*

	Prod No	*Price*
Nut/ferrule	C360NFPKG	
Cap	C360CPKG	
Plug	C360PPK	
Tightening tool	C360ET	

Unions and reducing unions *for 360 µm tubing*



Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Union, quick mount	C360QUPKG2		C360QUPKG4	$65	C360QUPKG6	
Union	C360UPKG2		C360UPKG4	48	C360UPKG6	
Reducing union, 1/16" to 360 µm	—		—		C360RU1PK6	

Tees and crosses *for 360 µm tubing*

Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Tee, quick mount	C360QTPKG2		C360QTPKG4	$82	C360QTPKG6	
Cross, quick mount	C360QXPKG2		C360QXPKG4	100	C360QXPKG6	

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NEW 360 µm Nanovolume Fittings

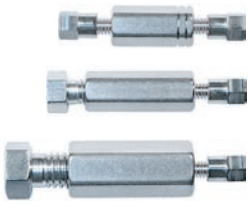
For fused silica tubing — 10,000 psi and above

These fittings are constructed from HPLC grade stainless steel, with stainless steel nut and a special ferrule which is precision machined from electroformed nickel. For optimal sealing characteristics, the ferrule is gold plated.

Nut/ferrules and caps — *for 360 µm FS tubing*

	Prod No	*Price*
Nut/ferrule	C360NFFS	
Cap	C360CFS	

Unions and reducing unions — *for 360 µm FS tubing*



Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Union	C360UFS2		C360UFS4		C360UFS6	
Reducing unions, 1/32" to 360 µm	C360RU.5FS2		C360RU.5FS4		C360RU.5FS6	
Reducing unions, 1/16" to 360 µm	—		—		C360RU1FS6	

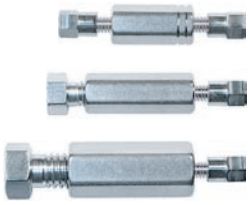
For metal tubing — up to 20,000 psi

Our highest pressure Nanovolume fittings are constructed of HPLC grade stainless steel, including stainless steel nut and ferrule. These fittings are optimized for use with stainless or electroformed nickel tubing.

Nut/ferrules and caps — *for 360 µm tubing*

	Prod No	*Price*
Nut/ferrule	C360NFS6	
Cap	C360C	

Unions and reducing unions — *for 360 µm tubing*



Bore size:	**50 micron**		**100 micron**		**150 micron**	
	Prod No	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Union	C360US62		C360US64		C360US66	
Reducing unions, 1/32" to 360 µm	C360RU.5S62		C360RU.5S64		C360RU.5S66	
Reducing unions, 1/16" to 360 µm	—		—		C360RU1S66	

MORE INFORMATION

360 µm fittings for use below 10,000 psi. 57
360 µm tubing
Electroformed nickel. 87
PEEK 88
1/32" Nanovolume fittings 59-60

TECH TIP

Use these **metal 360 micron nuts** with nano injectors:

C72MU . . . . . p 152
C72MX 152

NEW INTERNAL REDUCERS FOR 360 µm TUBING

Directly connect 360 µm tubing into a 1/32" Valco valve or fitting detail, providing a positive leak-free seal with zero dead volume.
The same patented design as our larger internal reducers (page 34).
Both versions have a stainless steel body.

Tubing OD	*Nut/ferrule material*	*Prod No*	*Price*
1/32" to 360 µm	Stainless	C360IZR.5S6	$34
	PEEK	C360IZR.5S6PK	34

50 µm = .002"
100 µm = .004"
150 µm = .006"

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
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Nanovolume Fittings for 1/32" Tubing

Designed for high resolution capillary HPLC, Cheminert nanovolume connectors include our one-piece 1/32" fingertight fittings, with a patented collapsible ferrule that makes fingertight nanovolume connections a snap. These fittings work with a variety of tubing, including PEEK, fused silica, and 1/32" electroformed nickel. Liners adapt the fittings for use with fused silica.

To avoid potential confusion, all fittings utilizing the Cheminert collapsible ferrule are made of black PEEK; fittings with a standard Valco ZDV fitting detail are natural PEEK.

Nuts and ferrules *for 1/32" tubing*

Valves and fittings are supplied with the appropriate quantity of nuts and ferrules. However, if additional fittings are required, they may be ordered separately. The two internal nuts include collapsible ferrules as an integral part of the fitting; the external nut must be used with the separate ferrule listed below.

	Prod No	*Price each:*
Internal nut with collapsible ferrule *For use with:* *Fittings on pages 60-62* *6 port valve CN2-4346, page 154* *4 port internal sampling injector CN4-4344, page 155*	C-NNFFPK	
Internal nut with collapsible ferrule *For use with:* *10 port nanovolume valve CN2-4340*, page 154	C-NNFLFPK	
External nut *For use with:* *Unions on page 61* *Column end fittings on page 62* Note: Requires collapsible PEEK ferrule, below	C-EN.5FPKB	
Collapsible PEEK ferrule *For use with:* *External nut, above*	ZGF.5PK	

Plugs *for 1/32" tubing*

	Prod No	*Price each:*
Internal plug *For use with:* *Fittings on page 60* *Nanovolume valves on pages 154-155*	C-NPFPK	

MORE INFORMATION

360 µm fittings . .pp 57-58
1/32" Nanovolume
column end fittings . . 62
Tubing
PEEK 88-89
Electroformed
nickel. 87

TECH TIP

Use these **collapsible ferrule-nuts** with:
1/32" Nanovolume
fittings . . . . . .pp 60-62
and with injectors:
CN2 154
CN4 155

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Nanovolume Unions, Tees, Y's, and Crosses for 1/32" Tubing

Unions *for 1/32" tubing*

	100 µm bore Prod No	Price	150 µm bore Prod No	Price
Union for 1/32" PEEK or electroformed nickel tubing Does not require or include liners.	C-NEU.5XFPK	$43	C-NEU.5FPK	

Reducing unions *for 1/32" tubing*

	200 µm bore Prod No
Reducing union, 1/32" to 1/16" tubing, natural PEEK	ZERU1.5FPK

Tees, y's, and crosses *for 1/32" tubing or FS* tubing*

		100 µm bore Prod No	Price	150 µm bore Prod No	Price
Tee	1/32" tubing or fused silica*	C-NTXFPK	$105	C-NTFPK	
Y	1/32" tubing or fused silica*	C-NYXFPK	105	C-NYFPK	
Cross	1/32" tubing or fused silica*	C-NXXFPK	120	C-NXFPK	

*A liner is needed for use with fused silica. Order 27 mm length, page 61.

Fill ports *for 1/32" nanovolume® valves*

These fill ports provide direct syringe connections to Model CN2 nanovolume valves. For use with 26 gauge blunt tip needle.

	Prod No
Fill port for 1/32" CN2 series HPLC injectors	C-NVISF

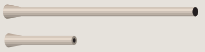
1/32" Nanovolume frits

These frits are the answer to filtration of 1/32" nanovolume fitting connections. A mere .25 mm (0.010") thin and 1/32" in diameter, they can be placed in any 1/32" fitting detail and add minimal volume. Price is for a package of 5 frits.

Pkg/5:	*Pore size*	*Prod No*
	0.2 micron	.2FR.5-5
	0.5 micron	.5FR.5-5

MORE INFORMATION
Unions for fused silica
. . . p. 18, 19, 57-58, 61

TECH TIP
Liners adapt nanovolume fittings for use with fused silica tubing. They are included with nanovolume **unions** for fused silica, but must be ordered separately for other fittings.



Liners . . . . . page 61

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
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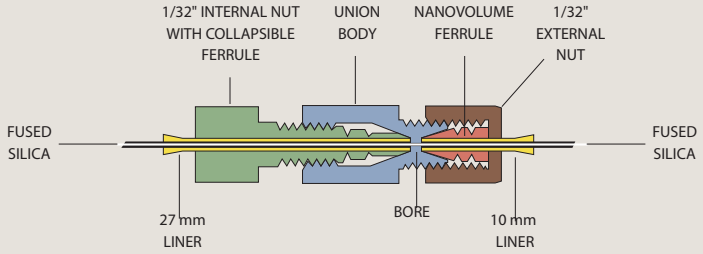
Nanovolume Unions and Liners for FS Tubing

Unions *for fused silica tubing*

	FS tubing OD	100 µm bore Prod No	150 µm bore Prod No
Union for fused silica tubing Includes liners.	125 -175 µm	C-NEU.5XFPK.15	C-NEU.5FPK.15
	175 -225 µm	C-NEU.5XFPK.20	C-NEU.5FPK.20
	225 -275 µm	C-NEU.5XFPK.25	C-NEU.5FPK.25
	275 -325 µm	C-NEU.5XFPK.30	C-NEU.5FPK.30
	325 -375 µm	C-NEU.5XFPK.35	C-NEU.5FPK.35



Union for use with fused silica
liners included
(C-NEU.5FPK.35)

Liners for 1/32" connectors *for use with fused silica tubing*

Use these liners with nanovolume connectors to adapt to the most common sizes of fused silica tubing. Natural PEEK.

The 27 mm liners are for internal nuts with collapsible ferrules. 10 mm liners are for use with external nuts. Sold in packages of 5.

27 mm liners
Use with internal nuts C-NNFFPK or C-NNFLFPK

For tubing OD	Prod No
125 - 175 µm	C-NL.15L-5
175 - 225 µm	C-NL.20L-5
225 - 275 µm	C-NL.25L-5
275 - 325 µm	C-NL.30L-5
325 - 375 µm	C-NL.35L-5

10 mm liners
Use with external nut C-EN.5FPKB

For tubing OD	Prod No
125 - 175 µm	C-NL.15S-5
175 - 225 µm	C-NL.20S-5
225 - 275 µm	C-NL.25S-5
275 - 325 µm	C-NL.30S-5
325 - 375 µm	C-NL.35S-5

MORE INFORMATION

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Fittings 59-60
External nuts 59
Internal nuts with
collapsible ferrules . 59
Liners for column end
fittings 62

TECH TIP
Use **27 mm liners**

with internal nuts with collapsible ferrules:

Use **10 mm liners**

with external nuts:

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Nanovolume Column End Fittings for FS Capillaries

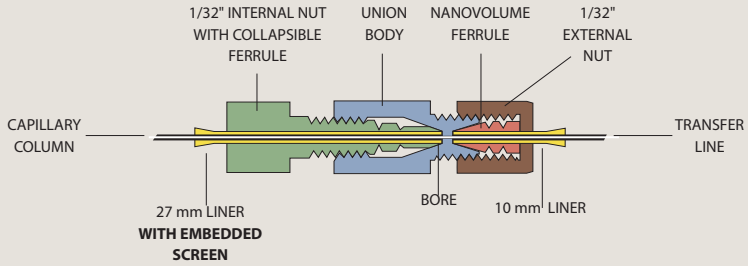
Nanovolume column end fittings include two liners to adapt the 1/32" fitting to fused silica. The 27 mm liner, used inside the internal nut, has a 1 µm 316 stainless steel screen embedded in the PEEK to provide closure for fused silica columns. The 10 mm liner is used with the external nut.

Like other nanovolume fittings, they include our one-piece 1/32" fingertight fittings, with a patented* collapsible ferrule. To avoid potential confusion, all fittings utilizing the Cheminert collapsible ferrule are made of black PEEK. The liners are natural PEEK.

Screen embedded in end of liner for column end fittings

Column end fittings *for 1/32" tubing*

Each:	*For tubing OD*	**100 µm bore** *Prod No*	**150 µm bore** *Prod No*
Column end fitting	125 - 175 µm	C-NEF.5XFPK.15S1	C-NEF.5FPK.15S1
for fused silica tubing	175 - 225 µm	C-NEF.5XFPK.20S1	C-NEF.5FPK.20S1
Includes liners	225 - 275 µm	C-NEF.5XFPK.25S1	C-NEF.5FPK.25S1
	275 - 325 µm	C-NEF.5XFPK.30S1	C-NEF.5FPK.30S1
	325 - 375 µm	C-NEF.5XFPK.35S1	C-NEF.5FPK.35S1



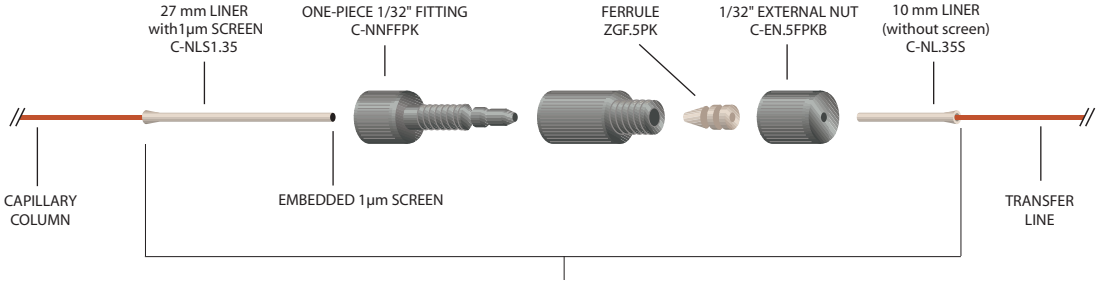
Cross-section
Column end fitting (C-NEF.5FPK.35S1)

Replacement liners for column end fittings *for FS capillaries*

Use these liners with nanovolume column end fittings to adapt to the most common sizes of fused silica tubing. Natural PEEK, with embedded screen to provide full closure for fused silica capillaries.
Sold individually.

27 mm liners for column end fittings

For tubing OD	*Prod No*
125 - 175 µm	C-NL S1.15
175 - 225 µm	C-NLS1.20
225 - 275 µm	C-NLS1.25
275 - 325 µm	C-NLS1.30
325 - 375 µm	C-NLS1.35



Column end fitting for 360 µm fused silica columns
(C-NEF.5FPK.35S1)

*U.S. patent no. 6,575,501.

MORE INFORMATION
Liners for 1/32" fittings . . page 61

TECH TIP
Liners with embedded screens are also available for 1/16" PEEK tubing. Consult the factory for sizes and product numbers.

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No twist one-piece fittings

10-32 for 1/16" tubing

These new fittings offer the convenience of a one-piece fitting while solving a problem inherent to such designs. In other one-piece designs, the ferrule rotates against the fitting detail, creating particulates. The no twist design has a separate ferrule that snaps into the nut, so it's attached but still free to avoid rotation during tightening.

Since the ferrule is not machined onto the nut, it can be made from a different material. PEEK nut with PEEK ferrule, or PEEK nut with CTFE ferrule – the possibilities are endless.

Package of 5:	**Glass-filled PEEK ferrule**	**PEEK ferrule**	**CTFE ferrule**
Nut type Length	*Prod No*	*Prod No*	*Prod No*
PEEK, hex short	ZNF1PKG-5	ZNF1PK-5	ZNF1KF-5
PEEK, hex medium	MZNF1PKG-5	MZNF1PK-5	MZNF1KF-5
PEEK, hex long	LZNF1PKG-5	LZNF1PK-5	LZNF1KF-5
PEEK, fingertight	ZNF1FPKG-5	ZNF1FPK-5	ZNF1FKF-5

Optional ferrule materials available – FEP, PFA, PTFE, and glass-filled PTFE. Call for availability.
Some 1/32" versions are available. Call for details.

Patent No. 7,316,777

Internal nuts – high pressure PEEK

PEEK nuts are used in Cheminert polymeric valves with zero dead volume fittings. They can also be used as alternatives to standard stainless steel Valco nuts when polymeric ferrules are used (up to approximately 175°C). Fingertight nuts have a knurled surface designed to provide sufficient sealing force on the ferrule without wrenches. Hex style nuts allow wrench tightening; however, since they are polymeric, they can break and are recommended for use only when space is limited and fingers won't fit.

Caution: PEEK nuts are intended for use only with polymeric ferrules, which seal with lower force than their stainless steel counterparts. Overtightening can result in breakage.

Package of 10:	*Prod no*	*Length*
1/32" fingertight	ZN.5FPK-10	.42"
1/32" fingertight	LZN.5FPK-10	.54"
1/16" fingertight	ZN1FPK-10	.88"
1/16" hex	ZN1PK-10	.45"
1/16" hex	MZN1PK-10	.62"
1/16" hex	LZN1PK-10	.87"
1/8" hex	ZN2PK-10	.62"

Ferrules – high pressure PEEK

PEEK ferrules seal by the increased friction from compression.

Package of 10:	*Prod No*	*Pkg of 10:*
1/32"	ZF.5PK-10	1/4"
1/16"	ZF1PK-10	3/8"
1/8"	ZF2PK-10	1/2"

Ferrules – grooved PEEK

These patented ferrules* feature a grooved design that permits the ferrule to grip the tube in multiple places. They work great on tubing that is softer than the ferrule material. For example, PEEK grooved ferrules work well on PTFE or FEP tubing. They are not generally recommended if the tubing is the same material as the ferrule.

Package of 10:		*Prod No*
	1/32"	ZGF.5PK-10
	1/16"	ZGF1PK-10

MORE INFORMATION

Tightening tool for hex-head PEEK nuts. . 67

POLYMERS AT A GLANCE

PEEK . . . . . PK
Chemical resistance; up to 225°C

100 µm	=	.004"
150 µm	=	.006"
0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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High Pressure PEEK Fittings

Plugs and caps – high pressure PEEK

Polymeric plugs and caps are available in knurled finger-tight and wrench-tight hex nut designs, for use in valves or fittings. See discussion of PEEK nuts on page 63. PEEK caps include a PEEK nut and ferrule. For high pressure polymeric valve plugs, see below. For low pressure valve plugs, see page 71.

		PEEK plugs	PEEK caps
Description	*Length of nut**	*Prod No*	*Prod No*
1/32" fingertight	.42"	ZP.5FPK	ZC.5FPK
1/32" fingertight	.54"	LZP.5FPK	––
1/16" fingertight	.87"	ZP1FPK	ZC1FPK
1/16" hex	.62"	MZP1PK	ZC1PK
1/16" long hex	.87"	LZP1PK	––
1/8" hex	.62"	ZP2PK	ZC2PK

PEEK plugs for high pressure polymeric valves

These PEEK plugs are for use ***only*** in Cheminert HPLC polymeric valves (C1-C5 series) since the fitting detail in these valves is unique.

Description	*Length of nut**	*Prod No*
1/16" hex	.62"	C-MZP1PK
1/16" long hex	.87"	C-LZP1PK
1/16" fingertight	.88"	C-ZP1FPK

POLYMERS AT A GLANCE

PEEK . . . . . PK
Chemical resistance; up to 225°C

Tees and crosses – high pressure PEEK

Tees connect three lines. Crosses connect four lines. The 1/32" and 1/16" nuts are fingertight; 1/8" nuts are hex, for wrench tightening.

		PEEK tees	PEEK crosses
Tubing OD	*Bore*	*Prod No*	*Prod No*
1/32"	0.25 mm	ZT.5FPK	ZX.5FPK
	0.50 mm	ZT.5LFPK	ZX.5LFPK
1/16"	0.25 mm	ZT1CFPK	ZX1CFPK
	0.50 mm	ZT1MFPK	ZX1MFPK
	0.75 mm	ZT1FPK	ZX1FPK
	1.00 mm	ZT1LFPK	ZX1LFPK
1/8"	0.75 mm	ZT2PK	ZX2PK
	2.00 mm	ZT2LPK	ZX2LPK

TECH TIP

Ferrules for high pressure PEEK fittings are available in PEEK and PFA.

PEEK ferrules . . . . page 63
PFA ferrules 13

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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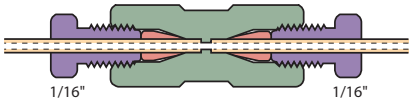
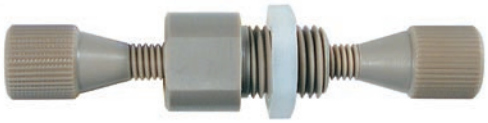
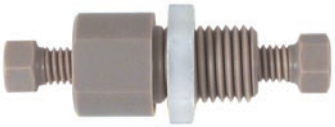


Internal union – PEEK
Standard bore version
(ZU1PK)



Bulkhead fingertight internal union – PEEK
(ZBU1FPK)

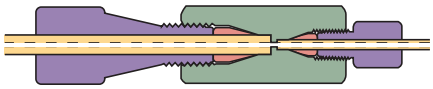


Bulkhead hex internal union – PEEK
(ZBU1PK)

Internal unions – high pressure PEEK

The 1/32" nuts are fingertight; 1/16" nuts are available in a choice of fingertight or hex; and 1/8" nuts are hex, for wrench tightening.

Tubing OD	*Bore*	**Standard** *Prod No*	**Bulkhead** *Prod No*	**Bulkhead panel hole diameter**
1/32" fingertight				
	0.25 mm	ZU.5FPK	ZBU.5FPK	5/16"
	0.50 mm	ZU.5LFPK	ZBU.5LFPK	5/16"
	1/32"	ZU.5TFPK	ZBU.5TFPK	5/16"
1/16" fingertight				
	0.25 mm	ZU1CFPK	ZBU1CFPK	3/8"
	0.50 mm	ZU1MFPK	ZBU1MFPK	3/8"
	0.75 mm	ZU1FPK	ZBU1FPK	3/8"
	1/16"	ZU1TFPK	ZBU1TFPK	3/8"
1/16" hex				
	0.25 mm	ZU1CPK	ZBU1CPK	3/8"
	0.50 mm	ZU1MPK	ZBU1MPK	3/8"
	0.75 mm	ZU1PK	ZBU1PK	3/8"
	1/16"	ZU1TPK	ZBU1TPK	3/8"
1/8" hex	0.75 mm	ZU2PK	ZBU2PK	7/16"
	2.0 mm	ZU2LPK	ZBU2LPK	7/16"
	1/8"	ZU2TPK	ZBU2TPK	7/16"



Internal reducing union – PEEK
Standard bore
(ZRU1.5FPK)

Bulkhead internal reducing union – PEEK
(ZBRU1.5FPK)

Internal reducing unions – high pressure PEEK

These unions connect two different sizes of tubing, with zero dead volume internal fittings on each end. In the bulkhead version, the bulkhead nut is on the side with smaller tubing. The 1/32" and 1/16" nuts are fingertight; 1/8" nuts are hex, for wrench tightening. A version with 1/16" and 1/8" hex nuts is also available.

Tubing OD	*Bore*	**Standard** *Prod No*	**Bulkhead** *Prod No*	**Bulkhead panel hole diameter**
1/16" to 1/32"	0.25 mm	ZRU1.5FPK	ZBRU1.5FPK	5/16"
	0.50 mm	ZRU1.5LFPK	ZBRU1.5LFPK	5/16"
	1/32"	ZRU1.5TFPK	ZBRU1.5TFPK	5/16"
1/8" to 1/32"	0.25 mm	ZRU2.5FPK	ZBRU2.5FPK	3/8"
	0.50 mm	ZRU2.5LFPK	ZBRU2.5LFPK	3/8"
	1/32"	ZRU2.5TFPK	ZBRU2.5TFPK	3/8"
1/8" to 1/16"	0.25 mm	ZRU21CFPK	ZBRU21CFPK	3/8"
	0.75 mm	ZRU21FPK	ZBRU21FPK	3/8"
	1.00 mm	ZRU21LFPK	ZBRU21LFPK	3/8"
	1/16"	ZRU21TFPK	ZBRU21TFPK	3/8"

High Pressure Specialty PEEK Fittings

One-piece fingertight fittings – color-coded PEEK

These molded fingertight fittings are rated to 5000 psi (350 bar), so they can be used in virtually any HPLC fitting detail with 10-32 threads. Six colors allow easy identification of tubing lines.

Package of 5:

Color	*Prod No*
Natural	JR-55020-5
Black	JR-55021-5
Red	JR-55022-5
Yellow	JR-55023-5
Blue	JR-55024-5
Green	JR-55025-5

One-piece PEEK fingertight fittings – narrow hex-head

This natural PEEK machined fitting has a narrow hex head and 10-32 threads.

Package of 5:

Color	*Prod No*
Natural	JR-5508-5

Color-It fingertight adapters

Use Color-It snap-on extensions to color-code our 1/4" hex-head nuts, and turn the nut into a fingertight fitting at the same time. Color-It adapters are available in six different colors, and can be used with PEEK and stainless hex-head nuts.

Package of 5:

Color	*Prod No*
Blue	JR-55010-5
Yellow	JR-55011-5
Green	JR-55012-5
Black	JR-55013-5
White	JR-55014-5
Red	JR-55015-5

Package of 12:

Color	*Prod No*
Multi-color (2 of each color)	JR-55016-12

MORE INFORMATION
Color-coded PEEK tubing . . . page 89

CAUTION
One-piece combination nuts and ferrules are not for high pressure gas service.

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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PEEK starter kit

In LC applications involving proteins, peptides, nucleic acids, or other samples of biological origin, metal systems may interact with samples or release transition metals that will deactivate columns. The PEEK starter kit facilitates replacement of stainless steel tubing, fittings, ferrules, mobile phase filters, etc., to create a biocompatible environment for samples and mobile phase.

	Prod No
PEEK starter kit	JR-35P

Includes:

- 1 Plastic box
- 10 PEEK one-piece fittings, 10-32
- 5 PEEK handtight fittings
- 5 PEEK nuts, hex-head long
- 20 PEEK ferrules, double-ended 1/16"
- 1 PEEK union, HP body only, 10-32
- 2 Tubing elbows 90°
- 2 Tubing elbows 180°
- 1 PEEK filter, in-line, incl. PAT frit 5 µm
- 1 Clean-cut tubing cutter
- 1 Last Drop PTFE filter 5 µm
- 3m PEEK tubing, 1/16" x 0.25 mm ID, blue stripe
- 3m PEEK tubing, 1/16" x 0.50 mm ID, orange stripe
- 1 Tweezers

Tightening tools for PEEK fittings

These handy tools make it fast and easy to tighten PEEK hex-head fittings. The red version is for use with the C360 series fittings shown on page 57. The green tool is for any 1/32" PEEK fitting with a 3/16" hex head nut, and the blue version fits the 1/4" hex common in fittings for 1/16" tubing.

Color	*For use with*	*Prod No*
Red	360 µm fittings	C360ET
Green	1/32" fittings	CNFT
Blue	1/16" fittings	ZNFT

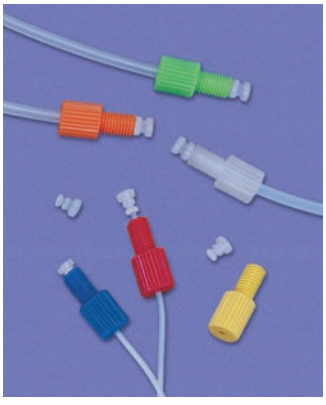
MORE INFORMATION

Hex-head PEEK fittings
360 µm..... page 57
1/32".....63-65
1/16"
High pressure...63-65
Low pressure 71

Low Pressure Flangeless Tube End Fittings

Cheminert low pressure fittings are ideally suited for flow injection analysis, low pressure liquid chromatography, and stream sampling devices. They may be safely used at pressures up to 500 psi and temperatures to 50°C. Two designs of low pressure tube end fittings are available. *Flangeless* tube end fittings utilize our new collapsible ferrule, which grips the tubing as the fitting is tightened without significantly reducing the tube ID. *Standard* tube end fittings are retained on polymeric tubing by a flange formed with a Cheminert flanging tool.

Flangeless tube end fittings *1/4-28*

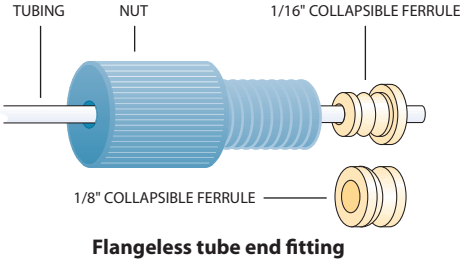


Flangeless tube end fittings eliminate the flanging tool required with standard tube end fittings. The nut turns on the tubing as freely as with our flanged fitting, eliminating the possibility of cracking or unscrewing that can occur when plastic tubing is subjected to twisting as fittings are connected.

Cheminert flangeless fittings include our patented* collapsible ferrule design. This innovative design utilizes a one-piece ferrule engineered to collapse as it is tightened. The collapse takes place in a very narrow area, resulting in a very effective seal with virtually no distortion of the tubing ID and no dead volume. The assembly is rated at 500 psi liquid when tightened by hand. Since only the tubing and the ferrule come into contact with the solution, the result is an inert system. Use CTFE ferrules for soft tubing (PTFE, FEP, etc.), but use PEEK ferrules for harder tubing (PEEK, ETFE, polyurethane, etc.)

Cheminert tube end fittings work with any 1/16" or 1/8" OD polymeric tubing, and come in twelve different colors for system color coding.

Flangeless fittings with CTFE ferrules		**1/16" OD**		**1/8" OD**	
	(pkg/5)	*Prod No*	*Price*	*Prod No*	*Price*
	Black	CFL-1BK		CFL-2BK	
	Blue	CFL-1BE		CFL-2BE	
	Brown	CFL-1BR		CFL-2BR	
	Dark gray	CFL-1DG		CFL-2DG	
	Green	CFL-1G		CFL-2G	
	Lavender/pink	CFL-1L		CFL-2L	
	Natural	CFL-1N		CFL-2N	
	Orange	CFL-1E		CFL-2E	
	Purple	CFL-1P		CFL-2P	
	Red	CFL-1R		CFL-2R	
	White	CFL-1W		CFL-2W	
	Yellow	CFL-1Y		CFL-2Y	
	Assorted *(pkg/12, one of each color)* with ferrule:				
	CTFE	CFL-1A		CFL-2A	
	PEEK	CFL-1A-PK		CFL-2A-PK	
Replacements					
PEEK ferrules	*(pkg/10)*	CFL-CB1PK		CFL-CB2PK	
CTFE ferrules	*(pkg/10)*	CFL-CB1KF		CFL-CB2KF	
PEEK nuts	*(pkg/5)*	CFL-1PK		CFL-2PK	
Setting tool		CST		CST	



Flangeless tube end fitting

Patent No. 6,575,501

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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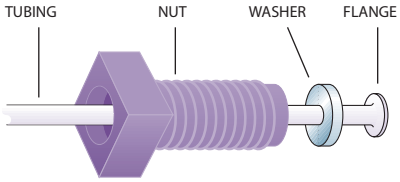
Low Pressure Standard Tube End Fittings and External Nuts

Standard flanged tube end fittings *1/4-28*

The basic component of the Cheminert system is the polypropylene nut, retained on PTFE or FEP tubing by a flange formed with a Cheminert flanging tool *(page 70)*. This is an excellent method for connecting fluorocarbon tubing, as there is no reduction of the inside diameter and no binding or twisting of the tubing when the fitting is tightened. A mating of the parts is achieved with zero dead volume, making this an ideal fitting for biological systems.

Cheminert tube end fittings come in twelve different colors for system color coding, and are available for 1/16" or 1/8" OD fluorocarbon tubing. (While in theory other polymers could be molded to form a flange, only fluorocarbons such as PTFE or FEP have low-temperature malleability and good form retention at operating temperatures.) Tube end fittings attach directly to Cheminert valves and fittings, and are easily joined to each other with a union. Tightening by hand is all that is required to make a leak-free seal at 500 psi liquid, although for long term reliability a wrench could be used to apply an additional 1/8 turn.

Packages include the same number of washers as fittings.



Flanged tube end fitting

Flanged fittings		**1/16" OD**		**1/8" OD**	
	(pkg/10)	*Prod No*	*Price*	*Prod No*	*Price*
	Black	CF-1BK		CF-2BK	
	Blue	CF-1BE		CF-2BE	
	Brown	CF-1BR		CF-2BR	
	Dark gray	CF-1DG		CF-2DG	
	Green	CF-1G		CF-2G	
	Lavender/pink	CF-1L		CF-2L	
	Natural	CF-1N		CF-2N	
	Orange	CF-1E		CF-2E	
	Purple	CF-1P		CF-2P	
	Red	CF-1R		CF-2R	
	White	CF-1W		CF-2W	
	Yellow	CF-1Y		CF-2Y	
	Assorted *(pkg/12, one of each color)*	CF-1A		CF-2A	
Washers	*(pkg/10)*	CF-W1		CF-W2	

MORE INFORMATION

High pressure fittings . . . . . .pp 63-66
PTFE and FEP tubing. 90

TECH TIP

To make up standard flanged tube end fittings, use the flanging tool on page 70.

A flanging starter kit, complete with flanging tool, flanging tips, and an array of tubing and fittings, is also available. *(See page 70.)*

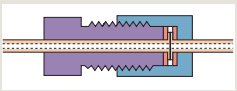
External nuts for flanged tube ends *1/4-28*

External nuts with female 1/4-28 threads are designed for use on tubing with a flanged end, just like the standard tube end fittings. Use them instead of a union or coupling to make a zero volume butt connection.

Package of 5:	**PEEK**		**CTFE**	
Tubing OD	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	CEN1PK		CEN1KF	
1/8"	CEN2PK		CEN2KF	

TECH TIP

Use our external nut tube end fittings to make true zero volume butt connections without a coupling.



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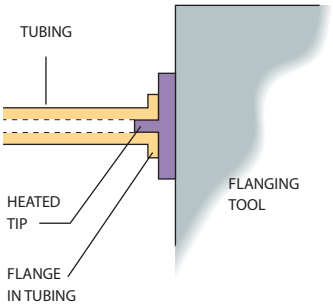
Flanging Tool, Starter Kit

Cheminert flanging tools

The flanging tool makes the flange which retains the standard 1/4-28 tube end fitting and washer on PTFE or FEP tubing. With this tool, lengths of tubing may be easily assembled to any required dimension. The time required is approximately 5 to 10 seconds per flange.

Flanging tools are available for 110 VAC or 230 VAC, and come complete with tips for 0.75 mm, 1.0 mm, and 2.00 mm ID tubing, a tubing holder for gripping the tubing during the flanging operation, a razor blade for tube cutting, and instructions.



Flange being made on tubing

		Prod No	*Price*
Flanging tools	110 VAC	CFT-110	
	230 VAC	CFT-220	
Flanging tool accessories			
Flanging tips			
	for tubing ID ≤ 0.25 mm	CFT-TXC	
	for tubing ID ≤ 0.75 mm	CFT-TC	
	for tubing ID ≤ 1.00 mm	CFT-TM	
	for tubing ID ≤ 1.50 mm	CFT-TL	
	for tubing ID ≤ 2.00 mm	CFT-TXL	
Razor blades *(pkg /10)*		CFT-R	
Tubing holder		CFT-H	

Cheminert starter kits

Starter kits come in either 1/16" or 1/8" versions, with flanging tools for 110 VAC or 230 VAC.

	110 VAC		**230 VAC**	
	Prod No	*Price*	*Prod No*	*Price*
Starter kits				
1/16" tubing	CFT1K-110		CFT1K-220	
1/8" tubing	CFT2K-110		CFT2K-220	

The starter kit includes:

- 1 flanging tool with 3 flanging tips
- 1 tubing holder
- 20 standard tube end fittings
- 20 stainless steel washers
- 10 couplings
- 20 feet of PTFE tubing
  (1/16" OD x 0.030" ID
  or
  1/8" OD x .060" ID)
- 1 male luer adapter
- 1 female luer adapter
- 1 plug
- 1 tee
- 1 glass connector

MORE INFORMATION

Standard tube end fittings ..... page 69
Stainless steel washers 69
Couplings 72
Male luer adapter..... 76
Female luer adapter ... 76
Plug..... 71
Tee 74
Glass connector 75

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Starter Kit, Low Pressure Plugs and Caps

Easy-Flange kit

The Easy-Flange flange-rolling tool uses mechanical force to form a flange on 1/16" - 1/8" OD PTFE tubing, offering an excellent non-electric alternative to the heated flanging tool.

The quality of the flange is excellent, since it is formed without stressing the tubing by heat. The specially designed negative conical profile of the flange-forming component yields an ideal shape for maximum sealing properties.

	Prod No	*Price*
Easy-Flange kit	JR-201540	

Includes:
- Plastic box
- Flanging discs with:
  - 0.5 mm SS pin for PEEK tubing
  - 0.8 mm polymer pin
  - 0.8 mm titanium pin
  - 1.3 mm polymer pin
  - 1.3 mm titanium pin
- Clean-cut tubing cutter
- PTFE tubing, 1/16" x 0.75 mm ID, 6 ft.

Plugs *1/4-28*

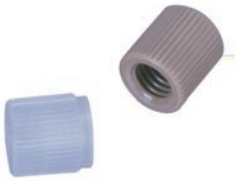
Plugs can be used to close off an unused port in a 1/4-28 valve or manifold.

	PEEK		CTFE	
Package of 5:	*Prod No*	*Price*	*Prod No*	*Price*
	CPPK		CPKF	

Low pressure PEEK plugs *10-32*

These all-PEEK plugs are for use in Cheminert PEEK fittings and low pressure polymeric valves (C20Z and C30Z series). For high pressure polymeric valves (C1-C5 series), use plugs on page 64.

		PEEK	
*Package of 1:Length of nut**		*Prod No*	*Price*
1/16" hex	.62"	MZP1PK	
1/16" long hex	.87"	LZP1PK	
1/16" fingertight	.88"	ZP1FPK	



Caps *1/4-28*

Caps are used to close off lines with 1/4-28 tube end fittings.

	PEEK		CTFE	
Package of 5:	*Prod No*	*Price*	*Prod No*	*Price*
	CCPK-5		CCKF-5	

MORE INFORMATION

Clean-cut tubing cutter ..... page 90
Tightening tool for hex-head PEEK nuts. . 67

0.25 mm	=	.010"
0.50 mm	=	.020"
0.75 mm	=	.030"
1.0 mm	=	.040"
1.5 mm	=	.060"
2.0 mm	=	.080"
4.6 mm	=	.180"
6.0 mm	=	.236"
6.4 mm	=	.253"
7.0 mm	=	.275"
10.0 mm	=	.400"
27.0 mm	=	1.08"
1/32"	=	0.8 mm
1/16"	=	1.6 mm
1/8"	=	3.2 mm
1/4"	=	6.4 mm
3/8"	=	9.5 mm
1/2"	=	12.7 mm

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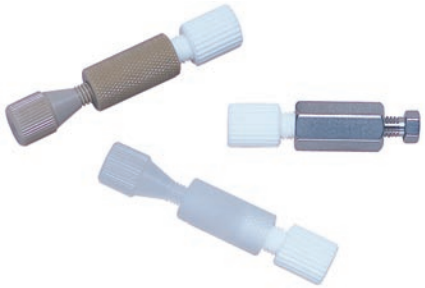
Low Pressure Unions

Unions — *Cheminert to Cheminert* — *1/4-28 to 1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated. Polypropylene unions are for use with flanged tubing only.

Tubing		**PEEK**		**CTFE**		**Polypropylene**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CUCPK		CUCKF		–	
1/16"	0.50 mm	CUPK		CUKF		–	
1/16"	0.75 mm	CUMPK		CUMKF		–	
1/8"	1.50 mm	CULPK		CULKF		–	
1/8"	Butt connection	CUTPK		CUTKF		CUTPP * (* pkg/5)	

Unions — *Cheminert to 1/16" ZDV* — *1/4-28 to 10-32*



Includes flangeless 1/4-28 and ZDV 10-32 fittings for 1/16" tubing.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CZUCPK		CZUCKF		CZUCS6	
1/16"	0.50 mm	CZUPK		CZUKF		CZUS6	
1/16"	0.75 mm	CZUMPK		CZUMKF		CZUMS6	

Unions — *Cheminert to 1/4" tubing* — *1/4-28 to 1/2-20*

Includes flangeless 1/4-28 and 1/2-20 fittings.

Tubing		**PEEK**		**CTFE**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
1/8" to 1/4"	1.50 mm	CU4LPK		CU4LKF	

Components	*Prod No*	*Price*
1/2-20 nut, CTFE	CFL-4KF	
1/2-20 nut, Delrin	CFL-4D	
CTFE ferrule	CFL-CB4KF-S	

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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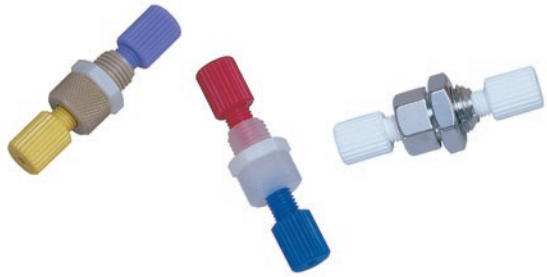
Low Pressure Bulkhead Unions

Bulkhead unions *Cheminert to Cheminert* *1/4-28 to 1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CBUCPK		CBUCKF		CBUCS6	
1/16"	0.50 mm	CBUPK		CBUKF		CBUS6	
1/16"	0.75 mm	CBUMPK		CBUMKF		CBUMS6	
1/8"	1.50 mm	CBULPK		CBULKF		CBULS6	



Bulkhead unions *Cheminert to 1/16" ZDV* *1/4-28 to 10-32*

Includes flangeless 1/4-28 and ZDV 10-32 fittings for 1/16" OD tubing.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/16"	0.25 mm	CZBUCPK		CZBUCKF		CZBUCS6	
1/16"	0.50 mm	CZBUPK		CZBUKF		CZBUS6	
1/16"	0.75 mm	CZBUMPK		CZBUMKF		CZBUMS6	

Low Pressure Tees, Crosses, and Manifolds

Tees *1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing OD	*Bore*	**PEEK** *Prod No*	*Price*	**CTFE** *Prod No*	*Price*
1/16"	0.25 mm	CTCPK		CTCKF	
1/16"	0.50 mm	CTPK		CTKF	
1/16"	0.75 mm	CTMPK		CTMKF	
1/8"	1.50 mm	CTLPK		CTLKF	

Crosses *1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing OD	*Bore*	**PEEK** *Prod No*	*Price*	**CTFE** *Prod No*	*Price*
1/16"	0.25 mm	CXCPK		CXCKF	
1/16"	0.50 mm	CXPK		CXKF	
1/16"	0.75 mm	CXMPK		CXMKF	
1/8"	1.50 mm	CXLPK		CXLKF	

Manifolds *1/4-28*

Includes flangeless 1/4-28 fittings for tubing OD indicated.

Tubing OD	*Bore*	**PEEK** *Prod No*	*Price*	**CTFE** *Prod No*	*Price*
5 ports					
1/16"	0.75 mm	C5M1PK		C5M1KF	
1/8"	1.50 mm	C5M2PK		C5M2KF	
9 ports					
1/16"	0.75 mm	C9M1PK		C9M1KF	
1/8"	1.50 mm	C9M2PK		C9M2KF	

MORE INFORMATION
Flangeless tube end fittings . . . . . page 68

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
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Mixing tees

1/4-28

Includes flangeless 1/4-28 fittings for tubing OD indicated.

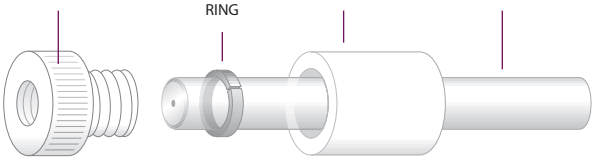
Tubing OD	*Bore*	PEEK *Prod No*	*Price*	CTFE *Prod No*	*Price*
1/16"	0.75 mm	CM1XPK		CM1XKF	
1/8"	1.50 mm	CM2XPK		CM2XKF	

Glass connectors

1/4-28 female to 1/4" glass tube

Glass connectors join a Cheminert tube end fitting to 1/4" OD glass tubing. They are available as individual components or as complete assemblies. Assemblies include a bushing and nut, a polypropylene or CTFE split ring, and a 1/4" OD x 3-1/4" long piece of 1 mm or 2 mm ID glass tube. This connector works only with our glass tubes.

Description	Acetal *Prod No*	*Price*	CTFE *Prod No*	*Price*
Complete assembly				
1 mm ID glass tubing	CGC41		CGC41KF	
2 mm ID glass tubing	CGC42		CGC42KF	
Components				
Bushing	CGCB		CGCBKF	
Nut	CGCN		CGCNKF	
Glass rod, 3-1/4" long				
1 mm ID	CGCG41		–	
2 mm ID	CGCG42		–	
Split rings *(package of 5)*	CGCR		CGCRKF	



Glass connector

Adapters

Tube adapters *1/4-28*

Tube adapters have male 1/4-28 threads going to 1/4" or 1/8" OD tubing.

Tubing		**PEEK**		**CTFE**		**316 Stainless**	
OD	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
1/8"	1.5 mm	CTA2PK		CTA2KF		CTA2S6	
1/4"	1.5 mm	CTA4PK		CTA4KF		CTA4S6	

Luer adapters *Luer to 1/4-28 or 10-32*

Luer adapters make a leak-tight connection from male or female luer to 1/4-28 threads.

		PEEK		**CTFE**		**PFA**	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*	*Prod No*	*Price*
Female luer							
to 1/4-28	1.50 mm	CFLAPK		CFLAKF		CFLAPFA	
to 10-32	0.75 mm	ZUFLPK		ZUFLKF		–	
Male luer							
to 1/4-28	1.50 mm	CMLAPK		CMLAKF		CMLAPFA	

Luer adapter bulkhead unions *Luer to 1/4-28 or 10-32*

Our luer adapter bulkhead union connects a male or female luer to 1/4-28 or 10-32 fittings. These are the ideal fittings for through-the-panel syringe injections. The 1/4-28 versions include flangeless fittings for 1/16" OD tubing. Versions with 10-32 connections (for 1/16" OD tubing) include a fingertight PEEK nut and a ferrule of the same material as the union.

		PEEK		**CTFE**	
Description	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
Female luer					
to 1/4-28	1.50 mm	CBUFLPK		CBUFLKF	
to 10-32	1.00 mm	ZBUFLPK		ZBUFLKF	
Male luer					
to 10-32	1.00 mm	ZBUMLPK		ZBUMLKF	

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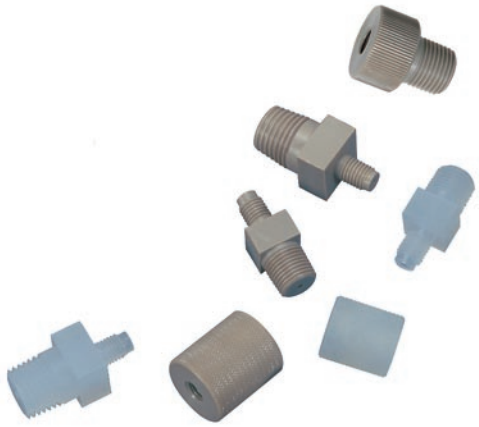


Pipe adapters

1/4-28 to NPT

Versions adapt male or female 1/4-28 fittings to male or female NPT.

		PEEK		CTFE	
NPT	*Bore*	*Prod No*	*Price*	*Prod No*	*Price*
Female 1/4-28 to male NPT					
1/8"	1.5 mm	CPA2PK		CPA2KF	$18
1/4"	1.5 mm	CPA4PK		CPA4KF	
Male 1/4-28 to male NPT					
1/8"	1.5 mm	CEPA2PK		CEPA2KF	
1/4"	1.5 mm	CEPA4PK		CEPA4KF	
Female 1/4-28 to female NPT					
1/8"	1.5 mm	CFPA2PK		CFPA2KF	
1/4"	1.5 mm	CFPA4PK		CFPA4KF	

NUT NOT INCLUDED

Cheminert 1/4-28 to Valco 10-32 ZDV adapter

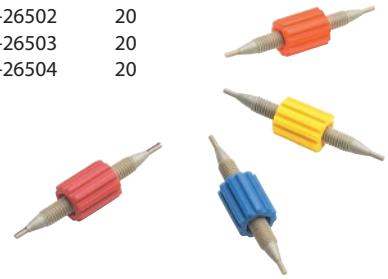
This adapter permits Valco 10-32 fittings to be installed into any 1/4-28 fitting detail. (Nut and ferrule are not included.)

Description	*Bore*	*Prod No*	*Price*
Port adapter	0.50 mm	ZLCA1PK	

One-piece fingertight column coupler

Choose from a variety of coupler IDs, indicated by the color of the sleeve (which parallels the color-coding of our PEEK tubing on page 89). A unique feature of this column coupler is that it adapts automatically to fit all pilot lengths – Valco, Waters, Upchurch, Rheodyne, etc. Since the tubing bottoms out in any fitting detail, added void volume is minimal. Material is PEEK.

Color	*Bore*	*Prod No*	*Price*
Red	0.13 mm ID	JR-26501	$20
Yellow	0.17 mm ID	JR-26502	20
Blue	0.25 mm ID	JR-26503	20
Orange	0.50 mm ID	JR-26504	20



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0.75 mm = .030"

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27.0 mm = 1.08"

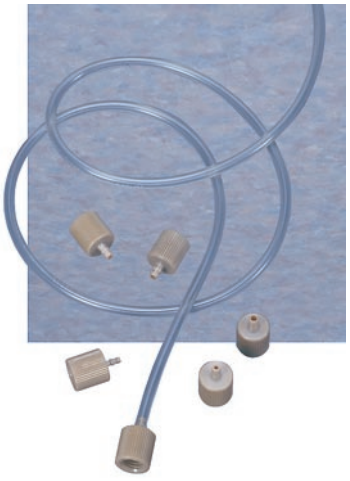
1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

Filters and Perifit Fittings

Perifit fittings for peristaltic pump tubing

The Cheminert Perifit is a unique fitting with a barb on one end and a 1/4-28 female fitting on the other end, for connecting a FIA line with the most commonly used peristaltic tubing. The fitting is compact and easy to install while providing a secure, trouble-free connection. A Perifit can be used as a "stop" on standard inexpensive Tygon® tubing, eliminating the need to buy the more expensive pre-cut tubing with pre-installed stops. Unlike many competitive systems, Perifits are reusable as the tubing wears.



Three sizes of Perifits are available to cover the range of tubing most commonly used in FIA.

For use with tubing sizes	*Prod No*	*Price*
0.50 to 1.02 mm ID	C-PFS	
1.12 to 1.65 mm ID	C-PFM	
1.85 to 2.29 mm ID	C-PFL	
Kit with 2 of each size above	C-PF	

In-line filters *1/4-28*

These convenient filters can be simply dropped into any 1/4-28 fitting detail. Constructed of PTFE and CTFE, with 316 stainless low-pressure-drop screen. (Fitting shown is not included.)

Pore size	*Prod No*	*Price*
2 micron	CFE-S2	
10 micron	CFE-S10	
75 micron	CFE-S75	

Biocompatible filter

This all-PEEK filter can be placed in any 1/16" line, providing filtration to 0.5 microns. The filter can be changed without tools, since both the filter housing and the fittings are designed to be hand tightened.

Tubing OD	*Bore*	*Prod No*	*Price*
1/16"	0.5 mm	ZU1FPK.5	

Replacement elements (PEEK-encapsulated titanium)

Pore size	*Prod No*	*Price*
0.5 micron	C-F1.5TI	

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
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Last Drop mobile phase filter

The Last Drop mobile phase filter allows more analyses per batch of mobile phase and helps reduce hazardous waste. The flat filter element sits parallel to the bottom of the reservoir, allowing the Last Drop to filter all but the last 2% of the mobile phase from the reservoir without drawing air into the system. Compare this with conventional cylindrical filters that can begin to draw air into the system when nearly 10% of the solvent remains in the reservoir.

The Last Drop mobile phase filter consists of a 316 stainless or PTFE filter element pressed into an inert PTFE housing. The top of the housing has a PEEK tripod which slips into 1.5, 2.2, or 3.5 mm ID pump inlet lines. It will also work with our 1/16" and 1/8" flangeless fittings.

Use the metal-free PTFE version for sensitive biochromatography applications where metal surfaces may corrode or interact with samples.

	Filter element	*Prod No*	*Price*
Last drop filter, 2.5µm	PTFE	JR-9000-0520	
	Stainless steel	JR-9000-0530	

Last Drop filter/spargers

The Last Drop filter/sparger combines filtration and sparging in a single unit. The PTFE housing contains a mobile phase filter with either a stainless steel or a PTFE filter element. The filter/sparger features a PEEK tripod connector for the solvent line, and a nut and ferrule for the sparging line.

	Filter element	*Prod No*	*Price*
Last drop filter/sparger			
2.5 µm filter, 10 µm sparger	PTFE	JR-9000-0602	
	Stainless steel	JR-9000-0640	

Filters

No-Met biocompatible mobile phase filter

Stainless steel in the flowpath is not acceptable in a growing number of applications involving the separation of biomolecules. High salt buffers can corrode stainless steel, and the metal ions released from metallic filters may contaminate or otherwise react with the biomolecules of interest.

The No-Met polyethylene filter is designed for these applications, with inert polymeric fittings and 20 µm filter effectively eliminating metal contamination from the fluid path. Use them for IC and biochromatography applications.

Because they are hydrophobic, No-Met filters may initially require some priming with methanol or acetonitrile.

	Prod No	*Price*
No-met mobile phase filter, 1/8"	JR-32178	
Replacement element	JR-32179	

Stainless steel mobile phase filters and helium spargers

Mobile phase filters protect your HPLC system from small particles in the mobile phase. These filters are made from 316 stainless and PEEK or PTFE, and are suitable for use with most solvents.

Helium spargers offer an inexpensive way to prepare and maintain mobile phases free of dissolved gases. Connect these spargers to a regulated supply of helium gas (0-400 ml/min) to remove dissolved gases from the mobile phase. Spargers are made from 10 micron porosity stainless steel.

Tubing OD	*Porosity*	*Suggested Max. Flow Rate (ml/min)*	*Prod No*	*Price*
1/16"	2 µm	8	JR-367016-2	
1/16"	10 µm	20	JR-367016-10	
1/16"	20 µm	20	JR-367016-20	
1/8"	2 µm	8	JR-367008-2	
1/8"	10 µm	20	JR-367008-10	
1/8"	20 µm	20	JR-367008-20	

Mobile phase filters *Direct connect*

Cheminert mobile phase filters provide point-of-use filtering of common HPLC or FIA solvents. They are designed to connect directly to 1/8" OD PTFE or PEEK tubing using a simple press fit. The filter housing is PTFE and includes a 2 or 10 micron titanium frit.

Pore size	*Prod No*	*Price*
2 micron	C-MPFTI2	
10 micron	C-MPFTI10	

0.25 mm = .010"
0.50 mm = .020"
0.75 mm = .030"

1.0 mm = .040"
1.5 mm = .060"
2.0 mm = .080"

4.6 mm = .180"
6.0 mm = .236"
6.4 mm = .253"

7.0 mm = .275"
10.0 mm = .400"

27.0 mm = 1.08"

1/32" = 0.8 mm
1/16" = 1.6 mm
1/8" = 3.2 mm

1/4" = 6.4 mm
3/8" = 9.5 mm
1/2" = 12.7 mm

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Mobile phase or solvent reservoirs *1/4-28*

These high density polyethylene reservoirs for in-line solvent use come with polypropylene caps, 1/4-28 flangeless fittings, and 1/8" PTFE tubes for one or two lines plus vent. Plugs are included for conversion to solvent storage when the reservoir is removed from the system. Optional PTFE filters with titanium frits are available on the facing page.

Capacity	*Cap*	*Prod No*	*Price*
0.5 liter	2-hole	C-MPR2	
0.5 liter	3-hole	C-MPR3	
0.5 liter	plain	C-BOT16	
1.0 liter	plain	C-BOT32	

VICI-cap

The VICI-cap is the most economical way to helium sparge and deliver HPLC mobile phases. The insert is manufactured from PTFE with an EPDM* O-ring and a polypropylene screw cap.

The VICI-cap is available for either GL45 or S40 threaded bottles. It has a 1/4-28 female port and three ports for tubing insertion: two 1/8" tubing ports and a 1/16" tubing port. The tubing ports are made so that you push the tubing through the hole, while 1/4-28 fittings provide the best connection. Unused ports can be plugged as required.

	Prod No	*Price*
VICI-cap GL-45	JR-9000-0001	
VICI-cap S40	JR-9000-0006	

Valves for vials

The screw-cap Mininert is available in a variety of sizes. The crimp-top valve for 13 mm ID glassware slides into the neck of the vial and features a threaded flange, which is turned to provide a leak-tight fit.

Pkg/12:	*Cap/thread size*	*Prod No*	*Price*
	13 mm-425	PS-614158	
	15 mm-425	PS-614160	
	18 mm-400	PS-614161	
	20 mm-400	PS-614170	
	24 mm-400	PS-614163	
	Crimp top	PS-614250	

MORE INFORMATION

Bulkhead connectors .... page 73
Flangeless fittings 68
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Polymeric tubing..... 90

TECH TIP

The VICI-cap is not usable for building up a helium atmosphere within the solvent bottle. It is only designed for continuous helium sparging.

*Ethylene Propylene Diene Monomer

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