

FLUIDIC & OPTICAL PRODUCTS AND INFORMATION

FLUIDICS

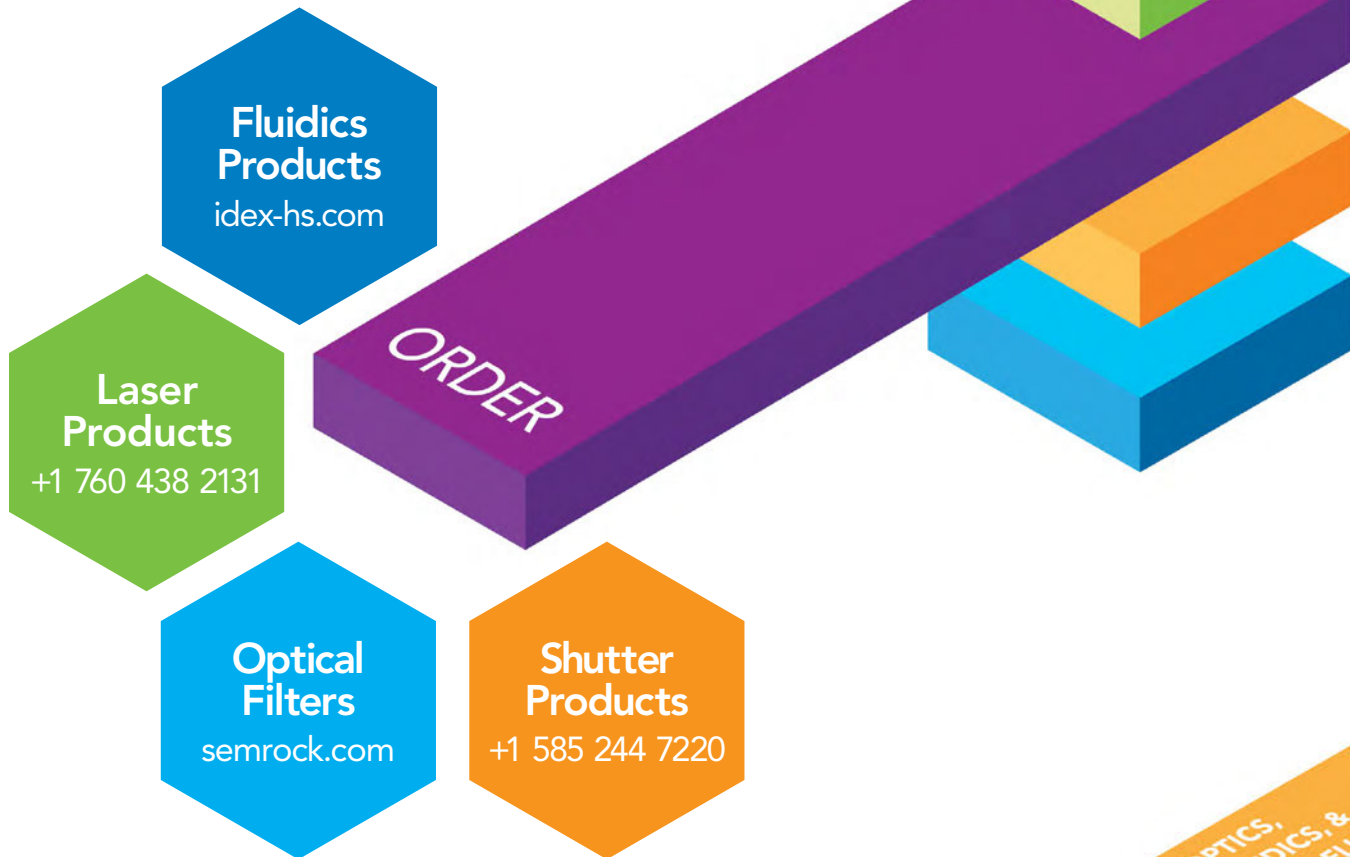
TUBING
FITTINGS
CONNECTORS
FILTERS & FRITS
VALVES
DEGASSERS
COLUMN HARDWARE
MARVELX
TUBING KITS

OPTICS

SHUTTERS
LASERS
OPTICAL FILTERS
ROTOR DRIVE SHUTTERS
DICHROIC BEAMSPLITTERS
SINGLE-BAND FILTER SETS
DPSS LASERS

LABORATORY SHUTTERS
SOLENOID SHUTTERS
MULTI-BAND FILTER SETS
STEPPER MOTOR SHUTTERS
HELIUM NEON LASERS

CONED FITTINGS
FLAT BOTTOM FITTINGS
UHPLC FITTINGS
VHP FITTINGS
DEBUBBLERS
PLUGS & CAPS
ACCESSORIES
FLANGED FITTINGS
SPECIALTY FITTINGS
FITTINGS KITS
LARGE BORE FITTINGS
HIGH PRESSURE
FLUOROPOLYMER
THREADED
MICROPORT
MULTI-PORT
LUER ADAPTERS
PEEK FRITS
SUS 316L
SUS 316L FRITS
ACCESSORIES



For your information, our U.S. Federal Taxpayer Identification number is 01-0736657; European Taxpayer Identification number is DE 146581180.

ORDER PROCESSING/ SHIPPING

Orders placed on our website process and ship as specified during the checkout process. Orders that are placed via fax/email will be subject to a \$100 minimum order quantity and typically process within one business day and ship within two business days. Customers who have established contract pricing terms must place catalog orders directly with their Customer Service representative.

All shipments are FCA unless otherwise noted. For orders not placed via our website, shipping charges will be prepaid and added to the invoice. Or, if requested, we will charge your carrier account number.

TERMS

Credit cards are accepted for orders placed within the United States. Purchase orders may also be used by qualified customers. No international credit card payment is possible. No international shipments are possible. For terms and conditions of sale please visit www.idex-hs.com/legal-notices. Terms and prices are subject to change without notice.

RETURN OF MATERIALS

Returns must be authorized in advance. Please contact us within 30 days of purchase for your Returns Material Authorization (RMA) Number. A restocking fee may apply. To request a Return Materials Authorization for IDEX Health & Science products visit www.idex-hs.com/return.

Product purchased through a Distributor must be returned directly to that Distributor. Please contact them for Return Material Authorization procedures.

DIRECT FROM OUR GLOBAL DISTRIBUTION NETWORK

IDEX Health & Science has established relationships with a global network of Distributors that offer outstanding product support and assistance. In order to meet our customer's needs, and the demands of being a global supplier, we have come to rely on our authorized Distributors to provide value-added service and support of our products. While we are happy to take your order directly, we encourage you to contact your local IDEX Health & Science Distributor.

HOW TO FIND A LOCAL DISTRIBUTOR FOR FLUIDICS PRODUCTS

For a complete distributor listing please visit www.idex-hs.com/distributors or email:

US:
IHSOrders@idexcorp.com

Europe:
CustomerService.hsEurope@idexcorp.com

Asia:
CustomerService.hsAsia@idexcorp.com

Our customer service team will help you contact a distributor in your area.

HOW TO FIND A LOCAL DISTRIBUTOR FOR SEMROCK PRODUCTS

For a complete distributor listing please visit www.semrock.com/international-distributors.aspx

The products in this catalog are intended for use with analytical, biotechnology and diagnostic equipment and accessories. THE MANUFACTURERS OF THE PRODUCTS IN THIS CATALOG SHALL HAVE NO LIABILITY WHATSOEVER DUE TO ANY MISUSE OF THEIR PRODUCTS. Of course, the safe use of our products depends on our customers, since it is you who select and control the protective gear and safety procedures used, as well as the pressures, temperatures, solvents, samples, ventilation, and other variables. Product and material performance ratings are provided as guides only. Individual field tests should be performed by customers to determine safe operating parameters given your particular procedures and use. IDEX Health & Science facilities are certified ISO 9001.



WE HAVE A NEW VISION FOR THE WORLD OF FLUIDICS & OPTICS

As your trusted partner in life science instrument development, we continue to invest in leading technologies and capabilities to solve your most demanding challenges.

For this reason, we have strategically integrated innovative optical companies, like Semrock and Melles Griot, to bring you a newly enhanced portfolio of state-of-the-art components and capabilities that are unrivaled in breadth, performance, quality and design.

Now, as *the* global authority in fluidics and optics, we deliver a complete spectrum of highly engineered solutions, and more powerful platforms than ever before.



Our vision of the complete path goes far beyond just meeting your needs — it anticipates them, with *intelligent solutions for life.*



FLUIDICS

OPTICS

BRINGING FLUIDICS & OPTICS TOGETHER

Our fusion of advanced optofluidic technologies is bringing together fluidics and optics to make your life science instrumentation innovation faster and easier.

IDEX Health & Science is respected worldwide for solving complex problems and delivering complete development path innovation for analytical, diagnostic, and biotechnology applications.



TARGETING YOUR SOLUTION

Our dynamic lineup of intelligently engineered fluidic and optical solutions exceed the standards for early design and rapid innovation. We partner with you to maximize system performance and provide instrument and consumable developers with these significant advantages:

- › Fluidic & Optical Solutions
- › Custom Module Development
- › Rapid Response Programs
- › Design for Manufacturability

 **LEARN MORE**

Explore our entire product portfolio and capabilities by visiting www.idex-hs.com



FLUIDICS

12 FLUIDIC CONNECTIONS

13 TUBING

- 16 PEEK Tubing
- 19 Stainless Steel Tubing
- 22 PEEKsil™ Tubing
- 24 PFA Tubing
- 26 FEP Tubing
- 27 ETFE Tubing
- 28 Tools

30 FITTINGS

- 32 One-Piece Fingertight Fittings
- 33 Stainless Steel Fittings
- 34 MicroTight® Fittings
- 35 Two-Piece Fingertight Fittings
- 36 Two-Piece SealTight™ Fingertight Fittings

- 37 NanoTight™ Fittings & Sleeves
- 38 LiteTouch® Fittings
- 39 Super Flangeless™ Fittings
- 42 VacuTight™ Fittings
- 43 Metric Flangeless Fittings
- 44 Flanged Fittings
- 45 Flangeless Fittings
- 48 MarvelX™
- 50 Fittings Tools
- 52 Tubing Sleeves
- 55 Plugs & Caps
- 56 Large Bore Fittings
- 57 VHP Micro Fittings
- 58 VHP PK Fittings
- 59 Stainless Steel VHP Fittings
- 60 Reusable VHP Fittings
- 61 Assorted Fittings Kits

62 CONNECTORS

- 63 Threaded Adapters
- 67 High Pressure Mixing Tees
- 69 High Pressure Unions
- 70 High Pressure PEEK Tees & Crosses
- 71 High Pressure MicroTight® Unions
- 72 High Pressure Stainless Steel Tees & Crosses

- 73 VHP Stainless Steel ZDV Unions
 - 74 VHP Tees & Crosses
 - 75 VHP MicroTight® Unions
 - 77 MicroTight® Adapters
 - 79 Accessories
 - 80 NanoPort Assemblies
 - 81 Low Pressure Manifolds
 - 82 Low Pressure Bulkhead Unions
 - 83 Low Pressure Y Connectors
 - 84 Low Pressure Unions
 - 86 Low Pressure Tees & Crosses
 - 87 Quick Connect Luer Adapters
 - 89 LuerTight™ Fittings
 - 90 Barbed Connectors
- ### 94 FILTERS & FRITS
- 95 Stainless Steel Frits
 - 97 PEEK Frits
 - 99 Frit-in-a-Ferrule™
 - 100 Bottom-of-the-Bottle™ Filters
 - 102 Inlet Solvent Filters
 - 103 Inline Filters
 - 105 Precolumn Filters
 - 107 Semi-Prep Filters
 - 108 Inline MicroFilters
 - 109 Mini MicroFilters
 - 110 Precolumn MicroFilters
 - 111 Bottle Caps
 - 112 Bottle Cap Plugs

How
To Order
Page 2

What's New
Page 8

Technical
Resources
Page 218

Index by
Part Number
Page 220

114 VALVES

- 119 Stand Alone Valve Products
- 120 Rapid Replacement Pods™
- 121 Manual Valves
- 124 Spare Parts
- 126 Valve accessories
- 127 Stainless Steel Sample Loops
- 128 PEEK Sample Loops
- 131 Suction Needle Adapter
- 132 Injection Port Adapters
- 133 Wrenches, Brackets, & Replacement Fittings
- 134 FLOW REGULATING VALVES**
- 135 Inline Cartridge Check Valves
- 136 Standard 1/4-28 Inline Check Valves
- 137 Non-Metallic Check Valves
- 139 Quick-Stop Luer Inline Check Valve
- 140 Micro-Splitter Valves
- 141 Micro-Metering Valves
- 142 Shut-Off Valves

143 BACK PRESSURE REGULATORS

- 144 Ultra-Low Volume Back Pressure Regulators (BPRs)
- 145 Back Pressure Regulator Assemblies
- 146 Back Pressure Regulator Holders
- 147 Back Pressure Regulator Cartridges
- 148 Pressure Relief Valves

150 DEGASSERS

- 151 Debubblers
- 154 Full Stand Alone Degassing Systems

156 COLUMN HARDWARE

- 157 Guard Hardware
- 158 Guard Columns

164 SHUTTERS**165 ROTOR DRIVE**

- 166 Flag Shutters
- 167 Paddle Shutters
- 168 RDS Shutters
- 170 SafeClose™ Shutters
- 171 Rotary Drive Integrated Controller Shutters

172 STEPPER MOTOR SHUTTERS

- 172 Stepper Shutters

174 SOLENOID SHUTTERS

- 175 IES™ Shutters
- 176 UltraThin™ Shutters
- 178 ExtremeService™ Shutters
- 179 Laser Shutters

180 SHUTTER CONTROLLERS

- 181 Rotor Drive Shutter Controllers
- 182 Electronic Shutter Controllers

184 LASERS

- 185 Helium Neon Lasers
- 188 Diode Lasers
- 190 DPSS Lasers

196 OPTICAL FILTERS

- 197 LightSuite™ Online Toolbox
- 199 BrightLine®
- 207 LaserMUX™
- 208 StopLine®
- 210 VersaChrome®
- 212 RazorEdge®
- 214 EdgeBasic™
- 215 MaxLine®™
- 216 MaxDiode
- 217 Near Infrared Bandpass Filters
- 217 Custom Sized Optical Filters

OPTICS



NEW

MarvelX™

Advance Your Fluidic Systems with Next Generation UHPLC Connection Technology

Page 48

WHAT'S



NEW

Shutters

Optimize Your Products with State-of-the-Art Melles Griot Optical Shutters, Designed for Flawless Performance and Manufacturability

Page 164

NEW

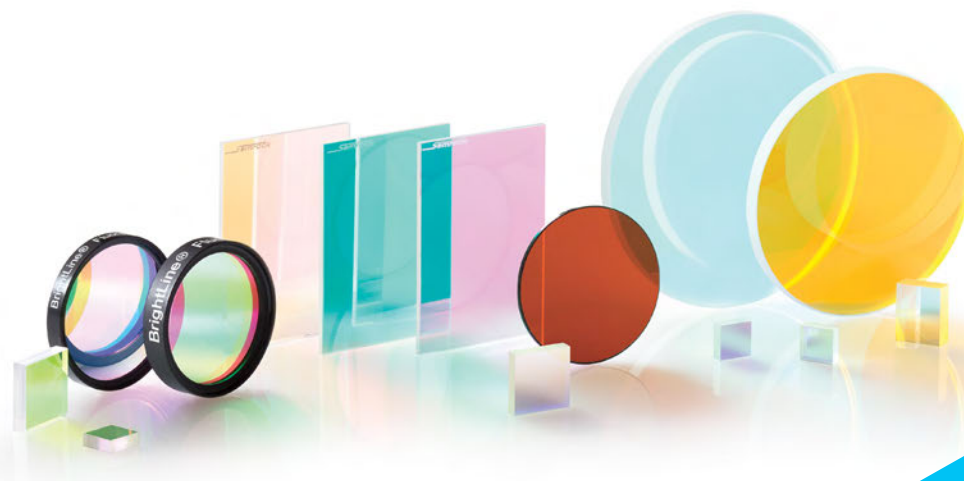
NEW

Lasers

Increase Your System's Imaging Performance with Long-Life, Field-Proven Melles Griot Lasers

Page 184





NEW

Optical Filters

Optimize Your Spectral Output and Performance with Spectrally Complex Semrock Optical Filters

Page 196

CATALOG HINTS



Bio

Biocompatible Products

Look for components with the blue "Bio" icon, which designates products that use materials anticipated to maintain the integrity and improve the analysis of biological samples in your intended applications.



Navigation Breadcrumbs

Quickly pinpoint any product or product family within this catalog to the same navigation path each product is categorized on our website. Look to the bottom of every product page for easy-to-follow breadcrumbs to locate specific categories and sub-categories in sequential order, then visit: www.idex-hs.com.



Welcome to Fluidics

We are the premier provider of intelligently engineered fluidic components, assemblies, and integrated solutions for a wide range of life science applications that require precise control and measurement.

Perform precise sample preparation and analysis with our premium fluidic solutions.



FLUIDICS



12 FLUIDIC CONNECTIONS

114 VALVES

150 DEGASSERS

156 COLUMN HARDWARE



Fluidic Connections

IDEX Health & Science has developed a comprehensive line of standard and custom tubing, connectors, fittings, and flow control devices that meet the increasingly demanding requirements of today's high performance analytical fluidic systems. We feature specialty, high-performance polymers and distinct materials designed to work with your system needs. We offer unique products such as biocompatible PEEK-lined stainless steel tubing as well as an assortment of high pressure and fluoropolymer tubing. All of our fittings, filters and frits and connectors come in a variety of materials and styles. We can provide micro and nano-scale dimensions and well as custom forming, assembly and kitting. We also offer our RI detector that provide high resolution and low dispersion detection for HPLC applications.

13

TUBING

30

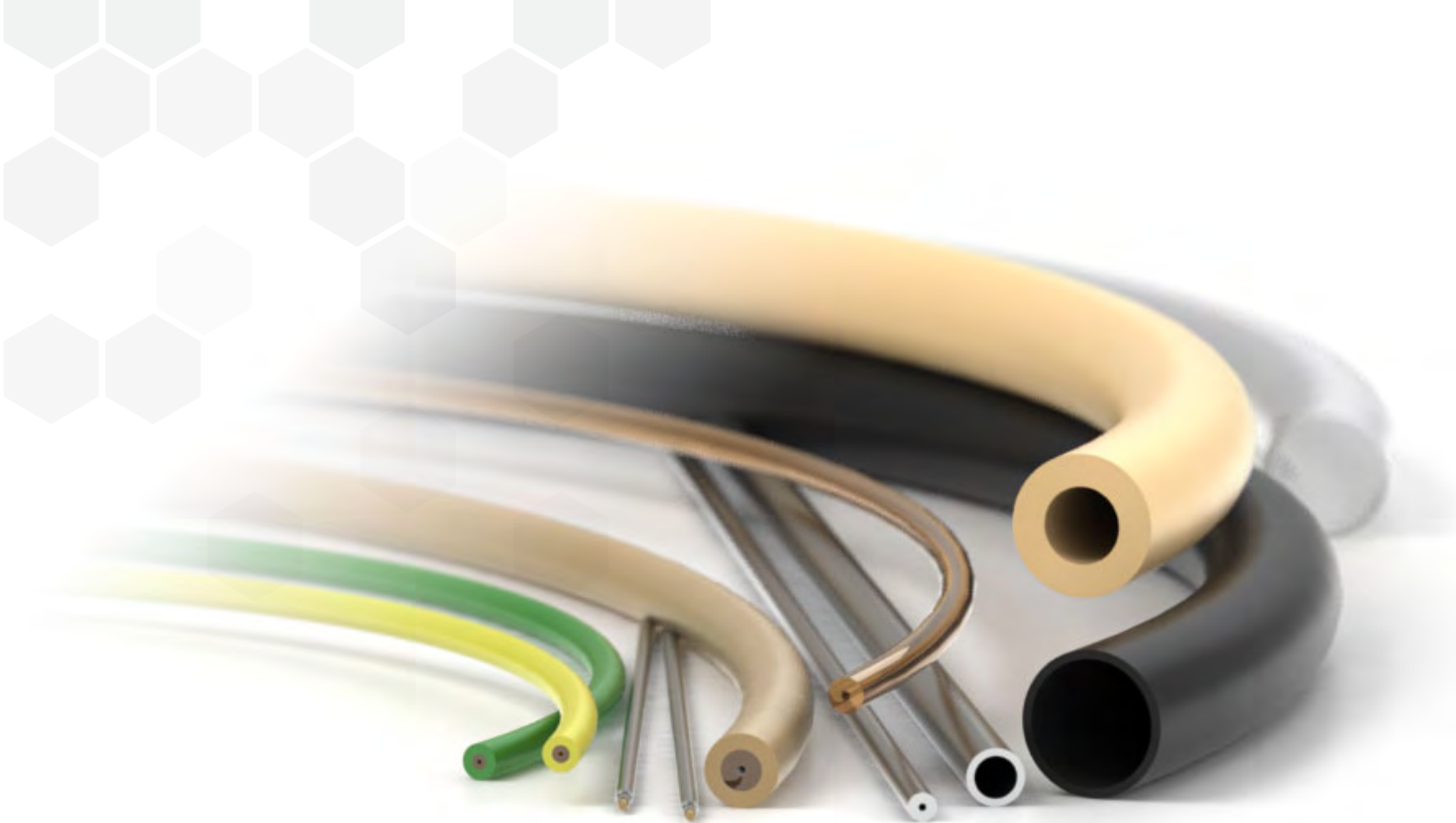
FITTINGS

62

CONNECTORS

94

FILTERS & FRITS



TUBING

Our high quality, versatile tubing is offered in a variety of materials and styles to meet your system requirements. Our high pressure tubing includes biocompatible PEEK selections and well as seamless, pre-cut stainless steel. Our fluoropolymer tubing is constructed with genuine Teflon™ FEP and PFA resin, and our unique High Purity PFA. Many of our tubing options are color coded for easy detection and some are translucent making it easy to view the fluid pathway. Our tubing is manufactured to precise tight tolerances to ensure dependable product consistency.

- 16** HIGH PRESSURE TUBING
- 24** FLUOROPOLYMER TUBING
- 28** TOOLS

TUBING OVERVIEW & FUNCTIONS

HIGH PRESSURE TUBING



| TUBING: | PEEK | Capillary PEEK | Fused Silica | Stainless Steel | PEEKsil™ |
|--------------------|---|--|---|--|---|
| Page | 16 | 16 | 16 | 19 | 22 |
| Description | <p>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.</p> <ul style="list-style-type: none"> Great alternative for stainless steel tubing in high pressure applications Many sizes available in color scheme to help identify ID | <p>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.</p> <ul style="list-style-type: none"> Available in common capillary tubing sizes with tight tolerances on OD and ID Tubing sleeves available for capillary tubing connections | <p>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.</p> <ul style="list-style-type: none"> Most commonly used OD and ID sizes available High quality, polyimide-clad fused silica Offered in convenient, two meter lengths | <p>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.</p> <ul style="list-style-type: none"> 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 | <p>PEEKsil is mechanically strong and has ideal characteristics for sealing with metal or polymer fittings.</p> <ul style="list-style-type: none"> 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 |

HIGH PRESSURE TUBING SPECIFICATIONS

| | | | | | |
|-----------------------------------|--|---|------------------------------------|--|---|
| OD (outside diameter) | 1/32" (785 µm), 1/16" (1.55 mm), 1/8" (3.2 mm) | 0.0145" (360 µm), 1/32" (785 µm), 0.020" (0.5 mm) | 0.0145" (360 µm) | 1/32" (785 µm), 1/16" (1.55 mm), 1/8" (3.2 mm) | 0.0145" (360 µm), 1/32" (785 µm), 1/16" (1.55 mm) |
| ID (inside diameter) | 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) | 0.004" (100 µm)– 0.080" (2.0 mm) | 0.001" (25 µm)– 0.012" (300 µm) |
| Operating Temp | -51 to 100 °C | -51 to 100 °C | -51 to 100 °C | -51 to 289 °C | -51 to 100 °C |
| Pressure Rating | 500–10,000 psi (34–690 bar) | 2,000–5,000 psi (138–345 bar) | N/A* | N/A* | 10,000 psi (690 bar) |
| Typical Tolerances | ±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) | ±0.001" (25 µm) for 1/16" OD tubing; ±0.003" (75 µm) for 1/8" OD tubing | ±0.0004" (10 µm) |
| Refractive Index (Clarity) | Opaque | Opaque | 1.78 | Opaque | Opaque |
| pH Range | 0–14 | 0–14 | 0–10 | 1–14 | 0–10 |
| Sterilization Techniques | Gamma irradiation; ethylene oxide; thermal | Gamma irradiation; ethylene oxide; thermal | Ethylene oxide; thermal | Gamma irradiation; ethylene oxide; thermal | Ethylene oxide; thermal |
| Autoclavable? | Y | Y | Y | Y | Y |

*The manufacturer of this tubing or material does not publish this specification.

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.

1 mm
OD



Page(s)
26

2 mm
OD



Page(s)
26

3 mm
OD



Page(s)
26

FLUOROPOLYMER TUBING



| TUBING: | PFA | High Purity PFA | 360 µm High Purity PFA | FEP | ETFE |
|--------------------|---|--|--|--|--|
| Page | 24 | 24 | 24 | 26 | 27 |
| Description | <p>Offers excellent chemical compatibility, plus due to its inner surface smoothness, PFA tubing tends to be more translucent than PTFE tubing.</p> <ul style="list-style-type: none"> • Offers higher purity and enhanced translucence when compared with other fluoropolymer tubes • Great for more critical, low pressure applications | <p>This polymer tubing is manufactured from a premium grade of PFA — one of the most contaminant-free polymers on the market.</p> <ul style="list-style-type: none"> • 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 | <p>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.</p> <ul style="list-style-type: none"> • Replacement for capillary tubing in low pressure applications where excellent chemical compatibility is required • Tubing sleeves available for capillary tubing connections | <p>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.</p> <ul style="list-style-type: none"> • Great for general, low pressure applications • Many sizes available in multiple colors for easy identification • Tight manufacturing tolerances to ensure product consistency | <p>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.</p> <ul style="list-style-type: none"> • Excellent solvent resistance • More durable and less gas permeable than PTFE, FEP, and PFA • Operating temperatures up to 80 °C |

FLUOROPOLYMER TUBING SPECIFICATIONS

| | | | | | |
|-----------------------------------|--|---|---|---|--|
| OD (outside diameter) | 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" (1.55 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" (1.6 mm), 1/8" (3.2 mm), 1/4" (6.35 mm) |
| ID (inside diameter) | 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) | 0.003" (0.075 mm) – 0.250" (6.35 mm) | 0.010" (0.25 mm)– 0.188" (4.80 mm) |
| Operating Temp | -51 to 80 °C | -51 to 80 °C | -51 to 80 °C | -51 to 50 °C | -51 to 80 °C |
| Pressure Rating | 500–2,000 psi (34–138 bar) | 250–2,000 psi (17–138 bar) | 1,750–3,500 psi (121–241 bar) | 2,500–4,000 psi (172–276 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) or 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 | ±0.001" (25 µm) for 1/16" OD tubing; ±0.003" (75 µm) for 1/8" OD tubing |
| Refractive Index (Clarity) | 1.34 | 1.34 | 1.34 | 1.338 | 1.4 |
| pH Range | 0–14 | 0–14 | 0–14 | 0–14 | 0–14 |
| Sterilization Techniques | Ethylene oxide; thermal | Gamma irradiation; ethylene oxide; thermal | Gamma irradiation; ethylene oxide; thermal | Ethylene oxide; thermal | Ethylene oxide |
| Autoclavable? | Y | Y | Y | Y | Y |

360 µm
OD

Page(s)
18, 24

1/32"
OD

Page(s)
18, 20, 23

1/16"
OD

Page(s)
18, 23, 21,
26, 27

1/8"
OD

Page(s)
18, 21, 26, 27

3/16"
OD

Page(s)
26

1/4"
OD

Page(s)
26

5/16"
OD

Page(s)
26



PEEK Tubing

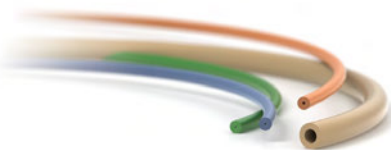
- › 1/16" or 1/8" outside diameter available
- › Biocompatible, inert, and easily cut
- › Great for high pressure applications
- › Maximum continuous use temperature: 100 °C

Our 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 28.



Capillary PEEK Tubing

- › 360 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 62) and to some of the valves in the Valves chapter (starting on page 114).



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.

 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.

 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 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 also available by the inch. Contact your local Distributor or IDEX Health & Science directly for pricing information.

 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 "Literature Request" 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 19). 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.

 SPECIFICATIONS & DETAILS

| Tubing OD | Tubing ID | OD Tolerance | ID Tolerance |
|---|-------------------------------------|--------------------|--------------------|
| PEEK TUBING SPECIFICATIONS | | | |
| 1/16" | 25 µm | ±0.001" (25 µm) | ±0.0005" (12.5 µm) |
| 1/8" | All | ±0.003" (75 µm) | ±0.003" (75 µm) |
| CAPILLARY PEEK TUBING SPECIFICATIONS | | | |
| 360 µm | All | ±0.0005" (12.5 µm) | ±0.0005" (12.5 µm) |
| 1/32" | All | ±0.0005" (12.5 µm) | ±0.0005" (12.5 µm) |
| FUSED SILICA TUBING, 360 µm OD | | | |
| 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) |

PEEK Tubing (Cont.)

PEEK Tubing

| Part No. | ID | Color | Max. Pressure | Qty. |
|---|---------------------------------------|---------|----------------------|------|
| PEEK TUBING, 1/16" OD | | | | |
| 1560 | 0.0025" (65 µm) ID x 5' (1.5 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1560L | 0.0025" (65 µm) ID x 50' (15 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1560XL | 0.0025" (65 µm) ID x 100' (30 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1560M | 0.0025" (65 µm) ID x 1,000' (304 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1561 | 0.004" (0.10 mm) ID x 5' (1.5 m) | Black | 7,000 psi (483 bar) | ea. |
| 1561L | 0.004" (0.10 mm) ID x 50' (15 m) | Black | 7,000 psi (483 bar) | ea. |
| 1561XL | 0.004" (0.10 mm) ID x 100' (30 m) | Black | 7,000 psi (483 bar) | ea. |
| 1561M | 0.004" (0.10 mm) ID x 1,000' (304 m) | Black | 7,000 psi (483 bar) | ea. |
| 1535 | 0.005" (0.125 mm) ID x 5' (1.5 m) | Red | 7,000 psi (483 bar) | ea. |
| 1535L | 0.005" (0.125 mm) ID x 50' (15 m) | Red | 7,000 psi (483 bar) | ea. |
| 1535XL | 0.005" (0.125 mm) ID x 100' (30 m) | Red | 7,000 psi (483 bar) | ea. |
| 1535M | 0.005" (0.125 mm) ID x 1,000' (304 m) | Red | 7,000 psi (483 bar) | ea. |
| 1536 | 0.007" (0.175 mm) ID x 5' (1.5 m) | Yellow | 7,000 psi (483 bar) | ea. |
| 1536L | 0.007" (0.175 mm) ID x 50' (15 m) | Yellow | 7,000 psi (483 bar) | ea. |
| 1536XL | 0.007" (0.175 mm) ID x 100' (30 m) | Yellow | 7,000 psi (483 bar) | ea. |
| 1536M | 0.007" (0.175 mm) ID x 1,000' (304 m) | Yellow | 7,000 psi (483 bar) | ea. |
| 1531 | 0.010" (0.25 mm) ID x 5' (1.5 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1531L | 0.010" (0.25 mm) ID x 50' (15 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1531XL | 0.010" (0.25 mm) ID x 100' (30 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1531M | 0.010" (0.25 mm) ID x 1,000' (304 m) | Natural | 7,000 psi (483 bar) | ea. |
| 1531B | 0.010" (0.25 mm) ID x 5' (1.5 m) | Blue | 7,000 psi (483 bar) | ea. |
| 1531BL | 0.010" (0.25 mm) ID x 50' (15 m) | Blue | 7,000 psi (483 bar) | ea. |
| 1531BXL | 0.010" (0.25 mm) ID x 100' (30 m) | Blue | 7,000 psi (483 bar) | ea. |
| 1531BM | 0.010" (0.25 mm) ID x 1,000' (304 m) | Blue | 7,000 psi (483 bar) | ea. |
| 1532 | 0.020" (0.50 mm) ID x 5' (1.5 m) | Orange | 6,000 psi (414 bar) | ea. |
| 1532L | 0.020" (0.50 mm) ID x 50' (15 m) | Orange | 6,000 psi (414 bar) | ea. |
| 1532XL | 0.020" (0.50 mm) ID x 100' (30 m) | Orange | 6,000 psi (414 bar) | ea. |
| 1532M | 0.020" (0.50 mm) ID x 1,000' (304 m) | Orange | 6,000 psi (414 bar) | ea. |
| 1533 | 0.030" (0.75 mm) ID x 5' (1.5 m) | Green | 4,000 psi (276 bar) | ea. |
| 1533L | 0.030" (0.75 mm) ID x 50' (15 m) | Green | 4,000 psi (276 bar) | ea. |
| 1533XL | 0.030" (0.75 mm) ID x 100' (30 m) | Green | 4,000 psi (276 bar) | ea. |
| 1533M | 0.030" (0.75 mm) ID x 1,000' (304 m) | Green | 4,000 psi (276 bar) | ea. |
| 1538 | 0.040" (1.00 mm) ID x 5' (1.5 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1538L | 0.040" (1.00 mm) ID x 50' (15 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1538XL | 0.040" (1.00 mm) ID x 100' (30 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1538M | 0.040" (1.00 mm) ID x 1,000' (304 m) | Natural | 3,000 psi (207 bar) | ea. |
| PEEK TUBING, 1/8" OD | | | | |
| 1534 | 0.062" (1.55 mm) ID x 5' (1.5 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1544 | 0.080" (2.00 mm) ID x 5' (1.5 m) | Natural | 3,000 psi (207 bar) | ea. |
| 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. |
| 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, 1/32" OD | | | | |
| 1576 | 0.005" (0.125 mm) ID x 5' (1.5 m) | Red | 5,000 psi (345 bar) | ea. |
| 1576L | 0.005" (0.125 mm) ID x 50' (15 m) | Red | 5,000 psi (345 bar) | ea. |
| 1576XL | 0.005" (0.125 mm) ID x 100' (30 m) | Red | 5,000 psi (345 bar) | ea. |
| 1576M | 0.005" (0.125 mm) ID x 1,000' (304 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. |
| 1577L | 0.007" (0.175 mm) ID x 50' (15 m) | Yellow | 5,000 psi (345 bar) | ea. |
| 1577XL | 0.007" (0.175 mm) ID x 100' (30 m) | Yellow | 5,000 psi (345 bar) | ea. |
| 1577M | 0.007" (0.175 mm) ID x 1,000' (304 m) | Yellow | 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. |
| 1581L | 0.010" (0.25 mm) ID x 50' (15 m) | Blue | 5,000 psi (345 bar) | ea. |
| 1581XL | 0.010" (0.25 mm) ID x 100' (30 m) | Blue | 5,000 psi (345 bar) | ea. |
| 1581M | 0.010" (0.25 mm) ID x 1,000' (304 m) | Blue | 5,000 psi (345 bar) | ea. |
| 1568 | 0.015" (0.40 mm) ID x 5' (1.5 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1568L | 0.015" (0.40 mm) ID x 50' (15 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1568XL | 0.015" (0.40 mm) ID x 100' (30 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1568M | 0.015" (0.40 mm) ID x 1,000' (304 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1569 | 0.020" (0.50 mm) ID x 5' (1.5 m) | Orange | 3,000 psi (207 bar) | ea. |
| 1569L | 0.020" (0.50 mm) ID x 50' (15 m) | Orange | 3,000 psi (207 bar) | ea. |
| 1569XL | 0.020" (0.50 mm) ID x 100' (30 m) | Orange | 3,000 psi (207 bar) | ea. |
| 1569M | 0.020" (0.50 mm) ID x 1,000' (304 m) | Orange | 3,000 psi (207 bar) | ea. |
| FUSED SILICA TUBING, 360 µm OD | | | | |
| FS-120 | 20 µm (0.0008") ID x 6.4' (2 m) | Natural | 10,000 psi (690 bar) | ea. |
| FS-150 | 50 µm (0.002") ID x 6.4' (2 m) | Natural | 10,000 psi (690 bar) | ea. |
| FS-175 | 75 µm (0.003") ID x 6.4' (2 m) | Natural | 10,000 psi (690 bar) | ea. |
| FS-110 | 100 µm (0.004") ID x 6.4' (2 m) | Natural | 10,000 psi (690 bar) | ea. |
| FS-115 | 150 µm (0.006") ID x 6.4' (2 m) | Natural | 10,000 psi (690 bar) | ea. |

Stainless Steel Tubing

- › Precut 316 stainless steel
- › Available ODs include 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.



APPLICATION NOTE

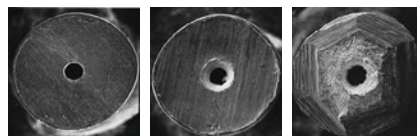
- › Our 1/32" OD tubing is designed for enhanced flexibility in high pressure applications.
- › Standard 1/16" and 1/8" OD stainless steel tubing is suited for most analytical applications.



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 page 16. 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

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 |
|-----------|--------------------|--------------------------|
| 1/32" | All | All |
| 1/16" | All | All, ex. 25' lengths |
| 1/8" | None | All, ex. 3 & 5 m lengths |

Stainless Steel Tubing (Cont.)



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 |
|-----------|--------------------------------|------------------------------|--------------------------------|
| 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

- › PEEK polymer tubing is available in all of these sizes, starting on page 16.



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.

Stainless Steel Tubing

| Part No. | ID | Length | Color | Maximum Pressure | Qty. |
|----------------------------------|------------------|-------------|--------|------------------------|------|
| STAINLESS STEEL, 1/32" OD | | | | | |
| U-1114 | 0.004" (0.10 mm) | 2" (5 cm) | Red | 19,300 psi (1,331 bar) | ea. |
| U-1115 | 0.004" (0.10 mm) | 4" (10 cm) | Red | 19,300 psi (1,331 bar) | ea. |
| U-1116 | 0.004" (0.10 mm) | 8" (20 cm) | Red | 19,300 psi (1,331 bar) | ea. |
| U-1117 | 0.004" (0.10 mm) | 12" (30 cm) | Red | 19,300 psi (1,331 bar) | ea. |
| U-1120 | 0.006" (0.15 mm) | 2" (5 cm) | Yellow | 19,300 psi (1,331 bar) | ea. |
| U-1122 | 0.006" (0.15 mm) | 8" (20 cm) | Yellow | 19,300 psi (1,331 bar) | ea. |
| U-1125 | 0.008" (0.20 mm) | 2" (5 cm) | Clear | 17,800 psi (1,227 bar) | ea. |
| U-1126 | 0.008" (0.20 mm) | 4" (10 cm) | Clear | 17,800 psi (1,227 bar) | ea. |
| U-1128 | 0.008" (0.20 mm) | 12" (30 cm) | Clear | 17,800 psi (1,227 bar) | ea. |
| U-1130 | 0.010" (0.25 mm) | 2" (5 cm) | Blue | 16,200 psi (1,117 bar) | ea. |
| U-1131 | 0.010" (0.25 mm) | 4" (10 cm) | Blue | 16,200 psi (1,117 bar) | ea. |
| U-1132 | 0.010" (0.25 mm) | 8" (20 cm) | Blue | 16,200 psi (1,117 bar) | ea. |
| U-1133 | 0.010" (0.25 mm) | 12" (30 cm) | Blue | 16,200 psi (1,117 bar) | ea. |
| U-1140 | 0.015" (0.40 mm) | 2" (5 cm) | Green | 12,300 psi (848 bar) | ea. |
| U-1141 | 0.015" (0.40 mm) | 4" (10 cm) | Green | 12,300 psi (848 bar) | ea. |
| U-1142 | 0.015" (0.40 mm) | 8" (20 cm) | Green | 12,300 psi (848 bar) | ea. |
| U-1143 | 0.015" (0.40 mm) | 12" (30 cm) | Green | 12,300 psi (848 bar) | ea. |
| U-1145 | 0.018" (0.45 mm) | 2" (5 cm) | Black | 10,000 psi (689 bar) | ea. |
| U-1146 | 0.018" (0.45 mm) | 4" (10 cm) | Black | 10,000 psi (689 bar) | ea. |
| U-1148 | 0.018" (0.45 mm) | 12" (30 cm) | Black | 10,000 psi (689 bar) | ea. |

Stainless Steel Tubing (Cont.)

| Part No. | ID | Length | Color | Maximum Pressure | Qty. |
|----------------------------------|-------------------|--------------|--------|------------------------|------|
| STAINLESS STEEL, 1/16" OD | | | | | |
| U-152 | 0.005" (0.125 mm) | 2" (5 cm) | Red | 21,600 psi (1,489 bar) | ea. |
| U-153 | 0.005" (0.125 mm) | 4" (10 cm) | Red | 21,600 psi (1,489 bar) | ea. |
| U-154 | 0.005" (0.125 mm) | 8" (20 cm) | Red | 21,600 psi (1,489 bar) | ea. |
| U-155 | 0.005" (0.125 mm) | 12" (30 cm) | Red | 21,600 psi (1,489 bar) | ea. |
| U-156 | 0.005" (0.125 mm) | 1.6' (0.5 m) | Red | 21,600 psi (1,489 bar) | ea. |
| U-157 | 0.005" (0.125 mm) | 3.2' (1 m) | Red | 21,600 psi (1,489 bar) | ea. |
| U-158 | 0.005" (0.125 mm) | 5' (1.5 m) | Red | 21,600 psi (1,489 bar) | ea. |
| U-160 | 0.005" (0.125 mm) | 25' (7.6 m) | Red | 21,600 psi (1,489 bar) | ea. |
| U-126 | 0.007" (0.175 mm) | 2" (5 cm) | Black | 20,900 psi (1,441 bar) | ea. |
| U-127 | 0.007" (0.175 mm) | 4" (10 cm) | Black | 20,900 psi (1,441 bar) | ea. |
| U-128 | 0.007" (0.175 mm) | 8" (20 cm) | Black | 20,900 psi (1,441 bar) | ea. |
| U-129 | 0.007" (0.175 mm) | 12" (30 cm) | Black | 20,900 psi (1,441 bar) | ea. |
| U-130 | 0.007" (0.175 mm) | 1.6' (0.5 m) | Black | 20,900 psi (1,441 bar) | ea. |
| U-131 | 0.007" (0.175 mm) | 3.2' (1 m) | Black | 20,900 psi (1,441 bar) | ea. |
| U-108 | 0.007" (0.175 mm) | 5' (1.5 m) | Black | 20,900 psi (1,441 bar) | ea. |
| U-161 | 0.007" (0.175 mm) | 25' (7.6 m) | Black | 20,900 psi (1,441 bar) | ea. |
| U-111 | 0.010" (0.25 mm) | 2" (5 cm) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-112 | 0.010" (0.25 mm) | 4" (10 cm) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-113 | 0.010" (0.25 mm) | 8" (20 cm) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-114 | 0.010" (0.25 mm) | 12" (30 cm) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-132 | 0.010" (0.25 mm) | 1.6' (0.5 m) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-133 | 0.010" (0.25 mm) | 3.2' (1 m) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-106 | 0.010" (0.25 mm) | 5' (1.5 m) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-162 | 0.010" (0.25 mm) | 25' (7.6 m) | Blue | 19,700 psi (1,358 bar) | ea. |
| U-101 | 0.020" (0.5 mm) | 2" (5 cm) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-102 | 0.020" (0.5 mm) | 4" (10 cm) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-103 | 0.020" (0.5 mm) | 8" (20 cm) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-104 | 0.020" (0.5 mm) | 12" (30 cm) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-134 | 0.020" (0.5 mm) | 1.6' (0.5 m) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-135 | 0.020" (0.5 mm) | 3.2' (1 m) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-105 | 0.020" (0.5 mm) | 5' (1.5 m) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-163 | 0.020" (0.5 mm) | 25' (7.6 m) | Yellow | 15,800 psi (1,089 bar) | ea. |
| U-115 | 0.030" (0.75 mm) | 2" (5 cm) | White | 12,000 psi (827 bar) | ea. |
| U-116 | 0.030" (0.75 mm) | 4" (10 cm) | White | 12,000 psi (827 bar) | ea. |
| U-117 | 0.030" (0.75 mm) | 8" (20 cm) | White | 12,000 psi (827 bar) | ea. |
| U-118 | 0.030" (0.75 mm) | 12" (30 cm) | White | 12,000 psi (827 bar) | ea. |
| U-136 | 0.030" (0.75 mm) | 1.6' (0.5 m) | White | 12,000 psi (827 bar) | ea. |
| U-137 | 0.030" (0.75 mm) | 3.2' (1 m) | White | 12,000 psi (827 bar) | ea. |
| U-107 | 0.030" (0.75 mm) | 5' (1.5 m) | White | 12,000 psi (827 bar) | ea. |
| U-164 | 0.030" (0.75 mm) | 25' (7.6 m) | White | 12,000 psi (827 bar) | ea. |
| U-138 | 0.040" (1.0 mm) | 2" (5 cm) | N/A | 8,100 psi (558 bar) | ea. |
| U-139 | 0.040" (1.0 mm) | 4" (10 cm) | N/A | 8,100 psi (558 bar) | ea. |
| U-140 | 0.040" (1.0 mm) | 8" (20 cm) | N/A | 8,100 psi (558 bar) | ea. |
| U-141 | 0.040" (1.0 mm) | 12" (30 cm) | N/A | 8,100 psi (558 bar) | ea. |
| U-142 | 0.040" (1.0 mm) | 1.6' (0.5 m) | N/A | 8,100 psi (558 bar) | ea. |
| U-143 | 0.040" (1.0 mm) | 3.2' (1 m) | N/A | 8,100 psi (558 bar) | ea. |
| U-144 | 0.040" (1.0 mm) | 5' (1.5 m) | N/A | 8,100 psi (558 bar) | ea. |
| U-165 | 0.040" (1.0 mm) | 25' (7.6 m) | N/A | 8,100 psi (558 bar) | ea. |
| U-145 | 0.046" (1.15 mm) | 2" (5 cm) | N/A | 5,800 psi (400 bar) | ea. |
| U-146 | 0.046" (1.15 mm) | 4" (10 cm) | N/A | 5,800 psi (400 bar) | ea. |
| U-147 | 0.046" (1.15 mm) | 8" (20 cm) | N/A | 5,800 psi (400 bar) | ea. |
| U-148 | 0.046" (1.15 mm) | 12" (30 cm) | N/A | 5,800 psi (400 bar) | ea. |
| U-149 | 0.046" (1.15 mm) | 1.6' (0.5 m) | N/A | 5,800 psi (400 bar) | ea. |
| U-150 | 0.046" (1.15 mm) | 3.2' (1 m) | N/A | 5,800 psi (400 bar) | ea. |
| U-151 | 0.046" (1.15 mm) | 5' (1.5 m) | N/A | 5,800 psi (400 bar) | ea. |
| STAINLESS STEEL, 1/8" OD | | | | | |
| U-825 | 0.080" (2.0 mm) | 10" (25 cm) | N/A | 7,600 psi (524 bar) | ea. |
| U-800 | 0.080" (2.0 mm) | 3.2' (1 m) | N/A | 7,600 psi (524 bar) | ea. |
| U-803 | 0.080" (2.0 mm) | 9.8' (3 m) | N/A | 7,600 psi (524 bar) | ea. |
| U-805 | 0.080" (2.0 mm) | 16' (5 m) | N/A | 7,600 psi (524 bar) | ea. |



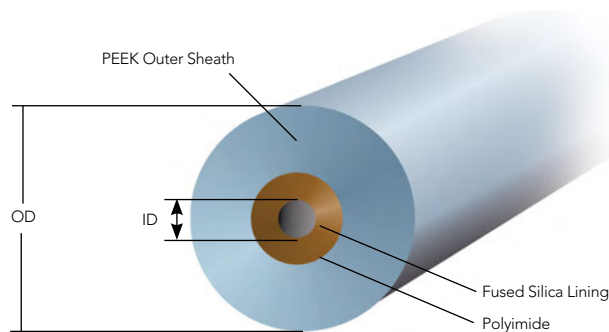
PEEKsil™ Tubing

- › PEEK covered fused silica
- › 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.*



SPECIFICATIONS & DETAILS

| Tubing OD | OD Tolerance | Tubing ID | ID Tolerance |
|-----------|------------------|--------------|------------------|
| | | 25 µm | ±0.00004" (1 µm) |
| 1/32" | ±0.0008" (20 µm) | 50–100 µm | ±0.00012" (3 µm) |
| 1/16" | ±0.0012" (30 µm) | 0.15–0.30 mm | ±0.0002" (5 µm) |



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) |
| 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.

PEEKsil™ Tubing

| 4" (10 cm) | ID | Length | Color | Qty. |
|---------------------------------|-----------------|--------------|---------|------|
| PEEKsil TUBING, 1/32" OD | | | | |
| 3255 | 0.001" (25 µm) | 2" (5 cm) | Orange | 2-pk |
| 32510 | 0.001" (25 µm) | 4" (10 cm) | Orange | 2-pk |
| 32515 | 0.001" (25 µm) | 6" (15 cm) | Orange | 2-pk |
| 32520 | 0.001" (25 µm) | 8" (20 cm) | Orange | 2-pk |
| 32550 | 0.001" (25 µm) | 1.6' (50 cm) | Orange | 2-pk |
| 3505 | 0.002" (50 µm) | 2" (5 cm) | Natural | 2-pk |
| 35010 | 0.002" (50 µm) | 4" (10 cm) | Natural | 2-pk |
| 35015 | 0.002" (50 µm) | 6" (15 cm) | Natural | 2-pk |
| 35020 | 0.002" (50 µm) | 8" (20 cm) | Natural | 2-pk |
| PEEKsil TUBING, 1/32" OD | | | | |
| 35050 | 0.002" (50 µm) | 1.6' (50 cm) | Natural | 2-pk |
| 3755 | 0.003" (75 µm) | 2" (5 cm) | Black | 2-pk |
| 37510 | 0.003" (75 µm) | 4" (10 cm) | Black | 2-pk |
| 37515 | 0.003" (75 µm) | 6" (15 cm) | Black | 2-pk |
| 37520 | 0.003" (75 µm) | 8" (20 cm) | Black | 2-pk |
| 37550 | 0.003" (75 µm) | 1.6' (50 cm) | Black | 2-pk |
| 31005 | 0.004" (100 µm) | 2" (5 cm) | Red | 2-pk |
| 310010 | 0.004" (100 µm) | 4" (10 cm) | Red | 2-pk |
| 310015 | 0.004" (100 µm) | 6" (15 cm) | Red | 2-pk |
| 310020 | 0.004" (100 µm) | 8" (20 cm) | Red | 2-pk |
| 310050 | 0.004" (100 µm) | 1.6' (50 cm) | Red | 2-pk |
| 31505 | 0.006" (150 µm) | 2" (5 cm) | Purple | 2-pk |
| 315010 | 0.006" (150 µm) | 4" (10 cm) | Purple | 2-pk |
| 315015 | 0.006" (150 µm) | 6" (15 cm) | Purple | 2-pk |
| 315020 | 0.006" (150 µm) | 8" (20 cm) | Purple | 2-pk |
| 315050 | 0.006" (150 µm) | 1.6' (50 cm) | Purple | 2-pk |
| PEEKsil TUBING, 1/16" OD | | | | |
| 6255 | 0.001" (25 µm) | 2" (5 cm) | Orange | 5-pk |
| 62510 | 0.001" (25 µm) | 4" (10 cm) | Orange | 5-pk |
| 62515 | 0.001" (25 µm) | 6" (15 cm) | Orange | 5-pk |
| 62520 | 0.001" (25 µm) | 8" (20 cm) | Orange | 5-pk |
| 62550 | 0.001" (25 µm) | 1.6' (50 cm) | Orange | 2-pk |
| 6505 | 0.002" (50 µm) | 2" (5 cm) | Natural | 5-pk |
| 65010 | 0.002" (50 µm) | 4" (10 cm) | Natural | 5-pk |
| 65015 | 0.002" (50 µm) | 6" (15 cm) | Natural | 5-pk |
| 65020 | 0.002" (50 µm) | 8" (20 cm) | Natural | 5-pk |
| 65050 | 0.002" (50 µm) | 1.6' (50 cm) | Natural | 2-pk |
| 6755 | 0.003" (75 µm) | 2" (5 cm) | Black | 5-pk |
| 67510 | 0.003" (75 µm) | 4" (10 cm) | Black | 5-pk |
| 67515 | 0.003" (75 µm) | 6" (15 cm) | Black | 5-pk |
| 67520 | 0.003" (75 µm) | 8" (20 cm) | Black | 5-pk |
| 67550 | 0.003" (75 µm) | 1.6' (50 cm) | Black | 2-pk |
| 61005 | 0.004" (100 µm) | 2" (5 cm) | Red | 5-pk |
| 610010 | 0.004" (100 µm) | 4" (10 cm) | Red | 5-pk |
| 610015 | 0.004" (100 µm) | 6" (15 cm) | Red | 5-pk |
| 610020 | 0.004" (100 µm) | 8" (20 cm) | Red | 5-pk |
| 610050 | 0.004" (100 µm) | 1.6' (50 cm) | Red | 2-pk |
| 61505 | 0.006" (150 µm) | 2" (5 cm) | Purple | 5-pk |
| 615010 | 0.006" (150 µm) | 4" (10 cm) | Purple | 5-pk |
| 615015 | 0.006" (150 µm) | 6" (15 cm) | Purple | 5-pk |
| 615020 | 0.006" (150 µm) | 8" (20 cm) | Purple | 5-pk |
| 615050 | 0.006" (150 µm) | 1.6' (50 cm) | Purple | 2-pk |
| 617515 | 0.007" (175 µm) | 6" (15 cm) | Yellow | 5-pk |
| 617520 | 0.007" (175 µm) | 8" (20 cm) | Yellow | 5-pk |
| 617550 | 0.007" (175 µm) | 1.6' (50 cm) | Yellow | 2-pk |
| 62005 | 0.008" (200 µm) | 2" (5 cm) | Blue | 5-pk |
| 620015 | 0.008" (200 µm) | 6" (15 cm) | Blue | 5-pk |
| 620020 | 0.008" (200 µm) | 8" (20 cm) | Blue | 5-pk |
| 620050 | 0.008" (200 µm) | 1.6' (50 cm) | Blue | 2-pk |
| 63005 | 0.012" (300 µm) | 2" (5 cm) | Gray | 5-pk |
| 630010 | 0.012" (300 µm) | 4" (10 cm) | Gray | 5-pk |
| 630015 | 0.012" (300 µm) | 6" (15 cm) | Gray | 5-pk |
| 630020 | 0.012" (300 µm) | 8" (20 cm) | Gray | 5-pk |
| 630050 | 0.012" (300 µm) | 1.6' (50 cm) | Gray | 2-pk |

PFA Tubing

PFA Tubing

- › 1/16" and 1/8" ODs available
- › Excellent solvent resistance and low gas permeability
- › Constructed with genuine Teflon™ PFA resin

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.

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
- › Constructed with genuine Teflon™ High Purity PFA resin

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 28 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.)



SPECIFICATIONS & DETAILS

| Tubing OD | OD Tolerances | Tubing ID | ID Tolerance |
|---|--------------------|-----------|--------------------|
| PFA TUBING SPECIFICATIONS | | | |
| 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 | | | |
| 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 | | | |
| 360 µm | ±0.0005" (12.5 µm) | All | ±0.0005" (12.5 µm) |

PFA Tubing

| Part No. | ID | Length | Color | Max. Pressure | Qty. |
|-------------------------------------|------------------|----------------|---------|---------------------|------|
| PFA TUBING, 1/16" OD | | | | | |
| 1500 | 0.020" (0.50 mm) | 5' (1.5 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1512L | 0.020" (0.50 mm) | 50' (15 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1512M | 0.020" (0.50 mm) | 1,000' (304 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1502 | 0.030" (0.75 mm) | 5' (1.5 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1514L | 0.030" (0.75 mm) | 50' (15 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1514M | 0.030" (0.75 mm) | 1,000' (304 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1503 | 0.040" (1.0 mm) | 5' (1.5 m) | Natural | 500 psi (34 bar) | ea. |
| 1507L | 0.040" (1.0 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1507M | 0.040" (1.0 mm) | 1,000' (304 m) | Natural | 500 psi (34 bar) | ea. |
| PFA TUBING, 1/8" OD | | | | | |
| 1509-5 | 0.062" (1.55 mm) | 5' (1.5 m) | Natural | 500 psi (34 bar) | ea. |
| 1509L | 0.062" (1.55 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| PFA HP TUBING, 1/16" OD | | | | | |
| 1622-5 | 0.020" (0.50 mm) | 5' (1.5 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1622L | 0.020" (0.50 mm) | 50' (15 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1622M | 0.020" (0.50 mm) | 1,000' (304 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1632-5 | 0.030" (0.75 mm) | 5' (1.5 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1632L | 0.030" (0.75 mm) | 50' (15 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1632M | 0.030" (0.75 mm) | 1,000' (304 m) | Natural | 1,000 psi (69 bar) | ea. |
| PFA HP TUBING, 1/8" OD | | | | | |
| 1641-5 | 0.062" (1.55 mm) | 5' (1.5 m) | Natural | 500 psi (34 bar) | ea. |
| 1641L | 0.062" (1.55 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| PFA HP PLUS TUBING, 1/16" OD | | | | | |
| 1902-5 | 0.010 (0.25 mm) | 5' (1.5 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1902L | 0.010 (0.25 mm) | 50' (15 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1902M | 0.010 (0.25 mm) | 1,000' (304 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1907-5 | 0.020" (0.50 mm) | 5' (1.5 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1907L | 0.020" (0.50 mm) | 50' (15 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1907M | 0.020" (0.50 mm) | 1,000' (304 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1912-5 | 0.030" (0.75 mm) | 5' (1.5 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1912L | 0.030" (0.75 mm) | 50' (15 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1912M | 0.030" (0.75 mm) | 1,000' (304 m) | Natural | 1,000 psi (69 bar) | ea. |
| PFA HP PLUS TUBING, 1/8" OD | | | | | |
| 1921-5 | 0.062" (1.55 mm) | 5' (1.5 m) | Natural | 500 psi (34 bar) | ea. |
| 1921L | 0.062" (1.55 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |



FEP Tubing

- › Great for moderate-to-low pressure applications
- › 1/16", 1/8", 3/16", 1/4", or 5/16" outside diameter available
- › 1 mm, 2 mm, or 3 mm outside diameter available
- › Maximum continuous use temperature: 50 °C
- › Constructed with genuine Teflon™ FEP resin

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 |
|-------------|-------------------|-------------------|
| 1/16" 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) |

| Part No. | ID | Length | Color | Max. Pressure | Qty. |
|------------------------------|------------------|----------------|---------|---------------------|------|
| FEP TUBING, 1/16" OD | | | | | |
| 1527-5 | 0.010" (0.25 mm) | 5' (1.5 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1527L | 0.010" (0.25 mm) | 50' (15 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1527XL | 0.010" (0.25 mm) | 100' (30 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1527M | 0.010" (0.25 mm) | 1,000' (304 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1548-5 | 0.020" (0.50 mm) | 5' (1.5 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1548L | 0.020" (0.50 mm) | 50' (15 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1548XL | 0.020" (0.50 mm) | 100' (30 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1548M | 0.020" (0.50 mm) | 1,000' (304 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1520-5 | 0.030" (0.75 mm) | 5' (1.5 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1520L | 0.030" (0.75 mm) | 50' (15 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1520XL | 0.030" (0.75 mm) | 100' (30 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1520M | 0.030" (0.75 mm) | 1,000' (304 m) | Natural | 1,000 psi (69 bar) | ea. |
| FEP TUBING, 1/8" OD | | | | | |
| 1521-5 | 0.062" (1.55 mm) | 5' (1.5 m) | Natural | 500 psi (34 bar) | ea. |
| 1521L | 0.062" (1.55 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1521XL | 0.062" (1.55 mm) | 100' (30 m) | Natural | 500 psi (34 bar) | ea. |
| FEP TUBING, 3/16" OD | | | | | |
| 1524L | 0.125" (3.2 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1524XL | 0.125" (3.2 mm) | 100' (30 m) | Natural | 500 psi (34 bar) | ea. |
| FEP TUBING, 1/4" OD | | | | | |
| 1650L | 0.188" (4.8 mm) | 50' (15 m) | Natural | 250 psi (17 bar) | ea. |
| 1650XL | 0.188" (4.8 mm) | 100' (30 m) | Natural | 250 psi (17 bar) | ea. |
| FEP TUBING, 1.0 MM OD | | | | | |
| 1671L | 0.020" (0.50 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1671XL | 0.020" (0.50 mm) | 100' (30 m) | Natural | 500 psi (34 bar) | ea. |
| FEP TUBING, 2.0 MM OD | | | | | |
| 1673L | 0.40" (1.0 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1673XL | 0.40" (1.0 mm) | 100' (30 m) | Natural | 500 psi (34 bar) | ea. |
| FEP TUBING, 3.0 MM OD | | | | | |
| 1677L | 0.080" (2.0 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1677XL | 0.080" (2.0 mm) | 100' (30 m) | Natural | 500 psi (34 bar) | ea. |



ETFE Tubing

- › Excellent chemical resistance
- › Constructed with genuine Tefzel™ resin
- › Holds pressure up to 4,000 psi (276 bar)
- › 1/16" or 1/8" outside diameter available
- › Maximum continuous operating temperature: 80 °C

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.



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.



RELATED PRODUCTS

Other tubing materials and dimensions may be available. Please contact IDEX Health & Science or your local representative directly.



SPECIFICATIONS & DETAILS

| 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) |

| Part No. | ID | Length | Color | Max. Pressure | Qty. |
|------------------------------|------------------|----------------|---------|---------------------|------|
| ETFE TUBING, 1/16" OD | | | | | |
| 1529 | 0.010 (0.25 mm) | 5' (1.5 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1529L | 0.010 (0.25 mm) | 50' (15 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1529XL | 0.010 (0.25 mm) | 100' (30 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1529M | 0.010 (0.25 mm) | 1,000' (304 m) | Natural | 4,000 psi (276 bar) | ea. |
| 1516 | 0.020" (0.50 mm) | 5' (1.5 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1516L | 0.020" (0.50 mm) | 50' (15 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1516XL | 0.020" (0.50 mm) | 100' (30 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1516M | 0.020" (0.50 mm) | 1,000' (304 m) | Natural | 3,000 psi (207 bar) | ea. |
| 1528 | 0.030" (0.75 mm) | 5' (1.5 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1528L | 0.030" (0.75 mm) | 50' (15 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1528XL | 0.030" (0.75 mm) | 100' (30 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1528M | 0.030" (0.75 mm) | 1,000' (304 m) | Natural | 2,000 psi (138 bar) | ea. |
| 1517 | 0.040" (1.0 mm) | 5' (1.5 m) | Natural | 500 psi (34 bar) | ea. |
| 1517L | 0.040" (1.0 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1517XL | 0.040" (1.0 mm) | 100' (30 m) | Natural | 500 psi (34 bar) | ea. |
| 1517M | 0.040" (1.0 mm) | 1,000' (304 m) | Natural | 500 psi (34 bar) | ea. |
| ETFE TUBING, 1/8" OD | | | | | |
| 1530 | 0.062" (1.55 mm) | 5' (1.5 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1530L | 0.062" (1.55 mm) | 50' (15 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1530XL | 0.062" (1.55 mm) | 100' (30 m) | Natural | 1,000 psi (69 bar) | ea. |
| 1648 | 0.093" (2.4 mm) | 5' (1.5 m) | Natural | 500 psi (34 bar) | ea. |
| 1648L | 0.093" (2.4 mm) | 50' (15 m) | Natural | 500 psi (34 bar) | ea. |
| 1648XL | 0.093" (2.4 mm) | 100' (30 m) | Natural | 500 psi (34 bar) | ea. |



Tools



FS-315
for fused silica tubing

Fused Silica Tubing Cutters

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.



A-327
for 1/16" and
1/8" OD tubing

A-329
for 3/16" - 5/16"
OD tubing

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. Our experts have 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-350
for capillary polymer tubing

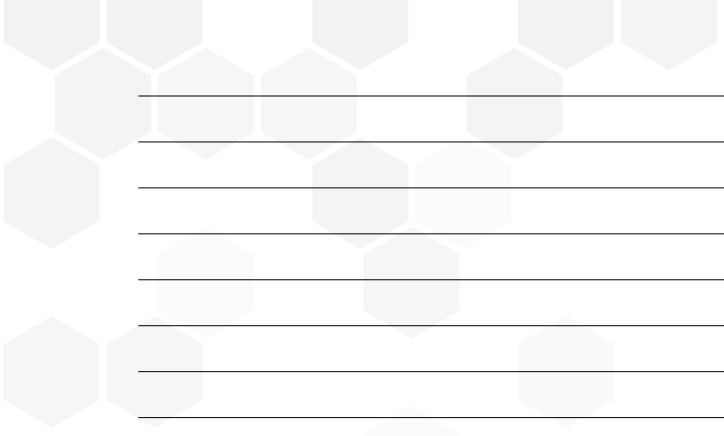
Capillary Polymer Tubing Cutters

Our 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 1/32" OD tubing. All tubing sleeves are 2" long and constructed with genuine Teflon™ FEP resin.

NOTE

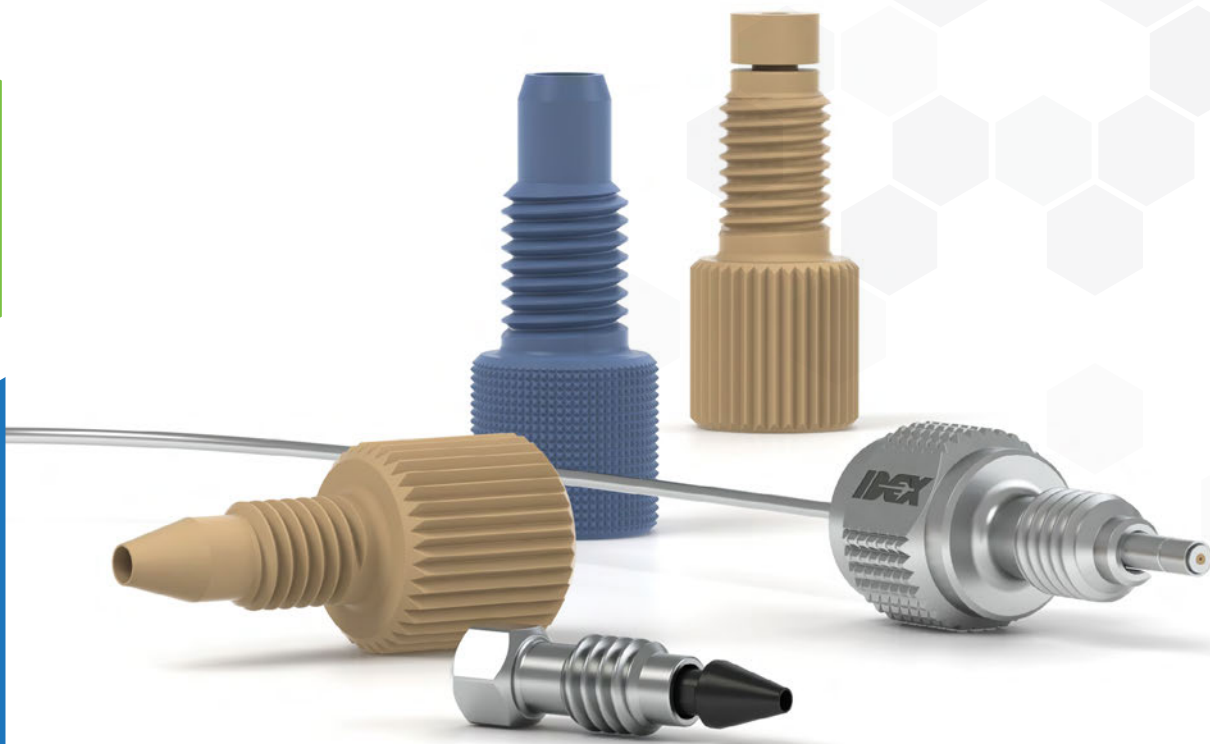
- › The A-350 Capillary Polymer Tubing Cutter can be used to cut tubing OD sizes other than 360 μm and 1/32". Simply use the proper NanoTight™ Tubing Sleeve found on page 52. Please note, however, that these sleeves are shorter than those listed on this page, and therefore will last through fewer cuts.
- › Our tubing cutters are material specific: the A-327, A-329, and A-350 should only be used to cut polymer tubing, where as the FS-315 should only be used to cut fused silica tubing.

| Part No. | Description | Qty. |
|--|---|-------|
| FUSED SILICA TUBING CUTTERS | | |
| 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 |
| 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-327, and A-329 | 5-pk |
| * Includes (1) A-328 5-pack of replacement blades. | | |



Lined writing area consisting of 22 horizontal lines.





FITTINGS

We offer a wide and diverse selection of fittings to meet your system requirements. 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 Fittings and Ferrules in 10-packs. We are 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.

32 CONED FITTINGS

39 FLAT-BOTTOM FITTINGS

48 MARVELX™

50 FITTINGS TOOLS

56 LARGE BORE FITTINGS

57 VHP FITTINGS

61 FITTINGS KITS

 NOTE

All testing is performed with water at room temperature unless otherwise specified. Please contact IDEX Health & Science directly for further details. 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.

 APPLICATION NOTE

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





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
- › Convenient and easy to use
- › Reusable

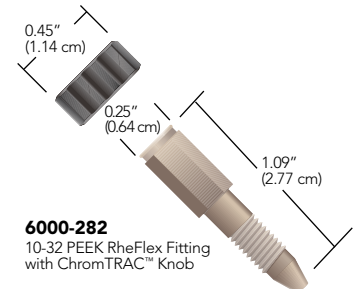
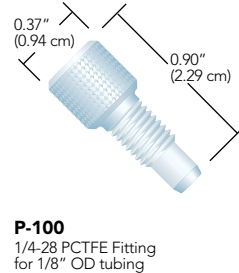
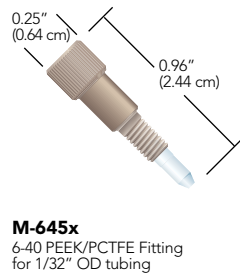
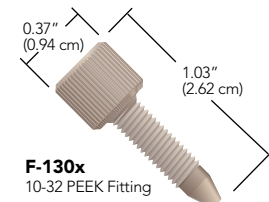
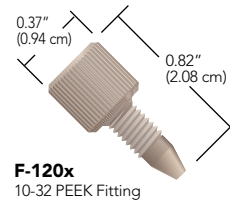
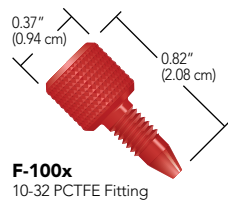
NOTE

- › Some of the fittings on this page are available in additional colors. Please contact your distributor or us for more information.
- › Fingertight is generally equal to 3–4 in-lbs (0.34–0.45 N·m).

Our 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 102.

RheFlex® One-Piece Fittings are included in many of the manual valves, starting on page 121. The One-Piece RheFlex M4 Fittings, for use with our MX Nano-Scale Modules, are listed on page 61.



| 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-120x | Fingertight Fitting for 1/16" OD Tubing | 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. |



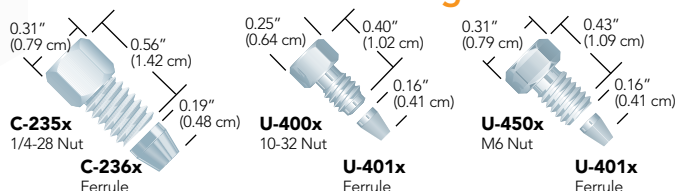
Stainless Steel Fittings

NOTE

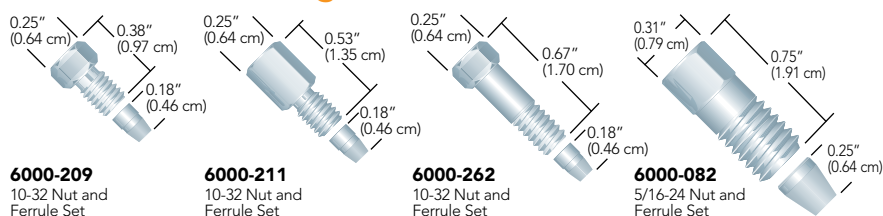
- Do not use metal fittings in plastic ports, as this can damage the port.
- The recommended torque to tighten these fittings is 20 in-lbs (2.25 N·m).

These 316 Stainless Steel Fittings are rated to 20,000 psi (1,380 bar) when wrench tightened. Choose IDEX Health & Science standard fittings, or select from the Common Valve Fittings or other manufacturer-compatible offerings.

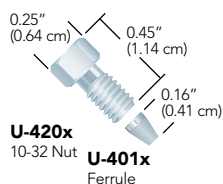
Standard Stainless Steel Fittings



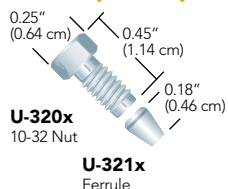
Common Valve Fittings



Beckman® Compatible Fittings



VICI® (Valco) Compatible Fittings



| 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 |
| COMMON VALVE 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-410x | Nuts for 1/16" OD Tubing, Waters Compatible | 10-32 Coned | 20,000 psi (1,380 bar) | 5/16" Hex | SST | 10-pk |



MicroTight® Fittings

- › Comprehensive Fitting System for Connecting Capillary Tubing
- › Made from PEEK Polymer

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 page 52), 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 50 for more information.



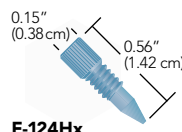
NOTE

MicroTight fittings and MicroFerrules

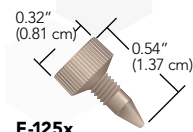
While the MicroTight Female Nuts may be used with any of the separate MicroFerrules, the MicroFerrules themselves are port-specific and are thus not interchangeable. Additionally, the one-piece MicroTight fittings are also port-specific and should not be exchanged.



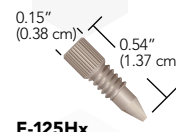
F-1245x
Standard Head Fitting
for use with
360 µm OD tubing



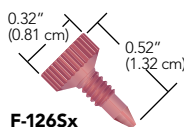
F-124Hx
Headless Fitting
for use with
360 µm OD tubing



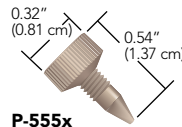
F-125x
Standard Head Fitting
for use with
MicroTight Sleeves



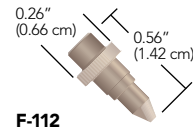
F-125Hx
Headless Fitting
for use with
MicroTight Sleeves



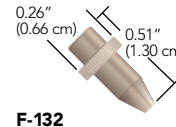
F-1265x
Standard Head Fitting
for use with 1/32" OD tubing



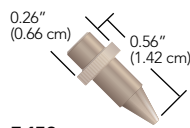
P-555x
Standard Head Plug



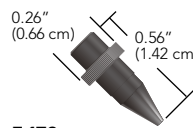
F-112
MicroFerrule for
1/32" OD tubing



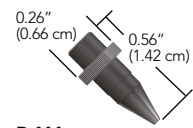
F-132
MicroFerrule for
1/16" OD tubing



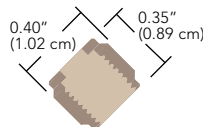
F-152
MicroFerrule for
360 µm OD tubing



F-172
MicroFerrule for
0.025" OD tubing



P-116
MicroFerrule Plug



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



RELATED PRODUCTS

- › Connectors for Capillary Tubing can be found on page 75.
- › Very High Pressure fittings for capillary tubing can be found on page 58.
- › Capillary tubing is featured on page 16.

| 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-1245x | 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-1265x | MicroTight Fitting for 1/32" OD Tubing | 6-32 Coned | 5,000 psi (345 bar) | Standard Micro Knurl | PEEK Red | 10-pk |
| P-555x | MicroTight Plug | 6-32 Coned | 5,000 psi (345 bar) | Standard Micro Knurl | PEEK Natural | 10-pk |
| 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. |



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
- › Economical, replace only the ferrule



APPLICATION NOTE

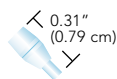
Some Fingertight Nuts feature wings in addition to a knurled head, which provide more leverage when tightening the fitting into a receiving port. Choose our single or double-winged design.

Please Note: customers can use the standard knurl head fittings with our tightening tools found on page 50.

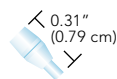


Two-Piece Fingertight Fittings feature a separate ferrule. Use a standard knurled head fitting for traditional fingertight applications, or use a fitting with wings built into the head for extra tightening leverage. A stainless steel hex headed fitting can be used for applications where a wrench may be needed for added tightening torque.

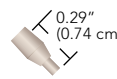
The M-215 Conductive Perfluoroelastomer Ferrule is designed for mass spectrometer electrospray applications. Unlike most graphite ferrules, the elastomeric properties of this ferrule let you use it through many tightening/retightening cycles. It also eliminates any possibility of graphite contamination 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.



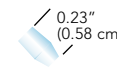
F-148
PCTFE Ferrule
for 190 µm OD tubing



F-151
PCTFE Ferrule
for 360 µm OD tubing



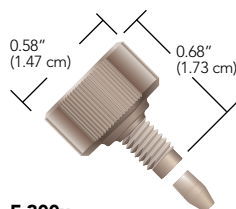
F-113
PEEK Ferrule
for 1/32" OD tubing



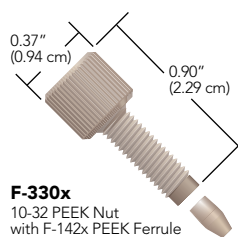
F-142N
ETFE Ferrule
for 1/16" OD tubing



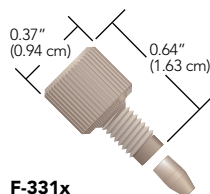
M-215
Conductive
Perfluoroelastomer
Ferrule for 360 µm
OD tubing



F-300x
10-32 PEEK Double-Winged Nut
with F-142x PEEK Ferrule



F-330x
10-32 PEEK Nut
with F-142x PEEK Ferrule



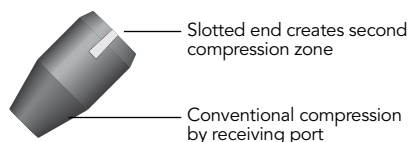
F-331x
10-32 PEEK Nut
with F-142x PEEK Ferrule

| Part No. | Description | Port | Pressure Rating | Head Style | Material | Qty. |
|---|---|-------------|---------------------|----------------|-------------------------------|-------|
| TWO-PIECE FINGERTIGHT FITTINGS (INCLUDES F-142 FERRULES) | | | | | | |
| 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-142 | Ferrule for 1/16" OD Tubing | 10-32 Coned | 6,000 psi (414 bar) | — | PEEK Natural | ea. |
| F-142N | Ferrule for 1/16" OD Tubing | 10-32 Coned | 4,000 psi (276 bar) | — | ETFE Natural | ea. |
| 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. |



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)



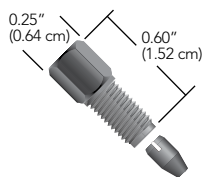
NOTE

Overtightening these fittings on fluoropolymer (e.g., FEP, PFA, and ETFE) tubing can cause the ID of your tubing to collapse.

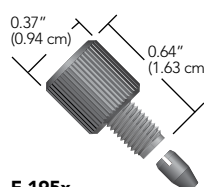
RELATED PRODUCTS

- › Find tightening tools for these fittings on page 50.
- › Try the F-350x FlushNut™ for the ultimate streamline design.

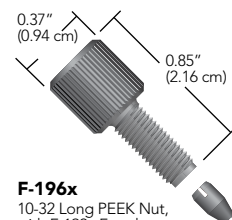
The dual compression created by the specially designed nut and ferrule enables our SealTight™ Fittings system to outperform standard finger tightened fittings. The forward cone of the SealTight Ferrule provides gripping power and a leak-free seal via conventional compression by the receiving port. The 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-192x Ferrule. A wide variety of fitting head styles are available for various space constraints.



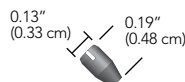
F-193x
10-32 Short PEEK Hex Head Nut, with F-192x Ferrule



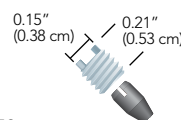
F-195x
10-32 Short PEEK Nut, with F-192x Ferrule



F-196x
10-32 Long PEEK Nut, with F-192x Ferrule



F-192x
SealTight Ferrule, for 1/16" OD tubing



F-350x
10-32 Stainless Steel FlushNut, with F-192x Ferrule

| Part No. | Description | Port | Pressure Rating | Head Style | Material | Qty. |
|---|---|-------------------|-------------------------------|----------------|------------|-------|
| SEALTIGHT TWO-PIECE FITTINGS (INCLUDES F-192 FERRULES) | | | | | | |
| 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-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-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 |



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

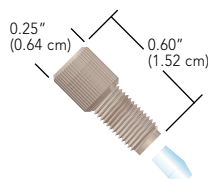


RELATED PRODUCTS

- › Find tightening tools for these head styles on page 50.
- › NanoTight Tubing sleeves start on page 52.

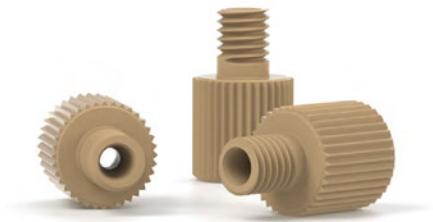
NanoTight™ Fittings and Sleeves are designed to connect 70 µm–1 mm OD capillary tubing to any standard 10-32 coned port normally intended for 1/16" OD tubing using the NanoTight Tubing Sleeves on page 52. The fittings can also be used to connect any 1/16" OD tubing. The ETFE ferrule material is softer 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-142Nx ferrules.



F-333Nx
Short Headless Nut
with F-142Nx Ferrule

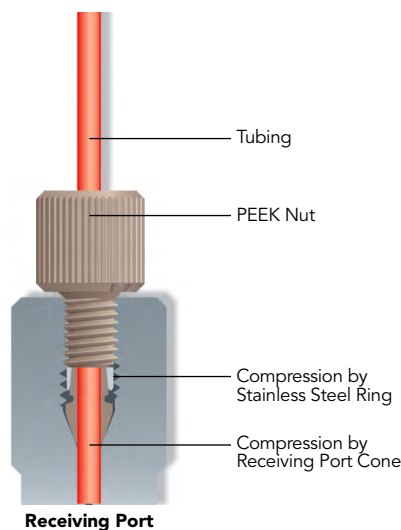
| Part No. | Description | Port | Pressure Rating | Head Style | Material (Nut/Ferrule) | Qty. |
|--|--|-------------|---------------------|----------------|---------------------------|-------|
| NANOTIGHT FITTINGS (INCLUDES F-142N FERRULES) | | | | | | |
| F-333Nx | NanoTight Fitting for 1/16" OD Tubing 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 |



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

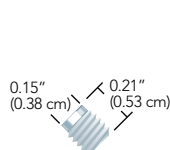
LITETOUCH FITTINGS SYSTEMS



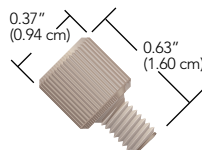
The LiteTouch® Fittings System grips tubing at two compression points (see diagram), holding to high pressures with Fingertight convenience. It also prevents polymer tubing from twisting, a potential problem when using standard Fingertight fittings. LiteTouch Fittings are available for use with 1/32", 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 50 for more information about these products.)

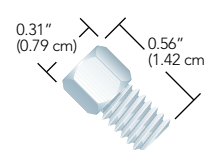
To avoid collapsing the ID of your tubing, the LiteTouch system can be used on hard tubing only, such as stainless steel and PEEK polymer tubing. The LiteTouch Ferrule System is not recommended for repeated use in plastic ports.



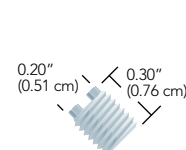
F-354x
10-32 Stainless Steel FlushNut for 1/32" and 1/16" OD tubing



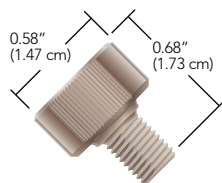
LT-110x
10-32 PEEK Nut for 1/32" and 1/16" OD tubing



C-235x
1/4-28 Stainless Steel Nut for 1/8" OD tubing



F-364x
1/4-28 Stainless Steel FlushNut for 1/8" OD tubing



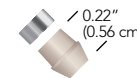
LT-210x
1/4-28 PEEK Double-Winged Nut for 1/8" OD tubing



LT-132x
PEEK Ferrule with Stainless Steel Lock Ring for 1/32" OD tubing



LT-100x
PEEK Ferrule with Stainless Steel Lock Ring for 1/16" OD tubing



LT-200x
PEEK Ferrule with Stainless Steel Lock Ring for 1/8" OD tubing

RELATED PRODUCTS

- › The stainless steel nuts on page 59 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 |
| 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-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 59.

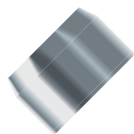


Super Flangeless™ Fittings

- › 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

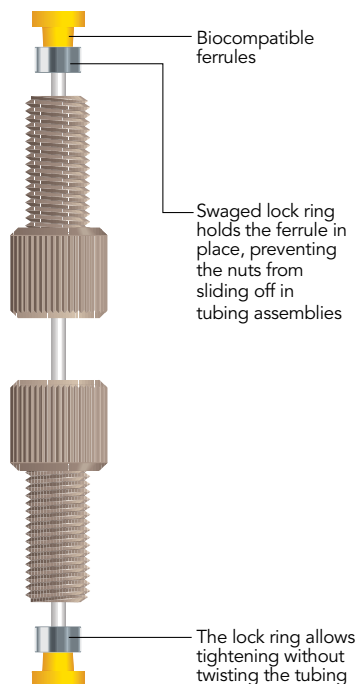
ASSEMBLY HINT

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.



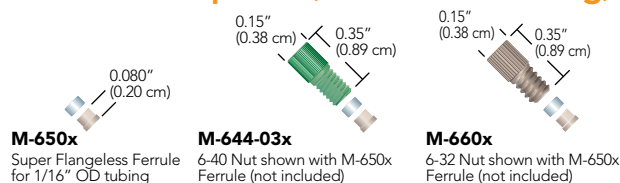
Enlarged to show detail

SUPER FLANGELESS FITTINGS SYSTEM

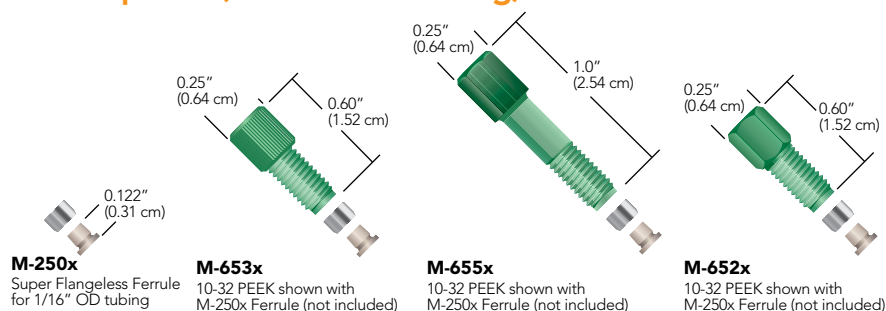


Our Super Flangeless™ Fittings provide the highest pressure holding capability in a flat-bottom fitting system that we offer. Our unique design eliminates loosening of fittings due to tubing twist and holds tight even through vibration. Our high pressure fittings are excellent for tubing assemblies and those times when connections need to be broken frequently.

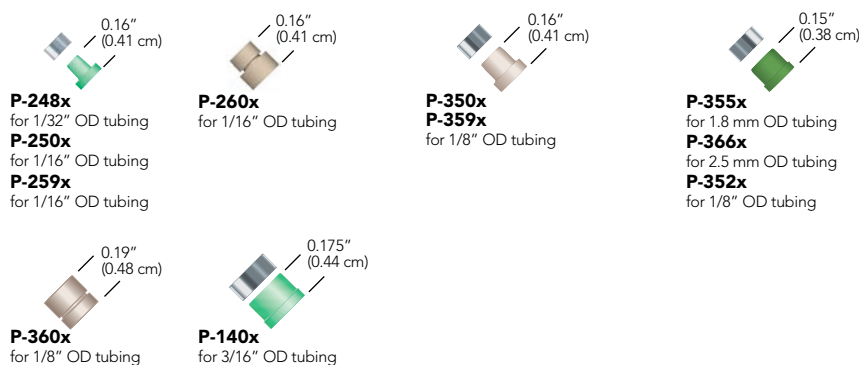
6-40 & 6-32 options (for 1-16" OD tubing)



10-32 options (for 1-16" OD tubing)

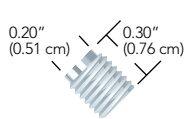


Ferrules for M6x1, 1/4-28, 5/16-24

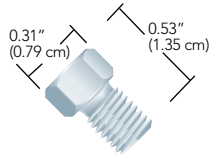


Super Flangeless™ Fittings (Cont.)

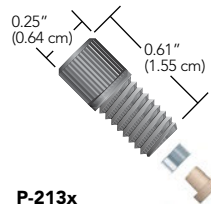
M6x1, 1/4-28, 5/16-24 Options for 1/32"–3/16" OD Tubing



F-356x
(M6X1, ≤ 1/16" OD Tubing)
F-364x
(1/4-28, > 1/16" OD Tubing)



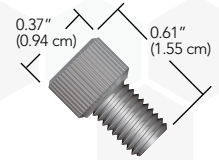
LT-105x
(1/4-28, ≤ 1/16" OD Tubing)
C-235x
(1/4-28, > 1/16" OD Tubing)



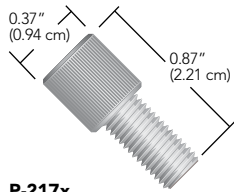
P-213x
(M6X1, ≤ 1/16" OD Tubing)
P-337x
(M6X1, > 1/16" OD Tubing)
P-232x
(1/4-28, ≤ 1/16" OD Tubing)
P-336x
(1/4-28, > 1/16" OD Tubing)



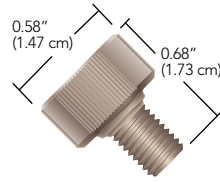
P-287x
(1/4-28, ≤ 1/16" OD Tubing)
P-387x
(1/4-28, > 1/16" OD Tubing)



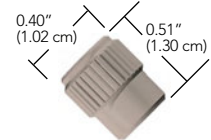
P-219x
(M6X1, ≤ 1/16" OD Tubing)
P-319x
(M6X1, > 1/16" OD Tubing)
LT-115x
(1/4-28, ≤ 1/16" OD Tubing)



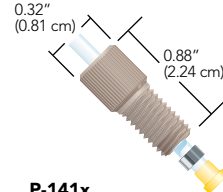
P-217x
(M6X1, ≤ 1/16" OD Tubing)
P-317x
(M6X1, > 1/16" OD Tubing)
P-246x, P-255x, P-281x
(1/4-28, ≤ 1/16" OD Tubing)
P-331x, P-381x
(1/4-28, > 1/16" OD Tubing)



LT-210x
(1/4-28, > 1/16" OD Tubing)



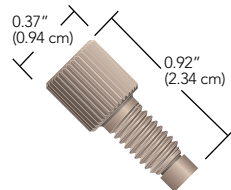
P-420x
(1/4-28, ≤ 1/16" OD Tubing)
F-156x
(1/4-28, > 1/16" OD Tubing)



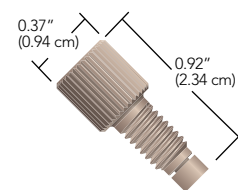
P-141x
(5/16-24, ≤ 1/16" OD Tubing)
P-137x
(5/16-24, 3/16" OD Tubing)

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-329x
M6X1, for 1/8" OD Tubing
P-249x
1/4-28, for 1/16" OD Tubing
P-349x
1/4-28, for 1/8" OD Tubing



P-229x
M6X1, for 1/16" OD Tubing

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™ and One-Piece Super Flangeless Fittings

| 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 |
| 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-213x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short | M6 Flat Bottom | * | Headless Knurl | PEEK Black | 10-pk |
| P-217x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing | M6 Flat Bottom | * | Standard Knurl | PPS Black | 10-pk |
| P-219x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short | M6 Flat Bottom | * | Standard Knurl | PEEK Black | 10-pk |
| M6X1 FITTINGS FOR 1.8 MM, 2.0 MM, 2.5 MM, 1/8" OD TUBING | | | | | | |
| P-317x | Super Flangeless For >1/16"–≤ 1/8" OD Tubing | M6 Flat Bottom | * | Standard Knurl | PPS Black | 10-pk |
| P-319x | Super Flangeless Nut for 1/8" OD Tubing, Short | M6 Flat Bottom | * | Standard Knurl | PEEK Black | 10-pk |
| 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-232x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Short | 1/4-28 Flat Bottom | * | Headless Knurl | PEEK Natural | 10-pk |
| 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-255x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing | 1/4-28 Flat Bottom | * | Standard Knurl | PEEK Natural | 10-pk |
| P-281x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing | 1/4-28 Flat Bottom | * | Standard Knurl | PPS Natural | 10-pk |
| P-287x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing | 1/4-28 Flat Bottom | * | Headless Knurl | PPS Natural | 10-pk |
| P-420x | Super Flangeless Nut for 1/16" or 1/32" OD Tubing, Female | 1/4-28 Flat Bottom | * | Female Knurl | PEEK Natural | 10-pk |
| 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-156x | Super Flangeless Nut for 1/8" OD Tubing, Female | 1/4-28 Flat Bottom | * | Female Knurl | PEEK Black | 10-pk |
| 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 |
| P-331x | Super Flangeless Nut for 1/8" OD Tubing | 1/4-28 Flat Bottom | * | Standard Knurl | PEEK Natural | 10-pk |
| P-336x | Super Flangeless Nut for 1/8" OD Tubing, Short | 1/4-28 Flat Bottom | * | Headless Knurl | PEEK Natural | 10-pk |
| P-381x | Super Flangeless Nut for 1/8" OD Tubing | 1/4-28 Flat Bottom | * | Standard Knurl | PPS Natural | 10-pk |
| P-387x | Super Flangeless Nut for 1/8" OD Tubing | 1/4-28 Flat Bottom | * | Standard Knurl | PPS Natural | 10-pk |
| 5/16-24 FITTINGS FOR 1/16", 1/8", 3/16" OD TUBING | | | | | | |
| P-137x | Super Flangeless Fitting for 3/16" OD Tubing | 5/16-24 Flat Bottom | * | Standard Knurl | PEEK Black | 10-pk |
| 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 | | | | | | |
| 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 |
| 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 |
| 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 |
| 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.



VacuTight™ Fittings

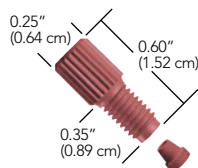
- › For 1/16" or 1/8" OD tubing connections into 10-32, 1/4-28, or M6 flat-bottom ports
- › Vacuum Rated to 25 in-Hg (84 kPa)
- › Improve transfer volume consistency

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 "combi chem" 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.

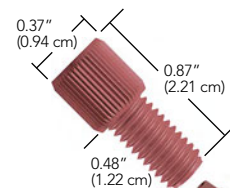
All VacuTight Nuts must be used exclusively with VacuTight Ferrules.



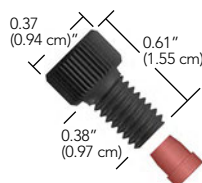
P-844x
PEEK Nut, 10-32
with P-840 Ferrule



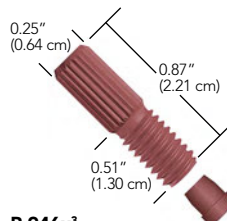
P-846x
PEEK Nut, 10-32
with P-840 Ferrule



P-930x¹
Delrin® Nut, 1/4-28
with P-840 Ferrule



P-945x²
Delrin Nut, M6
with P-940 Ferrule



P-946x³
Delrin Nut, 1/4-28
with P-940 Ferrule

¹ The dimensions shown apply to P-930x, P-931x, P-938x, P-942x, and P-948x.

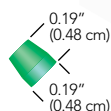
² The dimensions shown apply to P-945x.

³ The dimensions shown apply to P-946x.

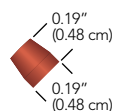
| Part No. | Description | Port | Pressure Rating | Head Style | Material | Qty. |
|--|--|--------------------------|---------------------------|----------------|--------------|-------|
| VACUTIGHT FITTINGS (INCLUDES P-840 OR P-940 FERRULES) | | | | | | |
| P-842x | VacuTight Fitting for 1/16" OD Tubing, 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 Black | 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-840 | VacuTight Ferrule for 1/16" OD Tubing | M6 or 1/4-28 Flat-Bottom | 400–800 psi (27–55 bar) | — | ETFE Red | ea. |
| 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 |

Metric Flangeless Fittings

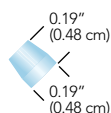
- › For 1/16", 1.8 mm, 2.0 mm, 2.5 mm, 3.0 mm, 4.0 mm, or 1/8" OD tubing
- › Convenience of flangeless fittings for metric tubing sizes and M6 flat-bottom ports



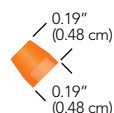
P-342x
ETFE Ferrule
for 1.8 OD tubing



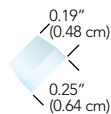
P-363Rx
ETFE Ferrule
for 2.0 mm OD tubing



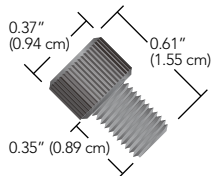
P-353x
ETFE Ferrule
for 2.5 mm OD tubing



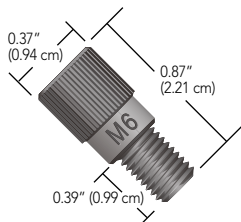
P-343x
ETFE Ferrule
for 3.0 mm OD tubing



P-344x
ETFE Ferrule
for 4.0 mm OD tubing



P-347x
PEEK Nut
for 1.8, 2.0, 3.0 mm or
1/8" OD tubing



P-207x
Delrin® Nut
for 1/16" OD tubing

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.



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 | P-200x (w/F-252 sleeve, not included) | P-207x, P-207Sx, P-247x |
| | 1/4-28 | P-200x (w/F-252 sleeve, not included) | Any 1/4-28 nut for 1/16" OD tubing from page 47 |
| 1.8 mm | M6 | P-342x | P-307x, P-307Sx, P-347x |
| | 1/4-28 | P-342x | Any 1/4-28 nut for 1/8" OD tubing from page 47 |
| 2.0 mm | M6 | P-363Rx | P-307x, P-307Sx, P-347x |
| | 1/4-28 | P-363Rx | Any 1/4-28 nut for 1/8" OD tubing from page 47 |
| 2.5 mm | M6 | P-353x | P-307x, P-307Sx, P-347x |
| | 1/4-28 | P-353x | Any 1/4-28 nut for 1/8" OD tubing from page 47 |
| 3.0 mm | M6 | P-343x | P-307x, P-307Sx, P-347x |
| | 1/4-28 | P-343x | Any 1/4-28 nut for 1/8" OD tubing from page 47 |
| 4.0 mm | M6 | P-344x | XP-132x from page 56 |
| | 5/16-24 | P-344x | |
| 1/16" | M6 | P-200x | P-207x, P-207Sx, P-247x, P-931, page 42 |
| | M6 | P-840 | |
| 1/8" | M6 | P-300x | P-307x, P-307Sx, P-347x, P-945x, page 42 |
| | M6 | P-940x | |



RELATED PRODUCTS

| | Page | Page |
|---|------|--|
| MORE METRIC-SIZED PRODUCTS | | |
| High Pressure Polymer Fittings | 58 | Low Pressure Unions 84 |
| High Pressure Stainless Steel Fittings | 59 | Bulkhead Unions 82 |
| Luer Adapters | 87 | PEEK (1.8 mm OD and Capillary) and Fused Silica Tubing 16 |
| Metric Threaded Adapters | 65 | PEEKsil™ Tubing 22 |
| External NPT Adapters | 66 | FEP Tubing (1.0–4.0 mm OD) and PFA Capillary Tubing 26 |
| VacuTight™ Fittings | 42 | Frit-In-A-Ferrule™ 99 |
| Plugs and Caps | 55 | |

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-2075x | 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-3075x | 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 |
| 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 |



Flanged Fittings

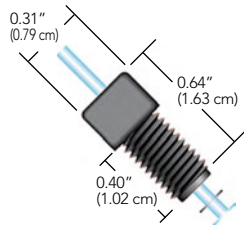
- › Fittings for 1/16" or 1/8" OD tubing, supplied with nut and 316 stainless steel washer
- › Multiple head styles and materials available; contact IDEX Health & Science for more information
- › For 1/4-28 and M6 flat-bottom ports
- › Some color options available; call for more information

Flanged Fittings are compatible with most standard 1/4-28 or M6 Flat-Bottom flanged fittings. The Delrin® (acetal resin) nut resists cross threading or loosening during use.



RELATED PRODUCTS

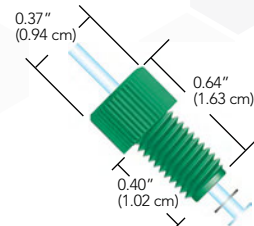
- › For an alternative to flanging tubing, we highly recommend the Flangeless Fittings found on page 45, the Super Flangeless™ Fittings found on page 39, or the VacuTight™ Fittings on page 42.



P-401x¹
Flanged Fitting for 1/16" OD tubing*

¹ The dimensions shown apply to all square-head Flanged Fittings

* Flanged tubing not included



P-482G³
Flanged Fitting for 1/16" OD tubing*

³ The dimensions shown apply to all knurled-head Flanged Fittings

* Flanged tubing not included

| 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-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-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-1087x | Washer for 1/8" OD Tubing | M6 Flat-Bottom | — | SST | 10-pk |



Flangeless Fittings

★ 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.

Flangeless Fittings eliminate the need to flange tubing. This removable and reusable system provides several benefits:

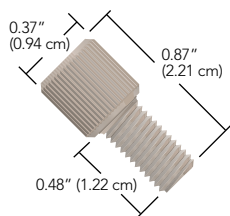
Convenience: Flangeless Fittings are easy to use. Just slip the nut and ferrule over the tubing and finger tighten the assembly into your receiving port. In tests, it is shown that the ideal amount of torque to achieve expected part performance should be approximately 3–4 in-lbs (0.34–0.45 N·m). Check out the line of special tightening tools designed to adapt to many standard torque wrenches, on page 50 and the adjustable torque driver, VHP-4000 on page 51.

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.

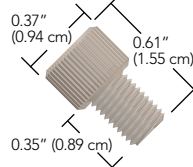
The 1/4-28 and M6 Flangeless Fittings for 1/16", 1/8", and metric sized OD tubing are summarized on the following page and listed on page 47.

1/4-28 Flangeless Fittings – Nuts



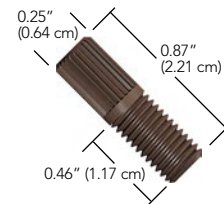
Standard

XP-201x
XP-202x
XP-220x
XP-230x
XP-238x
XP-245x
XP-301x – XP-305x
XP-330x



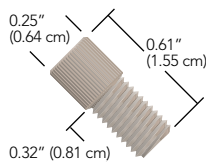
Short

XP-218x
XP-235x
XP-308x
XP-335x
P-207Sx
P-247x
P-307Sx
P-347x



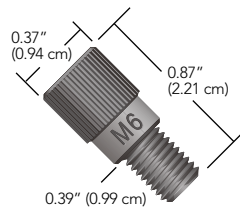
Headless

XP-286x



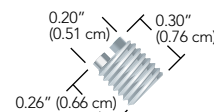
Short Headless

XP-283x



Standard Metric

P-207x
P-307x



FlushNut™

XF-358x
XF-368x

Flangeless Fittings (Cont.)

NOTE

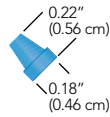
- › The XP-340x ferrule is designed for use with shallow receiving ports, such as those used on some low pressure valves.



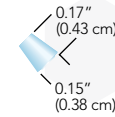
XP-340x
ETFE Small Valve Ferrule

- › The XF-368x 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.

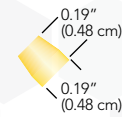
Ferrules



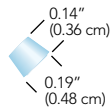
Standard 1/16"
P-200x
XP-200Nx



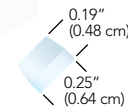
Small Valve 1/16"
XP-240x



**Standard 1/8"
and Metric Ferrules**
XP-300x
XP-300Nx
P-342x
P-353x
P-363Rx
P-343x



Small Valve 1/8"
XP-340x



Standard 4.0 mm
P-344x

RELATED PRODUCTS

- › For the Large Bore Flangeless Fittings, please refer to page 56.
- › Nuts for M6 threaded ports are on page 43; nuts for 5/16-24 threaded ports are on page 56.

Flangeless Fittings for 1/16" and 1/8" OD Tubing

- › Wide variety of materials and geometries to fit most applications
- › Excellent replacement for flanged fittings
- › Convenient and easy to use
- › Fittings and ferrules packaged together for easy ordering convenience

Flangeless Fittings for 1/16" OD Tubing, and for 1/8" OD Tubing are available in a variety of materials. The replacement ferrules are manufactured from inert ETFE, and are sold in a colored version or ETFE's natural color as the N option. The smaller ferrules, XP-240x and XP-340x are designed for shallow ports.

The fittings shown on this page are packaged together with the ferrules in convenient 10-packs. The 1/16" version include the XP-200x ferrule, and the 1/8" version include the XP-300x ferrule. Please visit our website, www.idex-hs.com, for single packaging options.

For higher pressure and temperature applications consider our Super Flangeless™ found on page 39.

Lock Nut

The XP-312x Lock Nut is for use with any 1/4-28 male Flangeless Fitting. Use this product in applications where vibrations can loosen fittings.

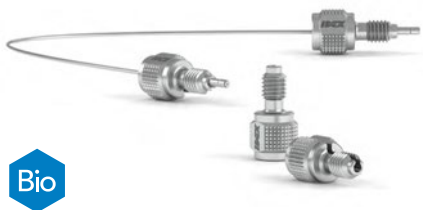
To Use: Thread the lock nut onto the male fitting. When the male fitting is firmly seated into the receiving port, tighten the lock nut down against the receiving port to securely hold the male fitting in place.



XP-312x
Lock Nut White Delrin

Flangeless Fittings

| Part No. | Description | Port | Pressure Rating | Head Style | Material | Qty. |
|---|---|-----------------------------|---------------------|----------------|---------------|-------|
| FLANGELESS FITTINGS FOR 1/16" OD TUBING | | | | | | |
| XF-358x | Flangeless Fitting for 1/16" OD Tubing, FlushNut | 1/4-28 Flat-Bottom | 2,000 psi (138 bar) | FlushNut | SST | 10-pk |
| XLT-111x | Flangeless Fitting for 1/16" OD Tubing | 10-32 Flat-Bottom | 2,500 psi (172 bar) | Standard Knurl | PEEK 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 10-pk |
| REPLACEMENT FERRULES FOR 1/16" OD TUBING | | | | | | |
| XP-200x | Flangeless Ferrule for 1/16" OD Tubing | 1/4-28 Flat-Bottom | 2,000 psi (138 bar) | — | ETFE Blue | 10-pk |
| XP-200Nx | Flangeless Ferrule for 1/16" OD Tubing | 1/4-28 Flat-Bottom | 2,000 psi (138 bar) | — | ETFE Natural | 10-pk |
| XP-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 |
| FLANGELESS FITTINGS FOR 1/8" OD TUBING (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 | 10-pk |
| XP-301x | Flangeless Fitting for 1/8" OD Tubing | 1/4-28 Flat-Bottom | 500 psi (34 bar) | Standard Knurl | Delrin Black | 10-pk |
| XP-302x | Flangeless Fitting for 1/8" OD Tubing | 1/4-28 Flat-Bottom | 500 psi (34 bar) | Standard Knurl | Delrin Red | 10-pk |
| XP-305x | Flangeless Fitting for 1/8" OD Tubing | 1/4-28 Flat-Bottom | 500 psi (34 bar) | Standard Knurl | Delrin Green | 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 | 10-pk |
| XP-315x | Flangeless Fitting for 1/8" OD Tubing | 1/4-28 Flat-Bottom | 500 psi (34 bar) | Standard Knurl | ETFE Natural | 10-pk |
| XP-330x | Flangeless Fitting for 1/8" OD Tubing | 1/4-28 Flat-Bottom | 500 psi (34 bar) | Standard Knurl | PEEK Natural | 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 | 10-pk |
| REPLACEMENT FERRULES FOR 1/8" OD TUBING | | | | | | |
| XP-300x | Flangeless Ferrule for 1/8" OD Tubing | 1/4-28 Flat-Bottom | 500 psi (34 bar) | — | ETFE Yellow | 10-pk |
| XP-300Nx | Flangeless Ferrule for 1/8" OD Tubing | 1/4-28 Flat-Bottom | 500 psi (34 bar) | — | ETFE Natural | 10-pk |
| XP-340x | Flangeless Ferrule for 1/8" OD Tubing, Small Valve | 1/4-28 Flat-Bottom | 500 psi (34 bar) | — | ETFE Natural | 10-pk |
| XP-312x | Lock Nut for Flangeless Nuts | 1/4-28 Flat-Bottom | — | — | Delrin White | 10-pk |



Bio

- › Finger-tight to 19,000 psi
- › Reusable up to 200 times
- › Zero Dead Volume
- › Biocompatible
- › Limit Wear
- › Increase Product Life
- › Many IDs and Lengths Available



LEARN MORE

Learn more about MarvelX Next Generation UHPLC Fittings at www.idex-hs.com/MarvelX



NOTE

- › MarvelX tubing includes a sleeve that assists in product identification, with ID, length and part number information:

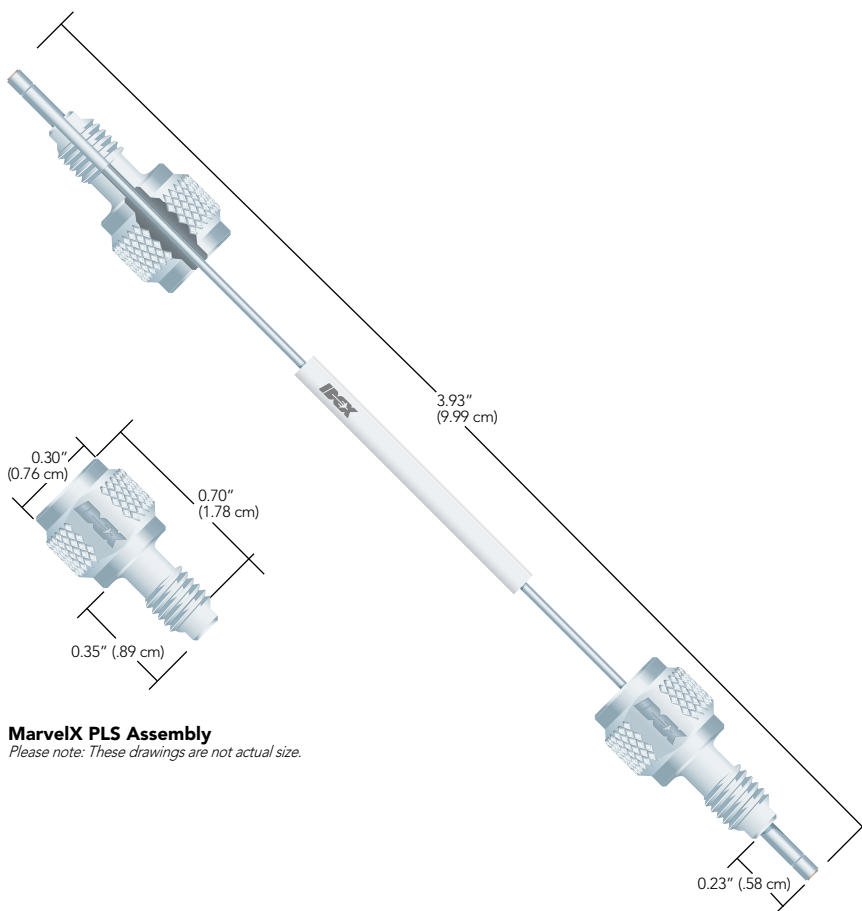


- › Minimum recommended bend-radius with MarvelX tubing is 1/4" (~6.35 mm).

MarvelX™

MarvelX™ Next Generation UHPLC Fittings

MarvelX UHPLC Connection Systems have been expertly designed for easy routing throughout your instrument, while providing consistent performance and superior re-usability. Built with convenient, removable stainless steel fittings and changeable, precision-cut flexible tubing, MarvelX can be used up to 200 times! The connection system is compatible with 10-32 coned receiving ports and is absolutely finger-tight — no tool required. MarvelX utilizes our unique next-generation patent-pending technology to auto-adjust to various port depths. This ensures zero dead volume and delivers better chromatography results with sleek, simple, and reliable functionality. In addition to our powerful Stainless Steel version, MarvelX offers a truly biocompatible option in PEEK-Lined Stainless Steel.



MarvelX PLS Assembly
Please note: These drawings are not actual size.



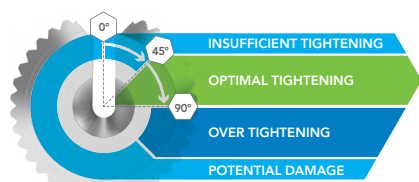
SPECIFICATIONS & DETAILS

| | |
|--------------------------------|---|
| Pressure Capability | 19,000 psi (~1,310 bar) for routine use; up to 23,000 psi max over pressure for PEEK-Lined versions; up to 29,000 psi max over pressure for Stainless Steel versions. |
| Installation Method | Finger-tight, 1/8 – 1/4 turn after initial resistance (~2 in-lbs) |
| Tubing Type | 1/32" OD flexible 316 Stainless Steel with 1/16" OD rigid tube ends |
| Fitting Type | 10-32 threaded, removable 316 Stainless Steel |
| Wetted Materials | PEEK-Lined versions: PEEK Stainless Steel versions: PEEK and 316 Stainless Steel |
| Maximum Use Temperature | 120 °C |

NOTE: The above performance specifications apply to use with appropriately-designed receiving ports under optimal conditions, using water at up to 120 °C for the testing process. If different conditions are used, the expected pressure threshold will be different.

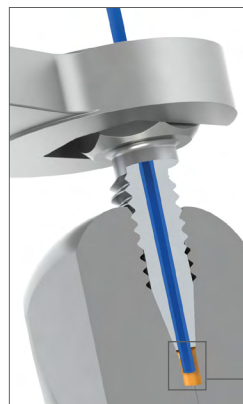
INSTRUCTIONS FOR TIGHTENING

- 1 Route tubing to the target port.
- 2 Slide fitting onto the tubing end via slot.
- 3 Slowly finger-tighten to first resistance; continue tightening 1/8-turn minimum, to 1/4-turn maximum.

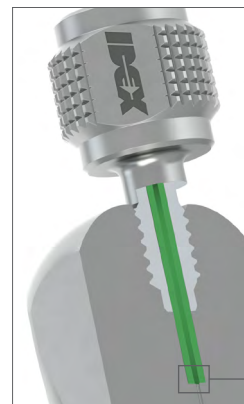


MARVELX™ UHPLC FITTINGS VS. CONVENTIONAL CONED FITTINGS

Conventional coned fittings require a ferrule in conjunction with a fitting for proper sealing. They depend on complex techniques, including tools, to improve sealing performance, which significantly increases probability of extra internal volume and poor chromatography results. The excessive force needed for tightening increases wear of expensive components and the likelihood of replacement, adding to overall costs.



MarvelX UHPLC fittings do not depend on ferrules. They seal at the bottom of the port, without complex techniques, which significantly reduces required torque and enables many more connects and disconnects. Furthermore, they are virtually impossible to over-tighten by hand, limiting wear and increasing product life. An enhanced proprietary tip design also ensures zero dead volume (ZDV) and better chromatography results.



MarvelX

| Length | 070 MM Part No. | 150 MM Part No. | 250 MM Part No. | 350 MM Part No. | 500 MM Part No. | 600 MM Part No. |
|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| PEEK-LINED STAINLESS STEEL ASSEMBLIES* | | | | | | |
| 25 µm ID | UPFP-6025070 | UPFP-6025150 | UPFP-6025250 | UPFP-6025350 | UPFP-6025500 | UPFP-6025600 |
| 50 µm ID | UPFP-6050070 | UPFP-6050150 | UPFP-6050250 | UPFP-6050350 | UPFP-6050500 | UPFP-6050600 |
| 75 µm ID | UPFP-6075070 | UPFP-6075150 | UPFP-6075250 | UPFP-6075350 | UPFP-6075500 | UPFP-6075600 |
| 100 µm ID | UPFP-6100070 | UPFP-6100150 | UPFP-6100250 | UPFP-6100350 | UPFP-6100500 | UPFP-6100600 |
| 150 µm ID | UPFP-6150070 | UPFP-6150150 | UPFP-6150250 | UPFP-6150350 | UPFP-6150500 | UPFP-6150600 |
| 300 µm ID | UPFP-6300070 | UPFP-6300150 | UPFP-6300250 | UPFP-6300350 | UPFP-6300500 | UPFP-6300600 |
| STAINLESS STEEL ASSEMBLIES* | | | | | | |
| 100 µm ID | UPFS-6100070 | UPFS-6100150 | UPFS-6100250 | UPFS-6100350 | UPFS-6100500 | UPFS-6100600 |
| 125 µm ID | UPFS-6125070 | UPFS-6125150 | UPFS-6125250 | UPFS-6125350 | UPFS-6125500 | UPFS-6125600 |
| 254 µm ID | UPFS-6254070 | UPFS-6254150 | UPFS-6254250 | UPFS-6254350 | UPFS-6254500 | UPFS-6254600 |
| REPLACEMENT PARTS* | | | | | | |

Replacement Tubing To order Replacement Tubing, simply add the letter "T" to the end of any of the part numbers listed above.
Example: UPFP-6020570T is the replacement tubing for UPFP-6020570.

Replacement Fittings UPN-61032 – Includes 3 replacement fittings.

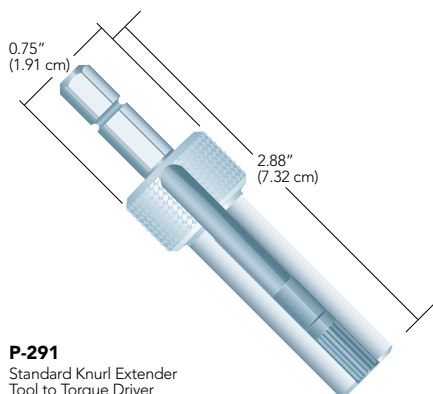
*Product availability and lead times may vary depending on the configuration. Contact Customer Service at +1 800 426 0191 or email CustomerService.hs@idexcorp.com for details.



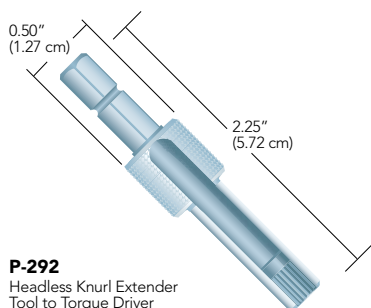
Fittings Tools



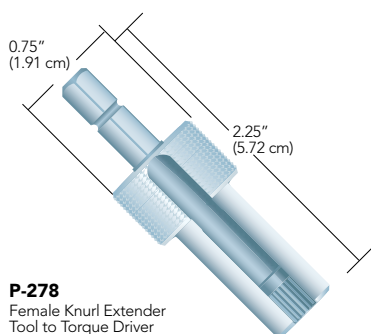
VHP-1000
VHP Wrench
1/4 in Hex 10 in-lbs (1.13 N·m)



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

Tightening Tools for VHP & Other 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 and VHP-2000) 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 ($\pm 6\%$ of setting) and have been tested extensively with the reusable VHP fittings on page 60. 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 IDEX Health & Science 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 in the table at the bottom of the page 51.

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 51. 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 51.



APPLICATION NOTE

The drawings represent actual size of the various knurled head designs of the IDEX Health & Science nuts featured in this chapter. Select the appropriate extender tool for the knurl pattern of the nut you've selected.

| FEMALE KNURL | STANDARD KNURL | HEADLESS KNURL |
|----------------------|----------------------|----------------|
| | | |
| STANDARD MICRO KNURL | MICRO HEADLESS KNURL | |
| | | |



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-135x 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 IDEX Health & Science valves and the stainless steel fittings listed on page 59.

Fittings Tools

| Part No. | Description | Use With Head Style | Torque Delivered | Qty. |
|-----------------------------|--|--------------------------|--|------|
| VHP TIGHTENING TOOLS | | | | |
| F-347 | Extender Tool to Torque Driver | FlushNut (1/4-28) | — | ea. |
| N-291 | Extender Tool to Torque Driver | Micro Headless | — | ea. |
| 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-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. |
| EXTENDER TOOLS | | | | |
| Part No. | Description | Material | | Qty. |
| 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. |
| M-150 | Swaging Tool for TinyTight Fittings, for 6–40 MINSTAC Port | SST | | ea. |



Tubing Sleeves

MicroTight® Tubing Sleeves

- › Manufactured from PEEK polymer
- › Pressure rated to 4,000 psi (276 bar)
- › Color-coded for easy inner diameter identification

IDEX Health & Science 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

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.

Our NanoTight sleeves were designed primarily for use with the NanoTight fittings, found on page 37 and also work well with the Super Flangeless™ fittings for 1/16" OD tubing on page 39. For tubing sleeves that can be used effectively with stainless steel fittings and at higher temperatures, consider using the PEEK Tubing Sleeves, found below.

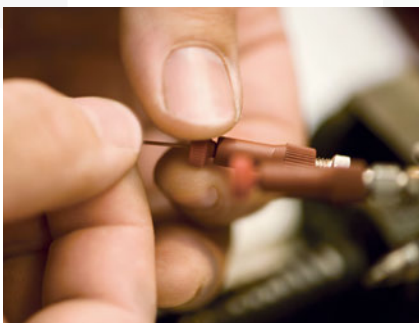
1/16" OD PEEK Tubing Sleeves

- › 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.

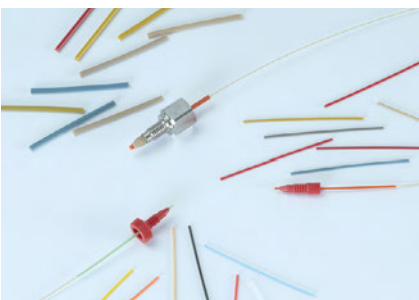
These sleeves require a wrench tightened nut to achieve proper sealing. We recommend our SealTight™ fittings on page 36. Many researchers also use a stainless steel nut and ferrule with these sleeves, such as our U-400 and U-401 (page 33).





1/32" OD PEEK Tubing Sleeves

These 1.6" long 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, use with U-400 and U-401 (not shown)
- › 1/32" OD FEP Tubing Sleeves, shown with F-126Sx Fitting
- › Fittings and tubing only shown to highlight how sleeves are designed to be used; they are not included with the sleeves



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 extruded polymer tubing, you are assured of the concentricity of the resultant connection.

Tubing Sleeves (Cont.)



RELATED PRODUCTS

Use 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 35).
- › The F-112 and P-416BLK MicroTight® Fittings (page 34) — 1/32" OD PEEK Tubing Sleeves only.
- › The 1/32" OD MicroTight Fittings on page 34.
- › The RheFlex M4 Fitting (page 61) for MX Module applications; the M-645 Valco®-Compatible Fitting (page 33) for Valco Nanovolume® valve applications.

Tubing Sleeves

| Part No. | ID | For Tubing OD Size | Color | Qty. |
|---|--|--------------------|---------|------|
| MICROTIGHT PEEK TUBING SLEEVES AND KITS, 0.025" OD | | | | |
| F-180 | 125 µm (0.005") | 70–110 µm | Red | ea. |
| F-181 | 180 µm (0.007") | 125–165 µm | Yellow | ea. |
| F-182 | 230 µm (0.009") | 175–215 µm | Natural | ea. |
| F-183 | 280 µm (0.011") | 225–265 µm | Blue | ea. |
| F-184 | 330 µm (0.013") | 275–315 µm | Orange | ea. |
| F-185 | 395 µm (0.0155") | 340–380 µm | Green | ea. |
| F-186 | 455 µm (0.018") | 400–440 µm | Black | ea. |
| F-187 | 535 µm (0.021") | 480–520 µm | Natural | ea. |
| F-188 | 152 µm (0.006") | 95–135 µm | Purple | ea. |
| 1328 | MicroTight Tubing Sleeve Kit, contains (6) each of the sleeve sizes listed above | — | — | ea. |
| 1356 | MicroTight Connector 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 | — | — | ea. |
| NANOTIGHT FEP TUBING SLEEVES, 1/16" OD | | | | |
| F-237 | 125 µm (0.005") | 70–110 µm | Red | ea. |
| F-238 | 180 µm (0.007") | 125–165 µm | Yellow | ea. |
| F-239 | 215 µm (0.0085") | 160–200 µm | Natural | ea. |
| F-240 | 280 µm (0.011") | 225–265 µm | Blue | ea. |
| F-241 | 330 µm (0.013") | 275–315 µm | Orange | ea. |
| F-242 | 395 µm (0.0155") | 340–380 µm | Green | ea. |
| F-243 | 455 µm (0.018") | 400–440 µm | Black | ea. |
| F-244 | 535 µm (0.021") | 480–520 µm | Natural | ea. |
| F-245 | 610 µm (0.024") | 555–595 µm | Red | ea. |
| F-246 | 685 µm (0.027") | 630–670 µm | Yellow | ea. |
| F-247 | 840 µm (0.033") | 785–825 µm | Green | ea. |
| F-252 | 1.07 mm (0.042") | 1 mm | Purple | ea. |
| PEEK TUBING SLEEVES FOR 1/16" OD FITTINGS | | | | |
| F-225 | 125 µm (0.005") | 70–110 µm | Red | ea. |
| F-226 | 180 µm (0.007") | 125–165 µm | Yellow | ea. |
| F-227 | 230 µm (0.009") | 175–215 µm | Yellow | ea. |
| F-228 | 250 µm (0.011") | 225–265 µm | Blue | ea. |
| F-229 | 330 µm (0.013") | 275–315 µm | Natural | ea. |
| F-230 | 405 µm (0.016") | 350–390 µm | Orange | ea. |
| F-231 | 560 µm (0.022") | 505–545 µm | Natural | ea. |
| F-232 | 785 µm (0.031") | 730–770 µm | Natural | ea. |
| F-233 | 865 µm (0.034") | 785–825 µm | Blue | ea. |
| F-234 | 685 µm (0.027") | 630–670 µm | Yellow | ea. |
| PEEK TUBING SLEEVES FOR 1/32" OD FITTINGS | | | | |
| F-381 | 180 µm (0.007") | 125–165 µm | Yellow | ea. |
| F-382 | 205 µm (0.008") | 150–190 µm | Natural | ea. |
| F-384 | 255 µm (0.010") | 200–240 µm | Blue | ea. |
| F-385 | 380 µm (0.015") | 325–365 µm | Natural | ea. |
| F-386 | 510 µm (0.020") | 455–495 µm | Orange | ea. |
| F-387 | 250 µm (0.011") | 225–265 µm | Red | ea. |
| F-388 | 330 µm (0.013") | 275–315 µm | Black | ea. |
| FEP TUBING SLEEVES FOR 1/32" OD FITTINGS | | | | |
| F-374 | 280 µm (0.011") | 225–265 µm | Blue | ea. |
| F-375 | 330 µm (0.013") | 275–315 µm | Orange | ea. |
| F-376 | 395 µm (0.0155") | 340–380 µm | Green | ea. |

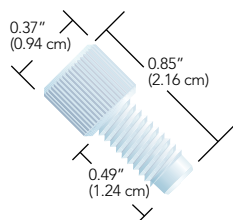


Plugs & Caps

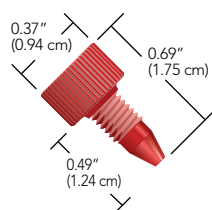
› Seal 6-32, 6-40, 10-32, 1/4-28, M6, or 5/16-24 threaded ports or fittings

Use our 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.

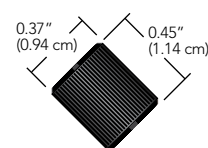
To help determine which plug or cap is best suited for your application, please visit www.idex-hs.com for detailed chemical compatibility data.



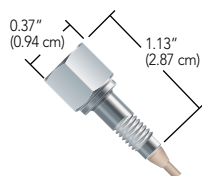
P-316
PFA Plug
for 1/4-28 flat-bottom ports



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-309 | Plug for 1/4-28 Flat-Bottom Ports | Standard Knurl | Delrin Black | ea. |
| 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-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-Bottom Ports | Micro Headless Knurl | PEEK Green | ea. |
| P-849 | Plug for 10-32 Flat-Bottom Ports | Standard Knurl | Delrin Black | ea. |
| U-467R | Plug for 10-32 Coned Ports | Standard Knurl | Delrin Red | ea. |
| 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. |

Large Bore Fittings

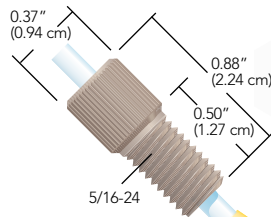
- › 5/16-24 or 1/2-20 threads
- › For use with 1/16", 1/8", 3/16", 1/4", 5/16", 3.0 mm, or 4.0 mm OD tubing

NOTE

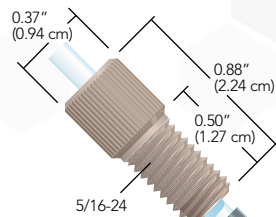
Each of the Large Bore Fittings shown on this page comes in a convenient 10-pack and is packaged with the most popularly chosen Ferrule option. The Fittings can be ordered separately by removing the preceding letter "X" from the part number. Additionally, to connect metric-sized tubing with outer diameters less than 4.0 mm to 5/16-24 threaded ports, reference the chart on page 43 to choose the correct nut/ferrule combination.

RELATED PRODUCTS

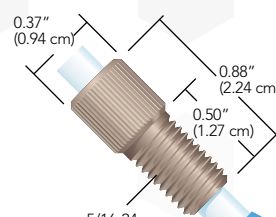
| | Page |
|---------------------------------|---------|
| MORE LARGE BORE PRODUCTS | |
| 5/16-24 Coned Fittings | 41 |
| Barbed Adapters | 90 |
| Threaded Adapters | 63 |
| Plugs | 55, 112 |
| Y Connector | 90 |
| ETFE Tubing | 27 |
| FEP, PFA Tubing | 26, 24 |
| Tubing Cutter | 28 |
| Pressure Relief Valve | 148 |
| Solvent Inlet Filters | 102 |
| Bottle Caps | 55 |
| Semi-Prep Inline Filters | 107 |



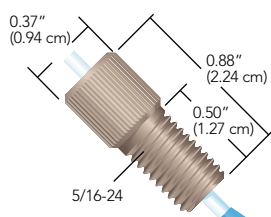
XP-130x
PEEK Nut, for 1/8" OD tubing shown with P-300 Flangeless Ferrule (page 43)



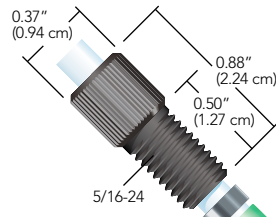
XP-131x
PEEK Nut, for 1/8" OD tubing shown with P-359 Super Flangeless™ Ferrule (included and found on page 41)



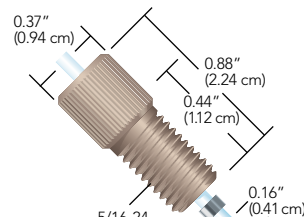
XP-132x
PEEK Nut, for 3/16" and 4.0 mm OD tubing shown with P-133 Flangeless Ferrule (included and found on this page)



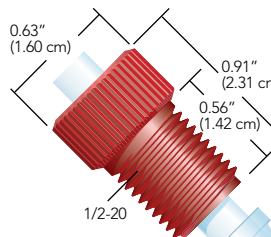
XP-136x
PEEK Nut, for 1/16" OD tubing shown with P-200 Flangeless Ferrule (included and found on page 43)



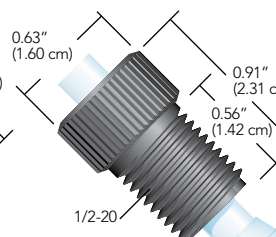
XP-137x
PEEK Nut, for 3/16" OD tubing shown with P-140 Super Flangeless Ferrule (included and found on page 56)



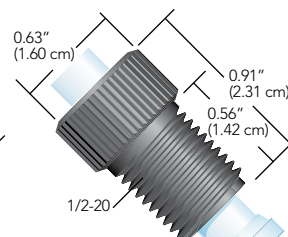
XP-141x
PEEK Nut, for 1/16" OD tubing shown with P-259 Super Flangeless Ferrule (included and found on page 41)



XU-620x
PEEK Nut, for 1/4" OD tubing shown with inverted U-650 Flangeless Ferrule for coned ports (included and found on this page)



XU-655x
PEEK Nut, for 1/4" OD tubing shown with U-650 Flangeless Ferrule (included and found on this page)



XU-662x
PEEK Nut, for 5/16" OD tubing shown with U-660 Flangeless Ferrule (included and found on this page)

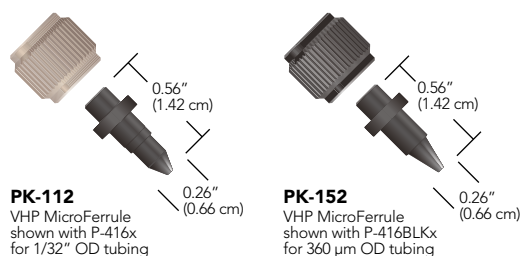
| Part No. | Description | Port | Pressure Rating | Head Style | Material (Nut/Washer) | Qty. |
|-----------------------------|--|---------------------|---------------------|----------------|------------------------------|-------|
| LARGE BORE FITTINGS | | | | | | |
| XP-130x | Flangeless Fitting for 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 |
| 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 |



VHP Micro Fittings

Micro Fittings are specifically designed for use with microferrules. They are manufactured from a proprietary PEEK blend (PK) which allow them to be used at higher temperatures (up to 200° C) and higher pressures ideal for UHPLC applications.

VHP MicroFerrules and Fittings 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.



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.

| Part No. | Description | Port | Pressure Rating | Required Torque | Head Style | Material | Qty. |
|--|---------------------------------------|---------------|------------------------|-----------------------|--------------|---------------|------|
| 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. |



VHP PK Fittings

RELATED PRODUCTS

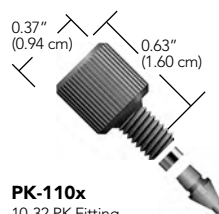
- Find unions, tees and crosses for VHP applications on page 75, and 74.

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.

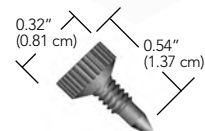
The VHP PK One-Piece fittings are available for 10-32 coned, 6-32 coned, or M4 coned ports, and Two-Piece fittings are available to connect either 1/16" or 1/32" OD tubing into 10-32 coned ports in multiple styles.



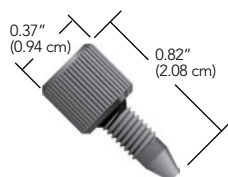
PK-110x
10-32 PK Fitting
shown with PK-100x for
1/16" OD tubing



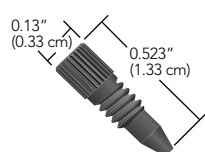
PK-110x
10-32 PK Fitting
shown with PK-132x for
1/32" OD tubing



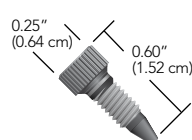
PK-126x
6-32 PK MicroTight® Fitting
for 1/32" OD tubing



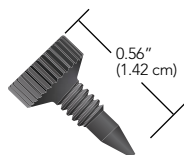
PK-120BLKx
10-32 PK Fitting
for 1/16" OD tubing



PK-126Hx
6-32 PK MicroTight® Fitting
for 1/32" OD tubing



UH-904x
M4, 1/32" Fitting
for IDEX Health & Science
MX valves



PK-124x
6-32 PK MicroTight® Fitting
for 1/32" OD tubing

| 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 |
| 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 (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 |

Stainless Steel VHP Fittings

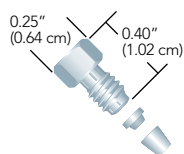
- › Pressure rated to 30,000 psi (2,070 bar)
- › Double compression ferrule design
- › Available with 10-32 threads for 1/16" OD tubing and M4 threads for 1/32" OD tubing

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.

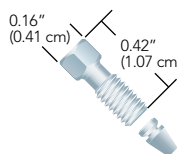


APPLICATION NOTE

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.



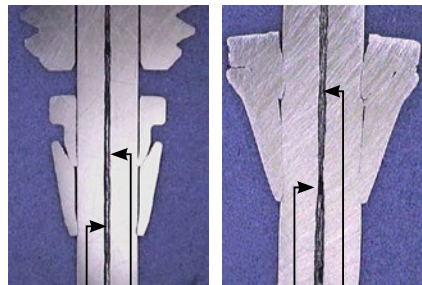
VHP-200x
VHP 10-32 Fitting
for 1/16" OD tubing



VHP-700x
VHP 6-40 Fitting
for 1/32" OD tubing

IDEX Health & Science VHP-200

Conventional Two Piece Ferrule Design



Uniform
Tubing Passage

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-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 |



Reusable VHP Fittings

- › Pressure rated up to 25,000 psi (1,720 bar)
- › Patented 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)
- › Quick component replacement, minimal downtime

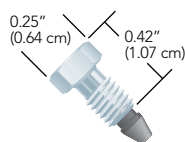


RELATED PRODUCTS

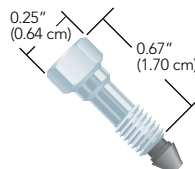
- › Find tightening tools on page 50 designed to deliver the torque necessary for these fittings.

IDEX Health & Science introduces an innovative line of Very High Pressure (VHP) fittings, designed to withstand extreme pressures. This patented line of ground-breaking fitting systems is perfect for use within the increasingly demanding requirements of today's high performance analytical systems.

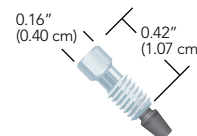
The Reusable VHP fittings can be reused when following the tightening torque specification listed below. With a polymer front ferrule, there is no damage to the tubing or receiving port, also increasing the life of these components.



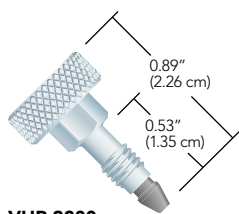
VHP-320x
10-32 VHP Fitting
for 1/16" OD tubing



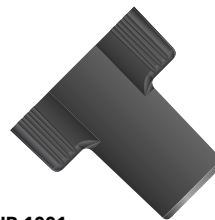
VHP-325x
10-32 VHP Fitting, Long
for 1/16" OD tubing



VHP-920x
M4 VHP Fitting
for 1/32" OD tubing



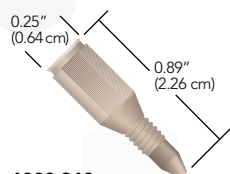
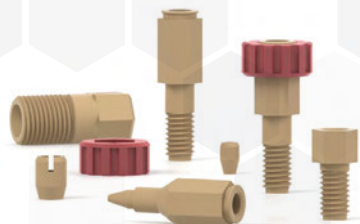
VHP-3200x
10-32 VHP Fitting
for 1/16" OD tubing



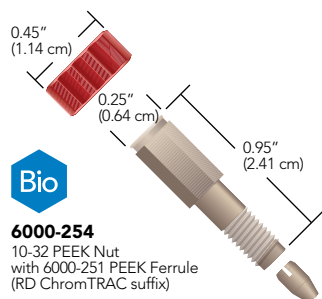
VHP-1001
VHP Fingertight
1/4" Hex Tool

| Part No. | Description | Port | Pressure Rating | Required Torque | Head Style | Material | Qty. |
|------------------------------|--------------------------------|-------------|------------------------|-----------------------|------------|----------|-------|
| REUSABLE VHP FITTINGS | | | | | | | |
| 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 |
| VHP-3200x | 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 |
| VHP-1001 | VHP Fingertight 1/4" Hex Tool | — | — | — | — | PPS | ea. |

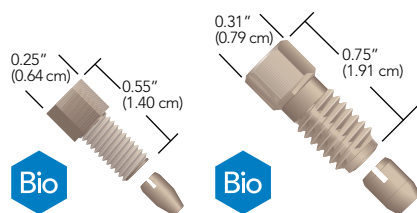
Assorted Fittings Kits



6000-360
M4 Fitting
M4 threads
for 1/32" OD tubing



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

RheFlex® M4 Fittings

- › Incorporates M4 coned threads for 1/32" OD tubing
- › Pressure rated to 5,000 psi (345 bar)

Our RheFlex M4 Fitting is designed to connect 1/32" OD tubing in MX Series II™ valves (see Actuated Valves, starting on page 119). 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 ChromTRAC™ knobs with the RheFlex M4 Fitting for fingertight convenience and to color-code connections.

Two-Piece RheFlex Fingertight Fittings

The 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 page 115 for more information on these valves.) *View the online product bulletin at: www.idex-hs.com.*

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 | CODE | COLOR |
|------|-------|------|--|
| BL | Blue | WH | White |
| GN | Green | YL | Yellow |
| GY | Gray | MC | Multi-color (two each of blue, green, gray, red, and yellow) |
| RD | Red | | |

Add these letter suffixes to the end of the seven-digit part numbers of the 10-32 and M4 threaded RheFlex Fittings listed below.

RELATED PRODUCTS

- › For PEEK tubing sleeves that can be used with these M4 RheFlex fittings, see page 52.
- › For reusable fittings that both work in UHPLC applications and can help ensure the tubing is fully inserted into the receiving port, see page 60.

| Part No. | Description | Port | Pressure Rating | Head Style | Material | Qty. |
|---|--|---------------|---------------------|----------------|---------------|-------|
| 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 |
| 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 |



CONNECTORS

Connectors are designed to securely join tubing together or to facilitate the joining of tubing to other fluid pathway components. We offer multiport connectors with different thread and port configurations to meet your system requirements and connection needs. Some of our connectors feature a True ZDV (Zero Dead Volume) internal configuration that helps minimize the formation of dead volume in your fluidic pathway. Our versatile adapters help bring two connectors with different configurations together. Connectors are manufactured from 316 stainless steel or from inert polymers to ensure chemical compatibility with the fluid passing through. Peristaltic tube connectors are ideal for making connections with soft-walled, peristaltic tubing. Our extensive line of connectors includes tees, crosses, Luer Adapters, barbed and threaded adapters, and a variety of other options.

- | | | | |
|-----------|--|-----------|---|
| 63 | THREADED ADAPTERS | 79 | ACCESSORIES |
| 67 | HIGH PRESSURE MULTIPORT CONNECTORS | 80 | NANOPORT ASSEMBLIES |
| 72 | ULTRA HIGH PRESSURE MULTIPORT CONNECTORS | 81 | LOW PRESSURE MULTIPORT CONNECTORS |
| 77 | MICROTIGHT® ADAPTERS | 90 | LUER ADAPTERS |
| | | 91 | PERISTALTIC TUBE CONNECTORS |



Threaded Adapters

- › Threaded adapters in a variety of configurations
- › English, Metric, and NPT threaded adapters offered
- › Bring together connectors with different threads
- › Manufactured from inert polymers — PEEK, PCTFE, ETFE, and PTFE

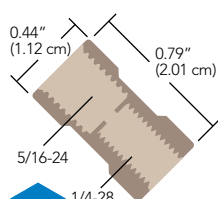
Two of the many challenges researchers face regularly, are trying to use one style of fitting for all connections, or trying to join two different sizes of tubing. To assist in overcoming these challenges we have engineered one of the most extensive threaded adapter lines available.

Threaded Adapters come in a wide variety of configurations to meet your system requirements. They are designed to effectively bring together connectors with different threads. We offer them in English, Metric, and NPT versions. Manufactured from inert polymers and stainless steel they deliver excellent chemical resistance.

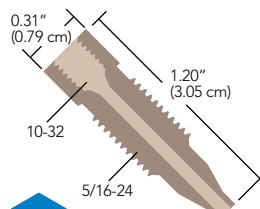


English Threaded Adapters

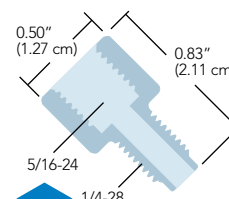
Our versatile English Threaded Adapters are used specifically to securely attach connectors with different threads. We designed these adapters to work with English to English threaded geometries. Manufactured from Stainless Steel, PEEK, or Tefzel™ (ETFE), they deliver excellent solvent resistance.



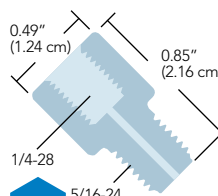
P-135
0.080" (2.05 mm) thru-hole



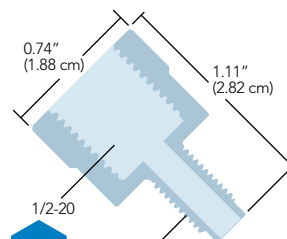
6000-076
0.066" (1.70 mm) thru-hole



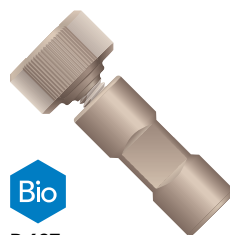
P-681
0.125" (3.20 mm) thru-hole



P-718
0.040" (1.00 mm) thru-hole



P-684
0.130" (3.30 mm) thru-hole



P-627
0.020" (0.50 mm) thru-hole
Includes (1) F-300 for 1/16" OD tubing

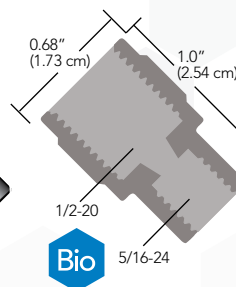
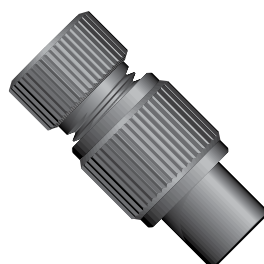
Threaded Adapters (Cont.)

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

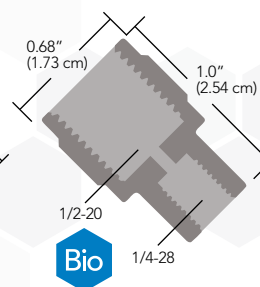
- Use the 6000-076 Adapter to connect 1/16" OD tubing to the Preparative-Scale Injector Valve (page 66).
- You may not need an adapter to connect 1/16" OD tubing into your flat-bottom port. A less expensive alternative is to use a Flangeless Nut and Ferrule starting on page 45 or a Super Flangeless™ Nut and Ferrule starting on page 39.



Bio

U-659

Tapered thru-hole
Includes (1) U-650/U-655
for 1/4" OD tubing



Bio

U-665

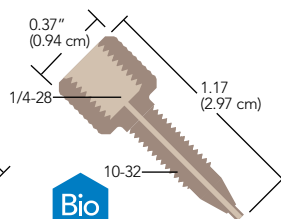
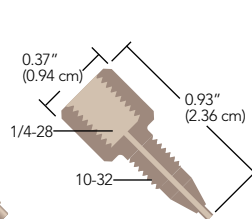
0.063" (1.60 mm) thru-hole
Includes (1) U-650/U-655
for 1/4" OD tubing



Bio

P-652

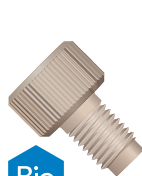
0.030" (0.75 mm) thru-hole
(Note the new knurled design)



Bio

P-654

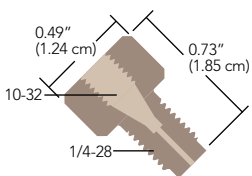
Extra Long, 0.030"
(0.76 mm) thru-hole



Bio

P-669-01

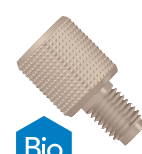
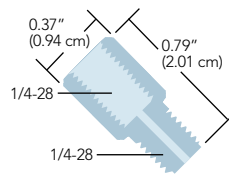
0.040" (1.00 mm) thru-hole



Bio

P-671

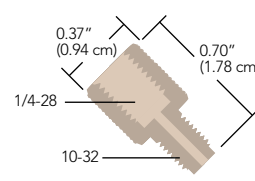
0.040" (1.00 mm) thru-hole



Bio

P-672

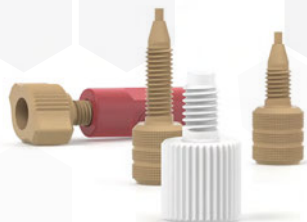
0.050" (1.25 mm) thru-hole



APPLICATION NOTE

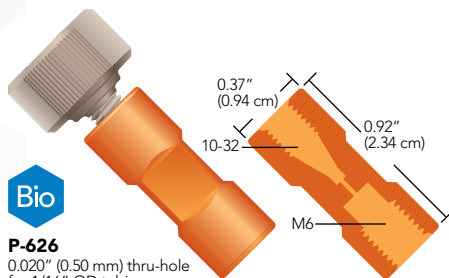
Here are application ideas using two of our popular adapters:

- 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.

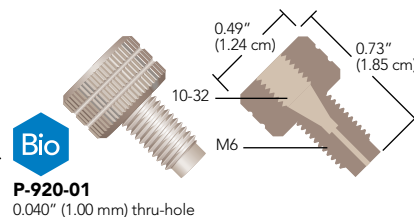


Metric Threaded Adapters

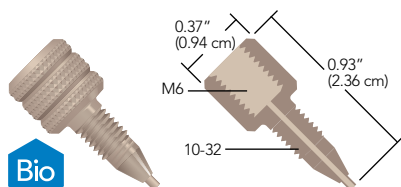
Our versatile Metric Threaded Adapters are used specifically to effectively attach connectors with different threads. We designed these adapters to work with English to Metric threaded geometries. Manufactured from Stainless Steel, PEEK or Tefzel™ (ETFE) they deliver excellent solvent resistance.



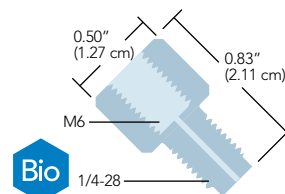
P-626
0.020" (0.50 mm) thru-hole
for 1/16" OD tubing
Includes (1) F-300



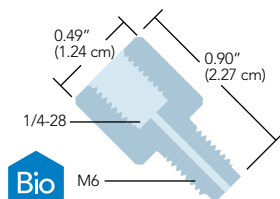
P-920-01
0.040" (1.00 mm) thru-hole



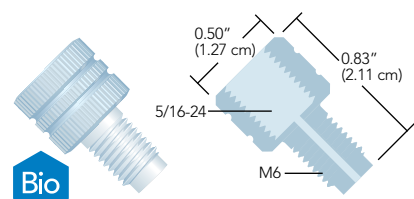
P-650
0.030" (0.75 mm) thru-hole



P-670
0.030" (0.75 mm) thru-hole



P-694
0.040" (1.00 mm) thru-hole



P-673
0.040" (1.00 mm) thru-hole

RELATED PRODUCTS

- › For an alternative to the Female M6 Adapters presented above, try a P-602 or P-622 Low Pressure Metric Union from page 84, along with the appropriate Metric Flangeless Fittings on page 43.
- › To direct connect your tubing into a flat-bottom port, find the appropriate Flangeless or Super Flangeless™ Fittings on page 45 and page 39 respectively.
- › Need metric fittings for your connections? See page 43.

Threaded Adapters (Cont.)



National Pipe Thread Adapters

These adapters make connections to female 1/8" and 1/4" National Pipe Thread (NPT) ports.

Manufactured from PEEK polymer, our 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.

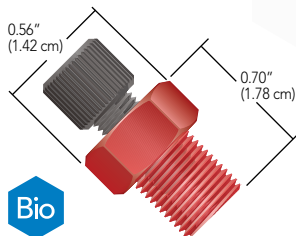
Please Note: Wrap the threads on the NPT side of these adapters with thread seal tape (plumber's tape) to ensure a leak-free seal.

RELATED PRODUCTS

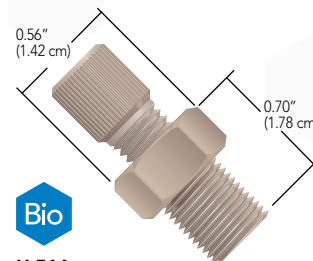
Replacement fittings for these adapters are located on the pages indicated below:

| | Page(s) |
|-----------------------------|---------|
| 1/4-28 for 1/8" OD tubing | 41 |
| 5/16-24 for 1/8" OD tubing | 41, 56 |
| 5/16-24 for 3/16" OD tubing | 41 |

Other tubing/fitting combinations are available. For more information, please contact your local Distributor or IDEX Health & Science directly.



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

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.

Threaded Adapters

| Part No. | Description | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. | | |
|--|--|------------|------------------|--------------|---------------------|--------------|------------------|------|
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| P-718 | PCTFE Adapter, 5/16-24 FB, F to 10-32 C, M, Extra Long | N/A | 0.040" (1.00 mm) | 10.3 µL | 1,000 psi (69 bar) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 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) | ea. | | |
| 1/8" MALE NATIONAL PIPE THREAD ADAPTERS | | | | | | | | |
| Part No. | Description | Color | Tubing OD | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
| 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) | ea. |
| 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) | ea. |
| 1/4" MALE NATIONAL PIPE THREAD 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) | ea. |
| 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) | ea. |

F = Female (internal) threads; M = Male (external) threads; XL = extra long; C = Coned; FB = Flat-Bottom

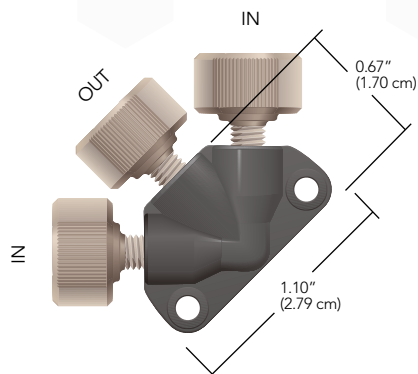
* The pressure rating of this adapter exceeds the pressure holding ability of the fittings and tubing used with it.

** Thru-hole tapers from 0.188" (4.80 mm) to 0.125" (3.20 mm).



High Pressure Mixing Tees

Mixing Tees utilize a specifically engineered internal geometry to efficiently mix two fluid streams into one combined stream. Mixing Tees are ideal for microbore or analytical gradient HPLC. These mixing tees are specifically designed for high pressure applications.



U-466 and U-466S
Static Mixing Tees with F-300 Fingertight Fittings for 1/16" OD tubing

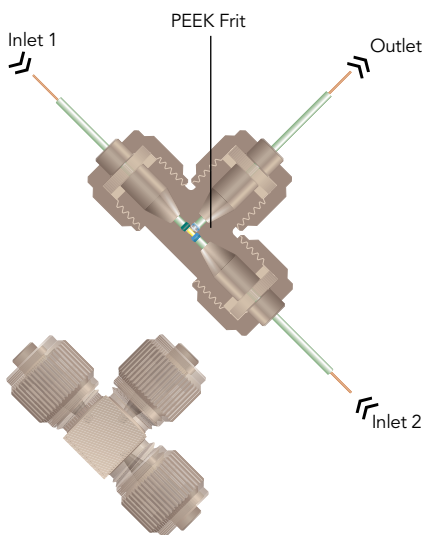
Static Mixing Tees

- › PEEK body with two-piece fingertight fittings
- › Low swept volume

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.



M-540
Micro Static Mixing Tee 0.010" thru-hole with fittings included (tubing and tubing sleeves not included)

Micro Static Mixing Tee

- › Constructed of inert PEEK and PCTFE
- › Low swept volume of 0.95 μL
- › Designed for flow rates of 20–250 $\mu\text{L}/\text{min}$

Our 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 (page 37).

RELATED PRODUCTS

- › See our Vacuum Degassing Systems on page 154.
- › Our standard Static Mixing Tees are designed for flow rates from 0.5 mL/min to 3 mL/min.

High Pressure Mixing Tees (Cont.)



APPLICATION NOTE

Several researchers use our PEEK MicroTee to introduce ionizing voltage to their fluid stream just prior to a Mass Spectrometer¹. 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 52) for the conducting wire (as needed to accommodate wire diameter), and at least two more MicroTight Tubing Sleeves (page 52) 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.

MicroTee & Cross for Capillary Tubing

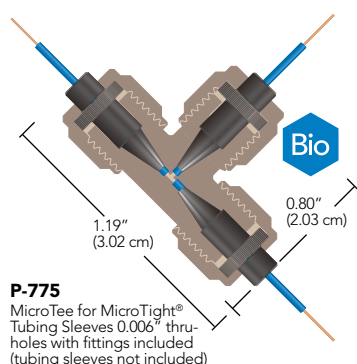
- › Direct connect 1/16", 1/32", 360 µm OD tubing, plus other capillary tubing
- › Low swept volume

Use our 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.

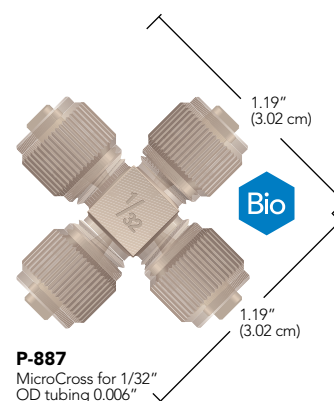


NOTE

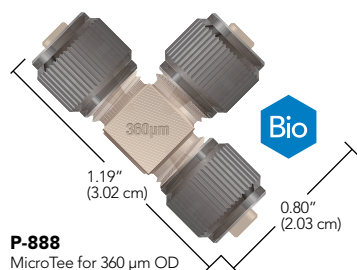
- › Use only the ferrules supplied with each connector — they are not interchangeable. Replacement ferrules and female nuts are available on page 35. For MicroUnions, MicroTees, and MicroCrosses for UHPLC applications, see page 72.



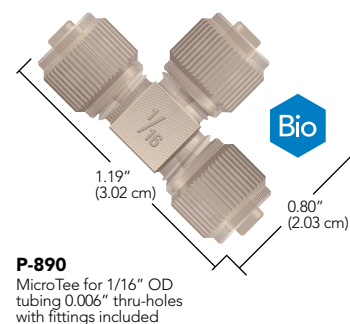
P-775
MicroTee for MicroTight[®] Tubing Sleeves 0.006" thru-holes with fittings included (tubing sleeves not included)



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

High Pressure Mixing Tees

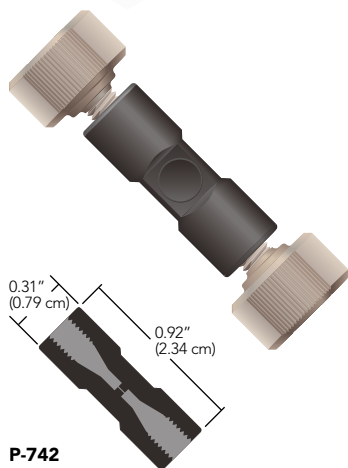
| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|--|---|---------------|-------------------------|-------------------|--------------|---------------------|------|
| STATIC MIXING TEE | | | | | | | |
| U-466 | PEEK Static Mixing Tee for 1/16" OD Tubing, 10 µm UHMWPE Frit | 10-32 Coned | (3) F-300 | 0.020" (0.50 mm) | 2.2 µL | 5,000 psi (345 bar) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |



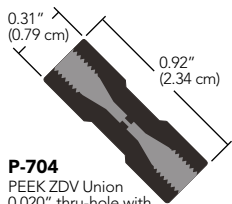
High Pressure Unions

PEEK ZDV Unions

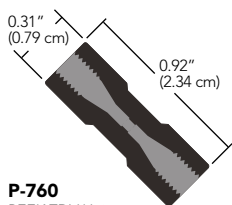
Our PEEK zero-dead-volume (ZDV) Unions come complete with two F-300 Fingertight Fittings for 1/16" OD tubing and are pressure rated to 5,000 psi (344 bar).



P-742
PEEK ZDV Union
0.010" thru-hole with
F-300 Fittings



P-704
PEEK ZDV Union
0.020" thru-hole with
F-300 Fittings



P-760
PEEK ZDV Union
0.050" thru-hole with
F-300 Fittings

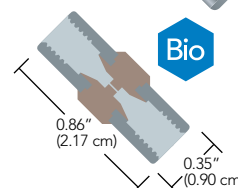
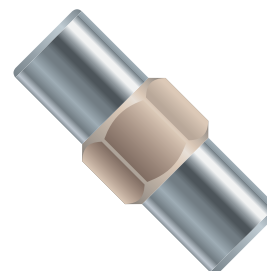
Bio-Inert UHPLC Unions

- › Unique, Patent-Pending Process allows a fully-PEEK fluid contact area combined with the strength of stainless steel
- › Pressure rated to 17,400 psi (1,200 bar)
- › Two inner diameters available: 0.008" and 0.016"

These unions are 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.

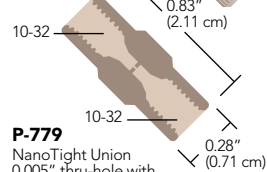
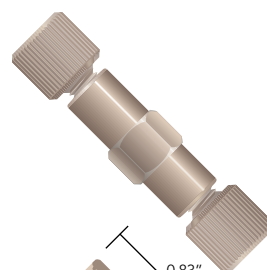
Note: All-stainless steel fittings should NOT be used with these unions, as they will damage the internal conical seat.



UP-700
Bio-Inert UHPLC Union 0.008" thru-hole for 1/16" OD tubing

NanoTight™ Union

NanoTight Unions improve 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 52) 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

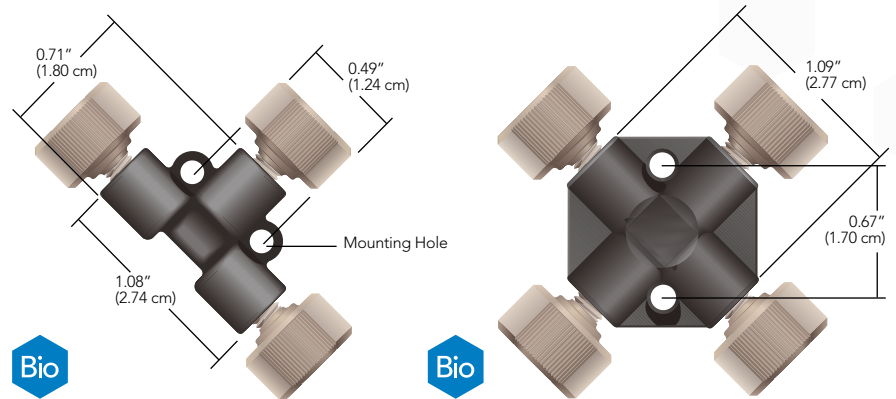
| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|-------------------------------|---|-------------|------------|------------------|--------------|------------------------|------|
| BIO-INERT UHPLC UNIONS | | | | | | | |
| UP-700 | Bio-Inert UHPLC Union 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |



High Pressure PEEK Tees & Crosses

- › 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

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.

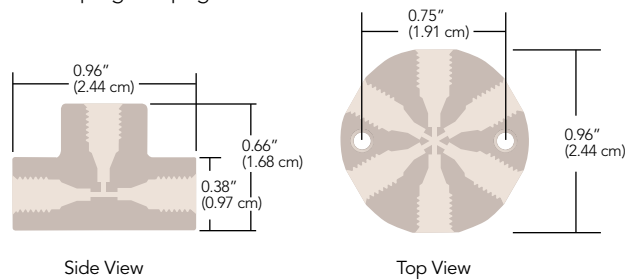


P-727 PEEK Tee
0.020" thru-hole with F-300 Fittings

P-729 PEEK Cross
0.020" thru-hole with F-300 Fittings

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 55.



P-170
PEEK 7-Port Manifold 0.020" thru-holes with F-331 Fittings

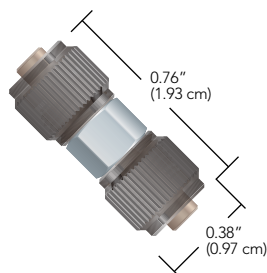
| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|------------------------------|--|-------------|-----------|------------------|--------------|---------------------|------|
| PEEK TEES AND CROSSES | | | | | | | |
| P-727 | PEEK Tee for 1/16" OD Tubing | 10-32 Coned | (3) F-300 | 0.020" (0.50 mm) | 0.57 μ L | 3,500 psi (241 bar) | ea. |
| P-728 | PEEK Tee for 1/16" OD Tubing | 10-32 Coned | (3) F-300 | 0.050" (1.25 mm) | 3.0 μ L | 3,500 psi (241 bar) | ea. |
| P-729 | PEEK Cross for 1/16" OD Tubing | 10-32 Coned | (4) F-300 | 0.020" (0.50 mm) | 0.72 μ L | 3,500 psi (241 bar) | ea. |
| 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 μ L | 5,000 psi (345 bar) | ea. |



High Pressure MicroTight® Unions

Conductive MicroTight Union

The Conductive MicroTight Union manufactured by IDEX Health & Science provides 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



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.

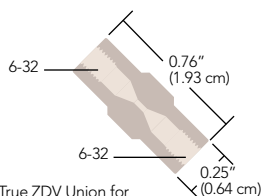


RELATED PRODUCTS

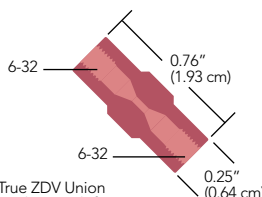
➤ Easily integrate the Conductive MicroTight Union into your system with our Insulating Mounting Bracket, shown on page 79.

MicroTight® Connectors for Capillary Tubing

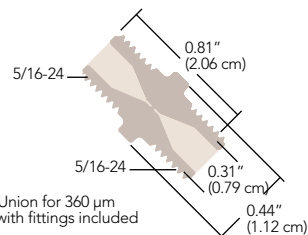
Connect two pieces of capillary tubing with our PEEK MicroTight Connectors. The True ZDV Unions allow two pieces of tubing to connect directly to each other — using the included gauge plug to ensure proper alignment. The standard union and elbow both feature a 0.006" (0.150 mm) thru-hole, adding only a small amount of additional flow-path volume to help ensure proper chromatographic results.



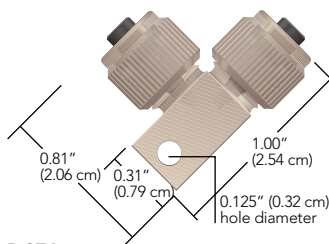
P-720
MicroTight True ZDV Union for use with MicroTight Sleeves with fittings and gauge plug included



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



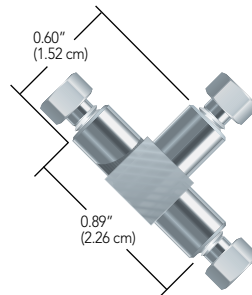
P-874
MicroElbow for MicroTight Tubing Sleeves with fittings included

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|--|---|---------------|--------------------------------------|-------------------|--------------|---------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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 | ea. |
| 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) | ea. |

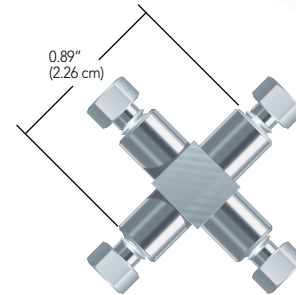


High Pressure Stainless Steel Tees & Crosses

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.

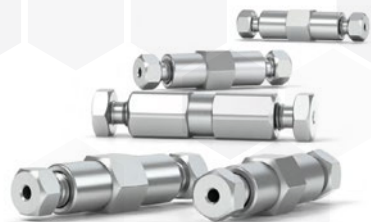


U-428 Stainless Steel Tee
0.020" thru-hole with U-400 and U-401 Fittings



U-430 Stainless Steel Cross
0.020" thru-hole with U-400 and U-401 Fittings

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|------------------------------------|---|-------------|----------------------|------------------|--------------|------------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |



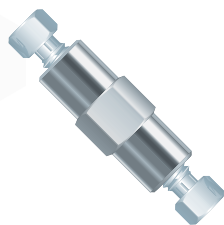
VHP Stainless Steel ZDV Unions

- › 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

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.

Our high pressure, zero-dead-volume (ZDV) unions are precision machined from 316 stainless steel, carefully passivated, then thoroughly rinsed. Each comes complete with stainless steel nuts and ferrules.



0.31" (0.79 cm)
0.84" (2.13 cm)

U-402
ZDV Union
0.020" thru-hole
for 1/16" OD tubing

0.31" (0.79 cm)
0.84" (2.13 cm)

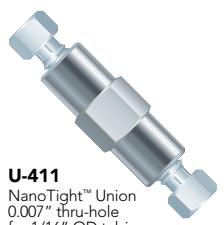
U-435
ZDV Union
0.010" thru-hole
for 1/16" OD tubing

0.31" (0.79 cm)
0.84" (2.13 cm)

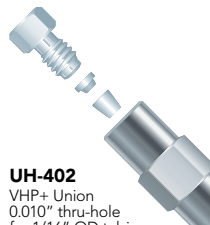
U-438
True ZDV Union
0.067" thru-hole
for 1/16" OD tubing

0.38" (0.97 cm)
1.20" (3.05 cm)

1593
ZDV Union
0.050" thru-hole
for 1/8" OD tubing



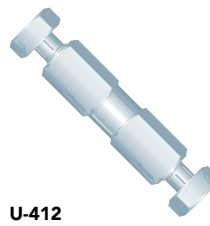
U-411
NanoTight™ Union
0.007" thru-hole
for 1/16" OD tubing



UH-402
VHP+ Union
0.010" thru-hole
for 1/16" OD tubing



U-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

0.31" (0.79 cm)
1.02" (2.59 cm)

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|--|--|--------------|---------------------------------------|------------------|--------------|------------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |



VHP Tees & Crosses

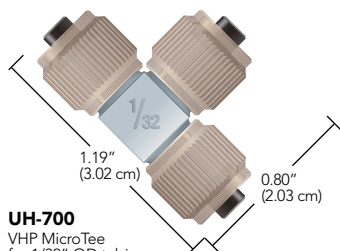
Our VHP Stainless Steel Tees and Crosses are precision machined from durable stainless steel. It is mechanically designed for bringing together three or four pieces of tubing. Our VHP Tees & Crosses have an extremely high pressure rating of 30,000 psi (2070 bar).

VHP Tees & Crosses for Capillary Tubing

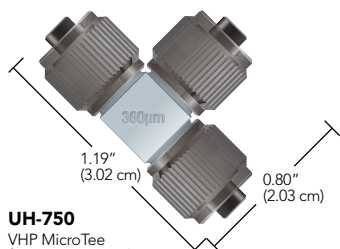
- › Direct-connect either 360 μm or 1/32" OD tubing — no sleeves required!
- › Available in both tee and cross configurations
- › Pressure rated to 15,000 psi (1,034 bar)

To help facilitate multi-port connections in UHPLC applications, our experts have 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.

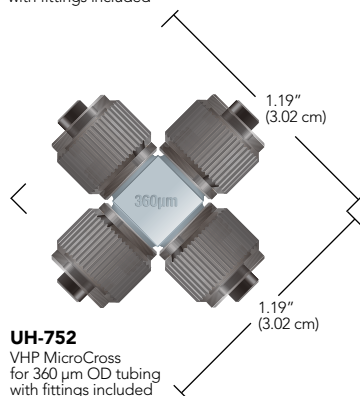
Included with the MicroTees and MicroCrosses are the VHP MicroFerrules found on page 59. The P-278 Extender Tool on page 33 can be used to tighten the female nuts that are included with these connectors.



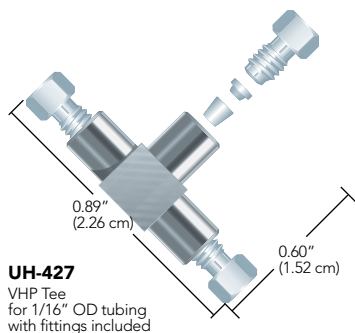
UH-700
VHP MicroTee
for 1/32" OD tubing
with fittings included



UH-750
VHP MicroTee
for 360 μm OD tubing
with fittings included



UH-752
VHP MicroCross
for 360 μm OD tubing
with fittings included



UH-427
VHP Tee
for 1/16" 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.

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).

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|--|--|---------------|--------------------------|------------------|--------------------|------------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |



VHP MicroTight® Unions

- › 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

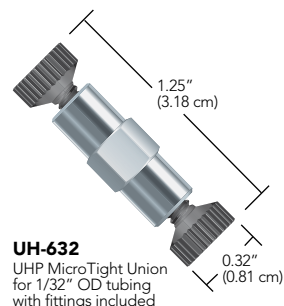
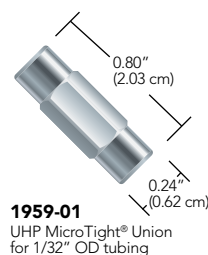
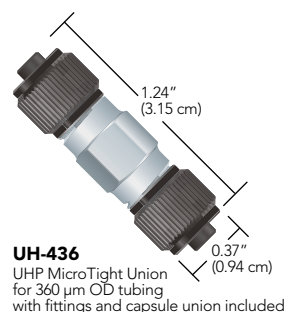
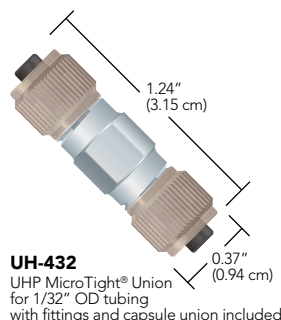
VHP Unions for Capillary Tubing

IDEX Health & Science has expanded its line of specialized fittings and connectors for UHPLC applications to include several innovative unions and adapters.

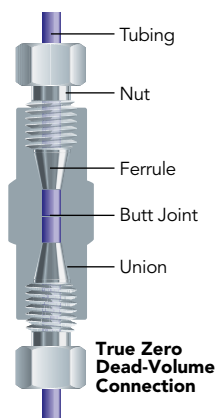
Two of these products — the UH-432 and UH-436 — follow the design of our popular Mini MicroFilters (see page 109) and allow a convenient union between either 1/32" OD tubing or 360 µm OD tubing. Each features a stainless steel union body and a unique stainless steel union capsule, enabling both excellent 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. These unions will work nicely with both the VHP-900 fittings (found on page 59) as well as the reusable VHP-920 (found on page 60).



VHP MicroTight® Unions (Cont.)



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.

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 28 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.



RELATED PRODUCTS

- › Find replacement VHP fittings on page 59.
- › Find Fused Silica tubing on page 16.
- › Find 1/32" OD Stainless Steel tubing on page 19.
- › 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 50.

VHP MicroTight Unions

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|--|--|---------------|---|-------------------|--------------|------------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |



MicroTight[®] Adapters

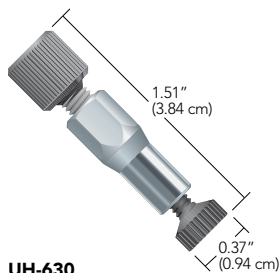
- › Convenient adapters for common 1/16" OD to capillary tubing
- › Direct connect to 1/32" OD or 360 µm OD tubing options available
- › VHP adapters pressure rated to 12,000 psi (828 bar)

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.

Create a true zero dead volume (ZDV) connection between 1/16" OD tubing and capillary tubing with our MicroTight Adapters.

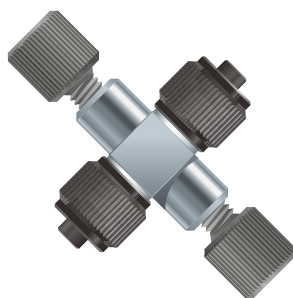
For Very High Pressure applications the UH-630 will connect 1/16" OD to 1/32" OD tubing in an inline true ZDV connection with the ability to withstand 12,000 psi (828 bar)! The materials of construction also allow this product to be used up to 200 °C, which reduces the pressure rating to 8,000 psi (552 bar). For more information on the fittings used with the VHP adapter, please see page 59.



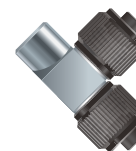
UH-630
VHP MicroTight Adapter for 1/16" and 1/32" OD tubing with fittings included



UH-634
VHP MicroTight Adapter for 1/16" and 360 µm OD tubing with fittings included



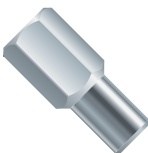
UH-906
VHP MicroTight Adapting Cross 10-32 Coned for 1/16" OD tubing and 5/16-24 Coned for 360 µm OD tubing



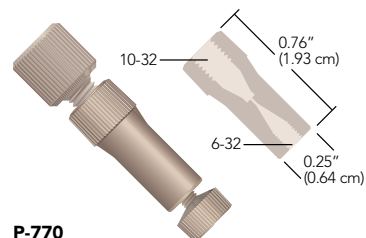
UH-753
VHP MicroTight Adapting Tee 360 µm (2 ports) to 10-32 C for 1/16" OD tubing (1 port)



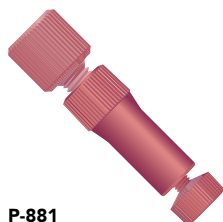
UH-631-01
VHP MicroTight Adapter 10-32 Coned for 1/16" OD tubing and 6-40 Coned for 1/32" OD tubing fittings not included



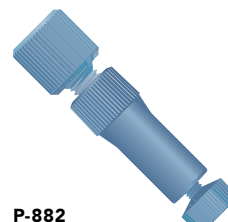
1958-01
VHP MicroTight Adapter 10-32 Coned for 1/16" OD tubing and M4x0.7 for 1/32" OD tubing



P-770
MicroTight ZDV Adapter for 1/16" OD to MicroTight Sleeves with fittings included



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

MicroTight® Adapters (Cont.)



RELATED PRODUCTS

- › Replacement 6-32 fittings are on page 34.
- › Replacement F-120 style nuts are on page 32 (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.

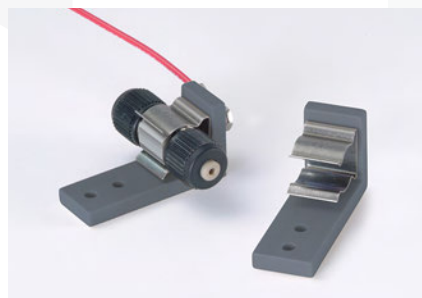
| | Page |
|---|------|
| 360 µm, 510 µm (0.020”), and 1/32” OD PEEK Tubing | 16 |
| 360 µm OD Fused Silica Tubing | 16 |
| 1/16” and 1/32” OD PEEKsil™ Tubing | 22 |
| 1/32” OD FEP Tubing | 26 |
| 360 µm OD High Purity PFA Tubing | 24 |
| 510 µm (0.020”) and 1/32” OD Stainless Steel Tubing | 19 |
| Polymer Capillary and Fused Silica Tubing Cutters | 28 |
| MX Series II™ Injection and Switching Valves | 119 |
| Manual Injection Valves | 121 |
| Micro Injection Port Adapters | 132 |
| Micro-Splitter Valves | 140 |
| Micro-Metering Valves | 141 |
| Microbore Guard Column | 158 |
| Ultra-Low Volume Back-Pressure Regulators | 144 |
| Nonmetallic 10-32 Micro-Volume Inline Check Valve | 137 |

MicroTight® Adapters

| Part No. | Description | Threads | Includes | Color | Swept Volume | Pressure Rating | Qty. |
|--|---|----------------------|---|-----------|--------------|-------------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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)* | ea. |
| 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)* | ea. |
| 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)* | ea. |
| 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)* | ea. |
| 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 | ea. |
| C = Coned | | | | | | | |
| * Pressure rating depends upon the fitting used. | | | | | | | |



Accessories



Insulating Mounting Bracket, shown with lead wire and Conductive MicroTight Union, not included.

Insulating Mounting Bracket

Use our Insulating Mounting Bracket to easily integrate the Conductive MicroTight Union (shown on page 71) or our Conductive Mini MicroFilters (on page 109) into your system or lab.

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.

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|------------------------------------|-----------------------------|---------|----------|-----------|--------------|-----------------|------|
| INSULATING MOUNTING BRACKET | | | | | | | |
| M-447 | Insulating Mounting Bracket | N/A | N/A | N/A | N/A | N/A | ea. |

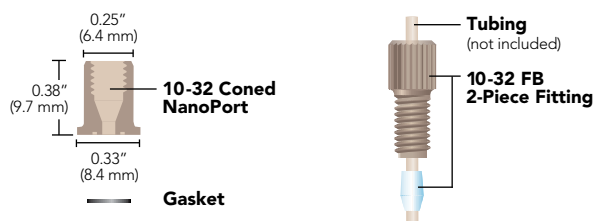


NanoPort Assemblies

- › For lab-on-a-chip applications
- › Options to connect 1/16" OD Tubing directly, or 360µm and 1/32" OD Tubing with tubing sleeves
- › **Wetted materials:**
PEEK and perfluoroelastomer

NanoPort Assemblies provide consistent fluid connections for chip-based analyses. NanoPort connections will bond to a variety of substrate materials with the use of Loctite.™

All NanoPort components are made of inert, biocompatible PEEK polymer (nuts and ports), Perlast® perfluoroelastomer (gaskets), and ETFE (ferrules). 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.



NOTE

Our NanoPort Assembly will readily connect 1/16" OD tubing with the included fittings. To connect 1/32" OD or 360µm OD, tubing sleeves for each size are included in each assembly.

Adhesive is not included in the N-333 NanoPort Assembly. Please contact IDEX Health & Science for bonding information or use common bonding adhesives such as Loctite.

| Part No. | Description | Threads | For Chip Hole | Tubing OD | Qty. |
|--------------------------------------|---|---------|-----------------------|-----------|-------|
| NANOPORT ASSEMBLIES | | | | | |
| 10-32 Coned NanoPort Assembly | | | | | |
| N-333 | F-333N | F-142N | Up to 0.063" (1.6 mm) | 1/16" | ea. |
| NANOPORT REPLACEMENT PARTS | | | | | |
| 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 |
| Gaskets | | | | | |
| N-123-02 | Gasket, For all assemblies except 6-32 Coned Assemblies | | N/A | N/A | ea. |

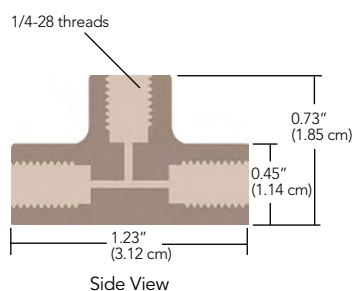


Low Pressure Manifolds

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.

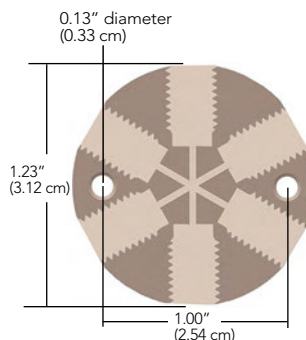
A few useful applications include:

- › Multiport mixing chamber
- › Gas sparging splitting union
- › Sample injection onto multi-well plates or a multiple direction flow path union



Side View

P-150
PEEK 7-Port Manifold
comes with Super Flangeless Fittings



Top View

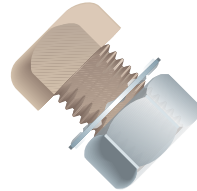
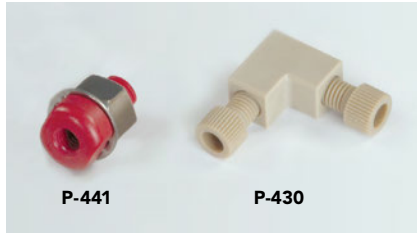
| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|------------------|--|-----------|----------------------|------------------|--------------|--------------------|------|
| MANIFOLDS | | | | | | | |
| Standard | | | | | | | |
| P-150 | PEEK 7-Port Manifold 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |

FB = Flat Bottom

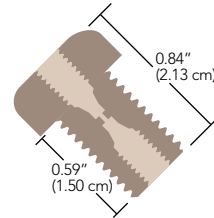


Low Pressure Bulkhead Unions

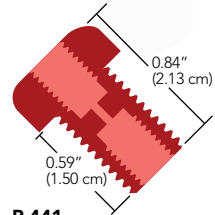
- › Designed for plumbing tubing through equipment housing
- › For use with standard 10-32 coned or 1/4-28 flat-bottom threaded fittings



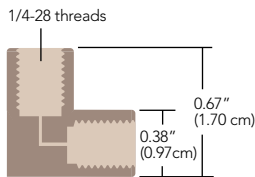
Bulkhead Union
includes stainless steel nut/lock washer



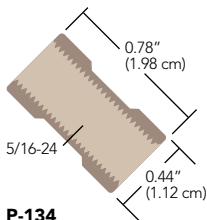
P-440
10-32 internal threads



P-441
1/4-28 internal threads



P-430
PEEK Elbow comes with Flangeless Fittings



P-134
PEEK ZDV Union

Thread 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).

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).

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.

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 page 39.

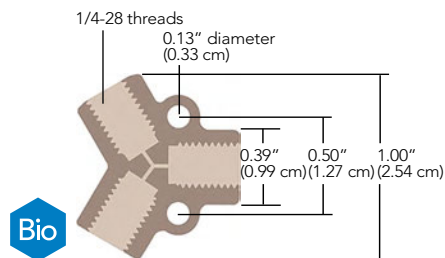
| Part No. | Description | Threads | Color | Includes | Thru-hole | Swept Volume | Qty. |
|-------------------------|--------------------------------|---------------------|---------|--------------------|------------------|--------------|------|
| BULKHEAD UNIONS | | | | | | | |
| P-440 | PEEK Bulkhead Union | 10-32 Coned | Natural | (1) SST Nut/Washer | 0.020" (0.50 mm) | 1.9 µL | ea. |
| P-441 | PEEK Bulkhead Union | 1/4-28 Flat-Bottom | Red | (1) SST Nut/Washer | 0.040" (1.00 mm) | 2.9 µL | ea. |
| P-441N | PEEK Bulkhead Union | 1/4-28 Flat-Bottom | Natural | (1) SST Nut/Washer | 0.040" (1.00 mm) | 2.9 µL | ea. |
| 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 | ea. |
| 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 | ea. |
| LARGE BORE UNION | | | | | | | |
| P-134 | PEEK True ZDV Union | 5/16-24 Flat-Bottom | Natural | N/A | N/A | N/A | ea. |



Low Pressure Y Connectors

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

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|---------------------|----------------------------|------------|------------|------------------|--------------|--------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |

FB = Flat-Bottom

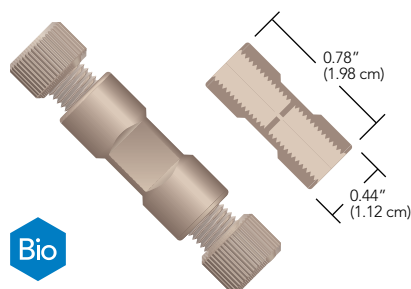


Low Pressure Unions

- › Manufactured from PEEK, ETFE, Delrin®, polypropylene, or PCTFE
- › Available with 1/4-28, M6, or 10-32 flat-bottom threads

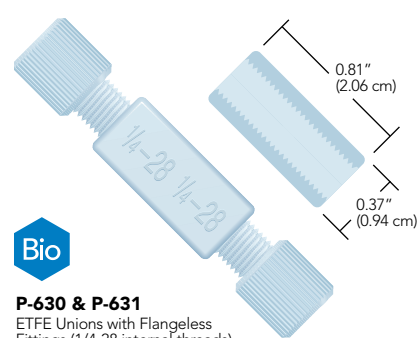
Our Low Pressure Unions are available in a variety of polymers, providing several low-cost and chemically-resistant options. The union assemblies below include fittings as shown in the table. The unions in the right column do not include fittings, allowing for customizing the fitting selection. In some 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 page 45 they can be used with the P-603 union to connect the two different tubing sizes.

Low Pressure PEEK Union Assemblies

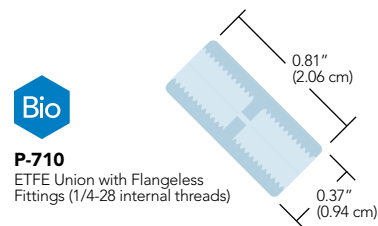


P-702 & P-703
PEEK Unions with Flangeless Fittings
(1/4-28 internal threads)

Low Pressure ETFE Union Assemblies

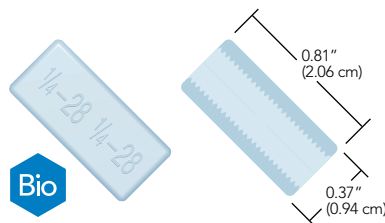


P-630 & P-631
ETFE Unions with Flangeless Fittings
(1/4-28 internal threads)



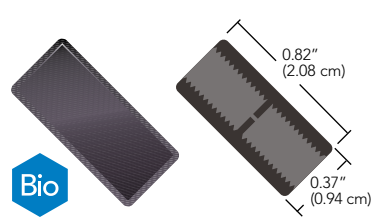
P-710
ETFE Union with Flangeless Fittings
(1/4-28 internal threads)

Low Pressure Standard Unions



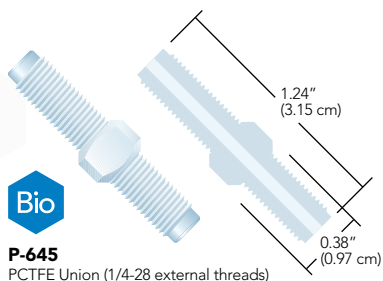
P-603, P-620 & P-623
Standard Unions (1/4-28 internal threads)

Low Pressure Metric Unions

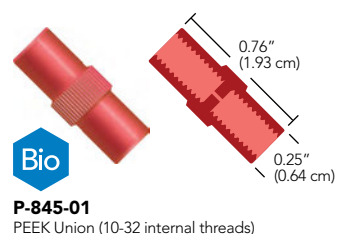


P-602 & P-622
Metric Unions (M6 internal threads)

Low Pressure Male Union



VacuTight™ Union



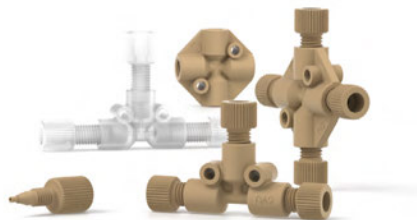
RELATED PRODUCTS

- › To use connectors in higher pressure applications, simply replace the provided fittings with Super Flangeless™ Nuts and Ferrules, found on page 39.
- › Use any of the 10-32 flat-bottom fittings on 39 and 42 to make an inline connection with our VacuTight Union. This product is designed for use with 1/16" OD tubing.

Low Pressure Unions

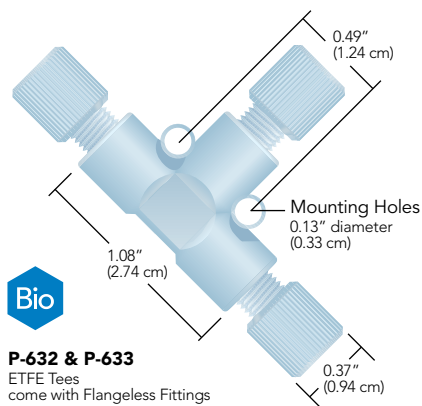
| Part No. | Description | Color | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|------------------------------|---|---------|-----------|------------------|------------------|--------------|--------------------|------|
| PEEK UNION ASSEMBLIES | | | | | | | | |
| P-702 | PEEK 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| STANDARD UNIONS | | | | | | | | |
| P-603 | Delrin True ZDV Standard Union | Natural | 1/4-28 FB | N/A | N/A | N/A | N/A* | ea. |
| P-620 | Polypropylene True ZDV Standard Union | Natural | 1/4-28 FB | N/A | N/A | N/A | N/A* | ea. |
| P-623 | ETFE True ZDV Standard Union | Natural | 1/4-28 FB | N/A | N/A | N/A | N/A* | ea. |
| METRIC UNIONS | | | | | | | | |
| P-602 | Delrin Metric Union | Black | M6 FB | N/A | 0.020" (0.50 mm) | 0.41 µL | N/A* | ea. |
| P-622 | ETFE Metric Union | Blue | M6 FB | N/A | 0.020" (0.50 mm) | 0.41 µL | N/A* | ea. |
| 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) | ea. |
| 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* | ea. |

* Pressure Rating depends on Fittings selected. See pressure rating for fittings on appropriate page.
FB = Flat-Bottom



Low Pressure Tees & Crosses

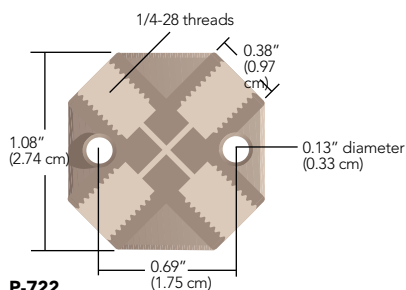
Our Low Pressure Tees and Crosses are available in two inert polymers and can handle pressures to 500 psi (34 bar) or 1,000 psi (69 bar), depending upon the configuration of the products. Each is designed with handy mounting holes. All ETFE Tees and Crosses ship complete with 1/4-28 PFA Flangeless nuts and ETFE ferrules, while their PEEK polymer counterparts ship with 1/4-28 PEEK nuts and ETFE ferrules. Replacement fittings are located on page 47.



Bio

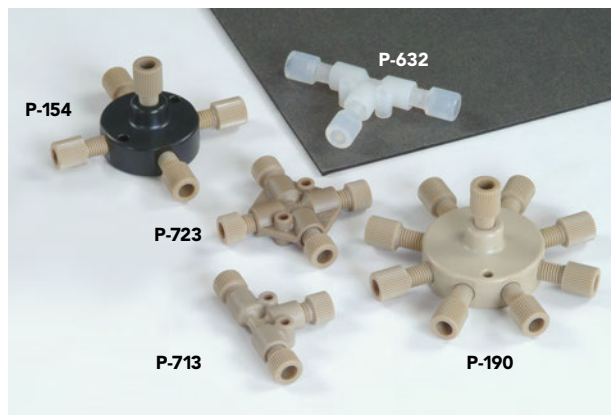
P-632 & P-633

ETFE Tees
come with Flangeless Fittings



P-722

PEEK Cross
comes with Flangeless Fittings



RELATED PRODUCTS

- › Seal off unused ports with any of our 1/4-28 flat-bottom plugs found on page 55.
- › 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 page 39.
- › High Pressure Tees, Crosses, and a 7-Port Manifold (all with 10-32 threaded ports) are on page 74.

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.

| Part No. | Description | Threads | Includes | Thru-hole | Swept Volume | Pressure Rating | Qty. |
|--------------------------------------|--------------------------------|--------------------|-----------------------|------------------|--------------|--------------------|------|
| LOW PRESSURE TEES AND CROSSES | | | | | | | |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |



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 Quick Connect Luer Adapter conforms to ISO requirements for medical luer taper configuration and performance (45 psi/3.1 bar).

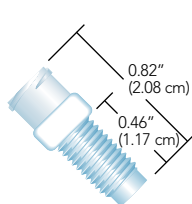
Find fittings to connect tubing to the threaded ports of these adapters in the Fittings chapter, starting on page 30.

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.

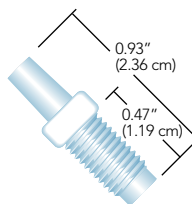


APPLICATION NOTE

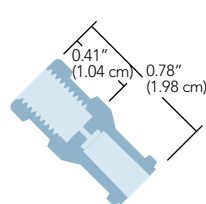
- › Our A-626 Bottle Cap Plug (page 55) can be used to plug any of the female luer adapters on this page.
- › To prevent a chemical spill when disconnecting your solvent reservoir tubing from the pump, try our Quick-Stop Luer Check Valve on page 139.
- › To economically prime an HPLC pump, simply remove 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.



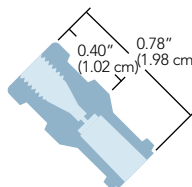
P-604, P-618, P-624
Female Luer to 1/4-28 Male
(luer end of P-604 different than shown)



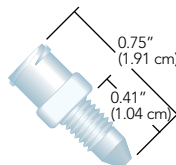
P-619, P-625
Male Luer to 1/4-28 Male



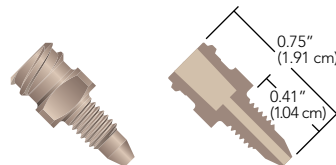
P-628
Female Luer to 1/4-28 Female



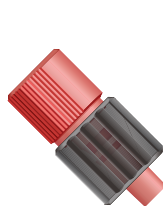
P-629
Female Luer to 10-32 Female



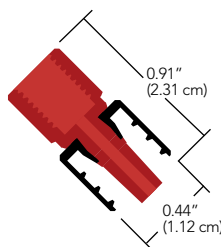
P-642
Female Luer to 10-32 Male



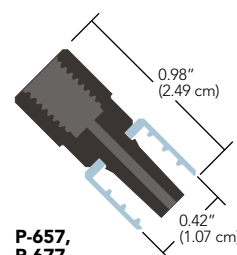
P-719
Female Luer to 10-32 Male



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

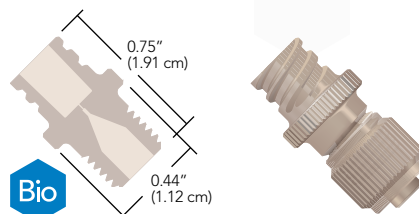
Quick Connect Luer Adapters (Cont.)

Luer-To-MicroTight® Adapter

› Easily connect 360 µm OD tubing to a syringe



P-662 Luer-to-MicroTight Adapter, shown with a B-310 Syringe (see table below) and PEEK capillary tubing (page 16), not included.



P-662
Luer-To-MicroTight Adapter for Luer to 360 µm OD tubing with fittings included

Quick Connect Luer Adapters

| Part No. | Description | Body Material | Lock Hub Material | Thru-hole | Qty. |
|------------------------------------|--|----------------------|-------------------|------------------|------|
| QUICK CONNECT LUER ADAPTERS | | | | | |
| P-604 | F Luer to 1/4-28 FB, M | Nat. Delrin | N/A | 0.05" (1.3 mm) | ea. |
| P-618 | F Luer to 1/4-28 FB, M | Nat. PP | N/A | 0.05" (1.3 mm) | ea. |
| P-619 | M Luer to 1/4-28 FB, M | Nat. PP | None * | 0.05" (1.3 mm) | ea. |
| P-624 | F Luer to 1/4-28 FB, M | Nat. ETFE | N/A | 0.05" (1.3 mm) | ea. |
| P-625 | M Luer to 1/4-28 FB, M | Nat. ETFE | None * | 0.04" (1.0 mm) | ea. |
| P-628 | F Luer to 1/4-28 FB, F | Nat. ETFE | N/A | 0.04" (1.0 mm) | ea. |
| P-629 | F Luer to 10-32 C, F | Nat. ETFE | N/A | 0.04" (1.0 mm) | ea. |
| P-642 | F Luer to 10-32 C, M | Nat. ETFE | N/A | 0.05" (1.3 mm) | ea. |
| P-655 | M Luer to 1/4-28 FB, F | Red PEEK | Black PEEK | 0.04" (1.3 mm) | ea. |
| P-656 | M Luer to 10-32 C, F | Nat. PEEK | Black PEEK | 0.05" (1.3 mm) | ea. |
| P-657 | M Luer to M6 FB, F | Black PEEK | Black PEEK | 0.05" (1.3 mm) | ea. |
| P-658 | F Luer to 1/4-28 FB, F | Red PEEK | N/A | 0.05" (1.3 mm) | ea. |
| P-659 | F Luer to 10-32 C, F | Nat. PEEK | N/A | 0.05" (1.3 mm) | ea. |
| P-660 | F Luer to M6 FB, F | Black PEEK | N/A | 0.05" (1.3 mm) | ea. |
| P-661 | F Luer to 5/16-24 FB, M | Nat. ETFE | N/A | 0.05" (1.3 mm) | ea. |
| P-675 | M Luer to 1/4-28 FB, F | Red ETFE | Natural PP | 0.05" (1.3 mm) | ea. |
| P-677 | M Luer to M6 FB, F | Black ETFE | Natural PP | 0.05" (1.3 mm) | ea. |
| P-678 | F Luer to 1/4-28 FB, F | Red ETFE | N/A | 0.05" (1.3 mm) | ea. |
| P-680 | F Luer to M6 FB, F | Black ETFE | N/A | 0.05" (1.3 mm) | ea. |
| P-683 | M Luer to 1/4-28 FB, M | Nat. PEEK | Black PEEK | 0.04" (1.0 mm) | ea. |
| P-686 | F Luer to M6 FB, M | Black ETFE | N/A | 0.05" (1.3 mm) | ea. |
| P-719 | F Luer to 10-32 C, M | Nat. PEEK | N/A | 0.05" (1.3 mm) | ea. |
| 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) | ea. |
| 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) | ea. |

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.

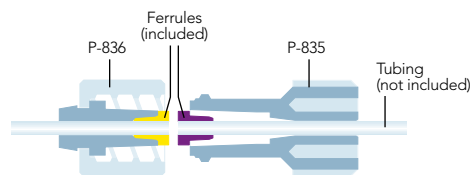


LuerTight[™] Fittings

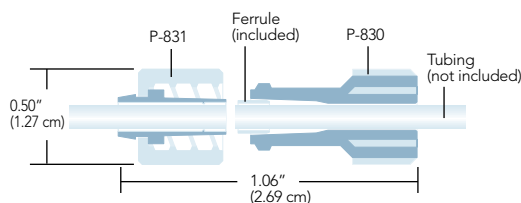
- › Luer fittings for fluoropolymer tubing
- › Quick disconnect and barbless
- › For 1/16" and 1/8" OD tubing

Our 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.

| Part No. | Description | Includes | Thru-hole | Pressure Rating | Qty. |
|--|---|----------------------------------|-----------|-----------------|------|
| 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) | ea. |
| P-838 | LuerTight System for 1/8" OD Tubing | (1) P-830, (1) P-831, (1) P-830T | N/A | 100 psi (7 bar) | ea. |
| LUERTIGHT FITTING COMPONENTS | | | | | |
| P-830 | Female Fitting for 1/8" OD Tubing | (1) Ferrule | N/A | N/A | ea. |
| P-830T | Set Plug to swage Ferrules into P-835 and P-830 | N/A | N/A | N/A | ea. |
| P-831 | Male Fitting for 1/8" OD Tubing | No Ferrule Required | N/A | N/A | ea. |
| P-835 | Female Fitting for 1/16" OD Tubing | (1) Ferrule | N/A | N/A | ea. |
| P-836 | Male Fitting for 1/16" OD Tubing | (1) Ferrule | N/A | N/A | ea. |
| <i>Female = internal receiving luer pocket; Male = external luer nose (surrounded by internally-threaded locking ring)</i> | | | | | |



Barbed Connectors

Our Type 1 Barbed Unions have been engineered to effectively join two pieces of soft-walled tubing together. This type of connector is typically the connector of choice for joining two peristaltic tubes with similar inner diameters together. Our unions are manufactured from either polypropylene or nylon.

Barbed to 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. 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).



Barbed "Y" Adapters

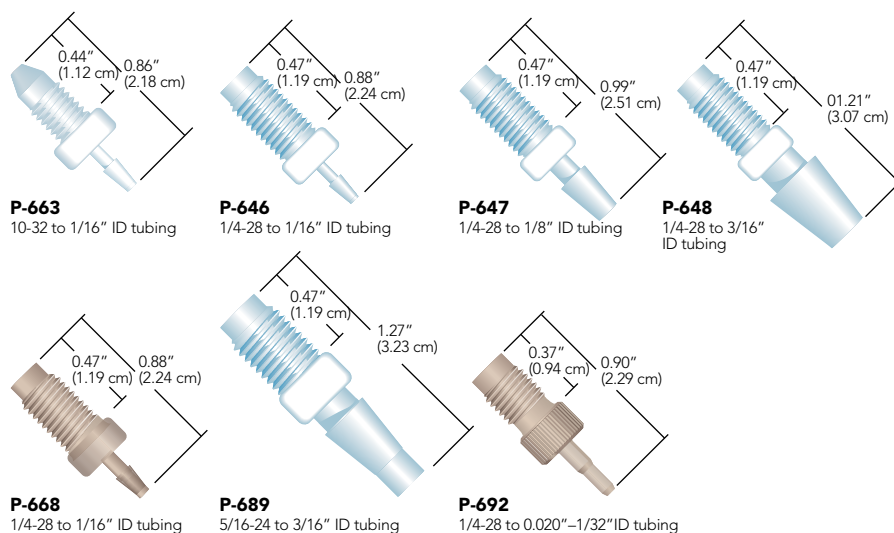
Our Barbed "Y" Adapters, manufactured from polypropylene, are engineered to effectively join three pieces of soft-walled tubing together in a Y configuration, offering less turbulence and gentler mixing of fluids than a traditional Tee Connector. This type of connector works well for joining three peristaltic tubes with similar inner diameters together.



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 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.





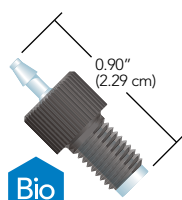
Swivel Barb Adapters

- › Barb connection spins freely from the nut to prevent twist during installation
- › Manufactured from polypropylene

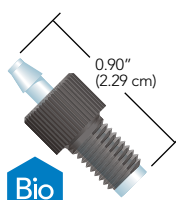
The Swivel Barb Adapters from IDEX Health & Science are made up of two captive pieces acting as a one-piece fitting for ease of use. Manufactured from polypropylene and available in three barb sizes, the Swivel Barb will facilitate connection between flexible tubing to a 1/4-28 flat-bottom port. The barbed insert spins freely from the threaded nut in order to prevent the tubing from twisting during installation.

RELATED PRODUCTS

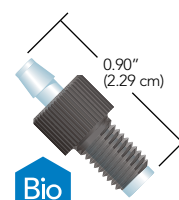
- › To connect low pressure fluoropolymer tubing, try the LuerTight™ Adapters on page 89.
- › To connect peristaltic tubing to low pressure fluoropolymer tubing, see page 92.
- › For peristaltic tubing, see page 15.



Bio
D-646
1/4-28 to 1/16" ID tubing



Bio
D-647
1/4-28 to 3/32" ID tubing

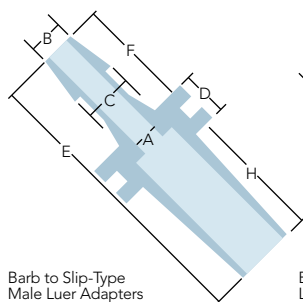


Bio
D-648
1/4-28 to 1/8" ID tubing

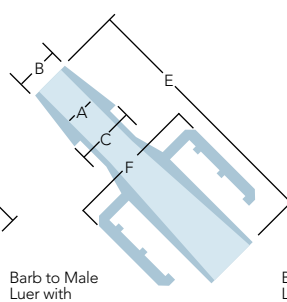


Luer to Barbed Adapters

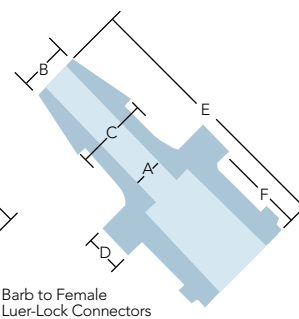
Our Luer to Barbed Adapters are an excellent choice when connecting between soft-walled tubing and luer-based products, such as a syringe or a low-pressure filter, for example. We offer several different configurations, allowing you to connect various sizes of soft-walled tubing to receiving ports that accept a male luer "slip" style connection; a male luer "lock" style connection; and a female-luer style of connector.



Barb to Slip-Type
Male Luer Adapters



Barb to Male
Luer with
Lock Ring Adapters



Barb to Female
Luer-Lock
Connectors

Barbed Connectors (Cont.)



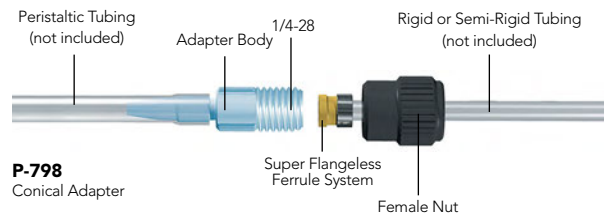
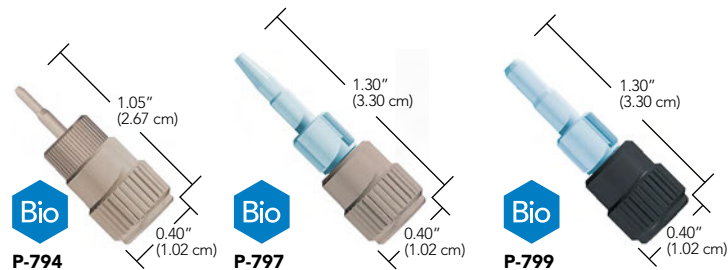
Conical Adapters

- › 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

Conical Adapters 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.

APPLICATION NOTE

To help secure peristaltic tubing more firmly to the Conical Adapters, simply attach a cable tie to the outside of the peristaltic tubing once it has been placed onto the Adapter body.



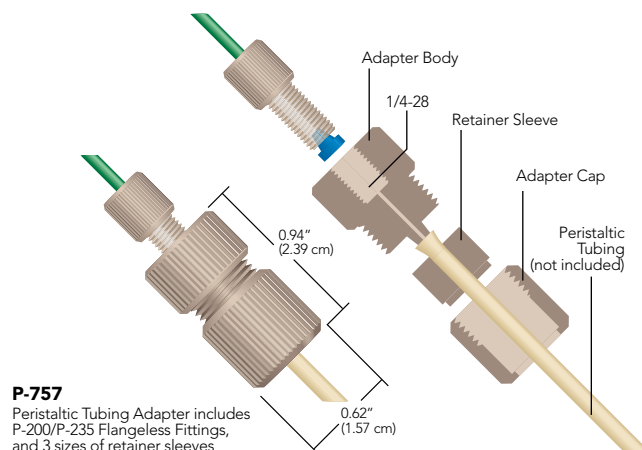
P-798
Conical Adapter



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 45.

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

Barbed Connectors

| Part No. | Tubing ID | Material | Qty. | | |
|---|---|-------------------------------|---------------------------------|------------------|------|
| BARBED TO BARBED ADAPTERS | | | | | |
| P-801 | 0.06" (1.5 mm) | Polypropylene | ea. | | |
| P-802 | 0.12" (3.0 mm) | Polypropylene | ea. | | |
| BARBED "Y" CONNECTORS | | | | | |
| P-860 | 0.06" (1.5 mm) | Polypropylene | ea. | | |
| P-861 | 0.10" (2.5 mm) | Polypropylene | ea. | | |
| P-862 | 0.12" (3.0 mm) | Polypropylene | ea. | | |
| P-863 | 0.18" (4.8 mm) | Polypropylene | ea. | | |
| P-864 | 0.25" (6.4 mm) | Polypropylene | ea. | | |
| THREAD TO BARBED ADAPTERS | | | | | |
| Part No. | Description | Material | Threads | Thru-hole | Qty. |
| P-663 | Barb Adapter, 1/16" (1.55 mm) ID Tubing | ETFE | 10-32 Coned | 0.04" (1.0 mm) | ea. |
| P-646 | Barb Adapter, 1/16" (1.55 mm) ID Tubing | ETFE | 1/4-28 Flat-Bottom | 0.04" (1.0 mm) | ea. |
| P-647 | Barb Adapter, 1/8" (3.20 mm) ID Tubing | ETFE | 1/4-28 Flat-Bottom | 0.08" (2.0 mm) | ea. |
| P-648 | Barb Adapter, 3/16" (4.75 mm) ID Tubing | ETFE | 1/4-28 Flat-Bottom | 0.10" (2.5 mm) | ea. |
| P-668 | Barb Adapter, 1/16" (1.55 mm) ID Tubing | PEEK | 1/4-28 Flat-Bottom | 0.04" (1.0 mm) | ea. |
| P-689 | Barb Adapter, 3/16" (4.75 mm) ID Tubing | ETFE | 5/16-24 Flat-Bottom | 0.10" (2.5 mm) | ea. |
| 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) | ea. |
| 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) | ea. |
| D-647 | Swivel Barb Adapter, 3/32" (2.40 mm) ID Tubing | Polypropylene | 1/4-28 Flat-Bottom | 0.056" (1.5 mm) | ea. |
| D-648 | Swivel Barb Adapter, 1/8" (3.20 mm) ID Tubing | Polypropylene | 1/4-28 Flat-Bottom | 0.08" (2.0 mm) | ea. |
| BARB TO SLIP-TYPE MALE LUER ADAPTERS | | | | | |
| Part No. | Description | Material | Qty. | | |
| P-854 | 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 | ea. | | |
| <i>These slip-type male luer fittings are for use in systems for which luer lock rings are not desired.</i> | | | | | |
| BARB TO MALE LUER WITH LOCK RING ADAPTERS | | | | | |
| P-850 | 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 | ea. | | |
| P-851 | 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 | ea. | | |
| P-852 | 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 | ea. | | |
| BARB TO FEMALE LUER-LOCK CONNECTORS | | | | | |
| P-857 | 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 | ea. | | |
| P-858 | 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 | ea. | | |
| P-859 | 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 | ea. | | |
| 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 | ea. | | |
| 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 | ea. | | |
| PERISTALTIC TUBING ADAPTERS | | | | | |
| Part No. | Description | Tubing OD | Peristaltic Tubing ID | Thru-Hole | Qty. |
| 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) | ea. |
| 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) | ea. |
| CONICAL ADAPTER ASSEMBLIES | | | | | |
| Part No. | Description | Rigid or Semi-Rigid Tubing OD | Peristaltic Tubing ID | Thru-Hole | Qty. |
| P-794 | Conical Adapter | 1/16" | 0.020"–0.030" (0.50 mm–0.75 mm) | 0.020" (0.50 mm) | ea. |
| P-797 | Conical Adapter | 1/16" | 1/16"–3/32" (1.55 mm–2.40 mm) | 0.040" (1.0 mm) | ea. |
| P-798 | Conical Adapter | 1/8" | 1/16"–3/32" (1.55 mm–2.40 mm) | 0.040" (1.0 mm) | ea. |
| P-799 | Conical Adapter | 1/8" | 3/32"–1/8" (2.40 mm–3.20 mm) | 0.060" (1.5 mm) | ea. |
| CONICAL ADAPTER REPLACEMENT PARTS | | | | | |
| Part No. | Description | For Use With | Material | Qty. | |
| F-156 | Female Nut, 1/8", 1/4-28 | P-798, P-799 | Black PEEK | ea. | |
| P-420 | Female Nut, 1/16", 1/4-28 | P-794, P-797 | Natural PEEK | ea. | |
| P-259 | Super Flangeless Ferrule, 1/16" | P-794, P-797 | Yellow ETFE/SST | ea. | |
| P-359 | Super Flangeless Ferrule, 1/8" | P-798, P-799 | Yellow ETFE/SST | ea. | |
| P-691 | Conical Adapter Body | P-799 | Natural ETFE | ea. | |
| P-692 | Conical Adapter Body | P-794 | Natural PEEK | ea. | |



FILTERS & FRITS

Our Filters offer an optimal way to filter your solvents, preventing pump cavitation and system damage. We offer different style filters for specific system specifications. Our filters protect your system from particulate matter from the solvent that may otherwise damage expensive hardware.

We offer a complete line of Frits manufactured from two different materials: PEEK and stainless steel. Both materials offer a variety of sizes of frit discs, as well as being available in numerous porosities. All our frits are designed with exceptional uniform porosity and a long filtration life.

- 95** FRITS
- 100** FILTERS
- 111** BOTTLE CAPS & PLUGS



Stainless Steel Frits

Our 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.

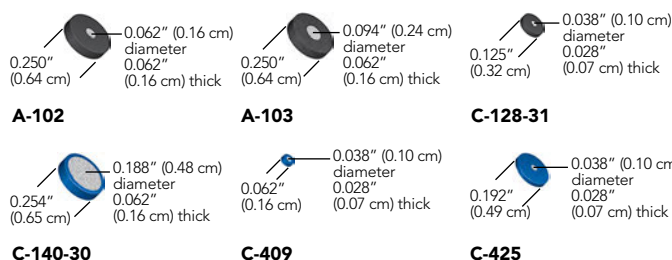
Many of the frits shown have the common 0.250" (0.64 cm) and 0.254" (0.64 cm) ODs, which allow them to be used in many of the Precolumn and Inline Filters found starting on page 103. Choose the larger diameter faces and/or larger porosity frits for faster flow rates. Choose frits with a smaller diameter face and/or smaller porosity for applications sensitive to extra flow path volume.

APPLICATION NOTE

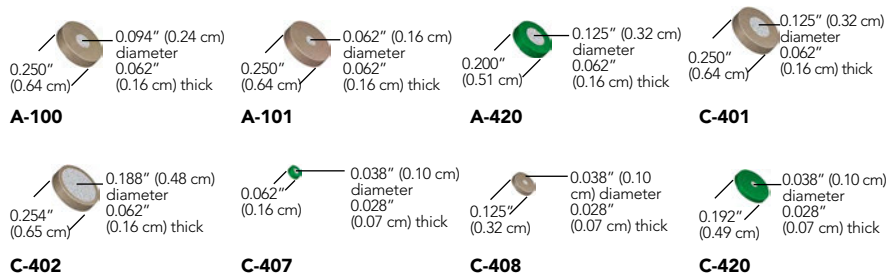
To Clean Or Not To Clean?

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 accidentally 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.

0.5 μm Stainless Steel Frits



2 μm Stainless Steel Frits



NOTE

Frits without the polymer rings cannot be used with our standard Precolumn and Inline Filter assemblies.

Semi-Prep Stainless Steel 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



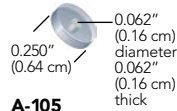
Stainless Steel Frits (Cont.)

5 µm Semi-Prep Stainless Steel Frits

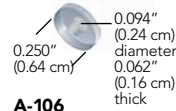


C-417

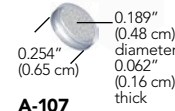
10 µm Semi-Prep Stainless Steel Frits



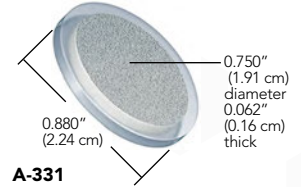
A-105



A-106



A-107

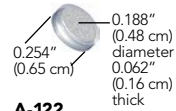


A-331

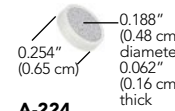
20 µm Semi-Prep Stainless Steel Frits



A-120



A-122



A-224



A-337

Stainless Steel Frits

| Part No. | Porosity | Disc Diameter | Disc Thickness | Ring OD | Ring Material | Frit Volume | Qty. |
|--|----------|------------------|------------------|------------------|---------------|-------------|------|
| STAINLESS STEEL FRITS | | | | | | | |
| A-100 | 2 µm | 0.094" (0.24 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PEEK | 1.7 µL | ea. |
| A-101 | 2 µm | 0.062" (0.16 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PEEK | 0.7 µL | ea. |
| A-102 | 0.5 µm | 0.062" (0.16 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PEEK | 0.6 µL | ea. |
| A-103 | 0.5 µm | 0.094" (0.24 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PEEK | 1.4 µL | ea. |
| 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-140-30 | 0.5 µm | 0.188" (0.48 cm) | 0.062" (0.16 cm) | 0.254" (0.65 cm) | PCTFE | 6.5 µL | ea. |
| C-401 | 2 µm | 0.125" (0.32 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PEEK | 3.0 µL | ea. |
| C-402 | 2 µm | 0.188" (0.48 cm) | 0.062" (0.16 cm) | 0.254" (0.65 cm) | PEEK | 7.8 µL | ea. |
| C-407 | 2 µm | 0.038" (0.10 cm) | 0.028" (0.07 cm) | 0.062" (0.16 cm) | PCTFE | 0.1 µL | ea. |
| C-408 | 2 µm | 0.038" (0.10 cm) | 0.028" (0.07 cm) | 0.125" (0.32 cm) | PEEK | 0.1 µL | ea. |
| C-409 | 0.5 µm | 0.038" (0.10 cm) | 0.028" (0.07 cm) | 0.062" (0.16 cm) | PCTFE | 0.1 µL | ea. |
| C-420 | 2 µm | 0.038" (0.10 cm) | 0.028" (0.07 cm) | 0.192" (0.49 cm) | PCTFE | 0.1 µL | ea. |
| C-425 | 0.5 µm | 0.038" (0.10 cm) | 0.028" (0.07 cm) | 0.192" (0.49 cm) | PCTFE | 0.1 µL | ea. |
| SEMI-PREP STAINLESS STEEL FRITS | | | | | | | |
| A-105 | 10 µm | 0.062" (0.16 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PCTFE | 0.9 µL | ea. |
| A-106 | 10 µm | 0.094" (0.24 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PCTFE | 2.0 µL | ea. |
| A-107 | 10 µm | 0.189" (0.48 cm) | 0.062" (0.16 cm) | 0.254" (0.65 cm) | PCTFE | 9.1 µL | ea. |
| A-120 | 20 µm | 0.125" (0.32 cm) | 0.062" (0.16 cm) | 0.250" (0.64 cm) | PCTFE | 3.7 µL | ea. |
| A-122 | 20 µm | 0.188" (0.48 cm) | 0.062" (0.16 cm) | 0.254" (0.65 cm) | PCTFE | 9.7 µL | ea. |
| A-224 | 20 µm | 0.188" (0.48 cm) | 0.062" (0.16 cm) | 0.254" (0.65 cm) | PTFE | 9.7 µL | ea. |
| A-331 | 10 µm | 0.750" (1.91 cm) | 0.062" (0.16 cm) | 0.880" (2.24 cm) | ETFE | 141.9 µL | ea. |
| A-332 | 2 µm | 0.750" (1.91 cm) | 0.062" (0.16 cm) | 0.880" (2.24 cm) | ETFE | 141.9 µL | ea. |
| A-337 | 20 µm | 0.750" (1.91 cm) | 0.062" (0.16 cm) | 0.880" (2.24 cm) | ETFE | 152 µL | ea. |
| A-343 | 2 µm | 0.625" (1.59 cm) | 0.062" (0.16 cm) | 0.750" (1.91 cm) | PCTFE | 112.6 µL | ea. |



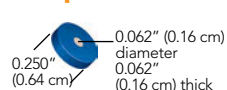
PEEK Frits

- › Inert, biocompatible, and metal-free
- › Uniform porosity, longer filtration life
- › Sealing rings manufactured from PCTFE

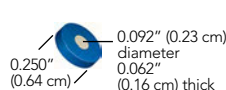
Patented IDEX Health & Science PEEK Frits offer exceptionally uniform porosity. This property ensures longer filtration life and consistent frit-to-frit swept volumes. The PEEK polymer frit discs are biocompatible and inert to most solvents, making them well-suited for bioanalytical applications. PEEK's robust properties make these products suitable for low and high pressure applications.

Disc rings, included on all 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.

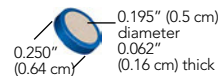
0.5 μ m PEEK Frits



A-701

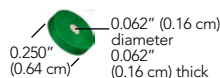


A-703

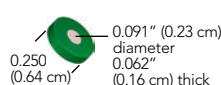


A-707

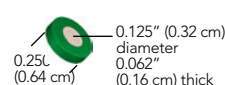
2 μ m PEEK Frits



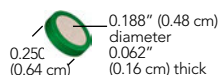
A-700



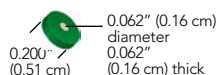
A-702



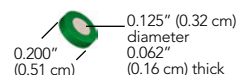
A-704



A-706

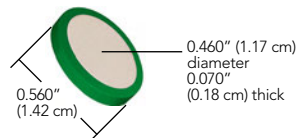


A-708



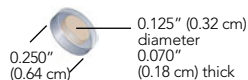
A-710

2 μ m Semi-Prep PEEK Frits

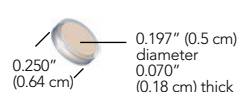


OC-802

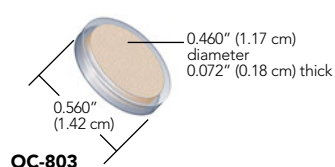
5 μ m and 10 μ m PEEK Frits



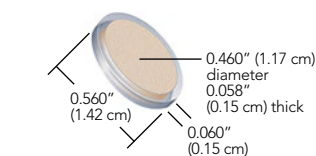
A-720



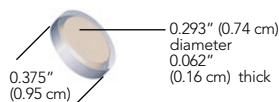
A-722



OC-803



OC-805



OC-815

PEEK Frits (Cont.)

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

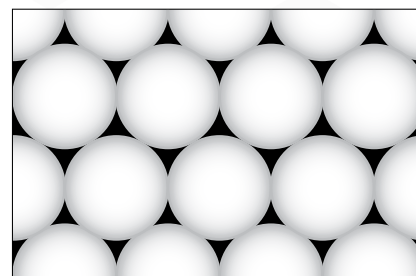
Any 0.247" to 0.254" diameter frit (including polymer ring) can be used with the Standard HPLC Inline Solvent Filters on page 102 and the Standard Precolumn Filters on page 105.

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.

20% for 0.5 μm frits 26% for 5 μm frits 30% for 20 μm frits
24% for 2 μm frits 28% for 10 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).

PEEK Frits

| 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-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. |
| SEMI-PREP PEEK FRITS | | | | | | | |
| 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-802 | 2 μm | 0.460" (1.17 cm) | 0.070" (0.18 cm) | 0.560" (1.42 cm) | PCTFE | 46.4 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-815 | 5 μm | 0.293" (0.74 cm) | 0.062" (0.16 cm) | 0.375" (0.95 cm) | PCTFE | 17.8 μL | ea. |

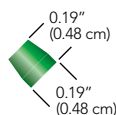


Frit-in-a-Ferrule™

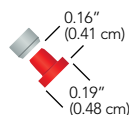
- › Seals and filters simultaneously
- › Less expensive and more convenient than traditional inline filter systems
- › Available in both Flangeless and Super Flangeless™ versions

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.

Our 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



| 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-270 | Super Flangeless, Natural PEEK, SST lock ring | 2 µm | SST | 0.062" | 0.062" | 0.74 µL | 2,500 psi (172 bar) | ea. |
| P-272 | Flangeless, Green PCTFE | 2 µm | SST | 0.062" | 0.062" | 0.74 µL | 2,000 psi (138 bar) | ea. |
| P-273 | Flangeless, Blue PCTFE | 0.5 µm | SST | 0.062" | 0.062" | 0.61 µL | 2,000 psi (138 bar) | ea. |
| P-274 | Super Flangeless, Natural PEEK, SST lock ring | 2 µm | PEEK | 0.046" | 0.030" | 0.20 µL | 2,500 psi (172 bar) | ea. |
| P-275 | Super Flangeless, Black PEEK, SST lock ring | 0.5 µm | PEEK | 0.046" | 0.030" | 0.16 µL | 2,500 psi (172 bar) | ea. |
| P-276 | Super Flangeless, Stainless Steel, Natural 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-372 | Flangeless, Green PCTFE | 2 µm | SST | 0.094" | 0.062" | 1.69 µL | 500 psi (34 bar) | ea. |
| P-373 | Flangeless, Blue PCTFE | 0.5 µm | SST | 0.094" | 0.062" | 1.41 µL | 500 psi (34 bar) | ea. |
| P-374 | Super Flangeless**, Natural PEEK, SST lock ring | 2 µm | PEEK | 0.094" | 0.042" | 1.15 µL | 2,500 psi (172 bar) | ea. |

* Swept volumes include/reflect theoretical frit volume values.

** The 1/8" Super Flangeless versions cannot be used in M6 ports.



Bottom-of-the-Bottle™ Filters

Our uniquely designed Bottom-of-the-Bottle™ Filters effectively protect your system by filtering out particulate matter that may otherwise damage expensive hardware.

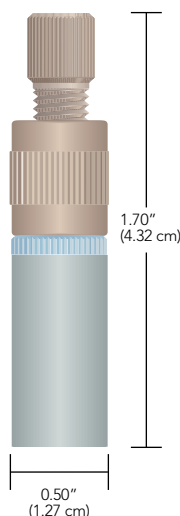
Stainless Steel Bottom-of-the-Bottle Solvent Filters

- › 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.

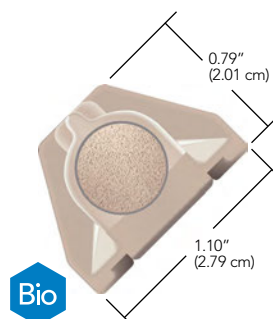
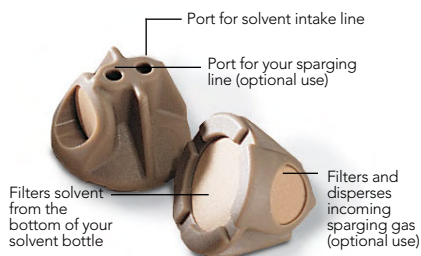


All-PEEK Bottom-of-the-Bottle Solvent Filters

- › Most recommended filtering unit
- › 100% PEEK polymer construction
- › Easy operation — no fittings required

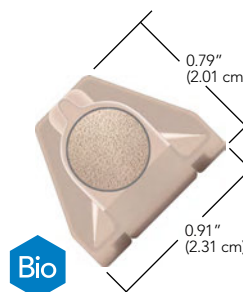
These biocompatible filters are made from 100% PEEK polymer, including the two built-in PEEK frits. The bottom frit (2 µm or 10 µm) will draw solvents from within 0.080" (2.0 mm) of the bottom of the solvent bottle. The 2 µm frit on the side may be used for a 1/8" OD helium sparging line.

To use, simply press fit your appropriately sized fluoropolymer tubing firmly into the top holes. That's it!



Bio
A-435
Bottom-of-the-Bottle Filter

Maximum Flow Rate: up to 30 mL/min



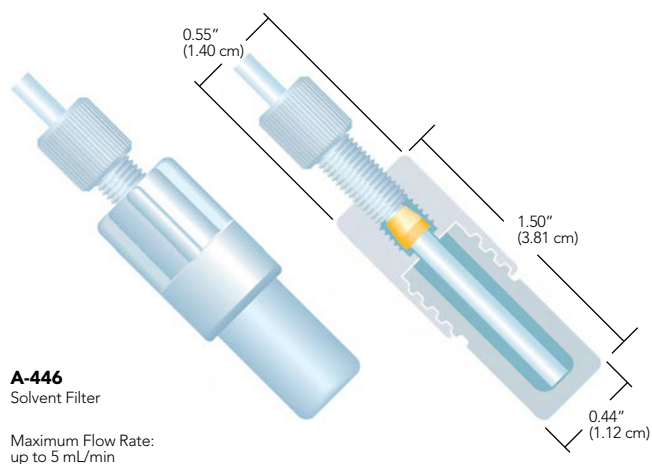
Bio
A-438
Bottom-of-the-Bottle Filter
(for small neck bottles)

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.



Bottom-of-the-Bottle Filters

| Part No. | Description | Porosity | For Tubing Size | Includes | Qty. |
|--|--|----------|-----------------|------------|------|
| 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 | ea. |
| A-551 | SST Filter Assembly, with A-522 filter cup | 2 µm | 1/8" OD | (1) XP-130 | ea. |
| A-520x | SST Replacement Solvent Filter Cups, 10-pk | 10 µm | — | — | ea. |
| A-522x | SST Replacement Solvent Filter Cups, 10-pk | 2 µm | — | — | ea. |
| ALL-PEEK BIOCOMPATIBLE BOTTOM-OF-THE-BOTTLE SOLVENT FILTERS | | | | | |
| A-435 | PEEK Filter | 2 µm | 1/8" OD | — | ea. |
| A-437 | PEEK Filter, for small-neck (GL-38) bottles | 2 µm | 1/8" OD | — | ea. |
| A-438 | PEEK Filter, for small-neck (GL-38) bottles | 10 µm | 1/8" OD | — | ea. |
| A-440 | PEEK Filter | 10 µm | 1/8" OD | — | ea. |
| A-441 | PEEK Filter | 10 µm | 3/16" OD | — | ea. |
| A-451 | PEEK Filter | 10 µm | 1/16" OD | — | ea. |
| UHMWPE BIOCOMPATIBLE BOTTOM-OF-THE-BOTTLE SOLVENT FILTERS | | | | | |
| A-445 | UHMWPE Filter Assembly | 10 µm | 1/16" OD | (1) XP-245 | ea. |
| A-446 | UHMWPE Filter Assembly | 10 µm | 1/8" OD | (1) XP-345 | ea. |
| A-427 | UHMWPE Replacement Solvent Filter Cups, 5-pk | 10 µm | — | — | ea. |



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

APPLICATION NOTE

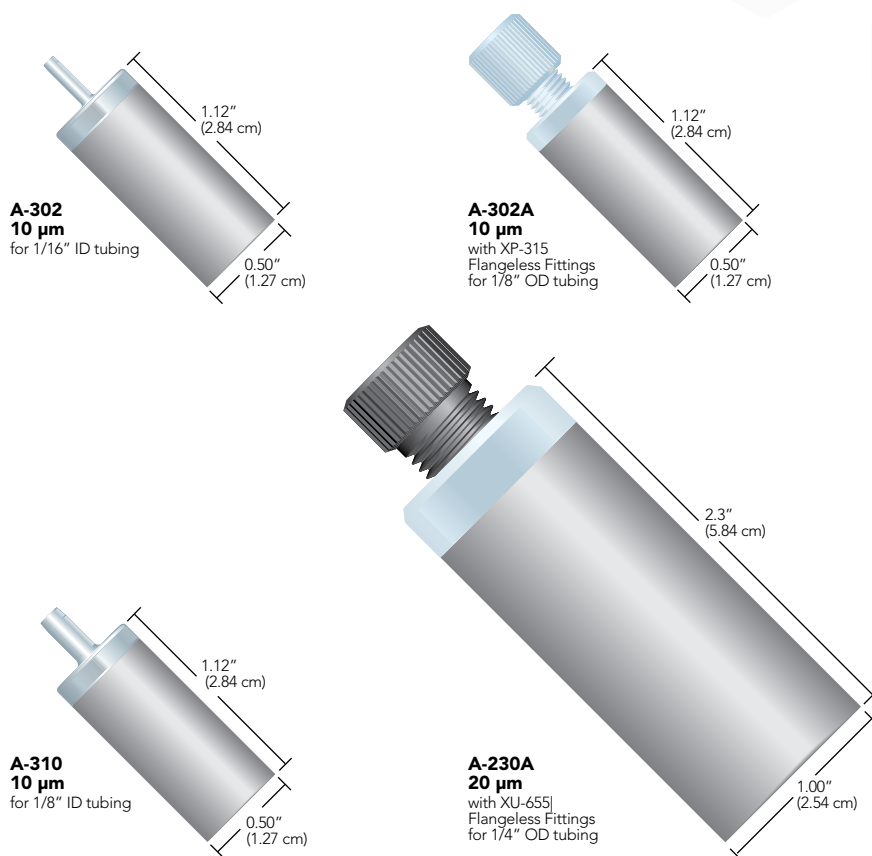
Why Use An Inlet Solvent Filter?

- ▶ 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.

It is good practice to filter your solvents to prevent pump damage. Our 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.



| Part No. | Description | Porosity | Material | For Tubing Size | Includes | Max. Suggested Flow Rate* | Qty. |
|---|---|------------------|------------|-----------------|-----------------------|---------------------------|------|
| 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 | ea. |
| A-243 | A-242, 5-pack | 2 μm | PCTFE, SST | 1/8" OD | (5) P-100 | 10 mL/min | ea. |
| A-228 | Inlet Solvent Filter with stem | 2 μm | SST | 1/8" ID | — | 80 mL/min | ea. |
| A-302 | Inlet Solvent Filter with stem | 10 μm | SST | 1/16" ID | — | 40 mL/min | ea. |
| A-302A | Inlet Solvent Filter with Flangeless Fittings | 10 μm | PCTFE, SST | 1/8" OD | (1) XP-315 | 40 mL/min | ea. |
| A-309 | Inlet Solvent Filter with stem | 10 μm | SST | 1/16" ID | — | 40 mL/min | ea. |
| A-231A | Inlet Solvent Filter with Flangeless Fittings | 20 μm | PCTFE, SST | 3/16" OD | (1) XP-132 | 100 mL/min | ea. |
| A-310 | Inlet Solvent Filter with stem | 10 μm | SST | 1/8" ID | — | 40 mL/min | ea. |
| INLET SOLVENT FILTERS FOR PREPARATIVE HPLC SYSTEMS | | | | | | | |
| A-225 | Inlet Solvent Filter with stem | 20 μm | SST | 1/16" ID | — | 100 mL/min | ea. |
| A-225A | Inlet Solvent Filter with Flangeless Fittings | 20 μm | PCTFE, SST | 1/8" OD | (1) P-315, (1) P-300N | 100 mL/min | ea. |
| A-227A | Inlet Solvent Filter with Flangeless Fittings | 10 μm | PCTFE, SST | 1/4" OD | (1) XU-655 | 100 mL/min | ea. |
| A-230A | Inlet Solvent Filter with Flangeless Fittings | 20 μm | PCTFE, SST | 1/4" OD | (1) XU-655 | 100 mL/min | ea. |
| A-311 | Inlet Solvent Filter with stem | 10 μm | SST | 1/16" ID | — | 100 mL/min | ea. |
| A-311A | Inlet Solvent Filter with Flangeless Fittings | 10 μm | PCTFE, SST | 1/8" OD | (1) XP-315 | 100 mL/min | ea. |

* Maximum suggested flow rates are determined by porosity and surface area.



Inline 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

Our Inline Filters are specially engineered for inline filtration. It is specifically designed to help prevent particulate contamination from clogging sensitive equipment. It is ideally suited for placement along the flow path line between the pump and injection valve/autosampler. We offer a variety of porosities for your application.

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 Versions for Standard HPLC (6,000 psi/414 bar) and UHPLC (25,000 psi/1,725 bar)
- › Help prevent particulate contamination from clogging sensitive equipment
- › Ideally suited for placement along the flow path line between the pump and injection valve/autosampler

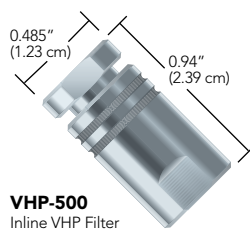
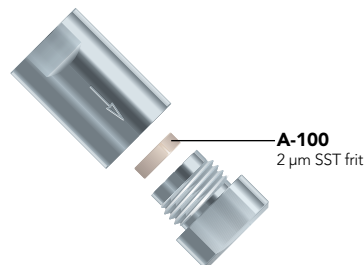
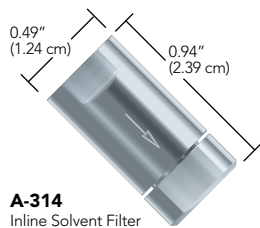
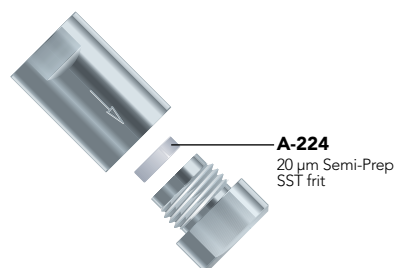
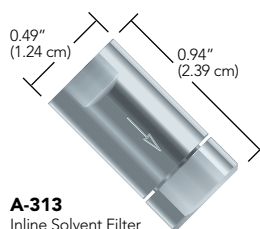


RELATED PRODUCTS

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.

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).

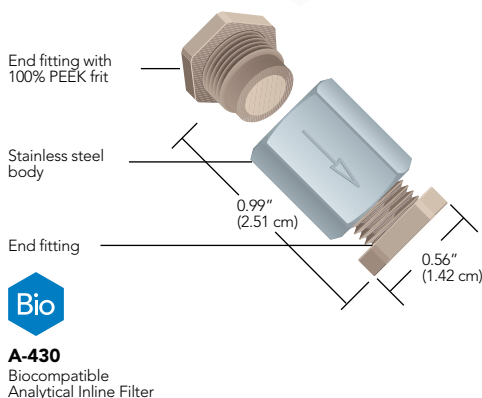


Inline Filters (Cont.)

Biocompatible Standard Inline Filters

- › 0.5 µm and 2 µm versions available
- › Features 100% PEEK flow path

Our 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.



Inline Filters

| Part No. | Description | Porosity | For Tubing Size | Threads | Includes | Swept Volume | Pressure Rating | Qty. |
|--|--|----------|-----------------|-------------|-------------|--------------|------------------------|-------|
| STANDARD 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-100 | Replacement Frits, Stainless Steel, ea. | 2 µm | N/A | — | — | 1.4 µL | N/A | ea. |
| 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-501 | Replacement Inline VHP Frit | 0.5 µm | N/A | N/A | N/A | 0.60 µL | N/A | ea. |
| VHP-506 | Replacement Inline VHP Frit | 0.2 µm | N/A | N/A | N/A | 0.54 µL | N/A | ea. |
| 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 |

*Swept volumes include/reflect theoretical frit volume values.
SST = Stainless Steel



Precolumn Filters

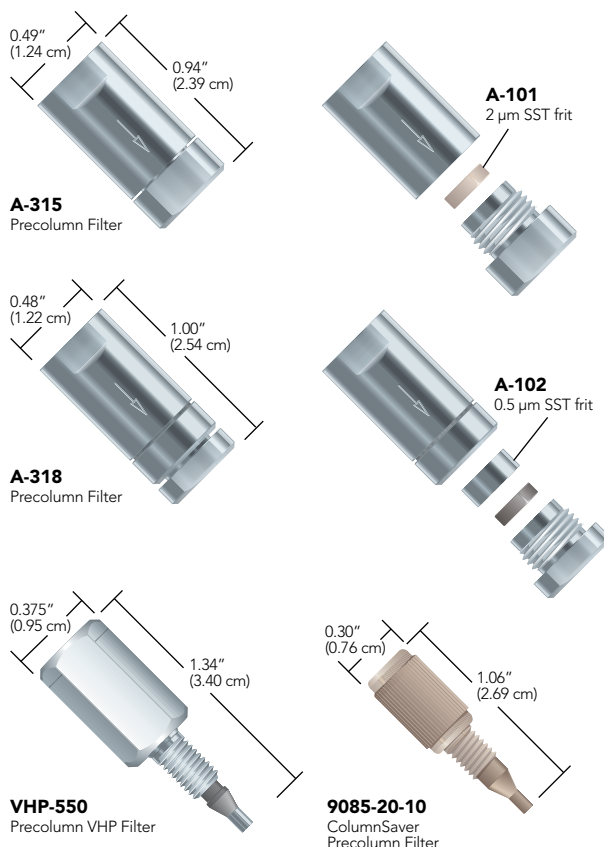
Our economical Precolumn Filters offer secure protection for analytical columns in HPLC and UHPLC. We offer traditional versions that can successfully connect tubing on both sides and our direct-connect versions attach to the inlet port of most standard columns. All versions feature a 10-32 coned ports for 1/16" OD tubing.

Standard Precolumn Filters

- › Economical protection for larger columns and injections
- › 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

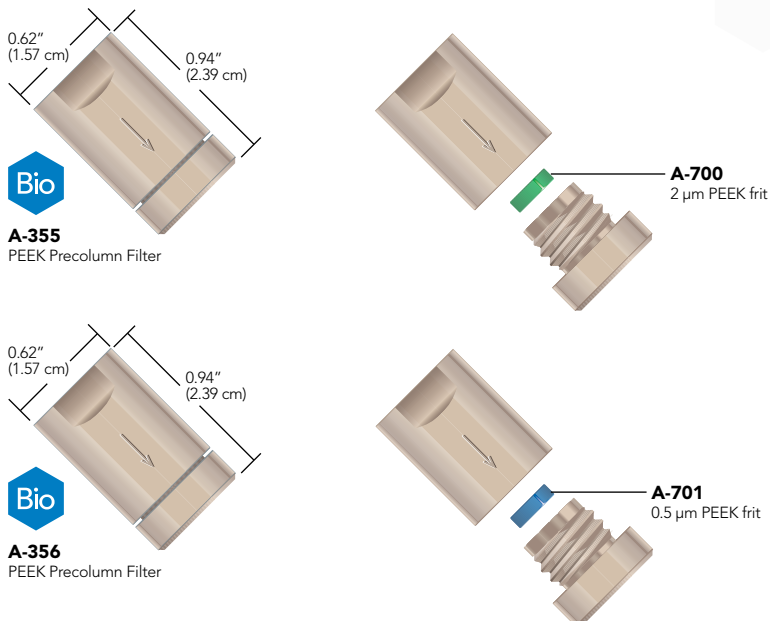


Precolumn Filters (Cont.)

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

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.



Precolumn Filters

| Part No. | Description | Porosity | For Tubing Size | Threads | Includes | Swept Volume* | Pressure Rating | Qty. |
|--|---|----------|-----------------|-------------|-------------|---------------|------------------------|-------|
| STANDARD 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-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-101 | Replacement Frits, Stainless Steel, ea. | 2 µm | N/A | — | — | 0.74 µL | N/A | ea. |
| A-102 | Replacement Frits, Stainless Steel, ea. | 0.5 µm | N/A | — | — | 0.61 µL | N/A | ea. |
| 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-551 | Replacement Precolumn VHP Frit Assembly | 0.5 µm | N/A | N/A | N/A | 1.9 µL | N/A | ea. |
| VHP-556 | Replacement Precolumn VHP Frit Assembly | 0.2 µm | N/A | N/A | N/A | 1.8 µL | N/A | ea. |
| 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 |
| 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) | ea. |
| A-356 | Solvent Filter Assembly, Biocompatible | 0.5 µm | | 10-32 Coned | (1) A-701 | 1.3 µL | 5,000 psi (345 bar) | ea. |
| A-700 | Replacement Frit, PEEK Polymer | 2 µm | | — | — | 0.74 µL | N/A | ea. |
| A-701 | Replacement Frit, PEEK Polymer | 0.5 µm | | — | — | 0.61 µL | N/A | ea. |

SST = Stainless Steel

*Swept volumes include/reflect theoretical frit volume values.

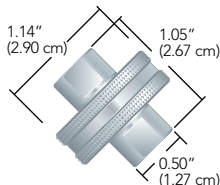


Semi-Prep Filters

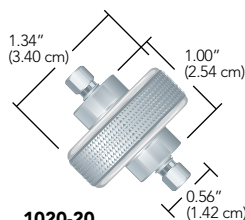
Biocompatible Semi-Prep Filters consist of a stainless steel body, two PEEK end fittings, and a separate PEEK frit. These filters are ideal for many higher flow analytical, semi-prep and preparative applications. Best of all, if the filter becomes clogged, simply unscrew the assembly, remove the frit and replace it. The frits are interchangeable.

Semi-Prep Inline Filters

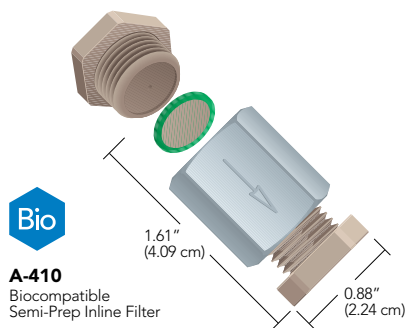
- › Designed for high-flow applications
- › Economical protection for larger columns and injections
- › SFC and HPLC compatible



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)



A-410
Biocompatible
Semi-Prep Inline Filter

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.

| Part No. | Description | Porosity | Threads | Includes | Swept Volume* | Pressure Rating | Qty. |
|---|--|----------|---------------------|-------------|---------------|---------------------|------|
| 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-331 | Stainless Steel Frits, Natural ETFE ring | 10 µm | N/A | N/A | 142 µL | N/A | ea. |
| A-332 | Stainless Steel Frits, Natural ETFE ring | 2 µm | N/A | N/A | 122 µL | N/A | ea. |
| A-337 | Stainless Steel Frits, Natural ETFE ring | 20 µm | N/A | N/A | 152 µL | N/A | ea. |
| ISO-PREP FILTERS | | | | | | | |
| 1020-05 | 21.2 mm Filter Holder | 0.5 µm | 10-32 Coned | (1) 7031-05 | 203 µL | 8,000 psi (552 bar) | ea. |
| 1020-20 | 21.2 mm Filter Holder | 2 µm | 10-32 Coned | (1) 7031-20 | 196 µL | 8,000 psi (552 bar) | ea. |
| 7031-05 | 21.2 mm Replacement Filter | 0.5 µm | N/A | N/A | 122 µL | 8,000 psi (552 bar) | ea. |
| 7031-20 | 21.2 mm Replacement Filter | 2 µm | N/A | N/A | 115 µL | 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. |

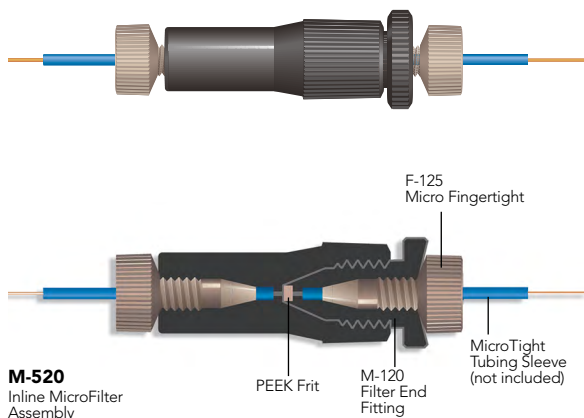
*Swept volumes include/reflect theoretical frit volume values.



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

Our 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 52). 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

| 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 |



Mini MicroFilters

- › Total volume as low as 10 nL
- › Conductive version for CEC and mass spectrometry applications

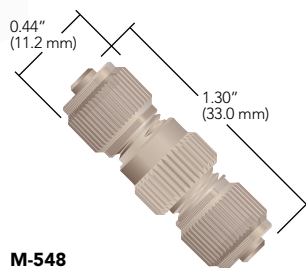
APPLICATION NOTE

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.

Our 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.



M-548
Mini MicroFilter Assembly

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 | Qty. |
|--|-------------------------------|----------|------------|---------------------|---------------------------------|--------------|---------------------|------|
| MINI MICROFILTER ASSEMBLY | | | | | | | | |
| 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) | ea. |
| 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) | ea. |
| 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-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-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 |

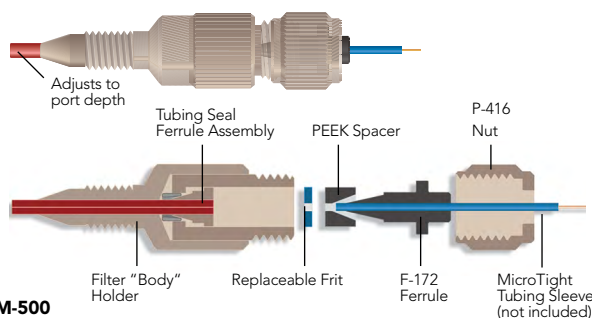
SST = Stainless Steel; Ti = Titanium



Precolumn MicroFilters

- › Direct connects to columns with 10-32 threads
- › Total void volume of 0.5 μ L
- › Two versions: direct connect 1/16" OD tubing or use MicroTight® tubing sleeves for 70–520 μ m OD capillary tubing

The Precolumn MicroFilters directly connect into your microbore or analytical column. Total theoretical void volume is only 0.5 μ L (includes frit volume) and the PEEK tubing used in the assembly of these units has a 0.005" (125 μ m) ID, virtually eliminating any mixing of the sample with the mobile phase.



M-500
Precolumn MicroFilter Assembly
(Includes indicated products)

| 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 μ m | MicroTight Tubing Sleeve | 10-32 Coned | (5) C-425, (1) F-172, (1) P-416 | 0.5 μ L | 4,000 psi (276 bar) | ea. |
| M-510 | Precolumn MicroFilter Assembly, PEEK Frit | 0.5 μ m | MicroTight Tubing Sleeve | 10-32 Coned | (5) A-735, (1) F-172, (1) P-416 | 0.5 μ L | 4,000 psi (276 bar) | ea. |
| M-550 | Precolumn MicroFilter Assembly, SST Frit | 0.5 μ m | 1/16" OD | 10-32 Coned | (5) C-425, (1) F-132, (1) P-416 | 0.5 μ L | 4,000 psi (276 bar) | ea. |
| M-560 | Precolumn MicroFilter Assembly, PEEK Frit | 0.5 μ m | 1/16" OD | 10-32 Coned | (5) A-735, (1) F-132, (1) P-416 | 0.5 μ L | 4,000 psi (276 bar) | ea. |
| REPLACEMENT PRECOLUMN MICROFILTER FRITS (FRIT DIAMETER X FRIT THICKNESS X OVERALL DIAMETER) | | | | | | | | |
| A-735 | PEEK Frits, 0.045" x 0.031" x 0.192" | 0.5 μ m | N/A | N/A | N/A | 216 nL | N/A | ea. |
| C-420 | SST Frits, 0.038" x 0.028" x 0.192" | 2 μ m | N/A | N/A | N/A | 101 nL | N/A | ea. |
| C-425 | SST Frits, 0.038" x 0.028" x 0.192" | 0.5 μ m | N/A | N/A | N/A | 101 nL | N/A | ea. |



Bottle Caps

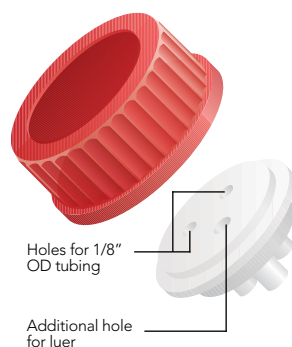
- › Extremely simple — no threaded ports or fittings
- › Manufactured from ETFE and Polypropylene

APPLICATION NOTE

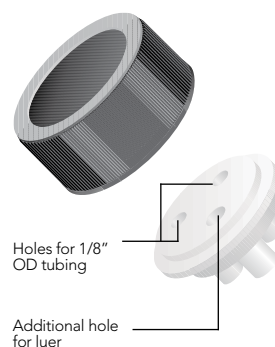
- › A self-regulating sparging system can help reduce helium consumption and improve pump performance. Set this up by pressing your tubing through the appropriate holes in your bottle cap and attaching each line to a filter. Sparge your mobile phase with an inert gas (preferably helium) for 15–20 minutes. 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 135) along the tubing line that runs between the gas supply and the solvent bottle.
- › For a more efficient degassing system, please see the HPLC Vacuum Degassing Systems on page 154.
- › Please see the Quick-Stop Luer Check Valve on page 139 for another solvent inlet Application Note.

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 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

NOTE

The A-610 Bottle Cap has a slightly different configuration than 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 fluoropolymer tubing with these bottle caps (page 55).

| Part No. | Description | Qty. |
|---|---------------------------|------|
| BOTTLE CAPS FOR GL-45, 1 L BOTTLES | | |
| A-610 | for 3/16" OD tubing, Red | ea. |
| A-620 | for 1/8" OD tubing, Red | ea. |
| A-630 | for 1/16" OD tubing, Red | ea. |
| BOTTLE CAPS FOR GL-38, 4 L BOTTLES | | |
| A-622 | for 1/8" OD tubing, Black | ea. |



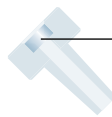
Bottle Cap Plugs

Use the A-626 Bottle Cap Plug to seal the third “tapered” luer hole found in most IDEX Health & Science 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).



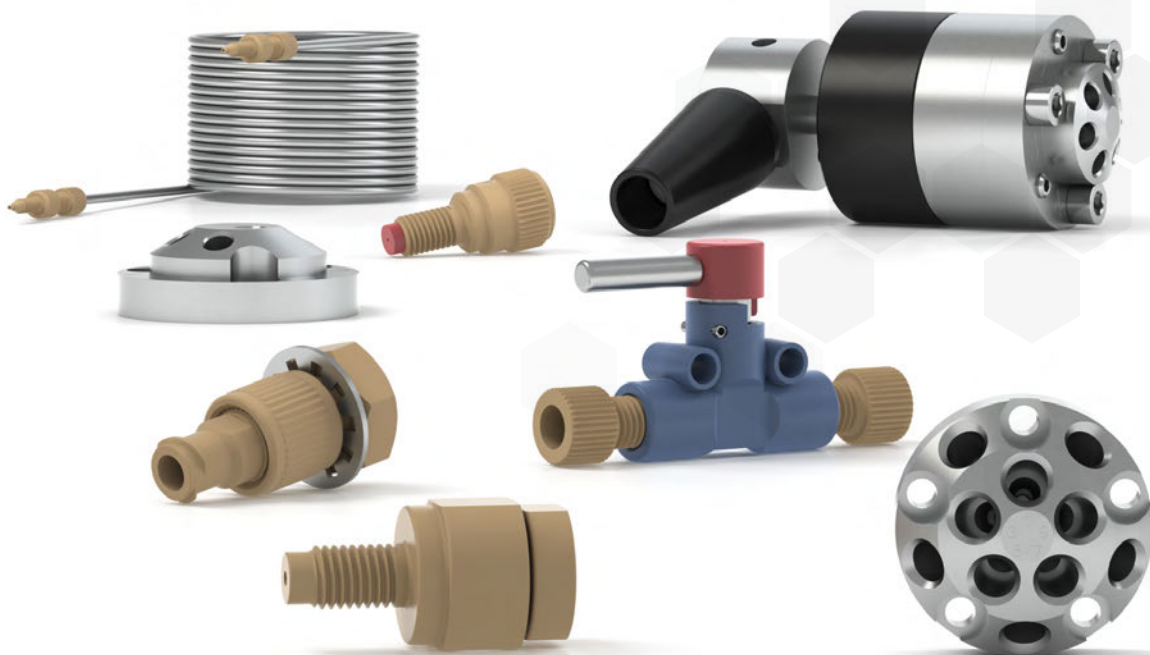
A-626
Bottle Cap Plug



A-629
Filter Bottle Cap Plug

20 µm stainless
steel frit

| Part No. | Description | Qty. |
|-------------------------|--|------|
| BOTTLE CAP PLUGS | | |
| A-626 | Bottle Cap Plug for luer hole, UHMWPE | ea. |
| A-627 | Filter Bottle Cap Plug for luer hole, UHMWPE with 20 µm stainless steel frit | ea. |
| A-628 | Bottle Cap Plug for 1/16”, 1/8” or 3/16” hole, UHMWPE | ea. |
| A-629 | Filter Bottle Cap Plug for 1/16”, 1/8” or 3/16” hole, UHMWPE with 20 µm stainless steel frit | ea. |



Valves

Our valves are an integral part of advanced fluid-handling solutions for a wide range of analytical instrumentation and clinical diagnostic systems. Our valve options include manual valves for lower frequency use and rotary shear valves that meet the high duty cycle requirements of UHPLC and also come in high and low pressure versions to meet your system requirements. We also offer check valves when there is a need to limit the fluid flow to one direction. Our Back Pressure Regulators products are designed to enhance system performance through outgassing prevention. All of our valve products, components, tools, and accessories are designed keeping our customer's system needs first.

115

VALVE OVERVIEW & FUNCTIONS

115

ROTARY SHEAR VALVES

119

STAND ALONE VALVE PRODUCTS

121

MANUAL VALVES

124

SPARE PARTS

126

VALVE ACCESSORIES

134

FLOW REGULATING VALVES

143

BACK PRESSURE REGULATORS

VALVE OVERVIEW & FUNCTIONS

| Valve Module | Flow Configurations | Page |
|-------------------------|--|------------|
| ACTUATED VALVES | | |
| UP TO 15,000 PSI | | 119 |
| Switching | 2-Position, 6-Port 2-Position, 10-Port | |
| Injection | For Injection, add the appropriately sized Sample Loop to the Switching valves above | |
| Selection | 6-Position, 7-Port | |
| UP TO 6,000 PSI | | 119 |
| Switching | 2-Position, 6-Port (Analytical and Nano Scale) 2-Position, 10-Port (Analytical and Nano Scale) | |
| Injection | For Injection, add the appropriately sized Sample Loop to the Switching valves above 2-Position, 6-Port (vertical port) | |
| Selection | 6-Position, 7-Port | |
| UP TO 125 PSI | | 119 |
| Switching | 2-Position, 6-Port 2-Position, 6-Port (Double 3-Way) | |
| Selection | 6-Position, 7-Port 10-Position, 11-Port | |
| MANUAL VALVES | | |
| UP TO 9,000 PSI | | 123 |
| Injection | 2-Position, 6-Port (Front-Loading, 9,000 psi) | |
| UP TO 6,000 PSI | | 123 |
| Switching | 2-Position, 6-Port (Analytical and Micro Scale) | |
| Injection | 2-Position, 6-Port | |
| Selection | 6-Position, 7-Port | |
| UP TO 1,000 PSI | | 123 |
| 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 | |
| Injection | 2-Position, 6-Port | |
| Selection | 6-Position, 7-Port | |

Rotary Shear Valves

Our 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 and Functions (Cont.)

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 those 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) | Medium Pressure Applications |
| 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 μ L per minute
- › Analytical Scale — flow rates from 100 μ L 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 page 114.

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 122 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".

Effects of Valves & 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 \leq 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 \rightarrow column \rightarrow 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 \rightarrow valve #1 \rightarrow column \rightarrow valve #2 \rightarrow detector).

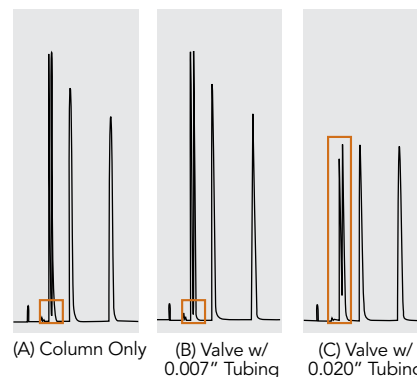
The injection valve and detector were connected to these valves by the same tubing used in the control. The extra tubing pieces required to connect the valves to the column were a 10 cm length for valve #1-to-column, and a 35 cm length for column-to-valve #2. The diameters of these tubes are indicated in the experimental details, to the right.

Comparison of Observed Column Plates of 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 μ L volume, 4 mm path. Sample volume: 2 μ L, partial-filling method.
Column: 2 mm ID x 100 mm long, 4 μ m C-18. True plates of column = 11,570.

Effects of Valves and Tubing on Resolution



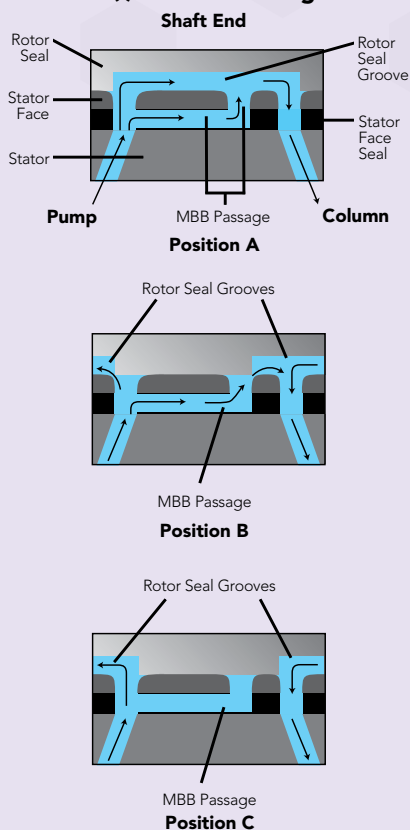
Conclusion: These sequential chromatograms show the effect of adding volume to the flow path through the addition of components.

- (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.

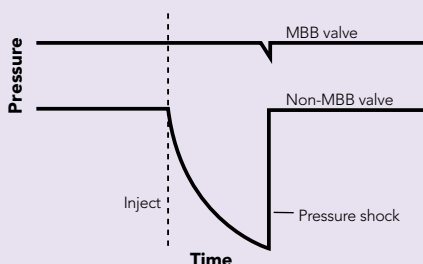
WHAT IS MAKE-BEFORE-BREAK™, AND WHEN DOES IT MATTER?

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

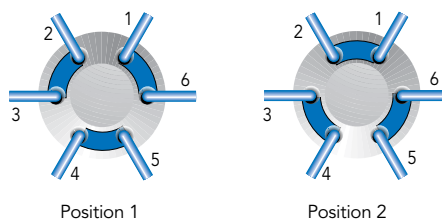


To maintain a constant, desired high-pressure flow, our Make-Before-Break (MBB®) design creates continuous flow between the LOAD and INJECT positions that virtually eliminates pressure transient shock to the system. A passage in the stator face makes a new connection before old connections break. The MBB design — an improvement over bypass-style injectors — does not dilute the sample and is easy to maintain and troubleshoot.

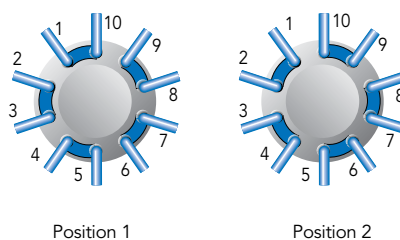


Switching Valves

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

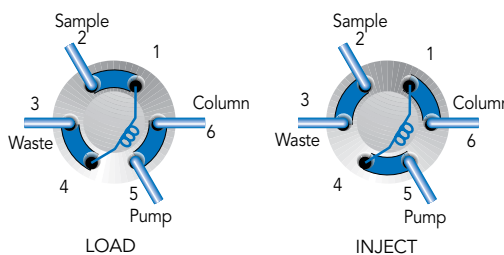


Flow path of Two-Position, Ten-Port Switching Valve

Our 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 manual switching valves (to 1,000 psi) described on page 123 have different flow path geometry as noted.

Injection Valves

Our 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 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 automatically.

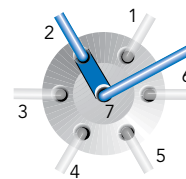
Injection valves are classified as either Single or Dual Mode based on how the Sample Loop can be filled. A Single Mode Injection valve requires complete filling of the sample loop and is configured for Rear loading, generally in an auto-sample configuration. A Dual Mode Injection valve allows either 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 131 for greater detail on partial vs. complete loop filling.)

Valve Overview and Functions (Cont.)

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.

Numerous configurations exist among selection valves (e.g., 6-position 7-port, or 10-position 11-port), but these valves typically operate between more than two positions. The ports are usually spaced radially, or outward in some manner around the center port of the stator.

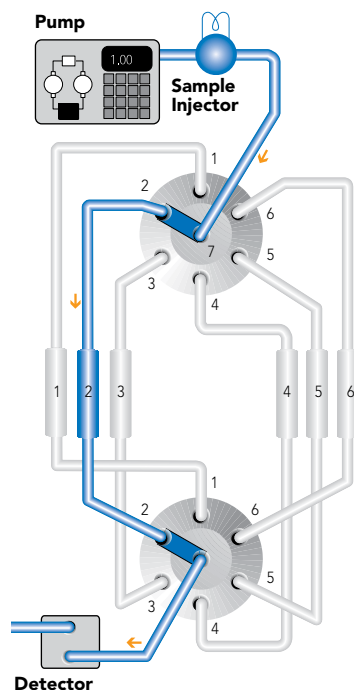


Flow path of Six-Position, Seven-Port Selector Valve



APPLICATION NOTE

Six column selection using two selection valves.





Stand Alone Valve Products

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.

MX Series II

› **MXT** to 15,000 psi
(1,035 bar)



› **MXP** to 6,000 psi
(410 bar)



› **MXX** to 125 psi
(8.5 bar)

Add our 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 124) or — for the higher-pressure MXP and MXP valves — the Rapid Replacement Pods™ (page 120) assures optimal performance.

| Part No. | Description | Ports, Connections | Wetted Material | Rapid Replacement Pod | Qty. |
|--|---|-------------------------------------|-----------------|-----------------------|------|
| ACTUATED VALVES 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 | ea. |
| MXT715-102 | 2-Position, 10-Port | 10-32 Ports for 1/16" OD Tubing | UltraLife | PD715-102 | ea. |
| 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 | ea. |
| All of these MXT valves include a set of 1/16" fittings. Replacement Fittings for MXT valves can be located on page 133. | | | | | |
| ACTUATED VALVES UP TO 6,000 PSI (410 BAR) | | | | | |
| SWITCHING | | | | | |
| MXP7900-000 | 2-Position, 6-Port | 10-32 Ports for 1/16" OD Tubing | DuraLife®* | PD7900 | ea. |
| MXP7960-000 | 2-Position, 10-Port | 10-32 Ports for 1/16" OD Tubing | DuraLife | PD7960 | ea. |
| MXP7980-000 | 2-Position, 6-Port, Nano, 5,000 psi (345 bar) | M4 Ports for 1/32" OD Tubing | DuraLife II | PD7980 | ea. |
| MXP7986-000 | 2-Position, 10-Port, Nano, 5,000 psi (345 bar) | M4 Ports for 1/32" OD Tubing | DuraLife II | PD7986 | ea. |
| MXP9900-000 | 2-Position, 6-Port, Biocompatible, 5,000 psi (345 bar) | 10-32 Ports for 1/16" OD Tubing | PEEK | PD9900 | ea. |
| MXP9960-000 | 2-Position, 10-Port, Biocompatible, 5,000 psi (345 bar) | 10-32 Ports for 1/16" OD Tubing | PEEK | PD9960 | ea. |
| 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 | ea. |
| SELECTION | | | | | |
| MXP7970-000 | 6-Position, 7-Port | 10-32 Ports for 1/16" OD Tubing | DuraLife II** | PD7970 | ea. |
| * 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 MXP valves include a set of 1/16" fittings. Replacement Fittings for MXP valves can be located on page 133. | | | | | |
| ACTUATED VALVES 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" | ea. |
| MXX777-603 | 2-Position, Double Three Way | Accepts Either 1/16" or 1/8" Tubing | RPC-7 | 1/16" and 1/8" | ea. |
| MXX777-612 | 2-Position, 6-Port, Large Bore | Accepts Either 1/16" or 1/8" Tubing | RPC-7 | 1/16" and 1/8" | ea. |
| SELECTION | | | | | |
| MXX777-605 | 6-Position, 7-Port | Accepts Either 1/16" or 1/8" Tubing | RPC-7 | 1/16" and 1/8" | ea. |
| MXX777-616 | 6-Position, 7-Port, Large Bore | Accepts Either 1/16" or 1/8" Tubing | RPC-7 | 1/16" and 1/8" | ea. |
| MXX778-605 | 10-Position, 11-Port | Accepts Either 1/16" or 1/8" Tubing | RPC-7 | 1/16" and 1/8" | ea. |

* 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 133.



Rapid Replacement Pods™

For IDEX Health & Science MX Series II 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 maintained at your convenience. The pod kit contains complete instructions for removal and replacement.



| Part No. | Description | For Valve Part No. | Qty. |
|----------------------------------|-----------------------|--------------------|------|
| TO 15,000 PSI (1,035 BAR) | | | |
| SWITCHING | | | |
| PD715-000 | Rapid Replacement Pod | MXT715-000 | ea. |
| PD715-102 | Rapid Replacement Pod | MXT715-102 | ea. |
| SELECTION | | | |
| PD715-105 | Rapid Replacement Pod | MXT715-105 | ea. |
| UP TO 6,000 PSI (410 BAR) | | | |
| SWITCHING | | | |
| PD7900 | Rapid Replacement Pod | MXP7900-000 | ea. |
| PD7960 | Rapid Replacement Pod | MXP7960-000 | ea. |
| PD7980 | Rapid Replacement Pod | MXP7980-000 | ea. |
| PD7986 | Rapid Replacement Pod | MXP7986-000 | ea. |
| PD9900 | Rapid Replacement Pod | MXP9900-000 | ea. |
| PD9960 | Rapid Replacement Pod | MXP9960-000 | ea. |
| INJECTION | | | |
| PD7920 | Rapid Replacement Pod | MXP7920-000 | ea. |
| SELECTION | | | |
| PD7970 | Rapid Replacement Pod | MXP7970-000 | ea. |



Manual Valves

Choose a manual valve if your application involves low frequency of use, demands operator control, or involves injection of smaller sample volumes.



7725i
Manual Injection Valve
Up to 9,000 psi (600 bar)



7060
Manual Switching Valve
Up to 7,000 psi (483 bar)

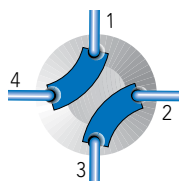


3725i-038
Manual Switching Valve
Up to 7,000 psi (483 bar)

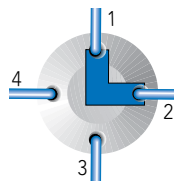


NOTE

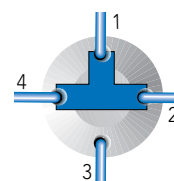
Manual Switching Valve Options



4-Way Diagonal Flow Switching Valves
(V-100D, V-101D)



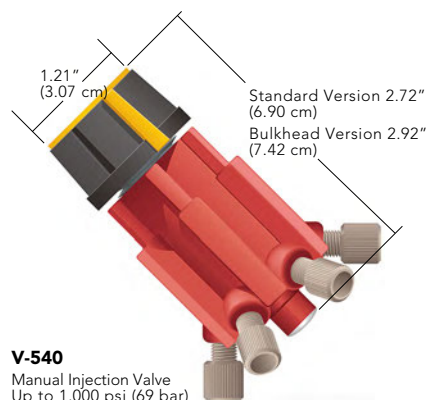
Right Angle Flow Switching Valves
(V-100L, V-101L)



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)

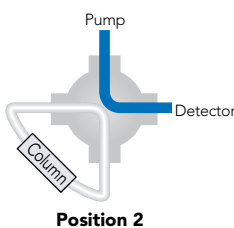
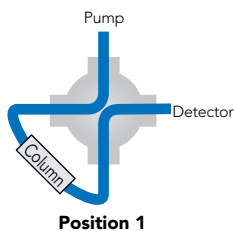
Manual Valves (Cont.)



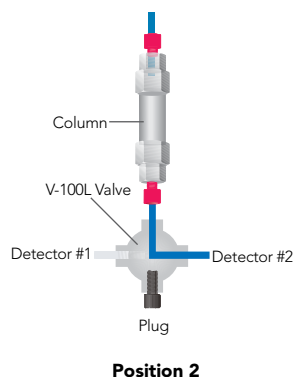
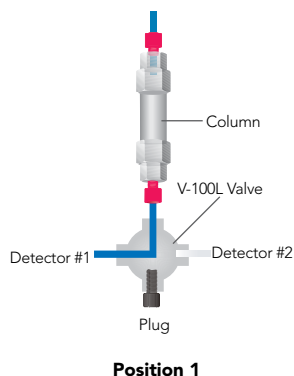
APPLICATION NOTE

Switching Valve Applications

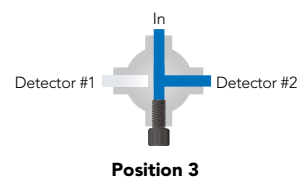
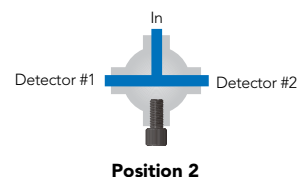
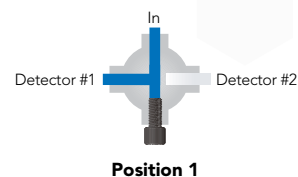
Protect sensitive system components (such as a column) during a cleaning cycle with our Diagonal Flow Switching Valve ("D"). This valve eliminates the need to remove, plug and reconnect a low pressure column (see below).



› 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.



Characteristics of 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 | 2 µL–5.0 mL | 316 SST, Vespel® PEEK, ETFE, ceramic | 7,000 (483) | 80° | Yes | 7725, 7725i |
| | | 1 µL–5.0 mL | 2 µL–10 mL | | 5,000 (340) | 50° | Yes | 9725, 9725i |
| | Micro | 0.1 µL–500 µL | 5 µL–1.0 mL | 316 SST, PEEK, Vespel, ceramic | 7,000 (483) | 80° | No | 8125 |
| Single Mode Can load the loop by one method: Complete filling — loop determines volume by over filling loop | Preparative | 100 µL–10 mL | 2.0 mL–20 mL | 316 SST, PEEK PEEK | 5,000 (340) | 50° | Yes | 3725(i)-038, 3725i |
| | | Analytical | Not Applicable | | 5 µL–5.0 mL 5 µL–10 mL | 7,000 (483) 5,000 (340) | 150° 50° | No No |

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.



SPECIFICATIONS & DETAILS

| Part No. | Stator Passage Diameter | Factory Set Pressure | Maximum Field Set Pressure | Maximum Temperature (°C) |
|------------------|-------------------------|----------------------|----------------------------|--------------------------|
| 3000 (PEEK) | 1.0 mm (0.040") | 3,000 psi (207 bar) | 4,000 psi (276 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° |

SST = Stainless Steel

Manual Valves

| Part No. | Description | Tubing/Fitting Size | Wetted Material | Configuration | Qty. |
|--|--|---|----------------------------------|---------------|------|
| MANUAL VALVES UP TO 9,000 PSI (600 BAR) | | | | | |
| INJECTION | | | | | |
| 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 | ea. |
| MANUAL VALVES UP TO 6,000 PSI (410 BAR) | | | | | |
| SWITCHING | | | | | |
| 3000 | 2-Position, 6-Port, Prep Scale | 5/16-24 Ports for 1/8" OD Tubing | PEEK | — | ea. |
| 7000 | 2-Position, 6-Port, Large Bore | 10-32 Ports for 1/16" OD Tubing | Stainless Steel & Vespel® | — | ea. |
| 7000L | 2-Position, 6-Port, Large Bore | 10-32 Ports for 1/16" OD Tubing | Stainless Steel & Vespel | — | ea. |
| 7030 | 2-Position, 6-Port | 10-32 Ports for 1/16" OD Tubing | Stainless Steel & Vespel | Double 3-Way | ea. |
| 7030L | 2-Position, 6-Port, Large Bore | 10-32 Ports for 1/16" OD Tubing | Stainless Steel & Vespel | Double 3-Way | ea. |
| INJECTION* | | | | | |
| 7010 | 2-Position, 6-Port Single Mode | 10-32 Ports for 1/16" OD Tubing | Stainless Steel & Vespel | 20 µL* | ea. |
| 9010 | 2-Position, 6-Port Single Mode (Switching, Injection) | 10-32 Ports for 1/16" OD Tubing | PEEK, ETFE, Ceramic | 20 µL* | ea. |
| 3725-038 | 2-Position, 6-Port, Prep Scale Dual Mode | 5/16-24 Ports for 1/8" Tubing | Stainless Steel & PEEK | 10 mL* | ea. |
| 3725i | 2-Position, 6-Port, Prep Scale Dual Mode with Switch | 5/16-24 Ports for 1/8" Tubing | PEEK | 10 mL* | ea. |
| 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* | ea. |
| 7725 | 2-Position, 6-Port, Analytical Scale Dual Mode | 10-32 Ports for 1/16" OD Tubing | Stainless Steel, Ceramic, Vespel | 20 µL* | ea. |
| 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* | ea. |
| 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* | ea. |
| 9725 | 2-Position, 6-Port, Analytical Scale Dual Mode | 10-32 Ports for 1/16" OD Tubing | PEEK, ETFE, Ceramic | 20 µL* | ea. |
| 9725i | 2-Position, 6-Port, Analytical Scale Dual Mode with Switch | 10-32 Ports for 1/16" OD Tubing | PEEK, ETFE, Ceramic | 20 µL* | ea. |
| SELECTION | | | | | |
| 7060 | 6-Position, 7-Port | 10-32 Ports for 1/16" OD Tubing | Stainless Steel & Vespel | 6-Way | ea. |

* Ships with a sample loop of indicated volume 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.

| Part No. | Description | Tubing/Fitting Size | Wetted Material | Configuration | Includes | Qty. |
|---|--|----------------------------------|-----------------|----------------------|------------|------|
| SWITCHING | | | | | | |
| V-100D | 4-Position, 4-Port, 500 psi (34 bar) | 1/4-28 Ports for 1/16" OD Tubing | PEEK, PTFE | Double Diagonal | * | ea. |
| V-101D | 4-Position, 4-Port, Bulkhead, 500 psi (34 bar) | 1/4-28 Ports for 1/16" OD Tubing | PEEK, PTFE | Double Diagonal | * | ea. |
| V-100L | 4-Position, 4-Port, 500 psi (34 bar) | 1/4-28 Ports for 1/16" OD Tubing | PEEK, PTFE | Right-Angle "L" | ** | ea. |
| 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" | ** | ea. |
| V-100T | 4-Position, 4-Port, 500 psi (34 bar) | 1/4-28 Ports for 1/16" OD Tubing | PEEK, PTFE | Single "T" | *** | ea. |
| V-101T | 4-Position, 4-Port, Bulkhead, 500 psi (34 bar) | 1/4-28 Ports for 1/16" OD Tubing | PEEK, PTFE | Single "T" | *** | ea. |
| 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 | ea. |
| 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 | ea. |
| 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 | ea. |
| 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 | ea. |
| 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 | ea. |
| 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 | ea. |
| 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 | ea. |
| 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 | ea. |

* (4) P-218BLK, (4) P-240.

** (4) P-218BLK, (4) P-240, (1) P-309.

*** (4) P-218BLK, (4) P-240, (1) P-309.

Spare Parts

We offer a full line of genuine spare parts to assist with your use of our valve products. We offer RheBuild® Kits designed for specific valve models. Rotor Seal and Stators are commonly replaceable parts.



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. Typically, 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 130.

Please Note: Rotor seals for MX Series II™ Modules are available in RheBuild® Kits on this page. Stators for MX Series II Modules are available on this page. MX (Series I) Module rotor seals are available in RheBuild Kits on this page.



RheBuild® Kits

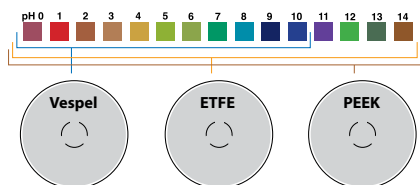
RheBuild Kits are available for most valve products. Included in each individualized RheBuild Kit are all parts, tools, and instructions to maintain precision performance of your particular product. RheBuild Kits eliminate individual part ordering.



APPLICATION NOTE

How to Select the Right Rotor Seal

The standard rotor seal in many of our 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 attack Vespel which damages the rotor seal. If you use any solutions above pH 10, our experts recommend 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.



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 ($\geq 100 \mu\text{L}$) 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 our Troubleshooting Guide for HPLC Injection Problems. You may download the Guide from the IDEX Health & Science web site: www.idex-hs.com under Education & Tools.

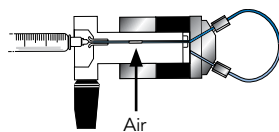


Figure 1 Air present in the needle port tube is pushed by the syringe during loading into the sample loop

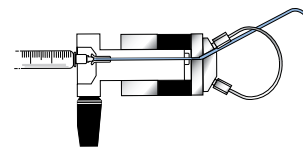


Figure 2 Pathway of the flushing mobile phase using the Needle Port Cleaner, Part # 7125-054 (see page 131) when the injector is in INJECT

| Part No. | For Valve Model No. | Description | Qty. |
|---|---------------------------------------|-------------------|------|
| VESPEL BLEND ROTOR SEALS | | | |
| 7000-016 | 7000L, 7040L | Vespel Rotor Seal | ea. |
| 7010-039 | 7010, 7000, 7040 | Vespel Rotor Seal | ea. |
| 7030-003 | 7030, 9030 | Vespel Rotor Seal | ea. |
| 7030-014 | 7030L | Vespel Rotor Seal | ea. |
| 7060-070 | 7060, 7066 | Vespel Rotor Seal | ea. |
| 7060-064 | 7060L | Vespel Rotor Seal | ea. |
| 7125-047 | 7125, 7725, 9725 | Vespel Rotor Seal | ea. |
| 7410-038 | 7410 | Vespel Rotor Seal | ea. |
| 7413-013 | 7413 | Vespel Rotor Seal | ea. |
| 8125-038 | 8125 | Vespel Rotor Seal | ea. |
| ETFE BLEND ROTOR SEALS | | | |
| 7010-071 | 7010, 7010-087, 7000, 7040 | ETFE Rotor Seal | ea. |
| 7030-015 | 7030, 9030 | ETFE Rotor Seal | ea. |
| 7060-074 | 7060, 7066, 9060 | ETFE Rotor Seal | ea. |
| 7125-079 | 7125, 7125-081, 7725 | ETFE Rotor Seal | ea. |
| 8125-097 | 8125 | ETFE Rotor Seal | ea. |
| 9010-051 | 9010 | ETFE Rotor Seal | ea. |
| 9125-082 | 9125, 9725 | ETFE Rotor Seal | ea. |
| PEEK BLEND ROTOR SEALS | | | |
| 3725-018 | 3725, 3725-038 | PEEK Rotor Seal | ea. |
| 9010-065 | 7000, 7010, 9010 | PEEK Rotor Seal | ea. |
| 8125-119 | 8125 | PEEK Rotor Seal | ea. |
| 9125-095 | 7125, 7725, 9125, 9725 | PEEK Rotor Seal | ea. |
| STATORS FOR MX SERIES II MODULES | | | |
| 7123-548 | MXT715-000 | Stator | ea. |
| 7123-550 | MXT715-105 | Stator | ea. |
| 7123-568 | MXT715-102 | Stator | ea. |
| 7770-229 | MXP7920-000 | Stator | ea. |
| 7980-004 | MXP7980-000 | Stator | ea. |
| 7986-004 | MXP7986-000 | Stator | ea. |
| 7900-146 | MXP9900-000 | Stator | ea. |
| 7900-179 | MXP7900-000 | Stator | ea. |
| 7900-183 | MXP7970-000 | Stator | ea. |
| 7960-014 | MXP7960-000 | Stator | ea. |
| 9960-002 | MXP9960-000 | Stator | ea. |
| STATORS FOR OTHER IDEX HEALTH & SCIENCE VALVES | | | |
| 3725-006 | 3725, 3710-038, 3000-038 and 3030-038 | Stator | ea. |
| 7010-069 | 7000L, 7030L, 7040L | Stator | ea. |
| 7010-040 | 7010, 7125, 7000, 7030 and 7040 | Stator | ea. |
| 7060-039 | 7060 and 7066 | Stator | ea. |
| 7060-065 | 7060L, EV501-100 | Stator | ea. |
| 7123-047 | PR/EV500-100 | Stator | ea. |
| 7123-127 | PR/EV750-107 | Stator | ea. |
| 7123-128 | PR/EV700-107 | Stator | ea. |
| 7123-142 | PR/EV500-104, EV501-104 | Stator | ea. |
| 7123-145 | PR/EV550-104, EV551-104 | Stator | ea. |
| 7123-147 | PR/EV550-100 | Stator | ea. |
| 7123-148 | PR/EV500-101 | Stator | ea. |
| 7123-149 | PR/EV550-101 | Stator | ea. |
| 7123-180 | PR703-100 and EV700-105 | Stator | ea. |
| 7123-221 | PR753-100 and EV750-105 | Stator | ea. |
| 7123-223 | PR/EV700-112 | Stator | ea. |
| 7410-041 | 7410 and 7413 | Stator | ea. |
| 7520-030 (inlet) | 7520 | Stator | ea. |
| 7520-035 (outlet) | 7520 | Stator | ea. |
| 7650-002 | PR/EV700-102 | Stator | ea. |
| 7725-010 | 7725(i) | Stator | ea. |
| 7750-070 | 7750 | Stator | ea. |
| 7750-038 | PR/EV700-100 | Stator | ea. |
| 8125-098 | 8125 | Stator | ea. |
| 9125-043 | 9125, 9010, 9030 and 9725(i) | Stator | ea. |
| 9650-009 | PR/EV750-102 | Stator | ea. |
| 9750-021 | PR/EV750-100 | Stator | ea. |

| Part No. | Description | Qty. |
|---|---|------|
| RHEBUILD KITS FOR MX SERIES II™ VALVES | | |
| 7150-999 | RheBuild Kit for MXT715-000 (includes 2 rotor seals) | ea. |
| 7152-999 | RheBuild Kit for MXT715-102 (includes 2 rotor seals) | ea. |
| 7155-999 | RheBuild Kit for MXT715-105 (includes 2 rotor seals) | ea. |
| 7920-999 | RheBuild Kit for MXP7920-000 and MXP7900-000 | ea. |
| 7960-999 | RheBuild Kit for MXP9960-000 (includes rotor seal and stator face seal) | ea. |
| 7961-999 | RheBuild Kit for MXP7960-000 | ea. |
| 7970-999 | RheBuild Kit for MXP7970-000 | ea. |
| 79801-999 | RheBuild Kit for MXP7980-000 | ea. |
| 79861-999 | RheBuild Kit for MXP7986-000 | ea. |
| 7900-999 | RheBuild Kit for MXP9900-000 (includes rotor seal and stator face seal) | ea. |
| RHEBUILD KITS FOR MANUAL VALVES | | |
| 3725-999 | RheBuild Kit for models 3725, 3725i, 3725-038, 3735i-038 | ea. |
| 7010-997 | RheBuild Kit including Stator for model 7010 | ea. |
| 7010-998 | RheBuild Kit, pH Upgrade Kit for model 7000 | ea. |
| 7010-999 | RheBuild Kit for model 7010 and 7010-type Valves | ea. |
| 7125-999 | RheBuild Kit for models 7125 and 7126 | ea. |
| 7410-999 | RheBuild Kit for model 7410 | ea. |
| 7520-999 | RheBuild Kit for models 7520 and 7526 (includes inlet stator and seal) | ea. |
| 7725-999 | RheBuild Kit for models 7725 and 7725i | ea. |
| 7788-999 | RheBuild Kit for model 7725i-188 | ea. |
| 8125-999 | RheBuild Kit for models 8125 and 8126 | ea. |
| 9010-999 | RheBuild Kit for model 9010 | ea. |
| 9125-999 | RheBuild Kit for models 9125 and 9126 | ea. |
| 9725-999 | RheBuild Kit for models 9725 and 9725i; 7725(i) pH upgrade kit | ea. |
| RHEBUILD KITS FOR MX SERIES I™ VALVES | | |
| 7900-999 | RheBuild Kit for models MX7900-000, MX7925-000, MX9900-000, MX9925-000 | ea. |
| 7960-999 | RheBuild Kit for model MX7960-000 | ea. |
| 7980-999 | RheBuild Kit for model MX7980-000 | ea. |
| 7984-999 | RheBuild Kit for model MX7984-000 | ea. |
| 7986-999 | RheBuild Kit for model MX7986-000 | ea. |
| RHEBUILD KITS FOR LABPRO™ & EV AUTOMATED FLUIDIC INSTRUMENTS | | |
| 1006-999 | RheBuild Kit for model PR/EV100-106 | ea. |
| 5001-999 | RheBuild Kit for models PR/EV500-101 and PR/EV550-101 | ea. |
| 5100-999 | RheBuild Kit for models PR/EV500-100 and PR/EV550-100 | ea. |
| 5104-999 | RheBuild Kit for models PR/EV500-104 and PR/EV550-104 | ea. |
| 7004-999 | RheBuild Kit for models PR/EV700-104 and PR/EV750-104 | ea. |
| 7112-999 | RheBuild Kit for models PR/EV700-112 and PR/EV750-112 | ea. |
| 7501-999 | RheBuild Kit for models PR/EV700-100 and PR/EV750-100 | ea. |
| 7502-999 | RheBuild Kit for models PR/EV700-102 and PR/EV750-102 | ea. |
| 7507-999 | RheBuild Kit for models PR/EV700-107 and PR/EV750-107 | ea. |
| 7531-999 | RheBuild Kit for models PR703-100 and PR753-100 | ea. |



VALVE ACCESSORIES

Our valve accessories include a variety of products that work with and are specific to our valve mechanics. From Sample Loops, driver boards, or mounting brackets we offer a wide array of accessories to meet your system requirements. We also include tools that work specifically with our valves and valve components.

- 127** STAINLESS STEEL SAMPLE LOOPS
- 128** PEEK SAMPLE LOOPS
- 131** SUCTION NEEDLE ADAPTER
- 132** INJECTION PORT ADAPTERS
- 133** WRENCHES, BRACKETS, & REPLACEMENT FITTINGS



Stainless Steel Sample Loops

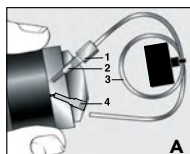


APPLICATION NOTE

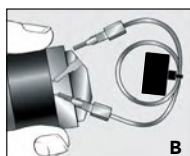
How to Properly Install Sample Loops: Stainless Steel

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.

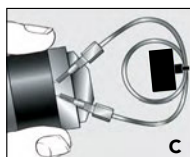
To install the sample loop:



- 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.



- Insert the tubing into port (4). Confirm that the tubing is bottomed in the valve port as shown in Figure A.
- While firmly pressing down on the tubing, hand-tighten the nut as tight as possible.



- With the IDEX Wrench (page 51), designed especially for fittings, tighten one quarter turn past finger tight. Remove the loop to confirm the ferrule is swaged onto the tube.
- Repeat steps a-d with the other end of the loop while the swaged end remains outside the valve port. See Figure B.
- Reinstall each end of the loop to their respective ports. See Figure C.

Figure 1 Cut-away view of stainless steel sample loop installation

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 the ID tolerance varies depending on the tubing tolerance of the metal tubing bore. Accuracy of large metal loops (1.0 mm, 0.040" bore) is about $\pm 5\%$, intermediate loops (0.5 mm, 0.020" bore) $\pm 10\%$, and small loops (0.2 mm, 0.007" bore) $\pm 30\%$.

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 131.

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.

| Part No. | Volume | Tubing | Qty. |
|--|-------------------------------|---------------------------------|------|
| 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 | ea. |
| 7021 | 10 μL Sample Loop | 0.30 mm (0.012") ID x 1/16" OD | ea. |
| 7022 | 20 μL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | ea. |
| 7023 | 50 μL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | ea. |
| 7024 | 100 μL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | ea. |
| 7025 | 200 μL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | ea. |
| 7026 | 500 μL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | ea. |
| 7027 | 1.0 mL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | ea. |
| 7028 | 2.0 mL Sample Loop | 1.0 mm (0.040") ID x 1/16" OD | ea. |
| 7029 | 5.0 mL Sample Loop | 1.0 mm (0.040") ID x 1/16" OD | ea. |
| 1876 | 10 mL Sample Loop | 2.0 mm (0.080") ID x 1/8" OD | ea. |
| 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 | ea. |
| 3065-019 | 5.0 mL Sample Loop | 2.0 mm (0.080") ID x 1/8" OD | ea. |
| 3065-023 | 10 mL Sample Loop | 2.0 mm (0.080") ID x 1/8" OD | ea. |
| 3065-025 | 20 mL Sample Loop | 2.0 mm (0.080") ID x 1/8" OD | ea. |
| 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 | ea. |
| 7755-021 | 10 μL Sample Loop | 0.30 mm (0.012") ID x 1/16" OD | ea. |
| 7755-022 | 20 μL Sample Loop | 0.30 mm (0.012") ID x 1/16" OD | ea. |
| 7755-023 | 50 μL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | ea. |
| 7755-024 | 100 μL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | ea. |
| 7755-025 | 200 μL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | ea. |
| 7755-026 | 500 μL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | ea. |
| 7755-027 | 1.0 mL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | ea. |
| 7755-028 | 2.0 mL Sample Loop | 1.0 mm (0.040") ID x 1/16" OD | ea. |
| 7755-029 | 5.0 mL Sample Loop | 1.0 mm (0.040") ID x 1/16" OD | ea. |
| 1876 | 10 mL Sample Loop | 2.0 mm (0.080") ID x 1/8" OD | ea. |
| 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 | ea. |
| 8021 | 10 μL Sample Loop | 0.20 mm (0.008") ID x 0.020" OD | ea. |
| 8022 | 20 μL Sample Loop | 0.25 mm (0.010") ID x 0.020" OD | ea. |
| 8023 | 50 μL Sample Loop | 0.30 mm (0.012") ID x 0.020" OD | ea. |



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 tolerance of the tubing bore. Accuracy of large PEEK loops (0.8 mm, 0.030" bore) is about $\pm 14\%$, intermediate loops (0.5 mm, 0.020") $\pm 21\%$, and small loops (0.2 mm, 0.007") $\pm 65\%$.

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 is reinserted in the ports for correct loop installation.



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.

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.

In dual mode injection valves (see "Sample Loop Loading" Application Note on page 131) 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:

- 1 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.
- 2 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.
- 3 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.

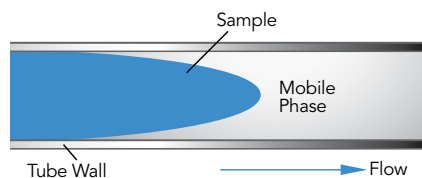


Figure 1 Schematic of sample flow through mobile phase between tubing walls

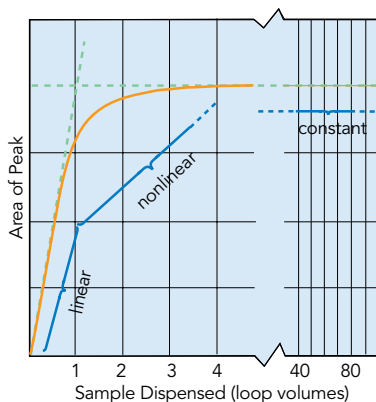


Figure 2 Sample mass (observed peak area) vs. volume of sample dispensed from the syringe, in units of loop volumes, injected onto the column from our dual mode injector such as model 7725



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 as THF, methylene chloride and DMSO cause PEEK tubing to swell while concentrated nitric acid and sulfuric acid weaken the tubing.



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.

- 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 a 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 IDEX Health & Science RheBuild® Kits are listed on page 124.
- 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 our Troubleshooting Guide for HPLC Injection Problems. You may download the Guide from our web site: www.idex-hs.com under Education & Tools.

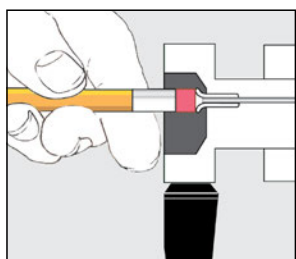


Figure 1 To reform the needle seal, push the eraser end of a pencil against the needle port

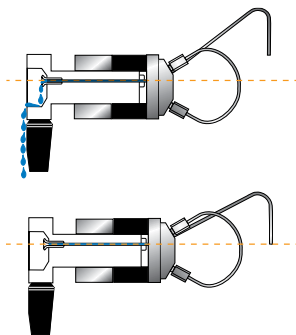


Figure 2 Needle port level compared to the level of vent line outlet:

- (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

PEEK Sample Loops (Cont.)



APPLICATION NOTE

Using Proper Syringe Needles

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 3725i 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 page 132.

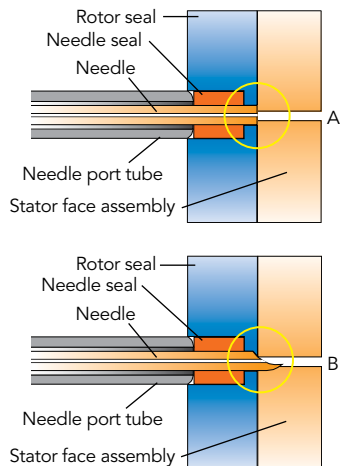


Figure 1 A square cut needle:
(A) stops against the stator face assembly; The tip of a pointed needle
(B) slips into the stator face and the tip breaks off as the valve rotates

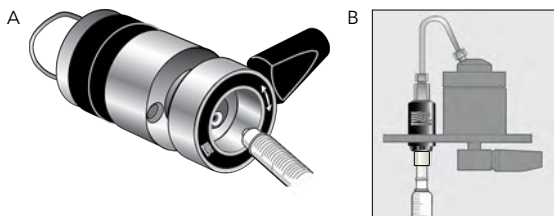
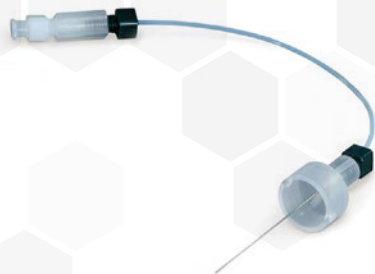


Figure 2
(A) Syringe fitted with Needle Port Cleaner (Part # 7125-054) loading a front-loading valve (model 7725);
(B) loading a Loop Filler Port (Part # 7012)

PEEK Sample Loops

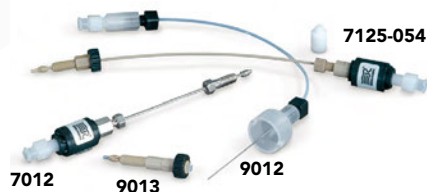
| Part No. | Volume | Tubing | Valco No. | Qty. |
|---|---|--------------------------------|-----------|-------|
| PEEK LOOPS FOR 3725, 3725I INJECTION VALVES | | | | |
| 3055-018 | 2.0 mL Sample Loop | 1.6 mm (0.062") ID x 1/8" OD | N/A | ea. |
| 3055-019 | 5.0 mL Sample Loop | 1.6 mm (0.062") ID x 1/8" OD | N/A | ea. |
| 3055-023 | 10 mL Sample Loop | 2.0 mm (0.080") ID x 1/8" OD | N/A | ea. |
| 3055-025 | 20 mL Sample Loop | 2.0 mm (0.080") ID x 1/8" OD | N/A | ea. |
| 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 | ea. |
| 9055-021 | 10 µL Sample Loop | 0.25 mm (0.010") ID x 1/16" OD | SL10WPK | ea. |
| 9055-022 | 20 µL Sample Loop | 0.25 mm (0.010") ID x 1/16" OD | SL20WPK | ea. |
| 9055-023 | 50 µL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | SL50WPK | ea. |
| 9055-024 | 100 µL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | SL100WPK | ea. |
| 9055-025 | 200 µL Sample Loop | 0.51 mm (0.020") ID x 1/16" OD | N/A | ea. |
| 9055-026 | 500 µL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | SL500WPK | ea. |
| 9055-027 | 1.0 mL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | SL1KCWPK | ea. |
| 9055-028 | 2.0 mL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | SL2KCWPK | ea. |
| 9055-029 | 5.0 mL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | N/A | ea. |
| 9055-033 | 10 mL Sample Loop | 0.76 mm (0.030") ID x 1/16" OD | N/A | ea. |
| 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 | ea. |
| 7755-015 | 2 µL Sample Loop (models 7725, 7725i, and 9725(i) only) | Internal groove | N/A | ea. |
| REPLACEMENT RHEFLX FITTINGS FOR PEEK LOOPS | | | | |
| 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 |



Suction Needle Adapter

Our 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.

9125-076



7012

9013

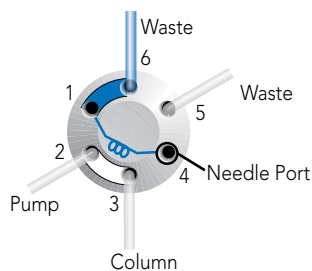
9012

7125-054

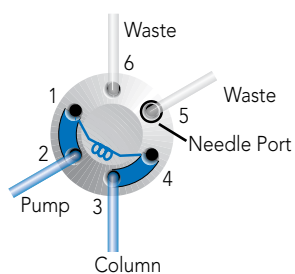


APPLICATION NOTE

Flow path for the typical dual mode injector



LOAD



INJECT

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 $\geq 5 \mu\text{L}$. Accuracy is limited as loop volumes are nominal.

Q: "Which method should I use and which IDEX Health & Science 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 123.

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 overflow the sample loop. Complete-filling maximizes the reproducibility of your results.

| Part No. | Description | Qty. |
|---|---|------|
| SUCTION NEEDLE ADAPTER & ACCESSORIES | | |
| 7012 | Stainless Steel Loop Filler Port | ea. |
| 7125-054 | Needle Port Cleaner | ea. |
| 9012 | PEEK Loop Filler Port | ea. |
| 9013 | PEEK Needle Port | ea. |
| 9125-076 | Suction Needle Adapter (for Models 7725 and 9725) | ea. |

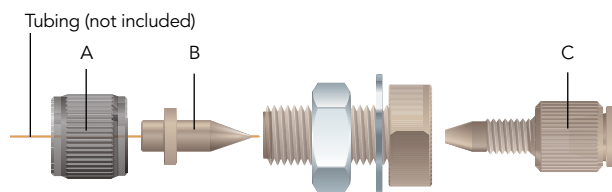
**V-447**

Injection Port Adapters

- › For 360 µm OD tubing
- › Mount on bracket or bulkhead

To introduce sample, connect 360 µm OD capillary tubing to an 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

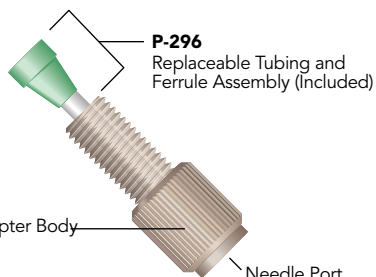


RELATED PRODUCTS

| | A | B | C |
|-----------------------------|----------|-------|----------|
| FOR 360 µm OD TUBING | | | |
| M-432 and V-447 | P-416BLK | F-152 | M-432-03 |

- › For use with Injection Valves on page 123.

This simple, biocompatible adapter is designed specifically for the Injection Valves on page 123 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-296
Replaceable Tubing and Ferrule Assembly (Included)

Adapter Body

Needle Port

P-295
1/4-28 Flat-Bottom Injection Port Adapter

| Part No. | Description | Qty. |
|--|---|------|
| MICRO INJECTION PORT ADAPTER | | |
| FOR 360 µm OD TUBING | | |
| F-152 | Replacement MicroFerrule for M-432, Natural PEEK | ea. |
| M-432 | Micro Injection Port Adapter Assembly | ea. |
| M-432-03 | Replacement Tubing/Fitting Assembly for M-432 & M-433 | ea. |
| P-416BLK | Replacement Female Nut for M-432, Black PEEK | ea. |
| V-447 | Micro Injection Port Adapter Assembly Actuator Mounting Kit Includes (1) M-432 with mini-actuator bracket and (2) mounting screws | ea. |
| 1/4-28 FLAT-BOTTOM INJECTION PORT ADAPTER | | |
| P-295 | Adjustable Injection Port Adapter | ea. |
| P-296 | Replacement Tubing/Ferrule Assembly | ea. |

Wrenches, Brackets, & Replacement Fittings



6810

Valve Wrenches

- › For convenient wrench-tightening of fittings on high pressure rotary shear valves
- › For removal of knobs on 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 our V-101 valves (page 123). The V-104 is an Allen wrench that can be used to remove the knob from our Medium Pressure Selection and Injection Valves (also found on page 123).



7160-010

7160

7160-029



Mounting Brackets

Our mounting brackets and panels of different shapes and sizes organize and provide a sturdy support for IDEX Health & Science valves. The Ring Stand Mounting Bracket now allows the valves to mount onto common laboratory equipment.

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 119. Please see the part number chart below for a list of individual part numbers.

| Part No. | Description | Qty. |
|-------------------------------------|---|-------|
| VALVE WRENCHES | | |
| 6810 | IDEX Wrench | ea. |
| MOUNTING BRACKET ACCESSORIES | | |
| 7160 | Mounting Panel | ea. |
| 7160-010 | Valve Angle Bracket | ea. |
| 7160-029 | Ring Stand Mounting Bracket | ea. |
| VALVE BRACKET | | |
| M-615-1 | Mounting Bracket for IDEX Health & Science Switching Valves | ea. |
| M-615-2 | Mounting Bracket for IDEX Health & Science Injection and Selection Valves | ea. |
| REPLACEMENT FITTINGS | | |
| 7770-039 | Ferrules for 1/8" OD Tubing | 25-pk |
| 7770-040 | Ferrules for 1/8" Tubing | 50-pk |
| 7770-044 | Ferrules for 1/16" OD Tubing | 25-pk |
| 7770-124 | O-rings for 1/16" OD Tubing | 25-pk |



FLOW REGULATING VALVES

Our Flow Regulating Valves include specifically designed valves that are used to control or stop the flow of a stream and are ideal for use if your application involves low frequency of use or demands operator control. A variety of types and styles of valves allow you to manage directional flow. In addition, we offer replacement cartridges for all of our flow regulating valves.

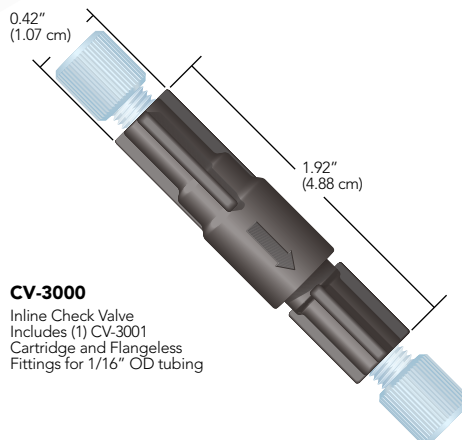
- 135** CHECK VALVES
- 140** MICRO-SPLITTER VALVES
- 141** MICRO-METERING VALVES
- 142** SHUT-OFF VALVES



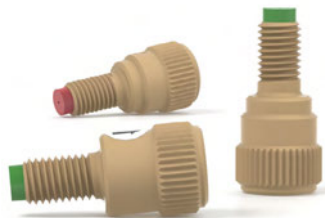
Inline Cartridge Check Valves

- › 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)

Our 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.



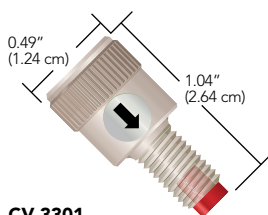
| Part No. | Description | Includes | Swept Volume | Qty. |
|--------------------------------------|---|-------------------------|-------------------|------|
| INLINE CARTRIDGE CHECK VALVES | | | | |
| CV-3000 | Inline Check Valve Assembly for 1/16" OD tubing | (1) CV-3001, (2) XP-215 | 96 μL | ea. |
| CV-3001 | Inline Check Valve Cartridge for CV-3000 | | 91 μL | ea. |
| CV-3010 | Inline Check Valve Assembly for 1/8" OD tubing | (1) CV-3011, (2) XP-315 | 100 μL | ea. |



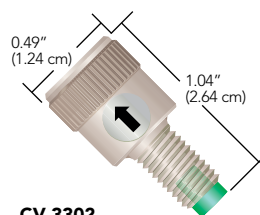
Standard 1/4-28 Inline Check Valves

- › 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)

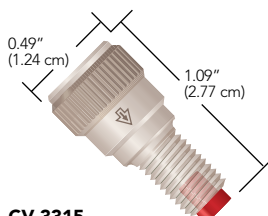
Connect these Inline Check Valves to any 1/4-28 flat-bottom port. Then thread your 1/4-28 flat-bottom fitting into the check valve to connect the tubing. Once installed, the spring-actuated sealing system eliminates back flow, helping to prevent upstream contamination or damage. In addition, the unique design of this product eliminates the additional tubing cuts and connections required to install conventional inline check valves.



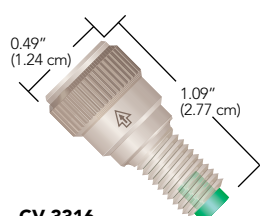
CV-3301
Standard, Inlet
1/4-28 FB Male to 1/4-28 FB Female
15 psi (1 bar) cracking pressure



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



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 45, 39, and 42, respectively, 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 page 36. Connect capillary tubing using the optional ferrules listed on page 35 or the NanoTight™ Fittings and Tubing Sleeves on page 37.

| Part No. | Description | Cracking Pressure | Qty. |
|--|---|-------------------|------|
| 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) | ea. |
| CV-3302 | Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F* | 15 psi (1 bar) | ea. |
| CV-3315 | Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F* | 3 psi (0.2 bar) | ea. |
| CV-3316 | Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F* | 3 psi (0.2 bar) | ea. |

* M = Male (external) threads; F = Female (internal) threads; C = Coned; FB = Flat-Bottom



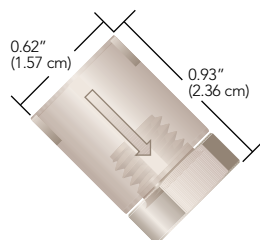
Non-Metallic Check Valves

- › Cracking pressure of 8 psi (0.6 bar)
- › Excellent chemical resistance
- › **Materials of construction:**
PEEK and perfluoroelastomer,
suitable for biological applications

Our Non-Metallic Check Valves are biocompatible and delivers a low cracking pressure. With a swept volume of only 7.4 μL , our 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.

10-32 Micro-Volume Inline Check Valves

With a swept volume of only 7.4 μL , our 10-32 Micro-Volume Inline Check Valves are 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) |

10-32 Micro-Volume Inline Check Valves

| Part No. | Description | Cracking Pressure | Qty. |
|--|---|-------------------|------|
| 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) | ea. |

* M = Male (external) threads; F = Female (internal) threads; C = Coned; FB = Flat-Bottom

Non-Metallic Check Valves (Cont.)

- › Low cracking pressure of 1 psi (0.07 bar)
- › Multiple configurations for different applications
- › Excellent chemical resistance
- › **Materials of construction:**
PEEK and perfluoroelastomer

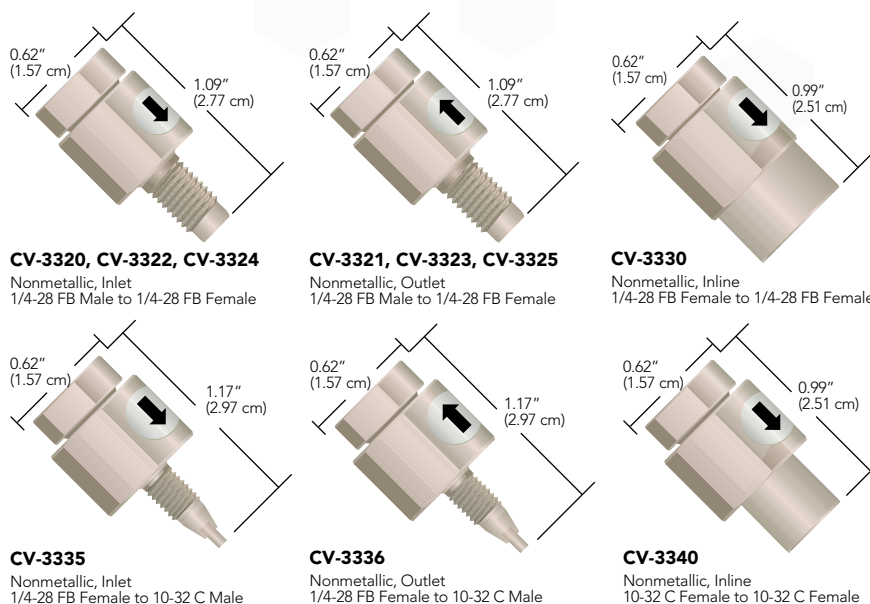
1/4-28 & 10-32 Inline Check Valves

Our 1/4-28 & 10-32 Non-Metallic 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.

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 135) 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.



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) |

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.

1/4-28 & 10-32 Inline Check Valves

| Part No. | Description | Cracking Pressure | Thru-Hole | Qty. |
|---|---|-------------------|------------------|------|
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |
| 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) | ea. |

* M = Male (external) threads; F = Female (internal) threads; C = Coned; FB = Flat-Bottom



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 39 – 46). 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.



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 45, 39, and 42, respectively, of the Fittings Chapter.
- › Micro-Volume Inline Check Valves and Non-Metallic Check Valves with 10-32 coned ports (page 137) can be used with any 10-32 polymer Fingertight or SealTight™ fitting on page 36. Connect capillary tubing using the optional ferrules listed on page 35 or the NanoTight™ Fittings and Tubing Sleeves on page 37.



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 148). 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 Derivatization:

For post-column derivatization, 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.

| Part No. | Description | Includes | Swept Volume | Qty. |
|------------------------------------|--------------------------------------|-------------------------|--------------|------|
| QUICK-STOP LUER CHECK VALVE | | | | |
| P-696 | Quick-Stop Luer Check Valve Assembly | (1) P-697, (1) P-655 | 127 µL | ea. |
| P-697 | Quick-Stop Luer Check Valve | | 107 µL | ea. |
| P-699 | Bulkhead Quick-Stop Luer Valve | (1) nut/lock washer set | 107 µL | ea. |



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)



APPLICATION NOTE

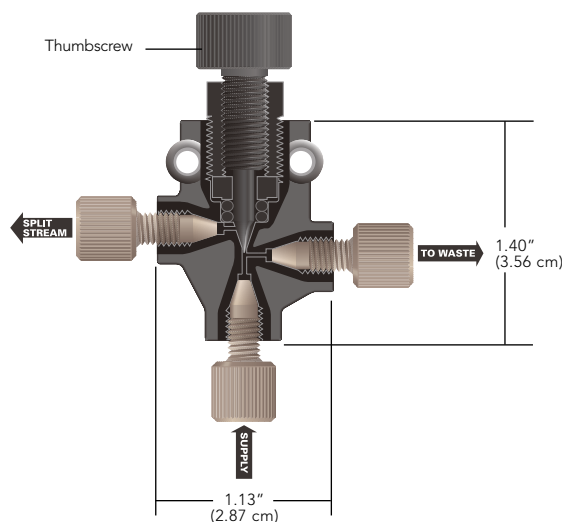
- › With an incoming flow rate of 1 mL/min using room temperature water and equal pressures on both outlet lines, the minimum split flow rate is 2 μ L/min for the standard micro-splitter valves and 4.8 μ L/min for the high pressure micro-splitter valves.
- › All Micro-Splitter Valves have been tested 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.

Our Micro-Splitter Valves are 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.



P-451
Standard Micro-Splitter Valve



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 μ L | 800 psi (55 bar) |
| P-451 | Standard | 10-32 | 1.2 / 2.8 μ L | 800 psi (55 bar) |
| P-460S, T | High Pressure | 10-32 | 1.2 / 2.8 μ L | 4,000 psi (276 bar) |
| P-470 | High Pres. Graduated | 10-32 | 1.2 / 2.8 μ L | 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 | Qty. |
|--|---|------------|------|
| MICRO-SPLITTER VALVES | | | |
| P-450 | Standard, 1/4-28, Biocompatible | (3) XP-235 | ea. |
| P-451 | Standard, 10-32, Biocompatible | (3) F-120 | ea. |
| P-460S | High Pressure, 10-32, with Stainless Steel Needle | (3) F-120 | ea. |
| P-460T | High Pressure, 10-32, with Titanium Needle | (3) F-120 | ea. |
| GRADUATED MICRO-SPLITTER VALVES | | | |
| P-470 | High Pressure Graduated, 10-32, with Stainless Steel Needle | (3) F-120 | ea. |

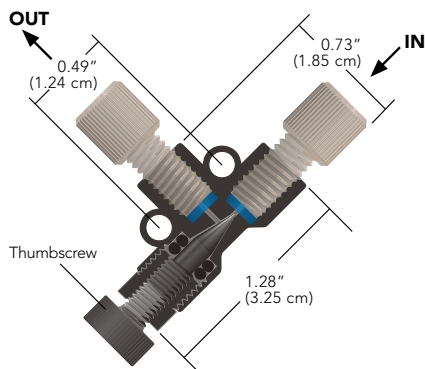
* Use with the MicroTight Tubing Sleeves, found on page 52.



Micro-Metering Valves

- › Flow rates as low as 3.5 $\mu\text{L}/\text{min}^*$
- › 1/4-28 flat-bottom and 10-32 coned designs available
- › **Materials of construction:** PEEK, PTFE

* At 1.0 mL/min incoming flow rate with room temperature water.



P-445
1/4-28 threaded
PEEK Micro-Metering Valve

For fine control of fluid flow rates, Micro-Metering Valves can reduce outgoing flow to as low as 3.5 $\mu\text{L}/\text{min}^*$. These needle valves are perfect for use with peristaltic pump fluid-transfer applications, mass spectrometry, and fraction collection.

Our 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 page 147.

Flow path materials are PEEK polymer and PTFE. All versions of this valve have 0.020" (0.50 mm) thru-holes.



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 (page 143) 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.*)

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 page 143).

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 | Qty. |
|------------------------------|-------------|-----------|------------------|-------------------|------------|------|
| MICRO-METERING VALVES | | | | | | |
| P-445 | PEEK, Black | 1/16" | 0.020" (0.50 mm) | 7.7 μL | (2) XP-230 | ea. |
| P-446 | PEEK, Black | 1/16" | 0.020" (0.50 mm) | 7.2 μL | (2) F-120 | ea. |
| P-447 | PEEK, Black | 1/8" | 0.020" (0.50 mm) | 7.7 μL | (2) XP-330 | ea. |

* Maximum internal volume, with valve fully open.

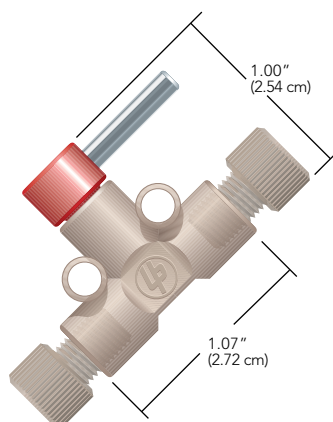


Shut-Off Valves

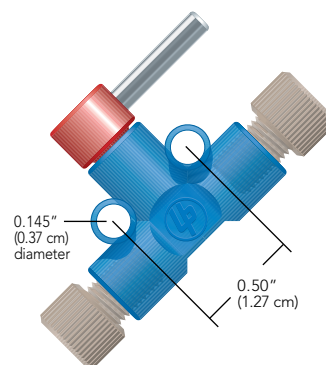
- › Biocompatible, all-polymer flow path
- › Available for 1/16" and 1/8" OD tubing
- › Pressure rated to 500 psi (34 bar)

Stop a flow stream quickly with IDEX Health & Science 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 page 14), may be connected to these valves using our 1/4-28 barbed adapters, found on page 90.



Bio **P-733**
PEEK Shut-Off Valve



Bio **P-783**
ETFE Shut-Off Valve

| Part No. | Material | OD Tubing | Thru-hole | Internal Volume* | Includes | Qty. |
|---------------------------------------|---------------|-----------|-----------------|------------------|-----------------------|------|
| SHUT-OFF VALVES, BIOCOMPATIBLE | | | | | | |
| P-721 | ETFE, Natural | 1/8" | 0.040" (1.0 mm) | 10.0 µL | (2) P-335, (2) P-300N | ea. |
| P-732 | PEEK, Natural | 1/16" | 0.020" (0.5 mm) | 2.5 µL | (2) XP-235 | ea. |
| P-733 | PEEK, Natural | 1/8" | 0.040" (1.0 mm) | 10.0 µL | (2) XP-335 | ea. |
| P-782 | ETFE, Blue | 1/16" | 0.020" (0.5 mm) | 2.5 µL | (2) XP-235 | ea. |
| P-783 | ETFE, Blue | 1/8" | 0.040" (1.0 mm) | 10.0 µL | (2) XP-335 | ea. |

* Maximum internal volume, with valve fully open.



BACK PRESSURE REGULATORS

Back Pressure Regulators (BPR) are designed to enhance system performance through outgassing prevention and improved pump check valve efficiency. It includes 5 and 20psi assemblies (replacement cartridges not available), a variety of pressure rated cartridges and assemblies, PEEK and stainless steel BPR holders, high pressure adjustable BPR for pressure between 2000 and 5000psi and ultra-low volume BPRs set to 100 and 500psi.

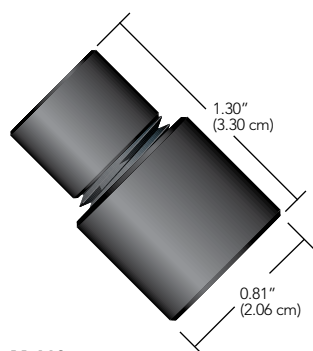
- 144** ULTRA-LOW VOLUME BACK PRESSURE REGULATOR
- 145** BACK PRESSURE REGULATOR ASSEMBLIES
- 146** BACK PRESSURE REGULATOR HOLDERS
- 147** BACK PRESSURE REGULATOR CARTRIDGES
- 148** PRESSURE RELIEF VALVES



Ultra-Low Volume Back Pressure Regulators (BPRs)

- › 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

Our 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.



M-410
MicroVolume BPR Assembly
Attached tubing not shown

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 137.

** 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.*



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.

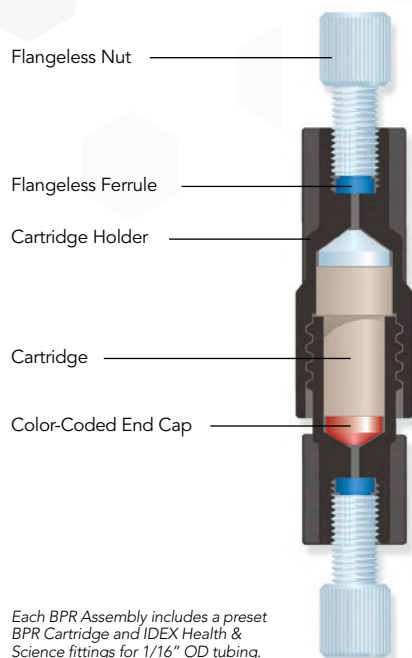
² Set at a flow rate of 0.5 mL/min.

³ Set at a flow rate of 5 mL/min.

| Part No. | Description | Pressure Setting | Tubing OD | Includes | Swept Volume | Qty. |
|------------------------------|-------------|------------------|-----------|----------|-----------------|------|
| ULTRA-LOW VOLUME BPRs | | | | | | |
| M-410 | Low Flow | 100 psi (7 bar) | 1/16" | XP-230 | 6 μL | ea. |
| M-412 | Low Flow | 500 psi (34 bar) | 1/16" | XP-230 | 6 μL | ea. |
| M-420 | High Flow | 100 psi (7 bar) | 1/16" | XP-230 | 6 μL | ea. |



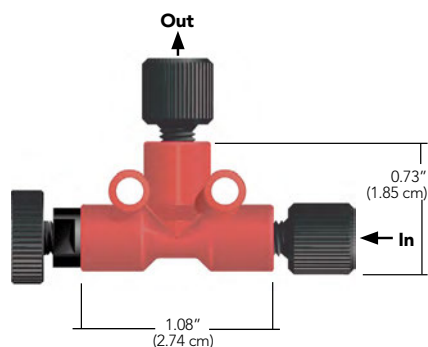
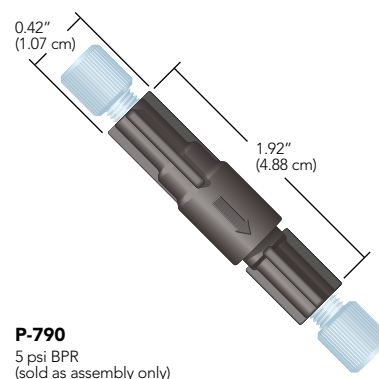
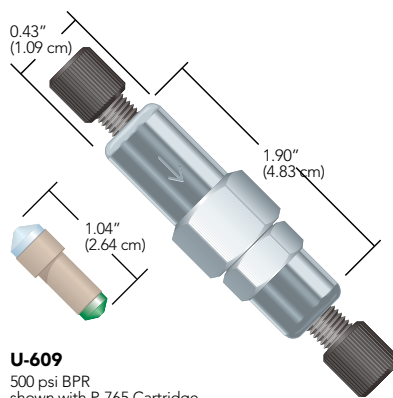
Back Pressure Regulator Assemblies



Each BPR Assembly includes a preset BPR Cartridge and IDEX Health & Science fittings for 1/16" OD tubing.

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).

Our 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.



High Pressure Adjustable Back Pressure Regulator

› 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.

| Part No. | Pressure Setting | Holder Material | Includes | Swept Volume | Qty. |
|--|-------------------------------|-----------------|----------------------------------|--------------|------|
| BPR ASSEMBLIES | | | | | |
| P-790 | 5 psi (0.3 bar) | PEEK | (2) XP-215 | 134 μ L | ea. |
| P-791 | 20 psi (1.4 bar) | PEEK | (2) XP-215 | 134 μ L | ea. |
| P-785 | 40 psi (2.8 bar) | PEEK | (1) P-761, (2) XP-215 | 131 μ L | ea. |
| P-786 | 75 psi (5.2 bar) | PEEK | (1) P-762, (2) XP-215 | 131 μ L | ea. |
| P-787 | 100 psi (7 bar) | PEEK | (1) P-763, (2) XP-215 | 131 μ L | ea. |
| P-788 | 250 psi (17 bar) | PEEK | (1) P-764, (2) XP-235 | 102 μ L | ea. |
| P-789 | 500 psi (34 bar) | PEEK | (1) P-765, (2) P-250, (2) LT-115 | 96 μ L | ea. |
| P-455 | 1,000 psi (69 bar) | PEEK | (1) P-796, (2) P-250, (2) LT-115 | 89 μ L | ea. |
| U-605 | 40 psi (2.8 bar) | SST | (1) P-761, (2) XP-201 | 129 μ L | ea. |
| U-606 | 75 psi (5.2 bar) | SST | (1) P-762, (2) XP-201 | 129 μ L | ea. |
| U-607 | 100 psi (7 bar) | SST | (1) P-763, (2) XP-201 | 129 μ L | ea. |
| U-608 | 250 psi (17 bar) | SST | (1) P-764, (2) XP-201 | 99 μ L | ea. |
| U-609 | 500 psi (34 bar) | SST | (1) P-765, (2) XP-201 | 93 μ L | ea. |
| U-610 | 750 psi (52 bar) | SST | (1) P-795, (2) P-250, (2) LT-115 | 91 μ L | ea. |
| HIGH PRESSURE ADJUSTABLE BPR ASSEMBLY | | | | | |
| P-880 | 2,000–5,000 psi (138–345 bar) | | (2) F-120BLK | 9 μ L | ea. |

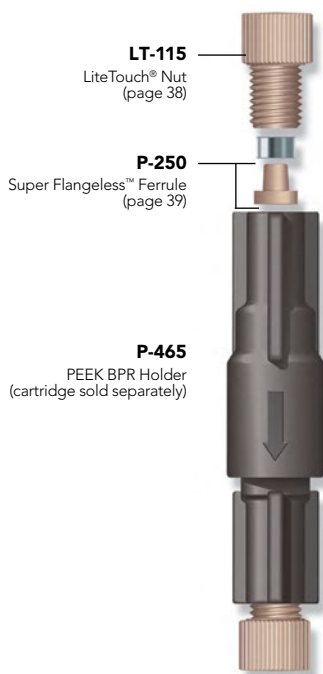


Back Pressure Regulator Holders

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)*



Pressure Rating 4,000 psi (276 bar)**



* Using PEEK tubing and supplied fittings.

** Using stainless steel tubing and supplied fittings.

| Part No. | Pressure Setting | Holder Material | Includes | Swept Volume | Qty. |
|--------------------|-------------------|-----------------|-----------------------|--------------|------|
| BPR HOLDERS | | | | | |
| P-465 | Biocompatible BPR | PEEK | (2) P-250, (2) LT-115 | 7 µL | ea. |
| U-469 | High Pressure BPR | SST | (2) F-300 | 4 µL | ea. |



Back Pressure Regulator 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 a 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 IDEX Health & Science 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.

- › 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.

IDEX Health & Science 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 144)

For flow control options try the Micro-Metering Valves found on page 141.

Back Pressure Regulator Replacement Cartridges

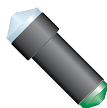
- › Materials of construction: PEEK, ETFE, perfluoroelastomer, and gold-plated stainless steel

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 $\pm 10\%$. Lower or higher flow rates may result in larger pressure fluctuations.



P-761
40 psi BPR Cartridge



P-796
1,000 psi BPR Cartridge

| Part No. | Pressure Setting | COLOR CODING | | Swept Volume | Qty. |
|-----------------------|--------------------|--------------|---------|--------------|------|
| | | Body | End-Cap | | |
| BPR CARTRIDGES | | | | | |
| P-761 | 40 psi (2.8 bar) | Tan | Blue | 125 μ L | ea. |
| P-762 | 75 psi (5.2 bar) | Tan | Yellow | 125 μ L | ea. |
| P-763 | 100 psi (7 bar) | Tan | Red | 125 μ L | ea. |
| P-764 | 250 psi (17 bar) | Tan | White | 95 μ L | ea. |
| P-765 | 500 psi (34 bar) | Tan | Green | 89 μ L | ea. |
| P-795 | 750 psi (52 bar) | Black | Blue | 87 μ L | ea. |
| P-796 | 1,000 psi (69 bar) | Black | Green | 83 μ L | ea. |

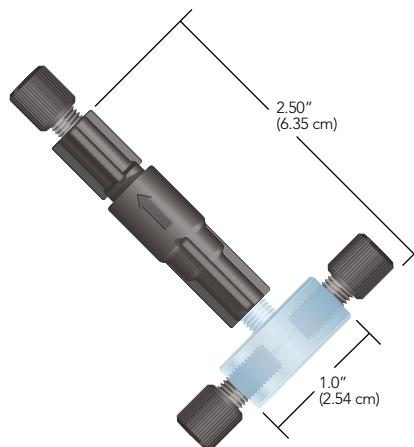


Pressure Relief Valves

› Prevent system over-pressurization

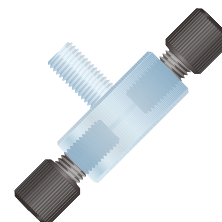
Our Pressure Relief Valves are ideal for preventing system over-pressurization. These products protect system components by diverting fluid flow automatically when inline pressure exceeds the set limit. Choose between preset 100 psi (7 bar) and 5 psi (0.3 bar) assemblies, both shipped with Flangeless 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. 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 145 with the P-612 Pressure Relief Valve Tee. Choose the P-612S for larger bore tubing and higher flow applications.



U-455

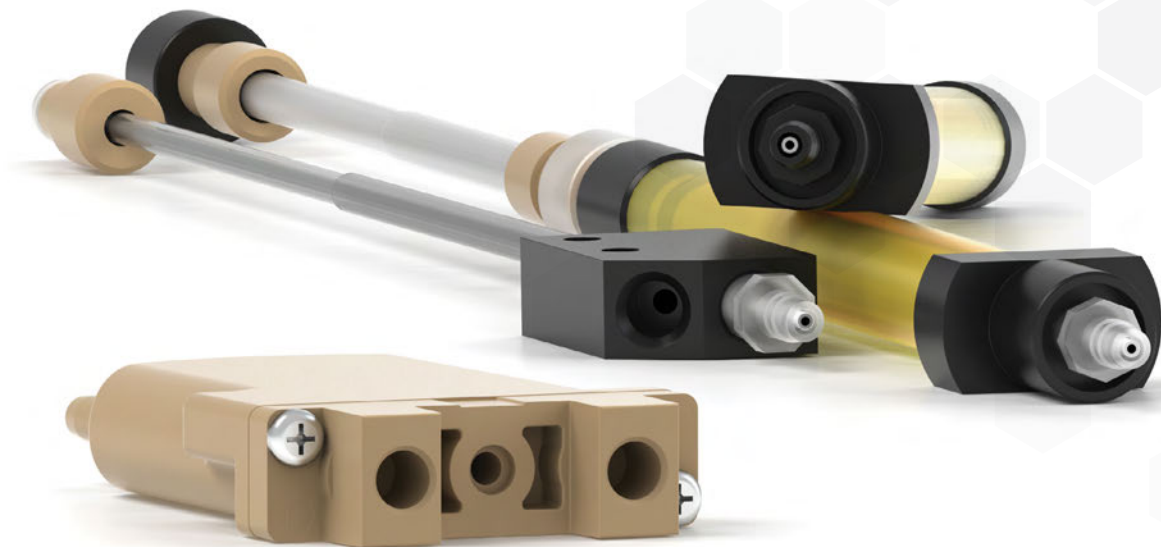
Pressure Relief Valve
Includes Flangeless Fittings
for 1/16" OD tubing
(Drawing is not actual size)



P-612

Pressure Relief Valve Tee
Includes Flangeless Fittings
for 1/16" OD tubing
(Drawing is not actual size)

| Part No. | Description | Pressure Setting | Tubing OD | Includes | Swept Volume | Qty. |
|-------------------------------|--------------------------|------------------|-----------|------------------|--------------|------|
| PRESSURE RELIEF VALVES | | | | | | |
| U-455 | Pressure Relief Assembly | 5 psi (0.3 bar) | 1/16" | XP-201 | 148 µL | ea. |
| U-456 | Pressure Relief Assembly | 100 psi (7 bar) | 1/16" | XP-201, wrenches | 139 µL | ea. |
| P-612 | Pressure Relief Tee Only | 1/16" | 1/16" | XP-201 | 14 µL | ea. |
| P-612S | Pressure Relief Tee Only | | 3/16" | XP-201 | 348 µL | ea. |



Degassers

Degassers improve fluidic instrument precision and reliability by removing dissolved gases from fluids before they outgas and form problem causing bubbles. Three main types of bubble removing products are available. AF based degassers offer the widest range of chemical compatibility and are used to eliminate retention shifts and baseline fluctuations. Silicone based degassers offer the highest flow rate capabilities for water based systems such as diagnostic and life science instrumentation to improve dispense accuracy and reliability. Poridex based products provide rapid bubble remove for locations where bubble introduction cannot be avoided.

151

DEBUBLERS

154

DEGASSING SYSTEMS



Debubblers

APPLICATION NOTE

- › Liquid handling
- › IVD
- › HPLC/UHPLC
- › O₂ and CO₂ 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.

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.
- › Designed for use with water based solutions with no surfactants. Active degassers are recommended for other solutions.

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

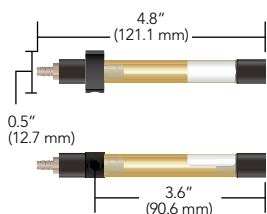
- › Eliminates baseline fluctuations for improved detector sensitivity.
- › Coaxial design reduces number of connections, improves reliability.
- › Single lumen design increases degassing reliability.

BENEFITS

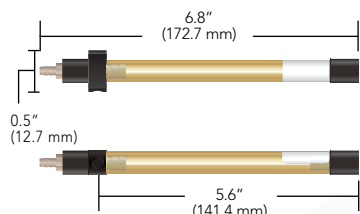
| | ACTIVE DEBUBBLER | DEBUBBLER/DEGASSER | TRANSFER-LINE DEGASSER |
|--|------------------|--------------------|------------------------|
| Perfect for applications that require dissolved gas like oxygen for reaction kinetics | ✓ | | |
| Improves dispense precision by capturing and removing bubbles | ✓ | ✓ | |
| 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 | | | ✓ |

Debubblers (Cont.)

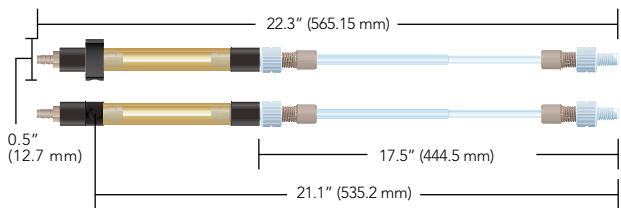
Overall Dimensions Please note: These drawings are not actual size.



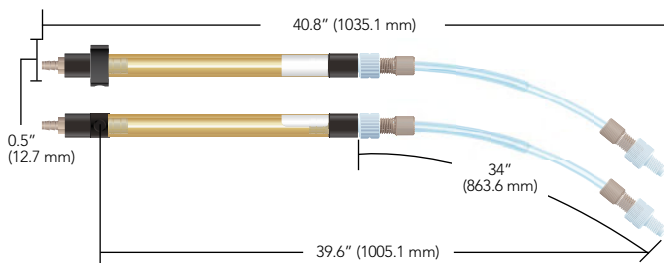
9000-1540
Active Debubbler, 2.5 mL



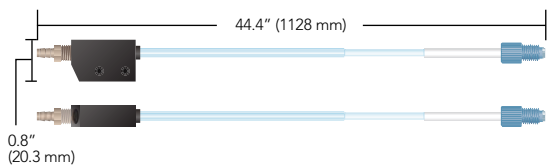
9000-1541
Active Debubbler, 5 mL



9000-1544
Debubbler / Degasser, 2.5 mL



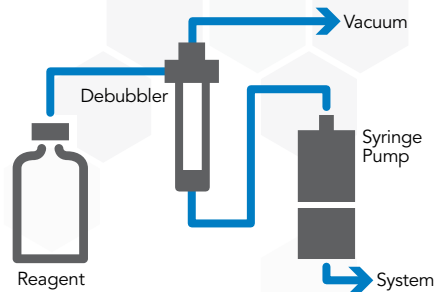
9000-1545
Debubbler/Degasser, 5 mL



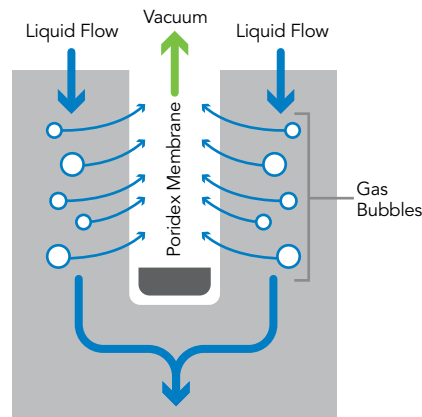
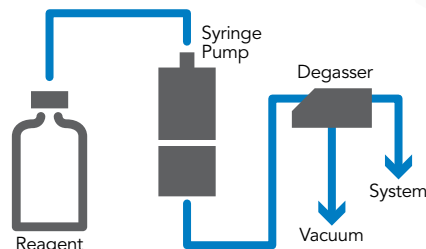
9000-1549
Transfer-Line Debubbler, 1.1 meter

IMPLEMENTATIONS

Typical Debubbler Implementation



Transfer-Line Degasser Implementation



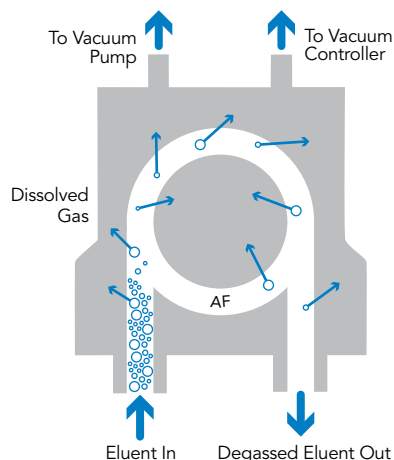
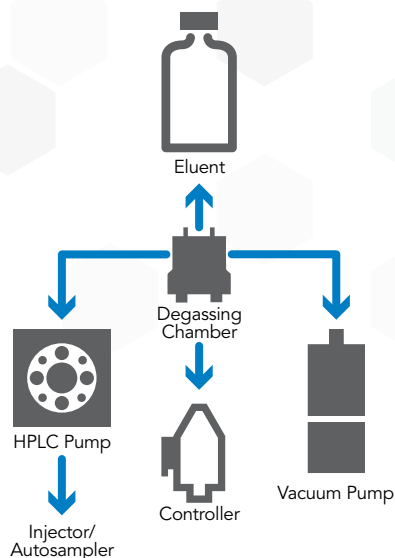
Gas bubbles are actively removed from a flowing liquid stream by vacuum via the PORIDEX membrane.

SPECIFICATIONS (ALL PLATFORMS)

| | ACTIVE DEBUBBLERS | DEGASSER/DEBUBBLERS | 200 KPA (30 PSI) @ 25 °C |
|--|--|--|--|
| Bubble Removal (volume of air removed/min @ 10 mL/min H₂O) | Up to 30 cc | Up to 30 cc | N/A |
| Degassing Efficiency† @ 1 mL/min H₂O | 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%. | Solutions > 50% aqueous. Not compatible with detergent concentrations > 0.05%. | 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 |
| Max. Operating Pressure | 200 kPa (30 psi) @ 25 °C | 200 kPa (30 psi) @ 25 °C | 200 kPa (30 psi) @ 25 °C |
| Max. Operating Temperature | 40 °C | 40 °C | 40 °C |
| Recommended Vacuum Level | Minimum 16 kPa absolute | Minimum 16 kPa absolute | Minimum 16 kPa absolute |
| Liquid Connection | 1/4-28 fitting system | 1/4-28 fitting system | 1/4-28 fitting system |
| Vacuum Connection | Tubing vacuum port(s) for 1/8" (3 mm) ID elastomeric tubing | Tubing vacuum port(s) for 1/8" (3 mm) ID elastomeric tubing | 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) | 0.8 mm Hg / mL / min (assumes laminar flow and viscosity of 1 cP) | 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.

TYPICAL DEGASSER IMPLEMENTATION



Dissolved gases are actively removed from a flowing liquid stream by vacuum via the IDEX Health & Science AF[®] membrane.

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 IDEX Health & Science 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 27) 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 45.

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.

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.

Debubblers

| Part No. | Description | Standard Bubble Trap Size | Transfer Line Length | Internal Volume | Max Bubble Capacity | Qty. |
|--|------------------------------|---------------------------|----------------------|---|---------------------|------|
| DEBUBBLER SERIES – AVAILABLE STANDARD CONFIGURATION | | | | | | |
| 9000-1540 | 2.5 mL Active Debubbler | 2.5 mL | — | 2.5 mL | 2.5 mL | ea. |
| 9000-1541 | 5 mL Active Debubbler | 5 mL | — | 5 mL | 5 mL | ea. |
| 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 | ea. |
| 9000-1545 | 5 mL Debubbler/Degasser | 5 mL | 34" (863.6 mm) | 5 mL in transfer line + 5 mL in bubble trap | 5 mL | ea. |
| 9000-1549 | 1.1 m Transfer-Line Degasser | — | 1.1 m (43") | 4 mL | N/A | ea. |



Full Stand Alone 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

Our 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 (IDEX Health & Science 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 Efficiency¹ @ 1 mL / min MeOH | > 70% O ₂ Removal |
| Membrane Material | IDEX Health & Science 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 ID¹ | 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 |

¹ 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

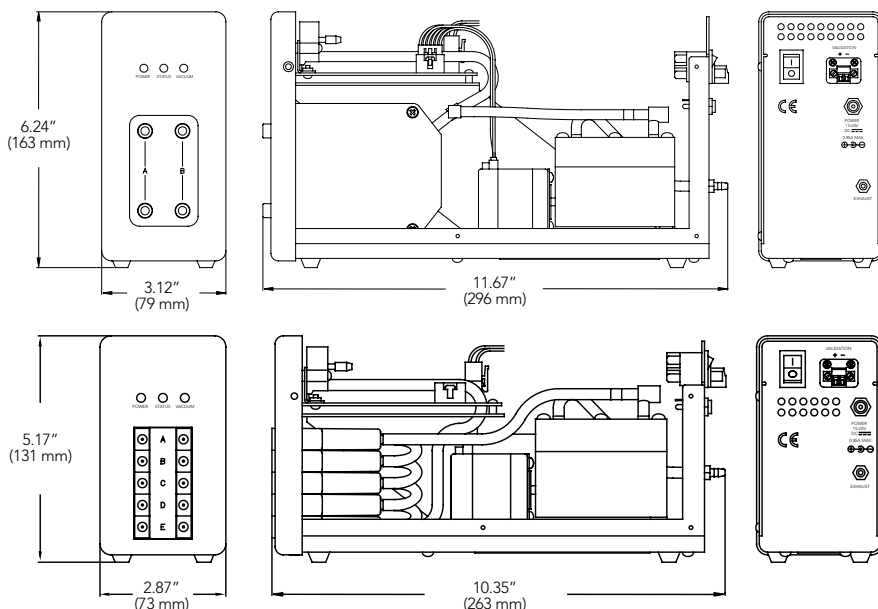
Power Requirement

Input Power required with AC Adapter (included): 100 to 240 V AC ($\pm 10\%$), 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



Full Stand Alone Degassing Systems

| Part No. | Number of Channels | Channel Volume | Max HPLC Gradient Flow Capability | Pressure Drop ^E | Degassing Flow Path ID | Qty. |
|--|--------------------|----------------|-----------------------------------|----------------------------|------------------------|------|
| STAND ALONE MINI VACUUM DEGASSING SYSTEMS — AVAILABLE CONFIGURATIONS^A | | | | | | |
| 0001-6500 | 2 | 480 μ L | 2.0 mL/min ^C | 0.18 kPa/mL/min | 0.045" (1.14 mm) | ea. |
| 0001-6501 | 4 | 480 μ L | 2.0 mL/min ^C | 0.18 kPa/mL/min | 0.045" (1.14 mm) | ea. |
| 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) | ea. |
| 0001-6484 | 2 | 13.8 mL | 40 mL/min ^D | 0.06 kPa/mL/min | 0.065" (1.65 mm) | ea. |

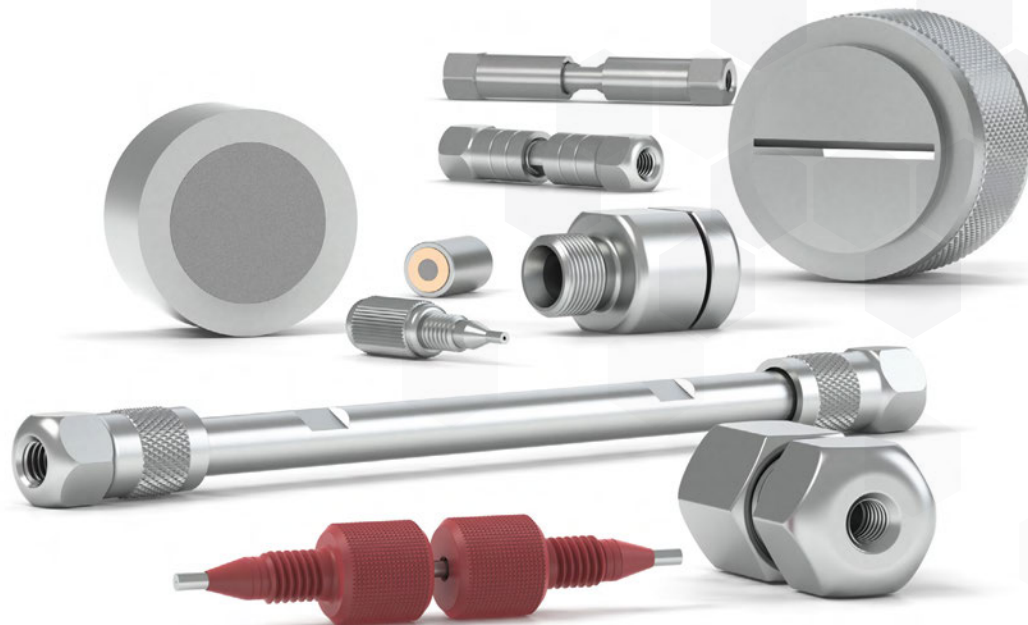
A. Custom configurations are available. Consult us for your own OEM solution to your specific application.

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/H₂O, 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/H₂O, 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



Column Hardware

We offer an extensive line of HPLC and UHPLC Column Hardware that has been optimized to enable selectivity, efficiency, and high-quality separation performance in your flow paths. To browse the full line of our column hardware portfolio please visit: www.idex-hs.com/column-hardware.html

- ▶ Biocompatible materials for LC and UHPLC columns
- ▶ Accessories for column protection and packing

Our line of column hardware includes protective accessories and connection products that enhance column functionality. Our columns come in a variety of sizes and materials to meet your system requirement.

157

GUARD HARDWARE

158

GUARD COLUMNS



Guard Hardware

Our Guard Hardware portfolio offers a variety of guard cartridges and holders to meet your system requirements. These include guards, guard holders, analytical cartridges, and tools designed to protect your system's valuable columns and help ensure high performance and excellent retention time.



Prep Scale Guard Holders

- › 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.



Tools

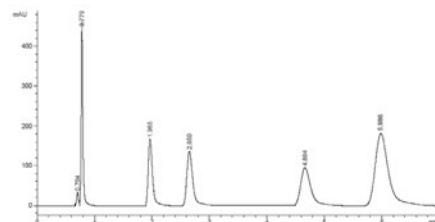
Our tools includes the Iso-Prep Guard Scraper that is specifically designed as a tool used to dress a cartridge upon packing in order to set the frit at the correct depth.



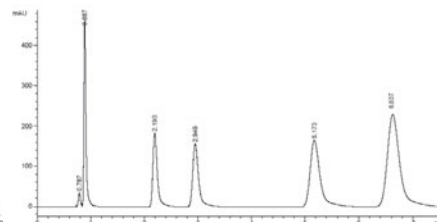
APPLICATION NOTE

- › 60:40 Acetonitrile:Water
- › 50 mL/min
- › Kromasil 10 µm C18
- › Backpressure: 100 psi (7 bar)

10 µm 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

| Part No. | Description | Qty. |
|---------------------------------|---|------|
| PREP SCALE GUARD HOLDERS | | |
| 9197-P | Iso-Prep Guard Holder | ea. |
| 9197-P-AR | Iso-Prep Guard Holder, 21.2mm, Anti Rotation | ea. |
| 9197-20 | Iso-Prep Guard Cartridge, 21.2 mm x 1 cm, 1 Frit | ea. |
| 9196-P | Iso-Prep Guard Holder, 30 mm | ea. |
| 9196-P-AR | Iso-Prep Guard Holder, 30 mm, Anti Rotation | ea. |
| 9196-20 | Iso-Prep Guard Cartridge, 30 mm x 1 cm, 2 µm Frit | ea. |
| 8083-MOD | Iso-Prep Guard, 30 mm Frit, 2 µm | ea. |
| TOOLS | | |
| 9197-S | Iso-Prep Guard Finishing Tool | ea. |
| 9196-S | Iso-Prep Guard Finishing Tool, 30 mm | ea. |



Guard Columns

We offer wide selection of pre-packed, cartridge style guard columns in addition to pack-it-yourself hardware. There are options for micro flow applications as well as analytical-scale applications. These guard columns can be immediately implemented into a system for your convenience.



Guard Column Kits

- › 100% biocompatible flow path
- › Pressure rated to 4,000 psi (276 bar)
- › Wetted materials are Titanium and PEEK
- › Reusable holder complete with fingertight fittings

Bio

Insert one of our 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 the following pages.

*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.

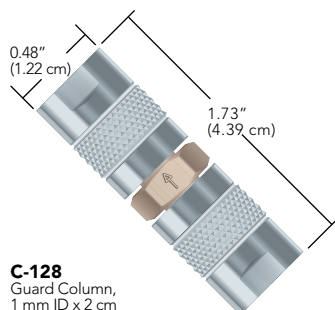


Microbore Guard Columns

- › Ideal for Microbore HPLC
- › Easily dry packed (or slurry packed with adapter)
- › Made of PEEK polymer and stainless steel

This 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.

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

SPECIFICATIONS & DETAILS

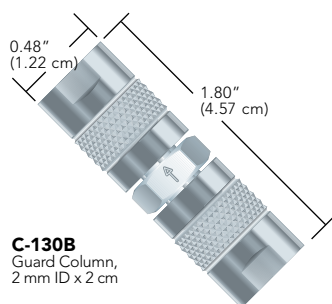
Packing Material Specifications:
The cartridges on this page are packed with 5 μm or 10 μm base-deactivated 80 Å spherical silica.



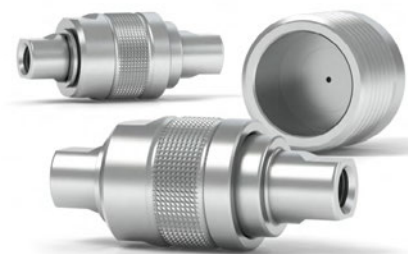
Analytical Guard Columns

› Easy to pack

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 μ m frits are easy to change, prolonging the life of the guard column. With only 62 μ L packing volume per guard column, a 3 g bottle of packing material will pack about 30 guard columns.



C-130B
Guard Column,
2 mm ID x 2 cm



Guard Column Holders

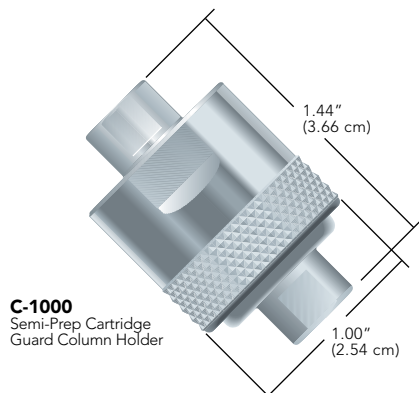
› 10 mm ID column protection

› Convenient cartridge system

› Easy to pack

The internal volume of our semi-prep guard column is just 780 μ L, 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.

** 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.*

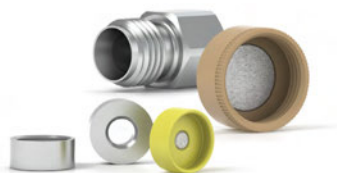


C-1000
Semi-Prep Cartridge
Guard Column Holder



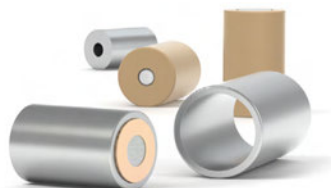
C-1000 Semi-Prep Guard Column
Fittings, tubing, and column shown are not included.

Guard Columns (Cont.)



Accessories

Our accessories include packing adapters and seal, packing funnels, and other useful products to work with your column systems.



Guard Column Cartridges

Our biocompatible Guard Column Cartridges are conveniently prepackaged and are offered in multiple packs. We offer these cartridges in a variety of bonded phases to match your column chemistry. These cartridges are reusable and economical.



APPLICATION NOTE

Why Use A Guard Column?

A guard column can increase the life of your analytical column significantly. 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.



RELATED PRODUCTS

- › All Guard Columns featured on this page include 10-32 Coned threads. Use any of the 10-32 coned fittings starting on page 32 to connect tubing to these guard columns.



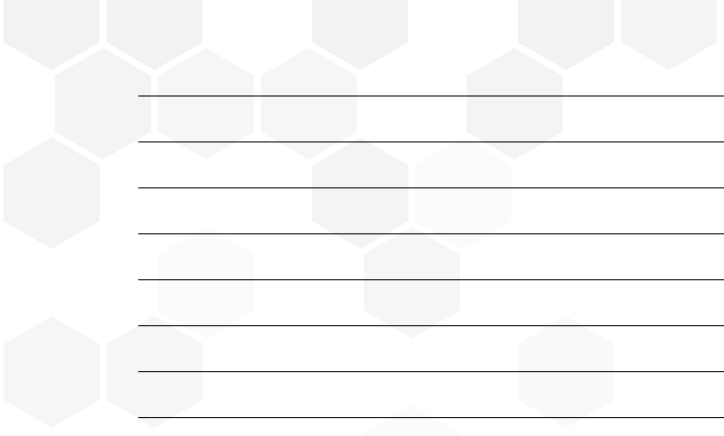
APPLICATION NOTE

Signs Indicating the Guard Column Needs to be Changed

- › System pressure build-up
- › Faster than usual retention times
- › Reduced resolution

Guard Columns

| Part No. | Description | Includes | Qty. |
|---|--|--------------|-------|
| GUARD COLUMN KITS | | | |
| C-281 | 2.0 mm ID C18 Cartridges (6-pk) with (1) C-270 Assembly | | ea. |
| MICROBORE GUARD COLUMNS | | | |
| 1.0 mm ID x 2 cm Unpacked | | | |
| C-128 | Guard Column | (2) C-128-31 | ea. |
| C-128-31 | 0.5 µm Stainless Steel Replacement Frit | | ea. |
| C-408 | 2 µm Stainless Steel Replacement Frit | | ea. |
| ANALYTICAL GUARD COLUMNS | | | |
| 2.0 mm ID x 2 cm Unpacked | | | |
| C-130B | Guard Column | (2) A-100 | ea. |
| C-130-20 | Packing Funnel | | ea. |
| A-100 | 2 µm Stainless Steel Replacement Frit | | ea. |
| A-103 | 0.5 µm Stainless Steel Replacement Frit | | ea. |
| BIOCOMPATIBLE GUARD COLUMN HOLDERS | | | |
| 10 mm ID x 1 cm | | | |
| C-270 | High Pressure, Stainless Steel, with (2) F-200 Fittings, Biocompatible | | ea. |
| GUARD COLUMN HOLDERS | | | |
| 10 mm ID x 1 cm | | | |
| C-1000 | Semi-Prep Cartridge Guard Column Holder | | ea. |
| C-1035 | Semi-Prep Cartridge | | ea. |
| ACCESSORIES | | | |
| C-128-40 | Slurry Packing Adapter | | ea. |
| C-130-40 | Slurry Packing Adapter | | ea. |
| C-1030 | Threaded Frit Cap with 2 µm Stainless Steel Frit | | ea. |
| GUARD COLUMN CARTRIDGES | | | |
| 2.0 mm ID x 1 cm, 10 µm Silica | | | |
| C-282 | Reversed Phase C18 | | 10-pk |
| 4.3 mm ID x 1 cm, 5 µm Silica | | | |
| C-751 | 4.3 mm ID C18 Cartridges (6-pk) with (1) C-270 Assembly | | ea. |
| C-752 | Reversed Phase C18 | | 10-pk |



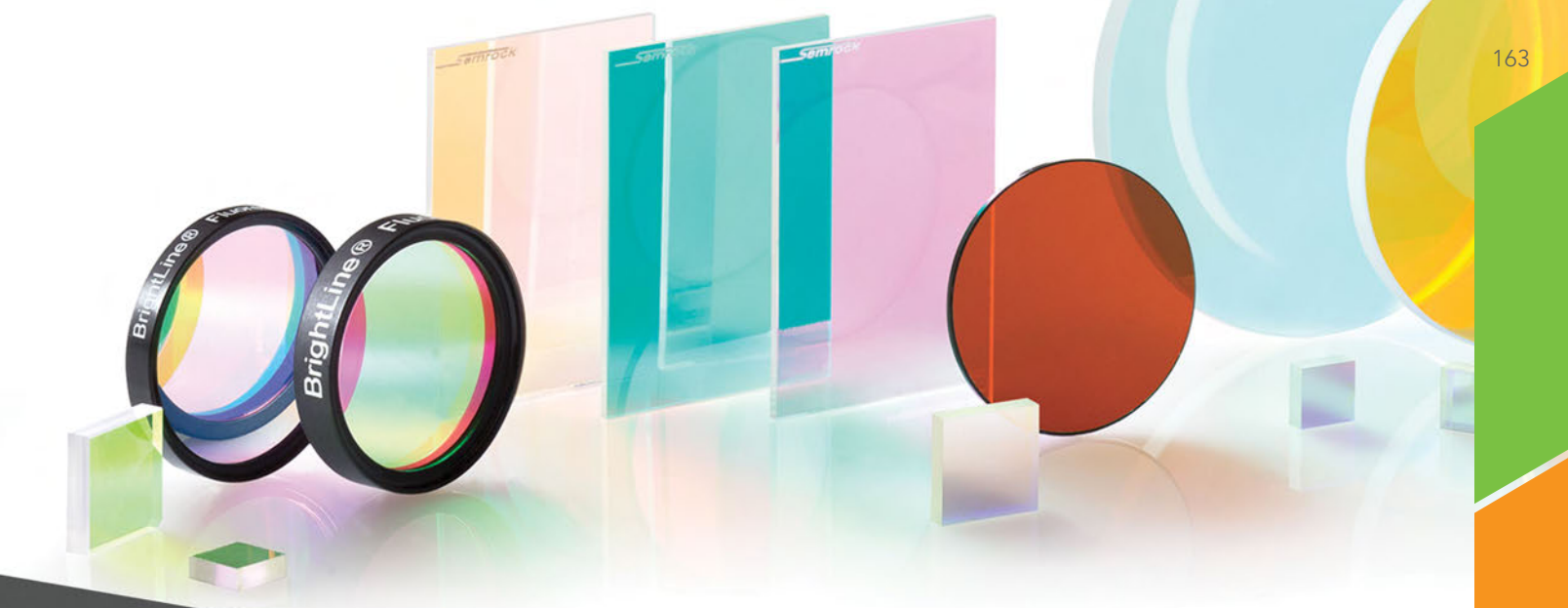
A series of horizontal lines for writing, spanning the width of the page. The lines are evenly spaced and extend from the left margin to the right margin.



Welcome to Optics

We are the market leader in providing “enabling” optical systems, vertically integrated from components through system design, manufacturing, and metrology. We combine deep technical expertise with creative engineering teams who understand how to bring product ideas to market successfully for OEM customers worldwide.

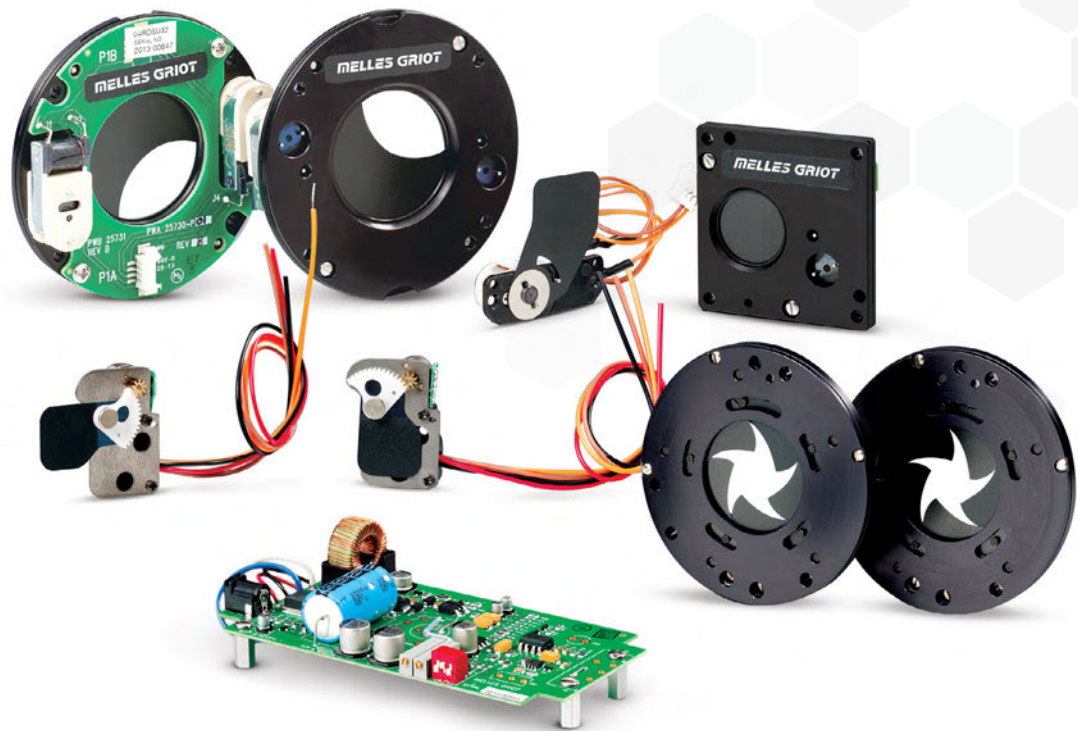
Increase your instrument sensitivity and accurately measure across detection channels with our powerful range of products.



164 SHUTTERS

184 LASERS

196 OPTICAL FILTERS



Shutters

The IDEX Health & Science line of Melles Griot Shutters offers high quality, high reliability, long life, affordably priced, standard off-the-shelf, and custom built shutters to meet your business application requirements. With over 50 years of industry-leading camera shutters heritage, we help you design and build thermal cameras that enable commercial and defense users to see in the night.

To order shutter products, please call Melles Griot at: 585-244-7220.

165

ROTOR DRIVE SHUTTERS

172

STEPPER MOTOR SHUTTERS

174

SOLENOID SHUTTERS

180

SHUTTER CONTROLLERS



ROTOR DRIVE SHUTTERS

Melles Griot rotor drive shutters incorporate a new generation of actuator technology for applications that require a small space envelope and unprecedented reliability, even under severe operating conditions. Our actuator technology has a design life of several million cycles, and its open architecture is easily configurable for custom packages and requirements.

These shutters are easily customizable for new and existing applications. They are extremely lightweight with few moving parts, and consume power only while moving the blades.

166 FLAG SHUTTERS

167 PADDLE SHUTTERS

168 RDS SHUTTERS

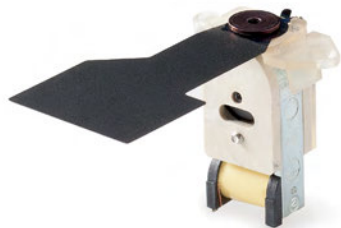
170 SAFECLOSE SHUTTERS

171 ROTARY DRIVE INTEGRATED
CONTROLLER SHUTTERS



LEARN MORE

Download our "How to Select a Shutter" guide by visiting
www.idex-hs.com/support/literature-downloads/support-literature

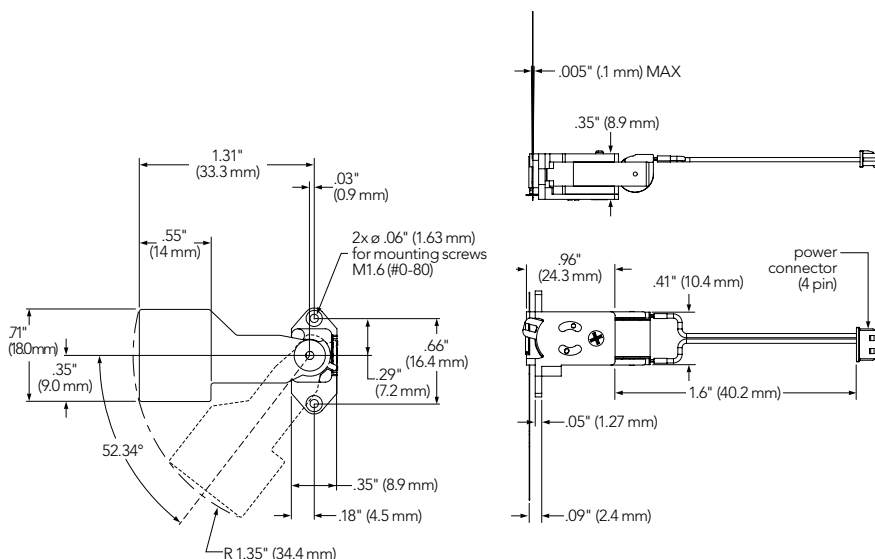


Flag Shutters

- › Easily customized for new and existing configurations
- › Designed for extreme temperature conditions (-40°C to +70°C)
- › Consume power only while moving the blades (bi-stable)
- › Extremely lightweight with few moving parts
- › Sized for security & surveillance cameras, 17 micron pixels, 320 x 240 to 640 x 480 CCD

Our Rotor Drive flag shutters are the ideal, economical solution for compact, portable applications. They are available in both single- and multi-blade formats to meet vertical fit design space requirements. They are often used in portable hand held thermal cameras and devices for first responder, inspection, and surveillance applications. Designed to withstand extreme temperature conditions, these shutters resist shock and vibration, and can operate reliably for several million cycles. The shutters accept onboard battery-powered drive circuitry.

04 RDS 5x1 Flag Shutter Dimensions in inches (mm).



| Part No. | Aperture | Drive Voltage ¹ (Vdc) | Actuation Speed ² (msec) | Number of Blades | Qty. |
|--|-------------------------|----------------------------------|-------------------------------------|------------------|------|
| FLAG SHUTTERS (NO HOLDING CURRENT REQUIRED) | | | | | |
| 04 RDS 501 | .67 x .75" (19 x 15 mm) | 9 | 20 | 1 | ea. |
| 04 RDS 531 | .75 x .89" (19 x 15 mm) | 3 | 20 | 1 | ea. |

¹ Nominal @ 20°C

² Typical, excluding bounce settling time (10 - 40 msec depending on the pulse drive power and wave form)

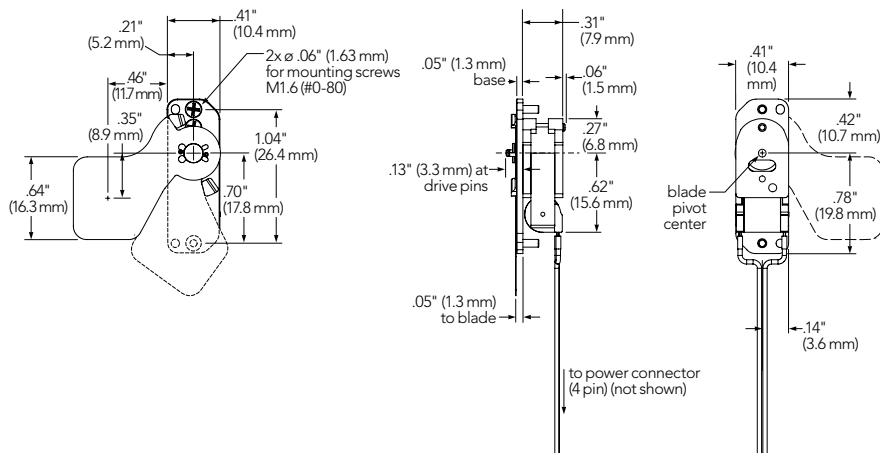


Paddle Shutters

- › Easily customized for new and existing configurations
- › Designed for extreme temperature conditions (-40°C to +70°C)
- › Consume power only while moving the blades (bi-stable)
- › Extremely lightweight with few moving parts
- › The suspended-blades' shape and coatings are optimized for visible and IR imaging

Our Rotor Drive paddle shutters are the ideal, economical solution for compact, portable applications. They are available in both single- and multi-blade formats to meet horizontal fit design space requirements. They are often used in cameras and devices for transportation and field portable applications. Designed to withstand extreme temperature conditions, these shutters resist shock and vibration, and can operate reliably for several million cycles. The shutters accept onboard battery-powered integrated drive circuitry.

04 RDS 7x1 Paddle Shutter Dimensions in inches (mm).



| Part No. | Aperture | Drive Voltage ¹ (Vdc) | Actuation Speed ² (msec) | Number of Blades | Qty. |
|--|-----------------------------|----------------------------------|-------------------------------------|------------------|------|
| PADDLE SHUTTERS (NO HOLDING CURRENT REQUIRED) | | | | | |
| 04 RDS 701 | .60 x .50" (15.3 x 12.6 mm) | 9 | 20 | 1 | ea. |
| 04 RDS 731 | .60 x .50" (15.3 x 12.6 mm) | 3 | 20 | 1 | ea. |

¹ Nominal @ 20°C

² Typical, excluding bounce settling time (10 - 40 msec depending on the pulse drive power and wave form)

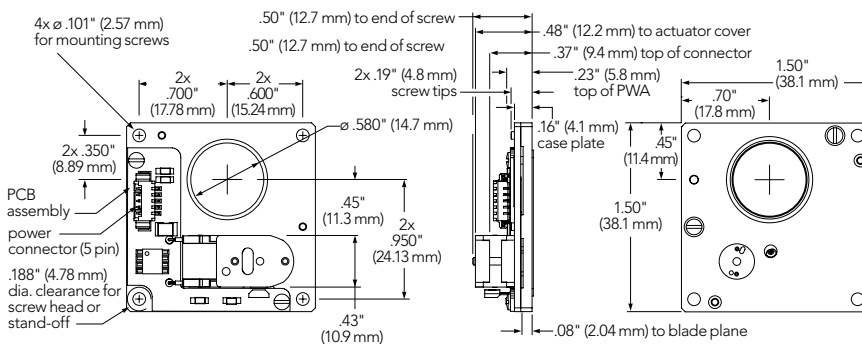


RDS Shutters

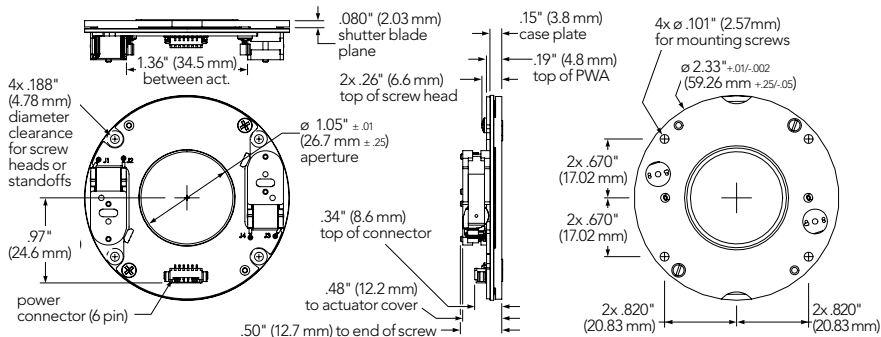
- › Easily customized for new and existing configurations
- › Designed for extreme temperature conditions (-40°C to +70°C)
- › Consume power only while moving the blades (bi-stable)
- › Extremely lightweight with few moving parts
- › High torque robust actuators

Our Rotor Drive iris shutters are excellent for small-space applications. They are available in both single- and multi-blade formats to meet compact design space requirements. They are often used in night vision, thermography, IR imaging, and laboratory research applications. Designed to withstand extreme temperature conditions, these shutters resist shock and vibration, and can operate reliably for several million cycles. The shutters accept onboard battery-powered integrated drive circuitry.

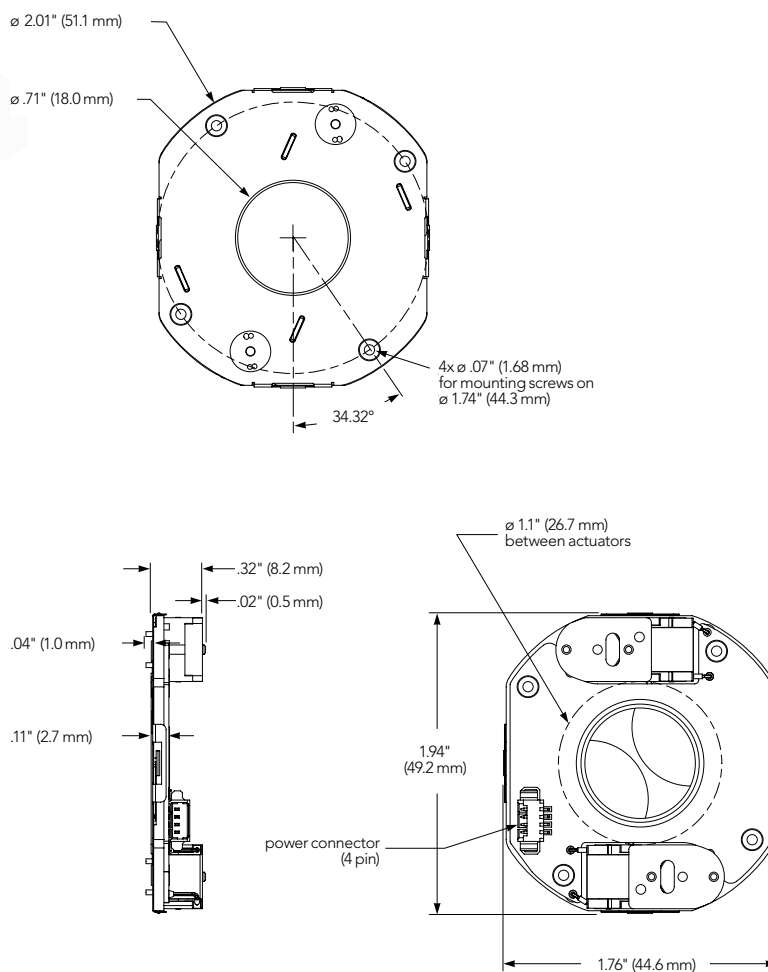
04 RDS 0x1 Rotor Drive Shutter Dimensions in inches (mm).



04 RDS 0x2 Rotor Drive Shutter Dimensions in inches (mm).



04 RDS 3x2 Rotor Drive Shutter Dimensions in inches (mm).



RDS Shutters

| Part No. | Aperture | Required Drive Current (mA) | Drive Voltage ³ (Vdc) | Actuation Speed ⁴ (msec) | Number of Blades | Qty. |
|---|--------------------------------|-----------------------------|----------------------------------|-------------------------------------|------------------|------|
| ROTOR DRIVE SHUTTERS (NO HOLDING CURRENT REQUIRED) | | | | | | |
| 04 RDS 332 | $\varnothing .71''$ (18 mm) | $\pm 660^1/\pm 330^2$ | $3^1/6^2$ | 20 | 2 | ea. |
| 04 RDS 002 | $\varnothing 1.05''$ (26.7 mm) | $\pm 450^1/\pm 225^2$ | $9^1/18^2$ | 20 | 2 | ea. |
| 04 RDS 032 | $\varnothing 1.05''$ (26.7 mm) | $\pm 660^1/\pm 330^2$ | $3^1/6^2$ | 20 | 2 | ea. |
| 04 RDS 004 | $\varnothing 1.38''$ (35 mm) | $\pm 280^1/\pm 140^2$ | $5.6^1/11.2^2$ | 35 | 4 | ea. |
| 04 RDS 005 | $\varnothing 2.28''$ (58 mm) | $\pm 1120^1$ | 9^1 | 30 | 5 | ea. |

¹ For a parallel-wired shutter

² For a series-wired shutter

³ Nominal @ 20°C

⁴ Typical, excluding bounce settling time (10 – 40 msec depending on the pulse drive power and wave form)



SafeClose™ Shutters

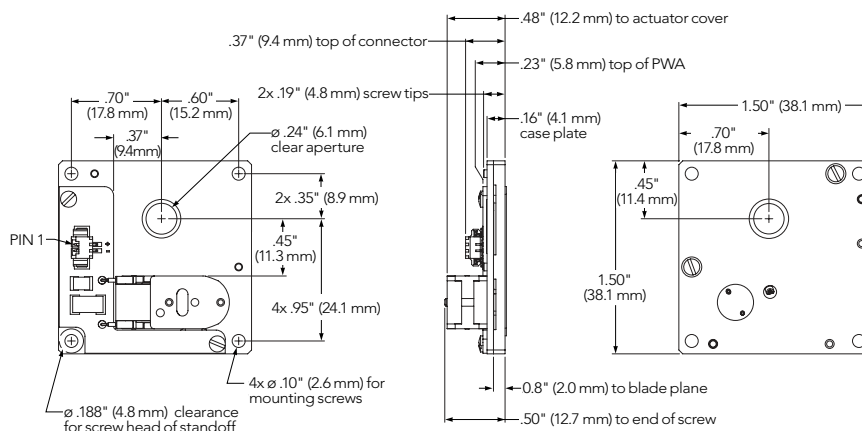
★ FEATURES

- › **Controller:**
No separate controller required
- › **Construction:**
Fail-safe magnetic return
- › **Durability:**
Multi-million cycle life
- › **Power handling:**
High LDT blade coating
- › **Operating Temperature:**
Reliable operation from -40°C to +70°C
- › **Performance/Reliability:**
High shock and vibration resistance

- › Multi-million cycle life
- › Fail-safe magnetic return
- › No separate controller required
- › High shock and vibration resistance
- › Reliable operation from -40°C to +70°C
- › High LDT blade coating

Our SafeClose™ laser shutters are based on proven rotor drive actuation technology with automatic closing on power down operation. This innovative design means there's no need for a separate controller just a 9V power signal is required to actuate the shutter and hold it open indefinitely. The blade will close upon signal removal. The shutters can withstand harsh environmental conditions, including wide temperature variations, high shock, and vibration in a clean environment. They are used in applications like analytical instrumentation, laser safety, and research.

04 LSC 001 SafeClose Shutter Dimensions in inches (mm).



| Part No. | Aperture | Configuration | Actuation Voltage (Vdc) | Peak Current ¹ (mA) | Open/Close Speed ² (msec) | Electrical Reset Time ³ (msec) | Maximum Repetition Rate (Hz) | Number of Blades | Qty. |
|---------------------------------------|-------------|-----------------|-------------------------|--------------------------------|--------------------------------------|---|------------------------------|------------------|------|
| SAFECLOSE LASER SHUTTERS | | | | | | | | | |
| 04 LSC 001 (Gold blade) | .24" (6 mm) | Normally Closed | 9 | 225 | 15 | 80 | 10 | 1 | ea. |
| 04 LSC 003 (Aluminum blade) | .24" (6 mm) | Normally Closed | 9 | 225 | 15 | 80 | 10 | 1 | ea. |

¹ Current drops from 225 to 70 mA in 10 msec on open

² Typical transition time to full blade rest

³ After close electrical drive circuit must reset



Rotary Drive Integrated Controller Shutters

★ FEATURES

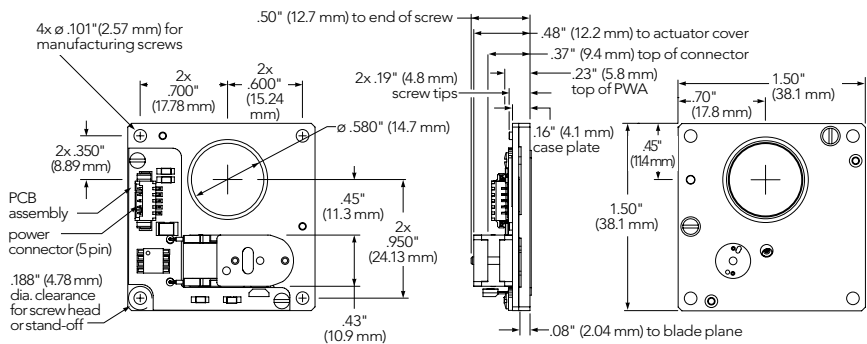
- › **Actuation Type:** TTL, separate channels for "Open" and "Close" signals
- › **Actuation Signal:**
Open: High (>3V)
Close: High (>3V)
- › **Actuation Pulse Time:** 60 msec
- › **Actuation Rate Continuous:**
4 Hz Maximum
- › **Minimum Time Between Actuators:** 125 msec*
- › **State Sensing Signal:**
Open: Low (<0.5V)
Close: High (>4.5V)

*Limit: one cycle per second.

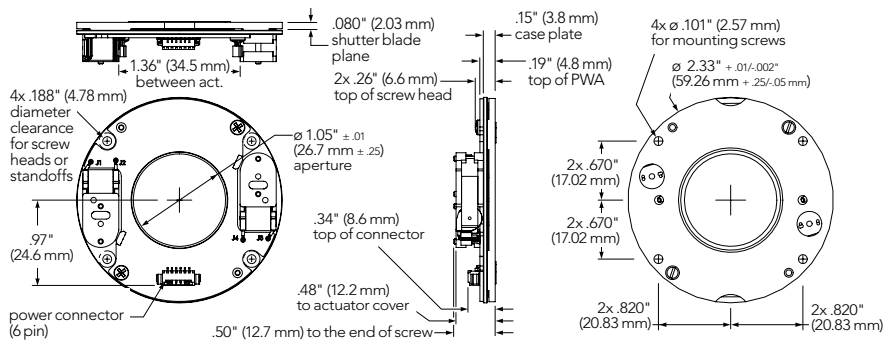
- › Accept state-controlling TTL input directly
- › Can be powered by AA batteries
- › Non-optical sensors provide indication of the shutter closed state via a separate TTL signal

Our Rotary Drive Integrated Controller Shutters offer the same capabilities and performance characteristics as our regular rotor drive shutters, with an integrated controller built-in to enable rapid integration into your application with minimal investment. We ensure that the controller is properly integrated, eliminating shutter malfunctions that can occur from an incorrect actuation signal. Our actuator technology has a design life of several million cycles, and its open architecture is easily configurable for custom packages and requirements. Shutters are available in both single- and multi-blade formats. They are often used in night vision, thermography, IR imaging, and laboratory research applications.

04 RDI 131 Shutter Dimensions in inches (mm).



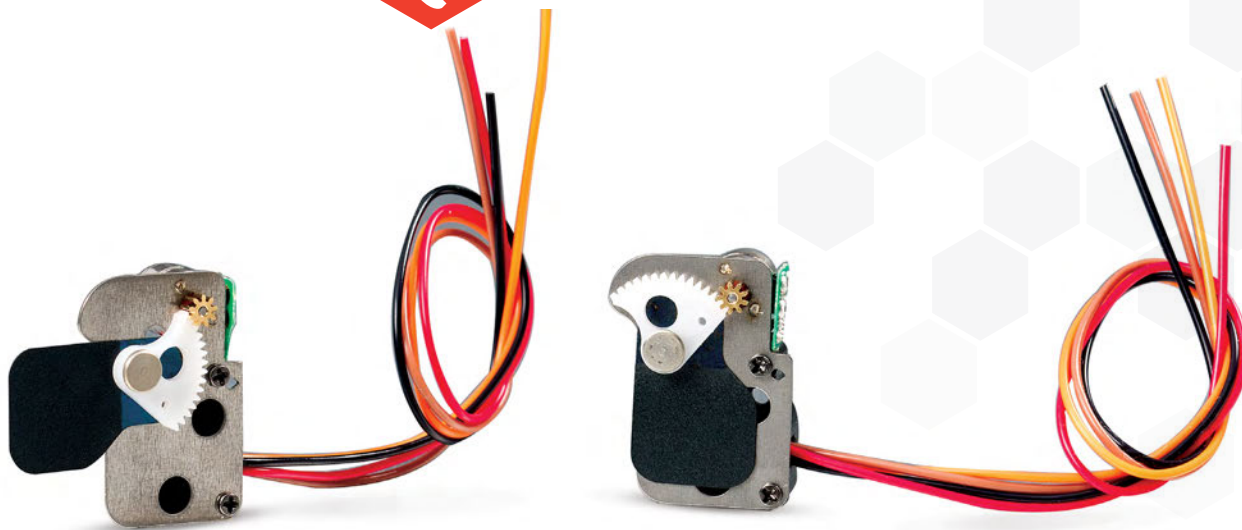
04 RDI 132 Shutter Dimensions in inches (mm).



| Part No. | Clear Aperture | Supply Voltage (Vdc) | Supply Quiescent Current (mA) ¹ | Supply Current During Actuation (mA) | Actuation Speed (msec) ² | Connector | Number of Blades | Qty. |
|--|-----------------|----------------------|--|--------------------------------------|-------------------------------------|-------------------------------------|------------------|------|
| ROTARY DRIVE INTEGRATED CONTROLLER SHUTTERS | | | | | | | | |
| 04 RDI 231 | .58" (14.7 mm) | 4.4 – 8.0 | 2 Max | 500 Max | 20 | Molex 5 pin, part number 53261-0571 | 1 | ea. |
| 04 RDI 232 | 1.05" (26.7 mm) | 4.8 – 9.0 | 11 Max | 750 Max | 20 | Molex 5 pin, part number 53261-0571 | 1 | ea. |

¹ At Supply Voltage = 5.0V

² Typical, excluding bounce settling time (10 - 40 msec depending on the pulse drive power and wave form)



STEPPER MOTOR SHUTTERS

Our stepper shutters use miniature stepper motors and geared drives, providing reliable low-power performance in a very compact package. Blade shape and coatings are optimized for visible and IR imaging, making them ideal for applications such as miniaturized night vision cameras and sights. The controlled speed/motion of the stepper drive minimizes blade stop impact, for long life, low wear, and low noise. The shutters are designed to withstand harsh environmental conditions, including shock, vibration and extreme temperatures typical in transportation and field portable applications.



LEARN MORE

Download our "How to Select a Shutter" guide by visiting www.idex-hs.com/support/literature-downloads/support-literature

Stepper Shutters



FEATURES

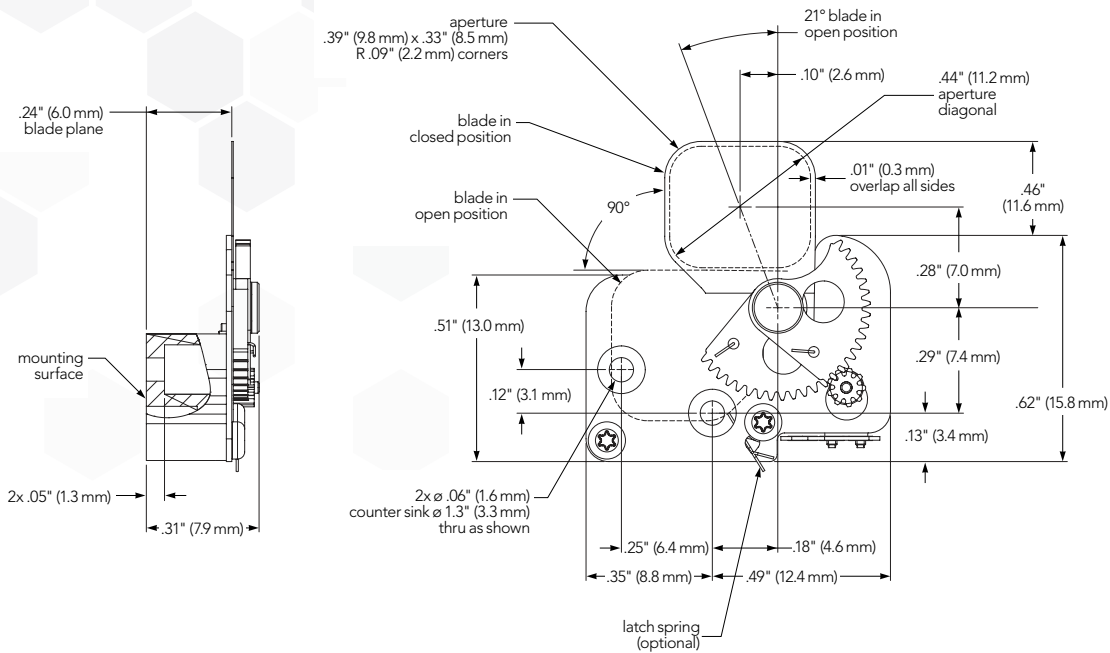
- › **Durability:** Long life
- › **Durability:** Low impact/Low wear
- › **Performance/Reliability:**
Repeatable speed/time control
- › **Performance/Reliability:**
Shock and vibration resistance
- › **Performance/Reliability:**
Reliable operation from -40°C to +70°C

- › Micro-miniature package
- › Low weight
- › Low power consumption

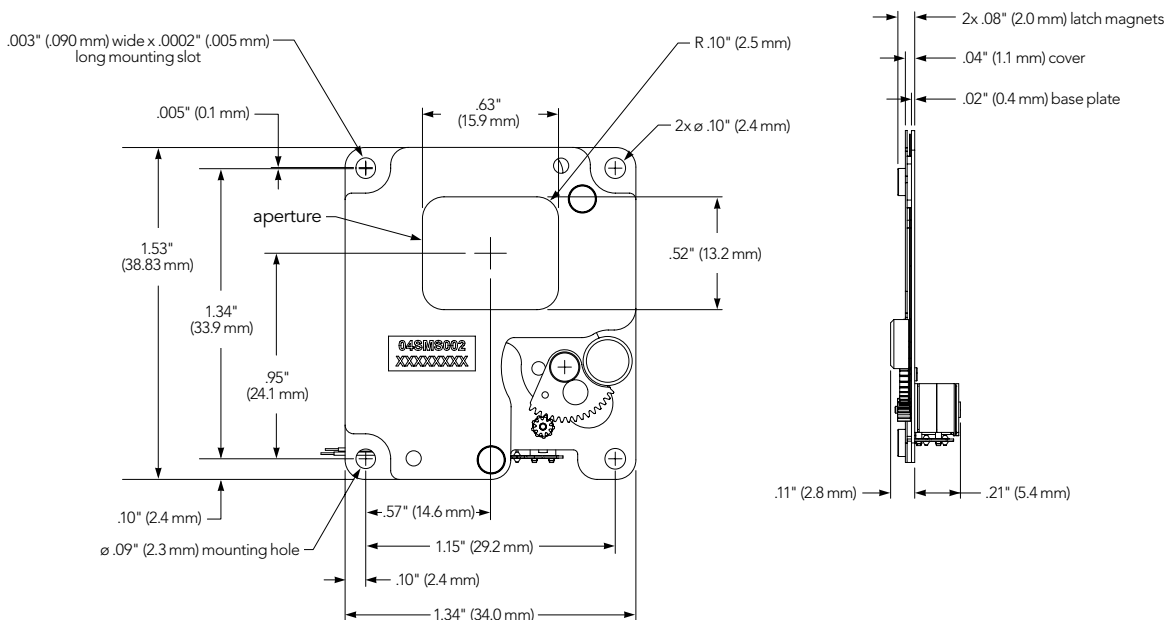
Our stepper shutters use miniature stepper motors and geared drives, providing reliable low-power performance in a very compact package. Blade shape and coatings are optimized for visible and IR imaging, making them ideal for applications such as miniaturized night vision cameras and sights. The controlled speed/motion of the stepper drive minimizes blade stop impact, for long life, low wear, and low noise. The shutters are designed to withstand harsh environmental conditions, including shock, vibration and extreme temperatures typical in transportation and field portable applications.



04 SMS 001 Stepper Shutter Dimensions in inches (mm).



04 SMS 102 Stepper Shutter Dimensions in inches (mm).



Stepper Shutters

| Part No. | Aperture | Electric Drive | Required Drive Current ¹ (mA) | Drive Voltage (Vdc) | Actuation Speed ² (msec) | Holding Current (mA) | Number of Blades | Qty. |
|----------------------------------|---|-----------------------------|--|---------------------|-------------------------------------|----------------------|------------------|------|
| STANDARD STEPPER SHUTTERS | | | | | | | | |
| 04 SMS 001 | Rectangular .38 x .33" (9.84 x 8.48 mm) | Bipolar Stepper, 2 Phase | 70 | 3.0 - 5.0 | 60 | 0 (not required) | 1 | ea. |
| 04 SMS 102 | Rectangular .63 x .52" (15.92 x 13.20 mm) | Bipolar Stepper, 2 Phase | 140 | 3.0 - 5.0 | 60 | 0 (not required) | 1 | ea. |
| 04 SMD 001 | .59" (15 mm) | Bipolar Stepper, 2 Phase | 300 | 3.0 - 5.0 | 60 | 1 | 1 | ea. |
| 04 SMSi 001 | .38 x .33" (9.84 x 8.48 mm) | Bipolar Stepper, 2 Phase | 70 | 3.0 - 5.0 | 60 | 0 | 1 | ea. |

¹ Per phase, @ 20°C,
² Maximum transition time



SOLENOID SHUTTERS

Our Melles Griot line solenoid shutters offer high-performance in a range of operating conditions. They are frequently used in imaging applications and laboratory research. Our family of solenoid shutters includes high-performance IES shutters, UltraThin electronic shutters, and Extreme Service shutters for harsh environments.

- 175** IES™ SHUTTERS
- 176** ULTRATHIN™ SHUTTERS
- 178** EXTREMESERVICE™ SHUTTERS
- 179** LASER SHUTTERS



LEARN MORE

Download our "How to Select a Shutter" guide by visiting www.idex-hs.com/support/literature-downloads/support-literature



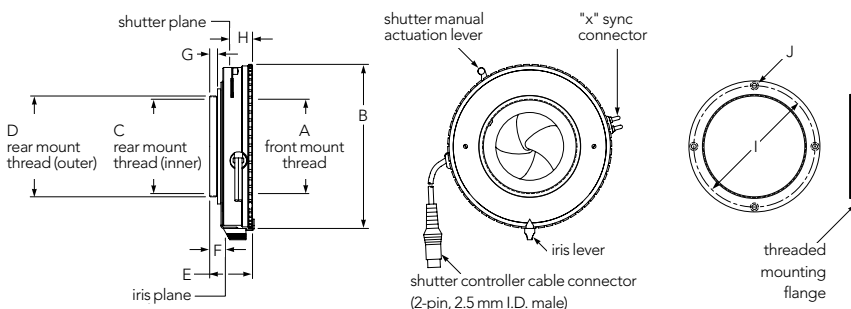
IES™ Shutters

★ FEATURES

- › **Compatibility:** Controllers are available for 12 Vdc shutters.
- › **Construction:** Spring-steel blades with a Teflon™-impregnated, black matte finish provide smooth and dependable operation.
- › **Construction:** Include an adjustable iris diaphragm, X synchronization, and a manual actuation lever that allows the shutter to operate without an electrical signal.
- › **Performance/Reliability:** Reliable, multi-blade shutter mechanism guarantees high operational speed and near 100% light extinction.
- › **Performance/Reliability:** 12 Vdc continuous rated solenoid coils are standard. Solenoids are also available in 6 Vdc.

Our Melles Griot line of IES™-series electronic shutters are ideal for laboratory and research labs, or scientific applications that demand the ability to shutter light beams with 100% transmission and high extinction. An iris diaphragm allows adjustment of the shutter's clear aperture from maximum to approximately 10% of maximum. For electronic flash synchronization or event triggering, IES shutters include an X-synchronization switch that provides electrical continuity when the shutter blades are fully open. For ease of setup, a manual actuation lever permits the opening and closing of the shutters without an electrical signal. All shutters are supplied with a C-mount flange that threads onto the shutter's rear outer mounting threads.

04 IES-series Electronic Shutter Dimensions in inches (mm).



▮ SPECIFICATIONS & DETAILS

| Dimension Code | A | B | C | D | E | F | G | H | I |
|---|------------------------------------|--------------------|------------------------------------|---------------------------------|--------------------|-------------------|-------------------|--------------------|--------------------|
| IES ELECTRONIC SHUTTERS, MECHANICAL DIMENSIONS | | | | | | | | | |
| Type 1 | M1.23 x .020" (M31.2 x 0.50 mm) | 2.5" (63.0 mm) | M1.23 x .020" (M31.2 x 0.50 mm) | M1.33 x .024" (M33.7 x 0.60) | 0.94" (23.9 mm) | 0.33" (8.5 mm) | 0.26" (6.5 mm) | 0.53" (13.4 mm) | 1.65" (42 mm) |
| Type 2 | M1.77 x .020" (M45.0 x 0.50) | 3.4" (87.3 mm) | M1.77 x .020" (M45.0 x 0.50) | M1.91 x .025" (M48.6 x 0.64) | 1.04" (26.4 mm) | .37" (9.5 mm) | 0.24" (6.2 mm) | 0.57" (14.9 mm) | 2.39" (60.6 mm) |
| Type 3 | M2.35 x .025" (M59.6 x 0.64) | 4.1" (103.3 mm) | M2.35 x .025" (M59.6 x 0.64) | M2.50 x .033" (M63.5 x 0.85) | 1.06" (27.0 mm) | .38" (9.8 mm) | 0.19" (4.7 mm) | 0.62" (15.7 mm) | 3.00" (76.4 mm) |
| Type 4 | M3 x .033" (M76.2 x 0.85) | 5.2" (132.0 mm) | M3 x .033" (M76.2 x 0.85) | M3.23 x .033" (M82.1 x 0.85) | 1.34" (34.0 mm) | .37" (9.5 mm) | 0.23" (6.0 mm) | 0.89" (22.5 mm) | 3.83" (97.2 mm) |

| Part No. | Maximum Aperture | Minimum Aperture | Actuation Speed (msec) | Diaphragm Blades | Coil Resistance | Rated Solenoid Voltage (Vdc) | Connector Included | Dimension Code | Qty. |
|--|------------------|------------------|------------------------|------------------|-----------------|------------------------------|--------------------|----------------|------|
| IES ELECTRONIC SHUTTERS, (CONFIGURATION: NORMALLY CLOSED) | | | | | | | | | |
| 04 IES 218 | 1" (25.4 mm) | .06" (1.6 mm) | 17 | 10 | 12 | 6 | No | Type 1 | ea. |
| 04 IES 211 | 1" (25.4 mm) | .06" (1.6 mm) | 17 | 10 | 50 | 12 | Yes | Type 1 | ea. |
| 04 IES 224 | 1.37" (34.9 mm) | .09" (2.2 mm) | 17 | 10 | 12 | 6 | No | Type 2 | ea. |
| 04 IES 213 | 1.37" (34.9 mm) | .09" (2.2 mm) | 17 | 10 | 50 | 12 | Yes | Type 2 | ea. |
| 04 IES 230 | 1.68" (42.7 mm) | .13" (3.4 mm) | 33 | 10 | 12 | 6 | No | Type 3 | ea. |
| 04 IES 214 | 1.68" (42.7 mm) | .13" (3.4 mm) | 33 | 10 | 50 | 12 | Yes | Type 3 | ea. |
| 04 IES 236 | 2.5" (63.5 mm) | .20" (5.1 mm) | 33 | 12 | 12 | 6 | No | Type 4 | ea. |
| 04 IES 215 | 2.5" (63.5 mm) | .20" (5.1 mm) | 33 | 12 | 50 | 12 | Yes | Type 4 | ea. |

Note: Speed is based on driving a shutter at four times rated voltage for ten milliseconds and holding at half rated voltage. The variable voltage drive can be created using an RC network or by pulse width modulation. The shutters can be operated at slightly slower speeds using rated voltage.



UltraThin™ Shutters

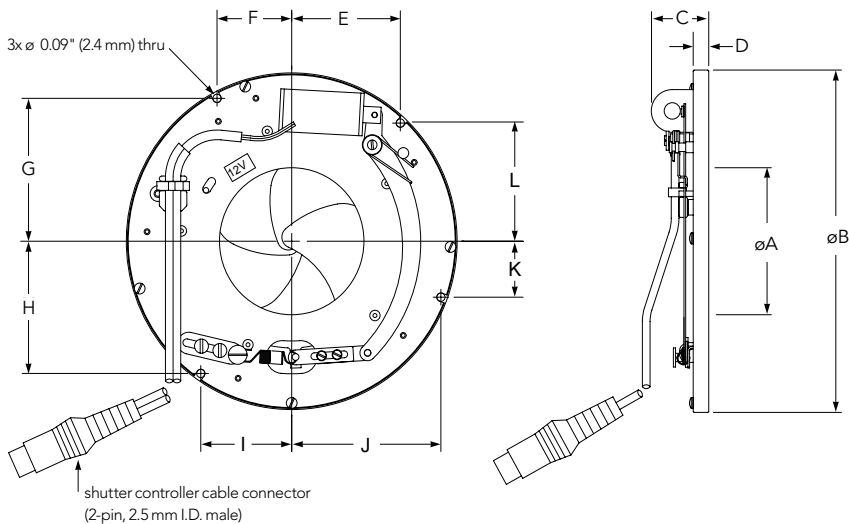
- › Smooth and dependable operation
- › Shutters may be mounted in any orientation

★ FEATURES

- › **Compatibility:** Controllers are available for 12 Vdc shutters.
- › **Construction:** Designed to fit into restricted spaces.
- › **Construction:** Spring-steel blades with a Teflon™-impregnated, black matte finish provide smooth and dependable operation.
- › **Performance/Reliability:** Reliable, multi-blade shutter mechanism guarantees high operational speed and near 100% light extinction.
- › **Performance/Reliability:** 12 Vdc continuous rated solenoid coils are standard. Solenoids are also available in 3 and 6 Vdc.
- › **Performance/Reliability:** Normally closed and normally open blade configurations are available.

Our UltraThin™-series electronic shutters are optimized for thermal or visible imaging applications that require compact size, low weight, and low-voltage operation. A reliable, multi-blade shutter mechanism guarantees high operational speed and near 100% light extinction. Spring-steel blades with a Teflon™-impregnated, black matte finish provide smooth and dependable operation. 12 Vdc continuous rated solenoid coils are standard. 3-, 6-, and 24-Vdc solenoids are also available.

04 UTS-series UltraThin Electronic Shutter Dimensions in inches (mm).





SPECIFICATIONS & DETAILS

| Dimension Code | A | B | C | D | E | F | G | H | I | J | K | L |
|--|--------------------|---------------------|--------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| ULTRATHIN™ ELECTRONIC SHUTTERS, MECHANICAL DIMENSIONS | | | | | | | | | | | | |
| Type1 | 0.99" (25.2 mm) | 2.28" (57.8 mm) | 0.54" (13.6 mm) | 0.13" (3.4 mm) | 0.69" (17.6 mm) | 0.68" (17.5 mm) | 0.74" (18.8 mm) | — | — | 0.13" (3.4 mm) | 0.99" (25.1 mm) | 0.71" (18.0 mm) |
| Type1 a | 0.99" (25.2 mm) | 2.28" (57.8 mm) | 0.54" (13.6 mm) | 0.13" (3.4 mm) | 0.70" (17.8 mm) | 0.93" (23.7 mm) | 0.37" (9.3 mm) | 0.99" (25.1 mm) | 0.17" (4.3 mm) | — | — | 0.72" (18.2 mm) |
| Type2 | 1.37" (34.9 mm) | 3.25" (82.5 mm) | 0.65" (16.5 mm) | 0.16" (4.2 mm) | — | 0.60" (15.2 mm) | 1.39" (35.2 mm) | 0.93" (23.5 mm) | 1.18" (29.9 mm) | 1.26" (31.9 mm) | 0.82" (20.9 mm) | — |
| Type3 | 1.68" (42.7 mm) | 3.91" (99.4 mm) | 0.68" (17.2 mm) | 0.19" (4.8 mm) | — | 0.95" (24.2 mm) | 1.59" (40.3 mm) | 1.57" (39.8 mm) | 0.98" (24.8 mm) | 1.77" (44.9 mm) | 0.55" (13.9 mm) | — |
| Type4 | 2.50" (63.5 mm) | 4.96" (126.0 mm) | 0.96" (24.3 mm) | 0.26" (6.6 mm) | 0.90" (22.9 mm) | — | — | 0.30" (7.5 mm) | 2.29" (58.2 mm) | 1.38" (35.0 mm) | 1.86" (47.2 mm) | 2.12" (53.9 mm) |

UltraThin Shutters

| Part No. | Clear Aperture | Actuation Speed (msec) | Shutter Blades | Coil Resistance | Rated Solenoid Voltage (Vdc) | Connector Included | Dimension Code | Qty. |
|--|-----------------|------------------------|----------------|-----------------|------------------------------|--------------------|----------------|------|
| ULTRATHIN ELECTRONIC SHUTTERS, (CONFIGURATION: NORMALLY CLOSED) | | | | | | | | |
| 04 UTS 208 | 0.99" (25.2 mm) | 17 | 5 | 12 | 6 | No | Type 1 | ea. |
| 04 UTS 201 | 0.99" (25.2 mm) | 17 | 5 | 50 | 12 | Yes | Type 1 | ea. |
| 04 UTS 210 | 0.99" (25.2 mm) | 17 | 5 | 50 | 12 | No | Type 1 | ea. |
| 04 UTS 218 | 0.99" (25.2 mm) | 17 | 5 | 12 | 6 | No | Type 1a | ea. |
| 04 UTS 220 | 0.99" (25.2 mm) | 17 | 5 | 50 | 12 | No | Type 1a | ea. |
| 04 UTS 226 | 1.37" (34.9 mm) | 17 | 5 | 12 | 6 | No | Type 2 | ea. |
| 04 UTS 203 | 1.37" (34.9 mm) | 17 | 5 | 50 | 12 | Yes | Type 2 | ea. |
| 04 UTS 228 | 1.37" (34.9 mm) | 17 | 5 | 50 | 12 | No | Type 2 | ea. |
| 04 UTS 234 | 1.37" (34.9 mm) | 17 | 5 | 12 | 6 | No | Type 2 | ea. |
| 04 UTS 236 | 1.37" (34.9 mm) | 17 | 5 | 50 | 12 | No | Type 2 | ea. |
| 04 UTS 242 | 1.68" (42.7 mm) | 33 | 5 | 12 | 6 | No | Type 3 | ea. |
| 04 UTS 204 | 1.68" (42.7 mm) | 33 | 5 | 50 | 12 | Yes | Type 3 | ea. |
| 04 UTS 244 | 1.68" (42.7 mm) | 33 | 5 | 50 | 12 | No | Type 3 | ea. |
| 04 UTS 250 | 1.68" (42.7 mm) | 33 | 5 | 12 | 6 | No | Type 3 | ea. |
| 04 UTS 252 | 1.68" (42.7 mm) | 33 | 5 | 50 | 12 | No | Type 3 | ea. |
| 04 UTS 258 | 2.50" (63.5 mm) | 33 | 6 | 12 | 6 | No | Type 4 | ea. |
| 04 UTS 205 | 2.50" (63.5 mm) | 33 | 6 | 50 | 12 | Yes | Type 4 | ea. |
| 04 UTS 260 | 2.50" (63.5 mm) | 33 | 6 | 50 | 12 | No | Type 4 | ea. |
| 04 UTS 266 | 2.50" (63.5 mm) | 33 | 6 | 12 | 6 | No | Type 4 | ea. |
| 04 UTS 268 | 2.50" (63.5 mm) | 33 | 6 | 50 | 12 | No | Type 4 | ea. |

Note: Speed is based on driving a shutter at four times rated voltage for ten milliseconds and holding at half rated voltage. The variable voltage drive can be created using an RC network or by pulse width modulation. The shutters can be operated at slightly slower speeds using rated voltage.

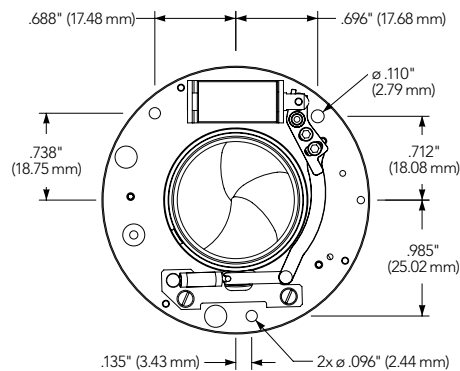


ExtremeService™ Shutters

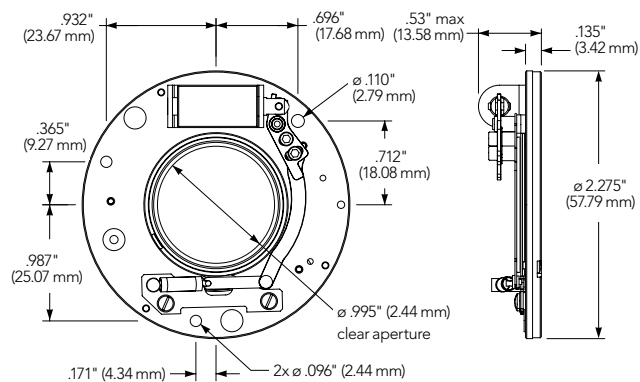
- › Operates reliably from -40°C to +70°C
- › Proprietary low-friction, high-IR emissivity blade coating
- › Offered in normally closed and normally open configurations
- › Available with 12 Vdc or 3 Vdc solenoids
- › Controllers are available for 12 Vdc shutter

ExtremeService™ shutters from our Melles Griot line offer industry-leading reliability in harsh environmental conditions. Their robust, temperature insensitive design thrives at temperatures as low as -40°C and as high as 70°C. The coating on the blades is highly emissive in the infrared spectral region, making these shutters an ideal choice for calibrating uncooled sensors in FLIR systems. ExtremeService shutters provide the reliability and control needed for night-vision and infrared-illumination systems, as well as for a wide range of analytical, metrology, photonics instrumentation, IR imaging, and thermography.

04 ESC- and ESO-series Shutter Dimensions in inches (mm).



Normally Closed Configuration



Normally Open Configuration

| Part No. | Clear Aperture | Maximum Speed (msec) | Shutter Blades | Coil Resistance | Holding Voltage | Rated Solenoid Voltage (Vdc) | Configuration | Qty. |
|---|------------------|----------------------|----------------|-----------------|-----------------|------------------------------|-----------------|------|
| EXTREMESERVICE ELECTRONIC SHUTTERS | | | | | | | | |
| 04 ESO 121 | 0.99" (25.20 mm) | 1/60 | 5 | 50 | 6 | 12 | Normally open | ea. |
| 04 ESC 121 | 0.99" (25.20 mm) | 1/60 | 5 | 50 | 6 | 12 | Normally closed | ea. |
| 04 ESO 031 | 0.99" (25.20 mm) | 1/60 | 5 | 3 | 1.5 | 3 | Normally open | ea. |
| 04 ESC 031 | 0.99" (25.20 mm) | 1/60 | 5 | 3 | 1.5 | 3 | Normally closed | ea. |

Note: Speed is based on driving a shutter at four times rated voltage for ten milliseconds and holding at half rated voltage. The variable voltage drive can be created using an RC network or by pulse width modulation. The shutters can be operated at a slightly slower speed using rated voltage.



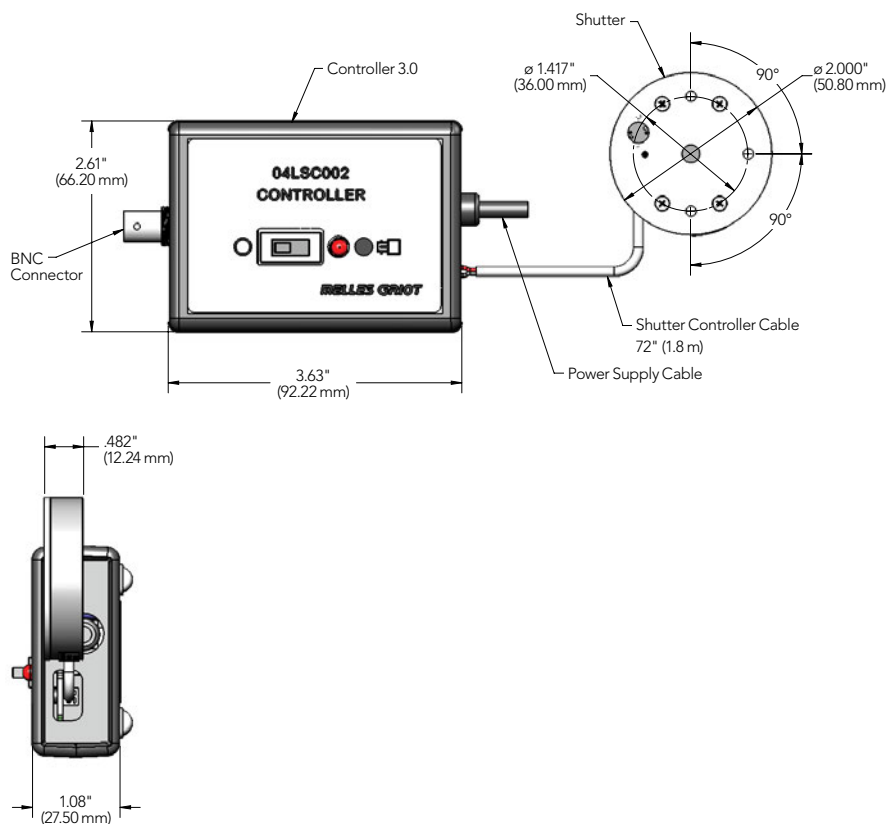
Laser Shutters

★ FEATURES

- › **Mechanical Interconnect:** Passes three of four 4-40 or M3 bolts on 36 mm circle
- › **Bore:** 5.5 mm (1.0 inches)
- › **Transition time:** 9 +/- 1 milliseconds
- › **Blades:** High absorption, up to 250 milliwatts.
- › **Digital interface:** BNC connector; normally low, opens on V>1.5 signal
- › **Power supply:** 12 volt, 2.0 amps max, universal adapters included for USA, Europe, UK, Australia, China, Korea, Japan
- › **Operating temperature:** -10°C to 40°C
- › **Shutter Life:** > 1,000,000 actuations
- › **Agency Compatibility:** RoHS, CE

Our Laser Shutter system controls light from lasers such as HeNe or Argon-ion lasers, typically in bio-medical imaging. The shutter attaches to the front of a laser using the standard bolt pattern. The shutter blade absorbs light to prevent back reflection. The shutter is driven by an attached controller and transitions reliably and repeatedly in 10 milliseconds for more than one-million cycles. The shutter is connected to the controller by a 2 meter cable. The controller has a BNC connector that opens the shutter on a high-going signal from a camera or computer and closes when the signal is returned to ground. The shutter automatically closes on power-down. A switch permits the shutter to be manually opened for setup. The switch also reconfigures the shutter for Open-Low operation. The controller is powered by a universal power supply and has adapters for most countries.

04 LSC 002 Laser Shutter Dimensions in inches (mm).



| Part No. | Description | Dimensions | Qty. |
|-----------------------|---------------|-------------------------------------|------|
| LASER SHUTTERS | | | |
| 04 LSC 002 | Laser Shutter | 2.61" (66.20 mm) x 3.63" (92.22 mm) | ea. |



SHUTTER CONTROLLERS

Our shutter products are complemented with accessories to assist with integration to your operating environment. We provide controllers, power supplies and shutter mounts to meet your regional voltage and computing requirements. Please refer to Melles Griot products our web site marketplace.idexop.com for updated information.

181 ROTOR DRIVE SHUTTER CONTROLLERS

182 ELECTRONIC SHUTTER CONTROLLERS



LEARN MORE

Download our "How to Select a Shutter" guide by visiting www.idex-hs.com/support/literature-downloads/support-literature



Rotor Drive Shutter Controllers

★ FEATURES

- › **Input Voltage:** 9 Volts
- › **Input Current:** 2.0 Amps Maximum
- › **TTL Input:** 2.4 – 5.0 Vdc, 2 mA
- › **Maximum Repetition Rate:** 5 Hz
- › **Weight:** 0.5 Kg
- › **Output Voltage:** 3 or 9 volts, switchable
- › **Dimensions (L x W x H)*:** 3.6 x 2.6 x 1.1 inches (92 x 66 x 28 mm)
- › **Connectors:**
 - Power input: female, 2.1mm, + center,
 - Shutter interconnect: two wire socket
 - TTL Interface: Command line, ground, unground
 - Status line: TTL high/low

› Drives Melles Griot rotor drive shutters

› Local or remote operation

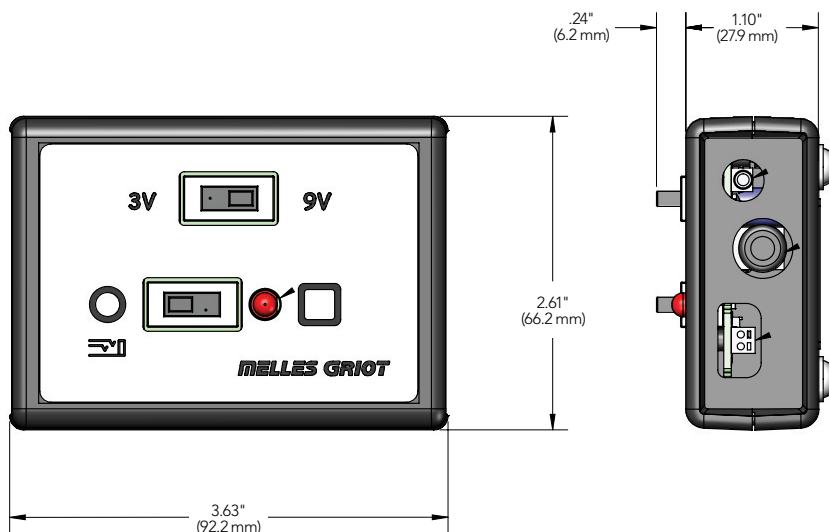
› Compliant with safety and environmental standards for commercial electronics

› Actuate with manual push button or standard TTL input signal

› OEM (unpackaged) control board available

Our line of Melles Griot rotor drive shutter controllers provide bidirectional pulsed drive to rotor drive shutters and can operate locally via manual push button, or remotely via TTL signal. The rotor drive shutter controller interconnects to shutters through a two position contact block. The unit is powered by the 9 V power supply supplied with unit.

Rotor Drive Shutter Controller Dimensions in inches (mm).



| Part No. | Description | Dimensions | Qty. |
|------------|----------------|-------------------------------------|------|
| 04 RSC 450 | RDS Controller | 2.61" (66.20 mm) x 3.63" (92.22 mm) | ea. |



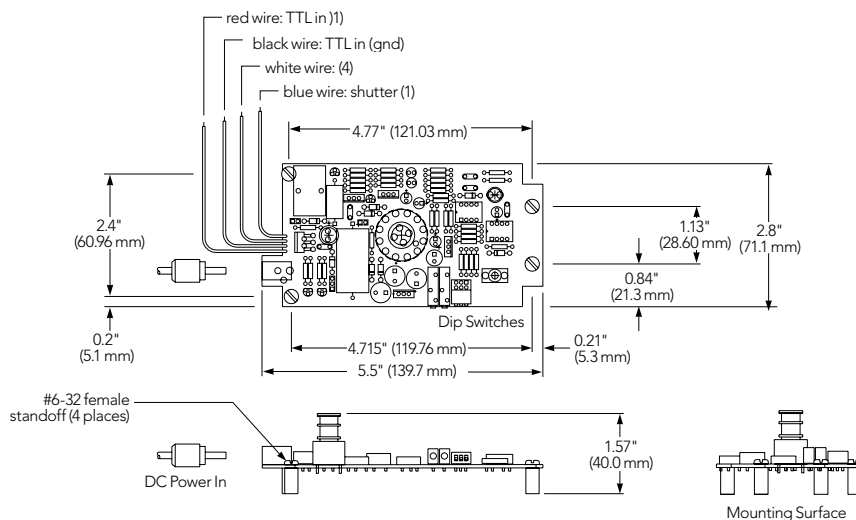
Electronic Shutter Controllers

★ FEATURES

- › **Input Voltage:** 12 Vdc
- › **Input Current:** 2.5 A Minimum
- › **Output Voltage:**
Initial Pulse: 48 Vdc for 10 – 20 msec
Holding Voltage: 6 Vdc
- › **Preset Shutter Speeds:**
2, 1, 1/2, 1/4, 1/8, 1/15, 1/30, 1/60 sec
- › **TTL Input:** 3 – 7 Vdc, 15 mA
(opto-isolated, floating ground)
- › **Maximum Repetition Rate:** 2 Hz
- › **Minimum Recharge Time:** 200 msec
- › **Input Voltage:** 90 – 264 Vac, 47 – 63 Hz
- › **Dimensions (L x W x H):** 5.90 x 3.13 x 1.82 inches (149.9 x 79.5 x 46.2 mm)
- › **Weight:** 0.32 kg (11.2 oz)
- › **Connectors, Packaged Controller:**
dc Input: Coaxial barrel
Shutter Drive: 50 Q coaxial barrel
- › **TTL Input:** BNC
- › **Connectors, OEM Controller Board:**
dc Input: Coaxial barrel
TTL and Shutter Drive: 6 in. pigtailed leads
- › Drives all 12 V IES™ and UltraThin™ shutters
- › Local or remote operation
- › CE compliant
- › 8 preset shutter speeds
- › Actuate with manual pushbutton or standard TTL input signal
- › Infinitely adjustable shutter speeds from 1/60th of a second to 30 seconds
- › Easy control of long shutter speeds via B (bulb) and T (time) control functions
- › OEM (unpackaged) control board also available

Our line of Melles Griot electronic shutter controllers facilitate the operation of all standard Melles Griot 12 volt IES™ and UltraThin™ shutters. For convenience, a number of shutter control functions are designed into the controller, including eight preset shutter speeds ranging from 1/60th of a second to two seconds. For local operation, these functions are actuated using the controller's manual pushbutton trigger switch. For remote operation, the functions are actuated using a TTL pulse or signal. A shutter control board, which can be panel mounted, is available separately for OEM applications.

59 OSC Electronic Shutter Controller Board Dimensions in inches (mm).



⚙️ APPLICATION NOTE

TTL Operation

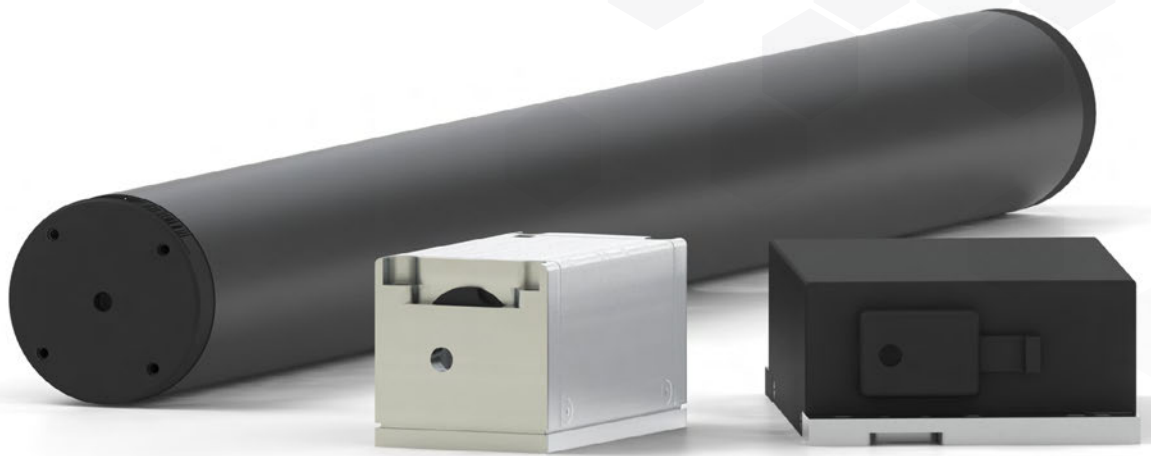
In the TTL setting, the shutter will actuate for an uncalibrated time when the manual trigger is pressed. To prevent the shutter from actuating as a result of electronic noise and spurious pulses, disconnect the TTL input plug when not in use.

| Part No. | Description | Plug Style | Qty. |
|--|----------------------|------------------------|------|
| ELECTRONIC SHUTTER CONTROLLER | | | |
| 04 ISC 850 | Controller | — | ea. |
| 59 OSC 205 | OEM Controller Board | — | ea. |
| SHUTTER CONTROLLER POWER SUPPLIES | | | |
| 04 IPS 833 | 12-Vdc Power Supply | 3 prong North American | ea. |
| 04 IPS 835 | 12-Vdc Power Supply | 2 prong European | ea. |
| 04 IPS 837 | 12-Vdc Power Supply | Japanese | ea. |



A series of horizontal lines for writing, starting from the top margin and extending to the bottom margin, providing a template for text entry.





Lasers

The IDEX Health & Science line of Melles Griot Lasers offers a broad range of wavelengths. As a world leader in laser technology – with over 35 years of experience and more than 3 million lasers shipped – our lasers exhibit long life, excellent stability, and field-proven performance.

To order laser products, please call Melles Griot at: 760-438-2131.

185

HELIUM NEON LASERS

188

DIODE LASERS

190

DPSS LASERS



Helium Neon Lasers

Our helium neon lasers exhibit long life, excellent stability, and field-proven performance. We offer a broad range of wavelengths with randomly or linearly polarized output. Products include full turnkey systems with laser head and power supply. For OEM's, we offer plasma tubes and fully customized configurations.

Red (632.8 nm) Linear or Random Polarization: LHP, LHR

Our LHP series of linearly polarized lasers have output power of up to 35mW and LHR series of randomly polarized lasers have output power of up to 17mW, making them ideal for Raman spectroscopy, holography, fast scanning, and test and measurement applications. All laser heads are mounted in rugged aluminum housings and come with a matched power supply. All systems meet CDRH and IEC requirements for laser equipment safety, and the 230 Vac versions are CE compliant. They can be mounted in a variety of orientations without sacrificing power or performance. Systems are convection cooled and operate from standard 115 Vac or 230 Vac outlets.



★ FEATURES

- › **Product Code:** LHP, LHR
- › **Beam Quality:** > 90% TEM₀₀
- › **Output Power:** Up to 35 mW
- › **Pointing Stability:** < 0.03 mrad
- › **Polarization:** Linear or Random
- › **Power Stability:** ± 2.5%
- › **Regulatory Approvals:** CDRH, IEC, and CE (230 Vac only) compliant
- › **Wavelength:** 632.8 nm
- › Complete systems, including power supply
- › 115 or 230 Vac versions available
- › OEM modules available

| Part Number | Part Number | Power (mW) | Beam Diameter (1/e ²) Nominal (mm) | Beam Divergence (1/e ²) Nominal (mrad) | Laser Head Dimensions Length x Diameter (mm) | Power Supply Dimensions W x H x L (mm) | Safety Classification | |
|---------------------|---------------------|------------|--|--|--|--|-----------------------|----------|
| LINEAR POLARIZATION | RANDOM POLARIZATION | | | | | | CDRH | IEC |
| 25-LHP-213 | 25-LHR-213 | 0.5 | 0.46 | 1.8 | 177.8 x 31.8 | 128.3 x 61.0 x 133.4 | Class II | Class 2 |
| 25-LHP-111 | 25-LHR-111 | 1 | 0.59 | 1.4 | 271.8 x 44.5 | 128.3 x 61.0 x 133.4 | Class IIIa | Class 3R |
| 25-LHP-073 | 25-LHR-073 | 2 | 0.76 | 1.1 | 279.9 x 35.1 | 128.3 x 61.0 x 133.4 | Class IIIa | Class 3R |
| 25-LHP-121 | 25-LHR-121 | 2 | 0.59 | 1.4 | 271.8 x 44.5 | 128.3 x 61.0 x 133.4 | Class IIIa | Class 3R |
| 25-LHP-691 | 25-LHR-691 | 2.5 | 0.52 | 1.5 | 224.8 x 31.8 | 128.3 x 61.0 x 133.4 | Class IIIa | Class 3R |
| 25-LHP-151 | 25-LHR-151 | 5 | 0.80 | 1.0 | 396.2 x 44.5 | 128.3 x 61.0 x 133.4 | Class IIIb | Class 3B |
| 25-LHP-171 | 25-LHR-171 | 7 | 1.02 | 0.8 | 455.9 x 44.5 | 128.3 x 61.0 x 133.4 | Class IIIb | Class 3B |
| 25-LHP-991 | 25-LHR-991 | 10 | 0.65 | 1.3 | 483.9 x 44.5 | 160.8 x 53.9 x 241.3 | Class IIIb | Class 3B |
| 25-LHP-925 | 25-LHR-925 | 17 | 0.96 | 0.9 | 637.3 x 44.5 | 160.8 x 53.9 x 241.3 | Class IIIb | Class 3B |
| 25-LHP-828 | NA | 25 | 1.23 | 0.7 | Rectangular: 1030.0 (L) x 78.7 (W) x 75.6 (H) | 160.8 x 53.9 x 241.3 | Class IIIb | Class 3B |
| 25-LHP-928 | NA | 35 | 1.23 | 0.7 | Rectangular: 1030.0 (L) x 78.7 (W) x 75.6 (H) | 160.8 x 53.9 x 241.3 | Class IIIb | Class 3B |

Helium Neon Lasers (Cont.)



★ FEATURES

- › **Product Code:** LGP, LGR
- › **Beam Quality:** > 90% TEM₀₀
- › **Output Power:** Up to 2.0 mW
- › **Pointing Stability:** < 0.03 mrad
- › **Polarization:** Linear or Random
- › **Power Stability:** ± 2.5%
- › **Regulatory Approvals:** CDRH, IEC, and CE (230 Vac only) compliant
- › **Wavelength:** 543.5 nm

Green (543.5 nm) Linear or Random Polarization: LGP, LGR

We offer a variety of green cylindrical HeNe linearly or randomly polarized laser systems, to match your application requirements. All laser heads are mounted in rugged aluminum housings and come with a matched power supply. All systems meet CDRH and IEC requirements for laser equipment safety, and the 230 Vac versions are CE compliant. Systems are convection cooled and operate from standard 115 Vac or 230 Vac outlets.

- › Complete systems, including power supply
- › 115 or 230 Vac versions available

| Part Number | Power (mW) | Beam Diameter (1/e ²) Nominal (mm) | Beam Divergence (1/e ²) Nominal (mrad) | Laser Head Dimensions Length x Diameter (mm) | Power Supply Dimensions W x H x L (mm) | Safety Classification | |
|--|------------|--|--|--|--|-----------------------|----------|
| | | | | | | CDRH | IEC |
| GREEN (543.5 nm) LINEAR POLARIZATION: LGP | | | | | | CDRH | IEC |
| 25-LGP-173 | 0.3 | 0.79 | 0.9 | 455.9 x 44.5 | 128.3 x 61.0 x 133.4 | Class IIIa | Class 3R |
| 25-LGP-193 | 1 | 0.86 | 0.8 | 510.3 x 44.5 | 160.8 x 53.9 x 241.3 | Class IIIa | Class 3R |
| GREEN (543.5 nm) RANDOM POLARIZATION: LGR | | | | | | CDRH | IEC |
| 25-LGR-173 | 0.8 | 0.79 | 0.9 | 455.9 x 44.5 | 128.3 x 61.0 x 133.4 | Class IIIa | Class 3R |
| 25-LGR-193 | 1.5 | 0.86 | 0.8 | 510.3 x 44.5 | 160.8 x 53.9 x 241.3 | Class IIIa | Class 3R |
| 25-LGR-393 | 2 | 0.86 | 0.8 | 510.3 x 44.5 | 160.8 x 53.9 x 241.3 | Class IIIa | Class 3R |



★ FEATURES

- › **Product Code:** STP
- › **Beam Quality:** TEM₀₀
- › **Output Power:** Up to 1.4 mW
- › **Polarization:** Linear
- › **Power Stability:** within ± 0.2%
- › **Regulatory Approvals:** CDRH, IEC, and CE (230 Vac only) compliant
- › **Wavelength:** 632.8 nm
- › **Frequency Stability (8 Hours):** < ± 1 MHz
- › **Coherence Length (m):** 300 (1 Hour)

Frequency Stabilized (632.8 nm): STP

STP laser systems come with power supply, laser, and frequency controller in a very small package. A patented frequency adaptor allows frequency locking within 10 minutes, convenient for both the OEM and end user. The 25 STP 910 is a CDRH Class II (IEC Class 2) system and is limited to less than 1 mW output. The 25 STP 912 is a CDRH Class IIIa (IEC Class 3R) system. Both power and frequency can be manually adjusted. These systems are ideal for use in systems and applications with space constraints or with fast response-time requirements.

- › Frequency stability: better than 1 MHz
- › Extremely compact
- › Rapid warm-up to frequency lock (<10 minutes)
- › Complete system, including power supply
- › OEM modules available

| Part Number | Power (mW) | Beam Diameter (1/e ²) Nominal (mm) | Beam Divergence (1/e ²) Nominal (mrad) | Laser Head Dimensions Length x Diameter (mm) | Laser System Dimensions Overall Length (mm) | Power Supply Dimensions W x H x L (mm) | Safety Classification | |
|---|------------|--|--|--|---|--|-----------------------|----------|
| | | | | | | | CDRH | IEC |
| FREQUENCY STABILIZED (632.8 nm): STP | | | | | | | | |
| 25-STP-910 | 0.5 | 0.48 | 1.7 | 176.8 x 54.5 | 259.1 | 128.3 x 61.0 x 133.4 | Class II | Class 2 |
| 25-STP-912 | 1 | 0.54 | 1.5 | 219.7 x 54.5 | 302.0 | 126.3 x 61.0 x 133.4 | Class IIIa | Class 3R |



Diode Lasers

The IDEX Health & Science line of Melles Griot Diode Laser modules provide extremely compact and reliable sources of laser light with minimal thermal footprint and maximum resistance to mechanical shock and vibration. This is achieved through state-of-the-art thermal management and mechanical design, which improves performance and reliability in harsh environments. A small footprint, versatile system integration, and product customization make our diode laser systems ideal for multiple applications in flow cytometry, confocal microscopy, DNA sequencing, and other medical applications.

★ FEATURES

- › **Power Stability:**
Free Space: $\pm 1\%$
Fiber Coupled: $\pm 2\%$
- › **Amplitude Noise**
Free Space: $\leq 0.1\%$ rms
Fiber Coupled: $\leq 0.2\%$ rms
- › **Pointing Stability:**
Free Space: $< 5 \mu\text{rad} / ^\circ\text{C}$
Fiber Coupled: N/A
- › **Power Consumption:** $< 15\text{ W}$
- › **Communications:** USB and RS-485
- › **Fiber Coupled only:**
Fiber Type: SM or PM
Fiber Termination: End Capped FC/APC
Fiber Length Nominal (m): 1
Typical NA: 0.12

CRN and CFx Series Diode Lasers (405 to 642 nm)

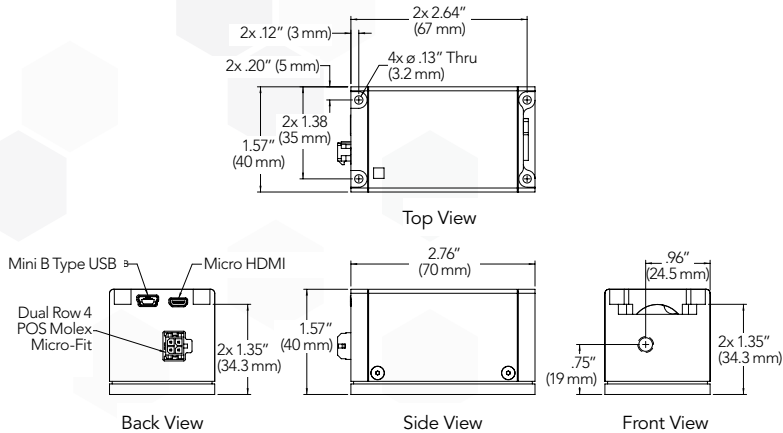
Our new 56-CRN and 57-CFx-series diode laser systems provide excellent beam performance and pointing stability from a compact self-contained package. This industry standard 70mm x 40mm x 40mm package is a must for applications in flow cytometry, confocal microscopy, and other medical applications by incorporating analog and digital drive electronics to provide a smaller footprint at a reduced cost. Standard parts listed below are built with a unique design allowing us to customize the laser beam parameters for our OEM customers, which simplifies your optical system design requirements, giving you flexibility to focus on your core competencies. Controlling the laser has never been easier, now with a USB interface, full control of the CRN and CFx series laser is a simple connection away. For those applications that need an end user interface, an optional external controller box is available for CDRH compliance requirements.

- › Excellent power and beam pointing stability
- › Low noise operation
- › Wide thermal operating range
- › Excellent high speed analog and digital modulation
- › Internal controller
- › Fiber coupled and free space versions
- › OEM modules available
- › **Available accessories:** CDRH Remote Control Box (Part Number 56-RLC-100)

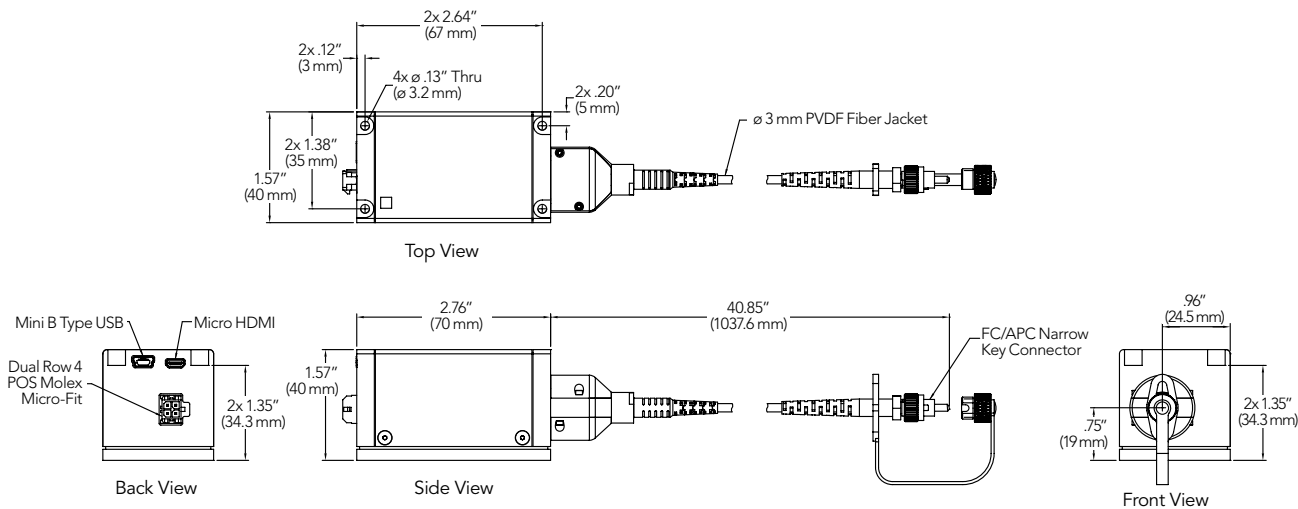
| Part Number | λ (nm) | Power (mW) | Beam Diameter (1/e ²) Nominal (mm) | Far Field Beam Divergence (1/e ²) Nominal (mrad) |
|----------------------|----------------------|----------------|--|--|
| FREE SPACE | | | | |
| 56-CRN-405-100 | 405 \pm 5 | 100 | 0.80 \pm 0.25 | ≤ 1.3 |
| 56-CRN-405-200 | 405 \pm 5 | 200 | 0.80 \pm 0.25 | ≤ 1.3 |
| 56-CRN-445-040 | 445 \pm 5 | 40 | 0.70 \pm 0.18 | ≤ 1.5 |
| 56-CRN-445-080 | 445 \pm 5 | 80 | 0.70 \pm 0.18 | ≤ 1.5 |
| 56-CRN-488-050 | 488 \pm 5 | 50 | 0.76 \pm 0.24 | ≤ 1.8 |
| 56-CRN-488-150 | 488 \pm 5 | 150 | 0.76 \pm 0.24 | ≤ 1.8 |
| 56-CRN-515-060 | 515 \pm 5 | 60 | 0.66 \pm 0.22 | ≤ 2.1 |
| 56-CRN-640-050 | 640 \pm 5 | 50 | 0.81 \pm 0.25 | ≤ 2.8 |
| 56-CRN-642-100 | 642 \pm 5 | 100 | 0.92 \pm 0.34 | ≤ 2.2 |
| FIBER COUPLED | | | | |
| Part Number SM Fiber | Part Number PM Fiber | λ (nm) | Power (mW) | |
| 57-CFS-405-025 | 57-CFP-405-025 | 405 \pm 5 | 25 | |
| 57-CFS-405-050 | 57-CFP-405-050 | 405 \pm 5 | 50 | |
| 57-CFS-445-025 | 57-CFP-445-025 | 445 \pm 5 | 25 | |
| 57-CFS-445-040 | 57-CFP-445-040 | 445 \pm 5 | 40 | |
| 57-CFS-488-025 | 57-CFP-488-025 | 488 \pm 5 | 25 | |
| 57-CFS-488-050 | 57-CFP-488-050 | 488 \pm 5 | 50 | |
| 57-CFS-515-025 | 57-CFP-515-025 | 515 \pm 5 | 25 | |
| 57-CFS-640-025 | 57-CFP-640-025 | 640 \pm 5 | 25 | |
| 57-CFS-642-050 | 57-CFP-642-050 | 642 \pm 5 | 50 | |

DIODE LASER OVERALL DIMENSIONS

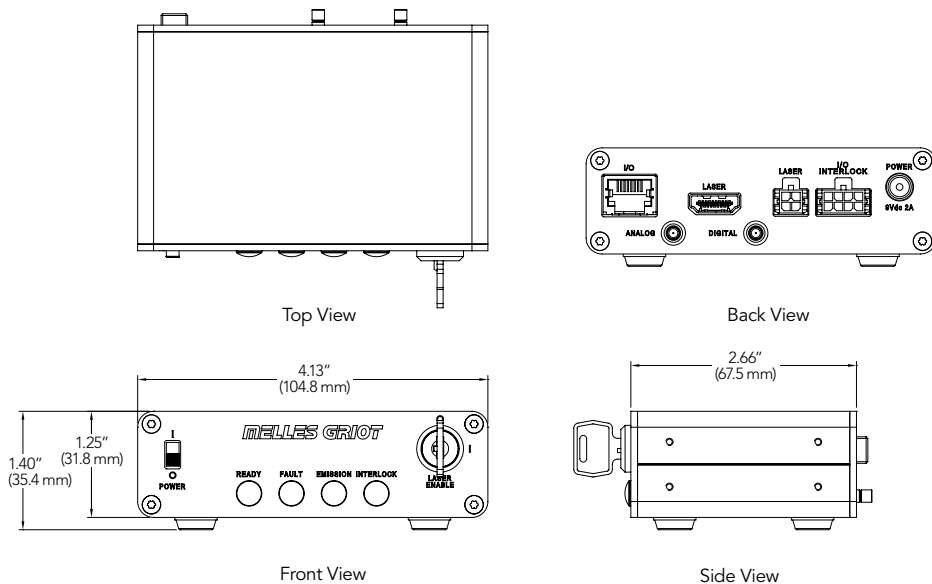
56-CRN Dimensions in inches (mm).



57-CFx Dimensions in inches (mm).



56-RLC-100 Dimensions in inches (mm).





DPSS Lasers

DPSS lasers provide compact and reliable laser light with a low thermal footprint and maximum resistance to mechanical shock and vibration. These lasers feature a compact laser head with excellent output power and pointing stability. This is achieved through state-of-the-art thermal management and current control, which improves performance and reliability in harsh environments. In addition to free space beam delivery, fiber optic beam delivery is also available for most products.



BDD Blue DPSS Lasers (488 nm)

Our 85-BDD is available with up to 50 mW of output power and features automatic power control (APC) for excellent power stability. The 85-BDD series can be used as a direct replacement for air-cooled argon-ion lasers in many bioanalytical and medical applications (e.g., flow cytometry, confocal microscopy, DNA analysis), thereby reducing power consumption from 1000 W to less than 15 W, vastly simplifying thermal management, and increasing system life.

★ FEATURES

- › **Product Code:** BDD
- › **Output Power:** Available up to 50 mW
- › **Power Stability:** As low as $\pm 2\%$
- › **Power Consumption:** As low as 15 W
- › **Power Feedback Mode:** Automatic Power Control or Constant Current
- › **Communications:** RS-232
- › **Regulatory Approvals:** CDRH, IEC and CE compliant

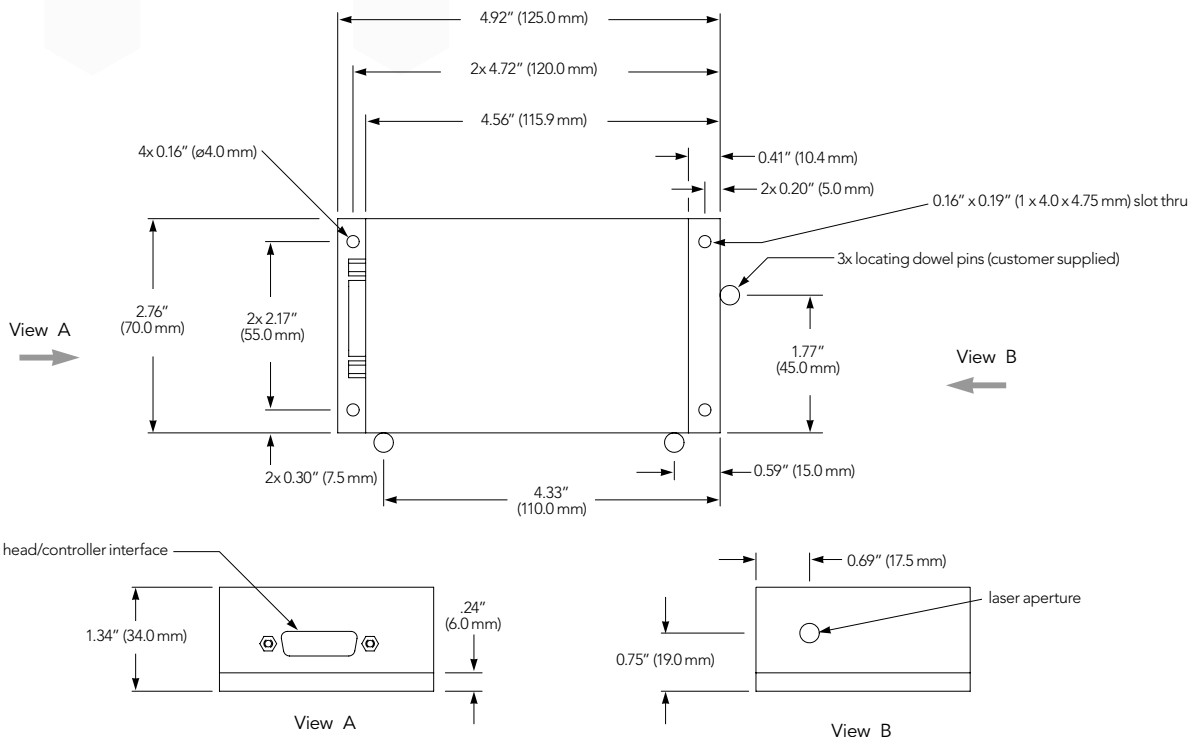
- › Automatic power control (APC)
- › Excellent beam quality ($M^2 < 1.2$)
- › Low-noise output: rms: $< 0.75\%$, 20 Hz to 1 MHz ($< 0.5\%$ typical); peak-to-peak: $< 1\%$, 20 Hz to 20 kHz
- › Stable operation at baseplate temperatures from $+10^\circ\text{C}$ to $+45^\circ\text{C}$
- › Highly reliable solid-state design for long life-time
- › Minimal heat-sinking requirements

| Part Number | λ (nm) | Power (mW) | Beam Diameter (1/e ²) Nominal (mm) | Far Field Beam Divergence (1/e ²) Nominal (mrad) |
|--------------------------------------|----------------|------------|--|--|
| BDD BLUE DPSS LASERS (488 nm) | | | | |
| 85-BDD-020 | 488 \pm 0.5 | 20 | 0.7 \pm 0.05 | 1.2 |
| 85-BDD-050 | 488 \pm 0.5 | 50 | 0.7 \pm 0.05 | 1.2 |

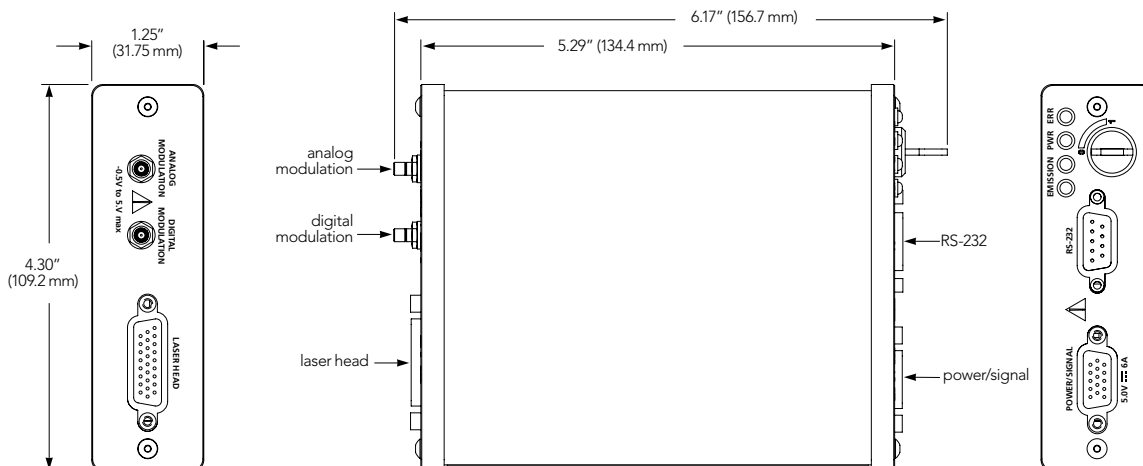


BDD BLUE DPSS LASERS (488 nm) OVERALL DIMENSIONS

85 BDD-series laser module. Dimensions in inches (mm).



85 BDD-series turn-key controller. Dimensions in inches (mm).



DPSS Lasers (Cont.)



★ FEATURES

- › **Product Code:** GCA
- › **Output Power:** 20 mW
- › **Power Stability:** As low as $\pm 2\%$
- › **Power Consumption:** < 10 W
- › **Power Feedback Mode:**
Automatic Power Control
- › **Communications:** Interface for remote monitoring and operation
- › **Regulatory Approvals:** CDRH, IEC and CE compliant
- › **Optical Noise:** <3% Peak to Peak (20Hz to 2MHz)

GCA Green DPSS Lasers (532 nm)

Our GCA series of green DPSS lasers deliver diffraction-limited, TEM₀₀ output from a compact, self-contained package that includes drive electronics and thermoelectric cooling. Automatic power control provides excellent power stability over a broad operating temperature range, and the highly efficient electronics require only 10 W at 5 Vdc input. These lasers are ideal for spectroscopy, laser-induced fluorescence, medical diagnostics, alignment, and a wide variety of testing applications.

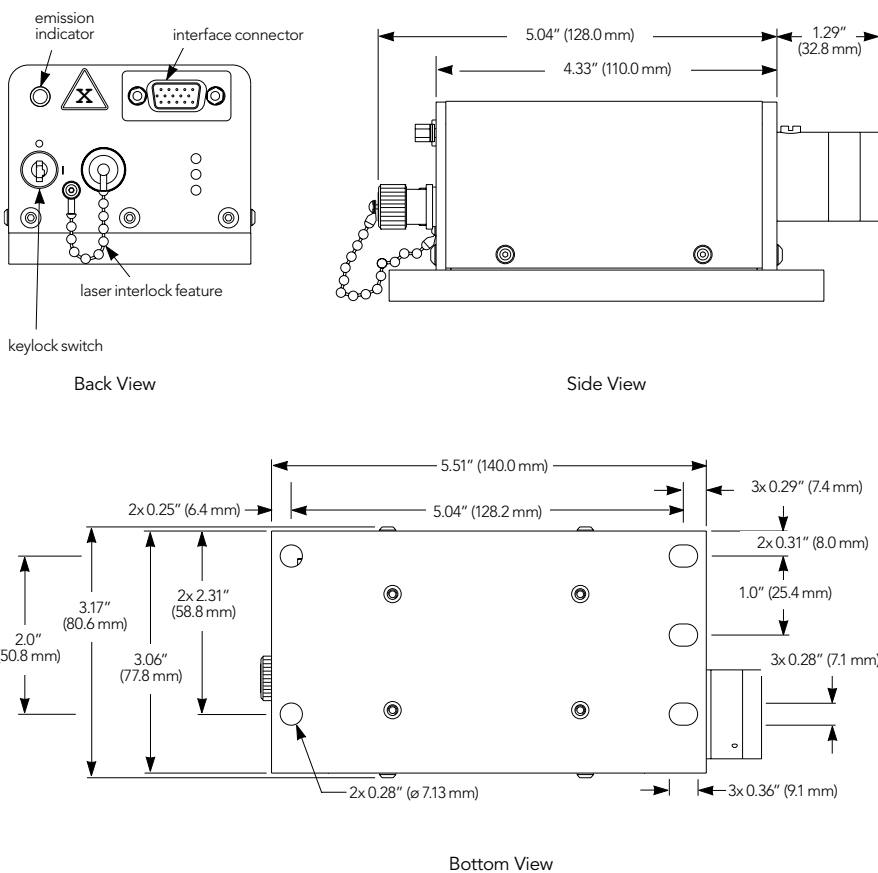
Systems are available in research and ultra-compact OEM configurations with a variety of standard and custom beam-delivery systems.

- › Stable output from 10°C to 40°C
- › Highly reliable solid-state design for long life-time
- › Excellent beam quality ($M^2 < 1.2$)
- › Low power consumption
- › Interface for remote monitoring and operation
- › Integrated laser controller
- › OEM modules available



OVERALL DIMENSIONS

85 GCA-series laser and supplied base plate. Dimensions in inches (mm).



| Part Number | λ (nm) | Power (mW) | Beam Diameter (1/e ²) Nominal (mm) | Far Field Beam Divergence (1/e ²) Nominal (mrad) |
|---------------------------------------|----------------|------------|--|--|
| GCA GREEN DPSS LASERS (532 nm) | | | | |
| 85-GCA-020 | 532 \pm 1.0 | 20 | 1.1 \pm 0.2 | 1.25 |

DPSS Lasers (Cont.)



FEATURES

- › **Product Code:** YCA
- › **Output Power:** Available up to 50 mW
- › **Power Stability:** As low as $\pm 2.5\%$
- › **Power Consumption:** < 30 W
- › **Power Feedback Mode:** Automatic Power Control or Constant Current Mode
- › **Communications:** RS-232
- › **Regulatory Approvals:** CDRH, IEC, and CE compliant

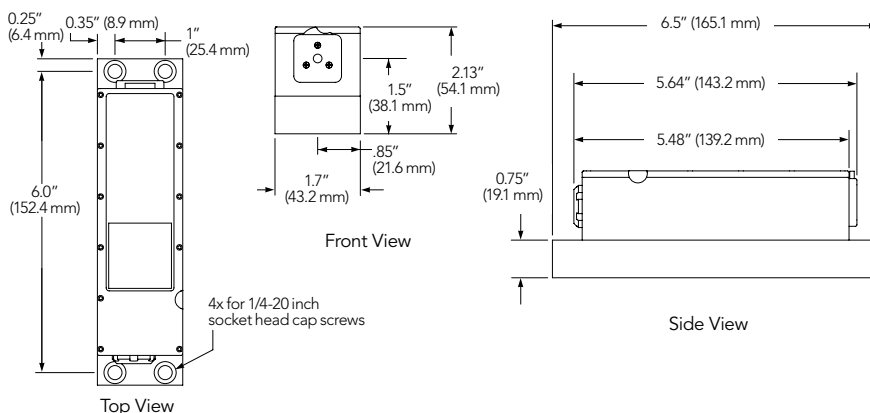
YCA Yellow DPSS Lasers (561 nm)

Our YCA series yellow DPSS lasers provide up to 50 mW at 561 nm, with excellent stability over a wide operating temperature range. Their wavelength make them ideally suited for bio-fluorescent dyes and as a highly reliable direct replacement for krypton-argon and many green lasers. The excellent beam quality, narrow linewidth, and low optical noise of YCA series lasers are ideal for confocal microscopy, metrology, spectroscopy, medical diagnostics, fluorescence, and interferometric applications. The small size, low power consumption, minimal heat-sinking requirements, and RS-232 control and monitoring interface are particularly suitable for compact, OEM applications.

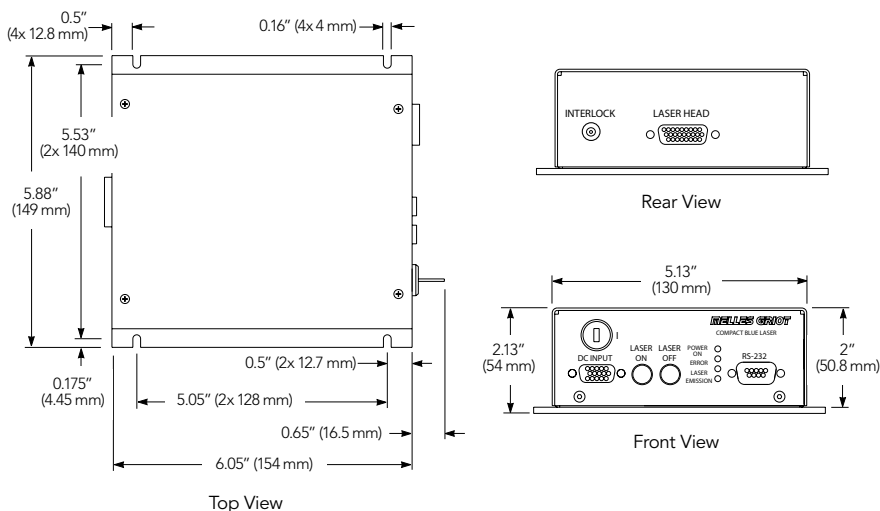
- › Single longitudinal mode
- › <0.5% rms noise (20 Hz to 2 MHz)
- › Stable output from 15°C to 35°C
- › Low power consumption
- › Excellent beam quality ($M^2 < 1.2$)
- › 0.67 mm beam diameter for easy retrofit from krypton ion lasers
- › Lightweight and compact
- › OEM modules available

OVERALL DIMENSIONS

85 YCA-series laser head. Dimensions in inches (mm).



85 YCA-series laser controller. Dimensions in inches (mm).



| Part Number | λ (nm) | Power (mW) | Beam Diameter ($1/e^2$) Nominal (mm) | Far Field Beam Divergence ($1/e^2$) Nominal (mrad) |
|--|----------------|------------|--|--|
| YCA YELLOW DPSS LASERS (561 nm) | | | | |
| 85-YCA-020 | 561 \pm 0.5 | 20 | 0.67 \pm 0.05 | 1.2 |
| 85-YCA-050 | 561 \pm 0.5 | 50 | 0.67 \pm 0.05 | 1.2 |

DPSS Lasers (Cont.)



FEATURES

- › **Product Code:** BLS
- › **Output Power:** Available up to 300 mW
- › **Power Stability:** As low as $\pm 2.5\%$
- › **Power Consumption:** 150 W (typical)
- › **Power Feedback Mode:** Automatic Power Control or Constant Current Mode
- › **Communications:** RS-232

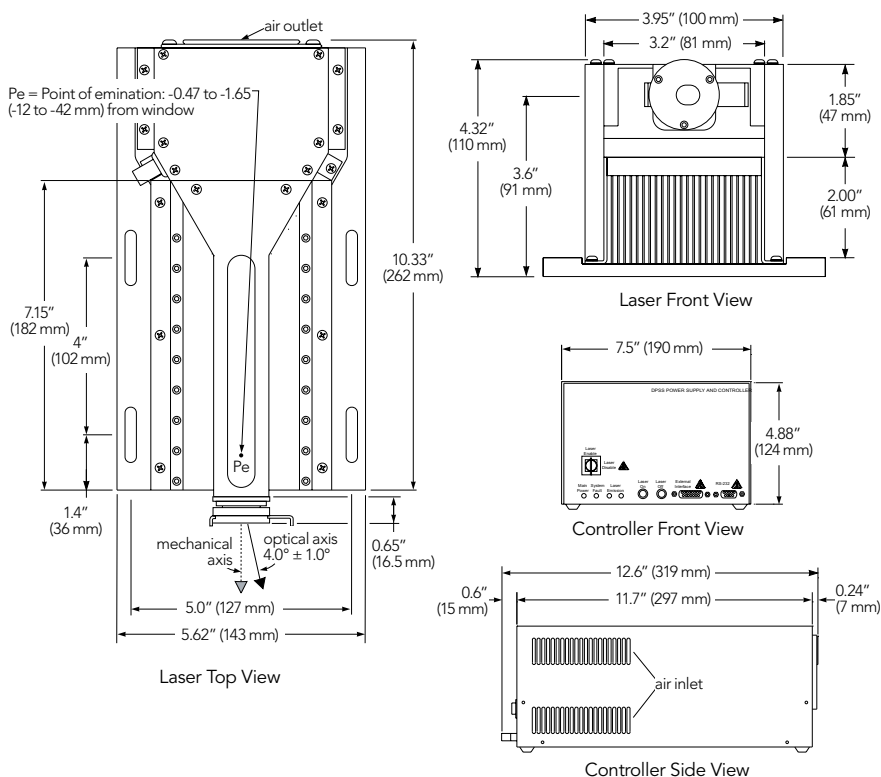
BLS Blue DPSS Lasers (457 nm, 100 to 300 mW)

Our single frequency diode-pumped solid-state blue lasers provide high power output at 457 nm in a compact, air-cooled package. They are ideal for use in semiconductor, biomedical, spectroscopic, interferometric, holographic instrumentation; laser display devices, photo-plotters, PC-board, wafer, and surface inspection equipment, and particle characterization instrumentation. Their single longitudinal mode and long coherence length make them an indispensable tool for holographic applications.

- › Single transverse and longitudinal mode
- › Coherence length up to 5 m
- › Low power consumption
- › Universal input voltage power supply
- › RS-232 interface
- › Automatic power control

OVERALL DIMENSIONS

85 BLS-series laser and controller. Dimensions in inches (mm).



| Part Number | Output Power (mW) | Beam Dimension (1/e ²) vertical x horizontal (mm) | Beam Shape | Beam Divergence (1/e ²) vertical x horizontal (mrad) |
|---|-------------------|--|------------|---|
| BLS BLUE DPSS LASERS (457 nm, 100 TO 300 mW) | | | | |
| 85-BLS-301 | 100 | 0.125 – 0.155 | Round | < 5.0 |
| 85-BLS-601 | 300 | (0.105 – 0.165) x (0.200 – 0.350) | Elliptical | < 5.5 x 3.0 |
| OPTIONAL ACCESSORIES | | | | |
| Part Number | Description | | | |
| 58-ASB-001 | Beam Expander | | | |

DPSS Lasers (Cont.)



FEATURES

- › **Product Code:** GHS
- › **Output Power:** Up to 3 W
- › **Power Stability:** As low as $\pm 3\%$
- › **Power Consumption:** As low as 150 W
- › **Power Feedback Mode:** Automatic Power Control or Constant Current
- › **Communications:** RS-232 or analog

GHS Green DPSS Lasers (532 nm, 1 to 3 Watts)

Our 85 GHS series diode-pumped solid-state green lasers are designed for use in display, scanning, and metrology applications requiring both high output and rugged construction. These hermetically sealed lasers provide up to three watts of power from a compact, air-cooled package. Our new clean-sealed construction means truly low-maintenance, hands off operation, and long-term reliability — even in a harsh or dirty environment.

For system manufacturers who value portability and economy, eliminating water cooling, reducing input power by two orders of magnitude, and reducing laser size by a factor of ten* are significant advantages of 85 GHS systems.

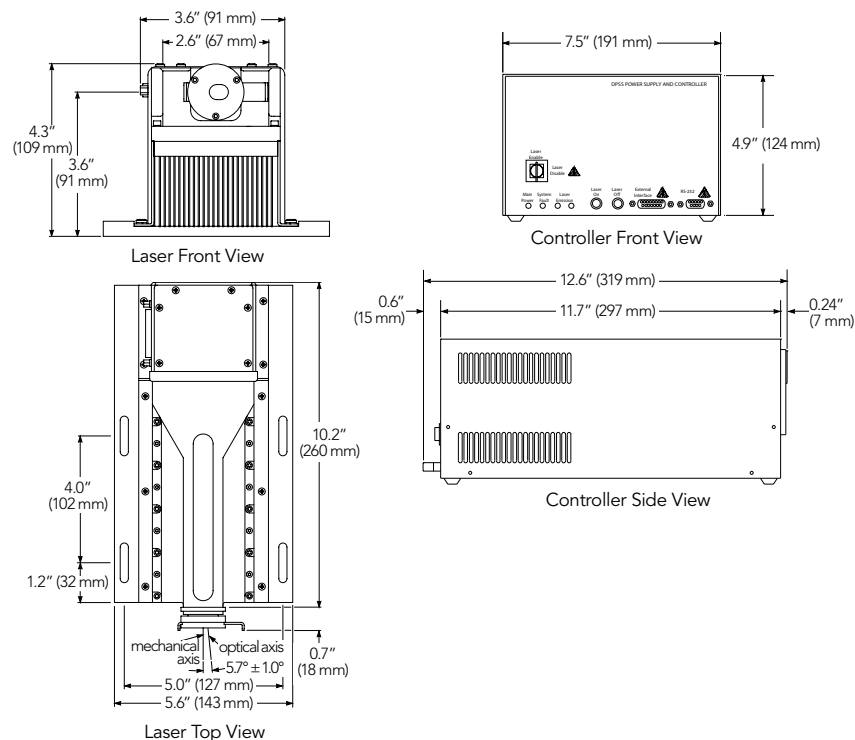
*Compared to a typical water-cooled argon-ion laser system.

- › Clean-sealed for reliability
- › Forced-air cooling
- › Lightweight and compact
- › Automatic power control
- › CW or external analog modulation
- › RS-232 interface
- › Low power consumption
- › Universal input voltage power supply
- › OEM modules available



OVERALL DIMENSIONS

85 GHS-series laser and controller. Dimensions in inches (mm).



| Part Number | λ (nm) | Power (W) | Beam Diameter (1/e ²) Nominal (μ m) | Far Field Beam Divergence (1/e ²) Nominal (mrad) |
|---|-----------------|-----------|---|---|
| GHS GREEN DPSS LASERS (532 nm, 1 TO 3 WATTS) | | | | |
| 85-GHS-201 | 532.0 \pm 0.5 | 1.0 | < 400 | < 12 |
| 85-GHS-301 | 532.0 \pm 0.5 | 2.0 | < 400 | < 12 |
| 85-GHS-305 | 532.0 \pm 0.5 | 2.5 | < 400 | < 12 |
| 85-GHS-309 | 532.0 \pm 0.5 | 3.0 | < 400 | < 12 |
| OPTIONAL ACCESSORIES | | | | |
| Part Number | Description | | | |
| 58-ASG-001 | Beam Expander | | | |



Optical Filters

IDEX Health & Science offers Semrock optical filters which set the standard in performance, quality, and reliability for the life science, point-of-care, clinical diagnostic, and analytical instrumentation industries.

Semrock manufactures spectrally complex hard-coated sputtered thin-film optical filters. Several patented product families are available for same day shipment. Standard catalog products are guaranteed to meet customer needs with a 30-day, no-hassle return policy and are covered by a ten-year warranty.

To order optical filter products, please visit www.semrock.com

197

LIGHTSUITE™ ONLINE TOOLBOX

199

BRIGHTLINE®

207

LASERMUX™

208

STOPLINE®

210

VERSACHROME®

212

RAZOREDGE®

214

EDGEBASIC™

215

MAXLINE®

216

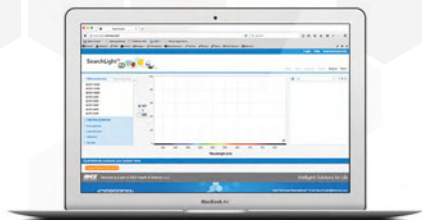
MAXDIODE®

217

NEAR INFRARED BANDPASS FILTERS

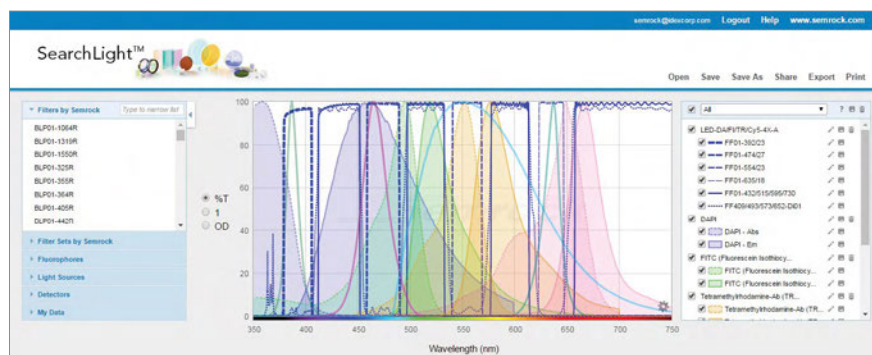
217

CUSTOM SIZED OPTICAL FILTERS



LightSuite™ Online Toolbox

Semrock, a unit of IDEX Health & Science, has developed a full complement of online tools designed to assist you in evaluating optical filters in terms of their use, design and overall optical system performance. Our LightSuite™ toolbox was created to easily put the power of Semrock a mouse click away, anytime of day or night. With LightSuite toolbox, including SearchLight™ and MyLight™, we make your optical filter performance, compatibility and design questions easier and more efficient to answer.



VIEW ONLINE

Explore SearchLight at
<https://searchlight.semrock.com>

SearchLight

SearchLight is a dedicated website that allows fluorescence microscope users and optical instrument designers to evaluate the optimal spectral performance of fluorophores, filter sets, light sources, and detectors as components of an overall system. Will your existing filter set work with a new fluorophore or light source? What if a new exciter was installed or you changed cameras? With this tool, you can compare optical signal to noise while changing any and all components of your system. SearchLight allows you to upload your own spectra for any component and also save and share results securely. SearchLight can be found at: <https://searchlight.semrock.com>. Use SearchLight now. Save time later. Easily email your SearchLight session to colleagues with a click of a button.

SearchLight Optimization Calculator

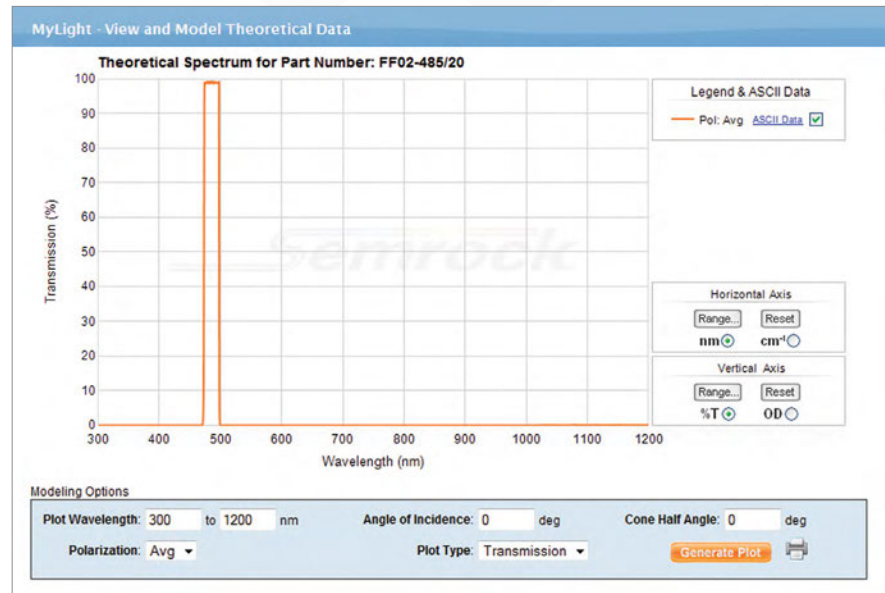
SearchLight's optimization calculator allows optical instrument designers to determine the impact of spectral edge locations on optical system performance instantly. The SearchLight optimization calculator allows users to simulate the impact to fluorescence signal, noise, and signal-to-noise ratio as a function of variation in the spectral edge locations of filters. Any combination of exciter, emitter and dichroic spectra can be simultaneously selected for such simulations. Eliminate trial-and-error headaches and work more efficiently with SearchLight's optimization calculator.

LightSuite™ Online Toolbox (Cont.)

MyLight™

Interested in seeing how a Semrock catalog filter behaves at a particular angle of incidence, state of polarization or cone half angle of illumination?

Simply click the [Click for MyLight Tool](#) button located above the spectral graph and the MyLight™ window will access our theoretical design data and allow you to see spectral shifts in filter performance under varying illumination conditions. You can simulate spectral performance in real time that previously required you to contact us. MyLight data can be downloaded as an ASCII file and the graphs printed or saved as PDFs.





BrightLine®

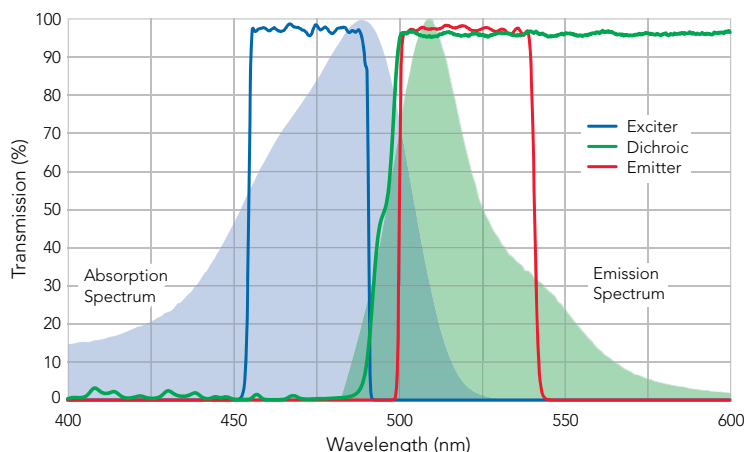
BrightLine® Single-band and Multi-band Sets

Most fluorescence instruments, including microscopes, are based on optical filters. A typical system has three basic filters: an excitation filter, a dichroic beamsplitter, and an emission filter. A combination of these filters make up a filter set, that are popularly used in microscopes. We stock a wide selection of filter sets optimized for the most popular fluorophores and fluorescence microscopes and imaging systems.

High transmission, steeper edges, precise wavelength accuracy and carefully optimized blocking mean better contrast and faster measurements.

Most IDEX Health & Science Semrock filter sets provide a balance between high-brightness and high-contrast. However, specific filter sets are optimized for high-contrast or high-brightness imaging. Single-band sets enable imaging and visualization of single fluorophores whereas multiband filter sets allow for imaging of a sample labeled with multiple fluorophores. Multiband filter sets are also available in several different configurations such as "Full Multiband," "Pinkel," and "Sedat" configurations that are specifically optimized for visualization, imaging speed and contrast.

Dozens of Single-band and Multiband filter sets compatible with broadband light sources are available for imaging popular fluorophores such as DAPI, FITC, TRITC, CFP, YFP, mCherry, Cy3, Cy5, Cy7, Alexa Fluor® dyes, etc.



Typical measured GFP-3035D Filter Set for Green Fluorescent Protein. Hard-coating technology combined with single-substrate filter construction results in the highest transmission and steepest edges available.

Spectacular Spectra

We manufacture multiband fluorescence filters with passband, edge steepness, and blocking performance that rival the best single-band filters, and all with the superior, "no burn-out" durability of hard coatings. In fact, every filter in every BrightLine filter set, including these multiband sets, is made with the same, durable hard-coating technology.

We always provide:

- › The highest transmission, blocking and edge steepness for dazzling visual and digital imaging
- › Hard, dielectric coatings for every filter, including UV excitors for 'no burn-out' performance
- › Spectrally complex filters are a specialty; the world's only five-color multiband set and a large selection of quad, triple, and dual band sets available and also guaranteed in stock

BrightLine® (Cont.)



BrightLine® Single-band & Multiband LED Filter Sets

- › Spectrally aligned to popular LED-based light engines
- › 10s to 100s of percent more signal per channel compared to traditional light source sets when used with LED-based light engines
- › Common excitation filters across the family simplifying visualization across different set configurations

We started with the spectra of the most popular LED-based light engines on the market today to design this family of filter sets. These sets deliver significant fluorescence signal improvements when compared to using traditional filter sets designed for standard broadband light sources such as mercury or xenon arc lamps. These filter sets are optimized to simultaneously deliver the brightest signal and the highest signal-to-noise ratio (contrast) available for imaging a range of fluorophores with LED-based light engines.

Single-band and Multiband filter sets are available for imaging popular fluorophores such as DAPI, FITC, TRITC, CFP, YFP, mCherry, Cy5, etc.

Fluorescence Filter Cubes

| Cube Part No. | Microscope Brand / Compatible Microscopes | |
|----------------|---|---|
| APERIO | | |
| AMF |  | ScanScope FL |
| NIKON | | |
| NTE |  | TE2000, 80i, 90i, 50i, 55i, Eclipse Ti, Ni, Ci, and any using the Epi-fluor Illuminator |
| NQF |  | E200, E400, E600, E800, E1000, TS100, TS100F, TE200, TE300, ME600L, L150A, and some Labophot, Optiphot, and Diaphot series |
| OLYMPUS | | |
| OMF |  | AX70, BX, BX50, BX51, BX60, BX61, BX50/51WI, BX60/61WI, IX50, IX51, IX70, IX71, IX81 |
| OFF |  | Compatible with the BX53, BX63 upright microscopes and also standard beam diameter applications for the IX53, IX73, and IX83 inverted microscopes. |
| OFX |  | Fluorescence Filter holder for Olympus IX3 Microscopes For large beam diameter and lower tier applications in the IX73 and IX83 model microscopes. Requires a 32mm emitter and exciter and a 32 x 44 mm dichroic beamsplitter. |
| ZEISS | | |
| ZHE |  | Axio Imager, AxioStar Plus, Axioskop 40, Axio Observer, AxioPlan2i, AxioPlan2ie, Axiovert200, and Axioskop2 (post-2001), Axiovert 40, Axio Examiner, and Axio Scope A1 |
| LEICA | | |
| LDMK** |  | DM-2000, DM-2500, DM-3000, DMI3000 B, DM-4000, DMI-4000 B, DM-5000, DM-5500, DM-6000 and DMI6000 B |
| LDMP |  | DMi8 |



BrightLine® Laser Fluorescence Single-band & Multiband Longpass Sets for Super-resolution Microscopy

- › Filter wavelengths precisely keyed to popular laser lines, with steep transitions from laser blocking to fluorescence transmission. Examples of covered laser lines (nm) are 405, 442, 488, 514, 561, 594, 635, etc.
- › Exceptionally high transmission to maximize system throughput, reducing acquisition time
- › Longpass sets allow for longer wavelengths to be detected and more light to be captured
- › Deep blocking at laser wavelengths to minimize noise background
- › $\lambda/2$ flatness dichroic beamsplitters suppress axial focal shift and aberrations for reflected laser light
- › Single-band and Multiband filter sets are available for imaging popular fluorophores such as DAPI, FITC, GFP, TRITC, CFP, YFP, mCherry, Cy5, etc.

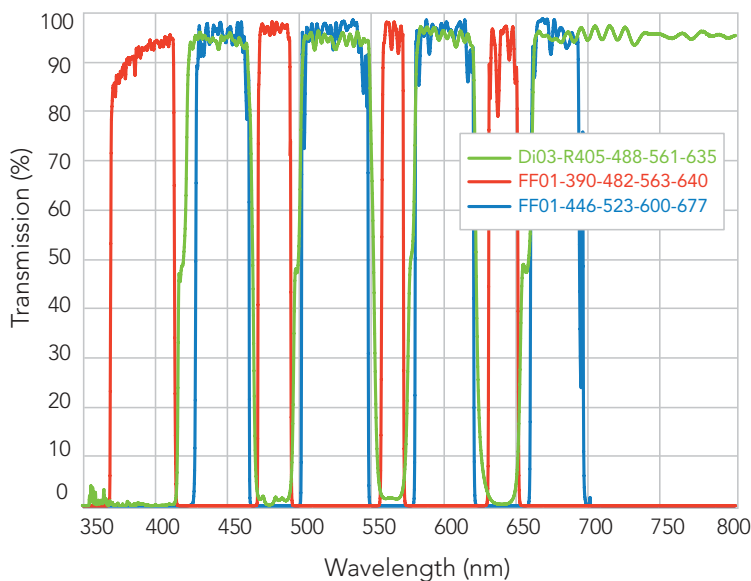
Designed for the unique demands of laser excitation, the dichroic beamsplitter reflection range extends down to 350 nm allowing the combined use of photoactivation, UV-sources with the normal excitation laser line. Users of uncaging and super-resolution techniques will appreciate this added functionality.

Unlock the full potential of your laser fluorescence imaging system. These filter sets enable superior resolution, higher sensitivity, and better image fidelity offered by today's state-of-the-art laser-based microscopes – including laser-scanning and spinning-disk confocal and TIRF microscopes. These sets are optimized for the most popular lasers used in fluorescence imaging, including newer all-solid-state lasers that are rapidly replacing older gas-laser technology.



VIEW ONLINE

For more information about Super-resolution dichroic beamsplitters, please visit www.semrock.com/super-resolution-dichroics.aspx



BrightLine multi-band $\lambda/2$ flatness super-resolution laser filter set, optimized for 405, 488, 561, and 635 nm laser sources.

BrightLine® (Cont.)



Super-resolution Microscopy Cubes

- › Guaranteed $\lambda/2$ P-V per inch flatness from cube mounted 1 mm thick dichroic beamsplitters
- › Maximize switching speed, minimize beam deviation, & minimize light scatter in emission
- › Minimal reflected wavefront distortion for even large diameter illumination beams
- › Available for popular laser lines & microscopy cubes (e.g. Olympus U-MF2 & U-FF, Zeiss FL Cube EC P&C, Nikon TE 2000)

Super-resolution Microscopy Cubes set the new standard for laser based microscopes. These cubes are optimized for mounting $\lambda/2$ flatness 1mm thick super-resolution laser dichroic beamsplitters. Maximize SNR and minimize artifacts in TIRF, Confocal, PALM, STORM, SIM, and other super-resolution techniques.

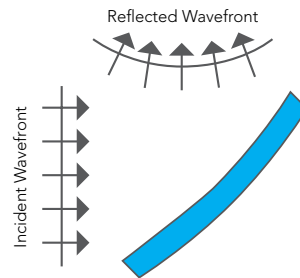
Conventional microscopy cubes can significantly compromise the flatness of the dichroic beamsplitters thereby introducing aberrations. But super-resolution imaging systems are highly sensitive to optical wavefront distortion and demand the highest quality components for best instrument sensitivity. Our industry-leading $\lambda/2$ flatness 1 mm thick laser dichroic beamsplitters minimize focus shift and aberrations in the reflected beam compared to standard dichroic beamsplitters. However, in order to realize their full flatness potential, these dichroic beamsplitters need to be carefully mounted in microscopy cubes. We have developed proprietary methods of installing $\lambda/2$ flatness super-resolution 1 mm thick dichroic beamsplitters in cubes and guarantee the flatness performance.

Offered as standard catalog products, cubes compatible with popular microscopes are available.

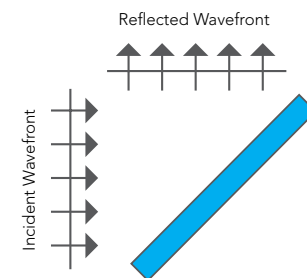
LEARN MORE

For more information about Super-resolution microscopy cubes, please visit www.semrock.com/super-resolution-microscopy-cubes.aspx

Standard Flatness Dichroic



Super-Resolution Dichroic





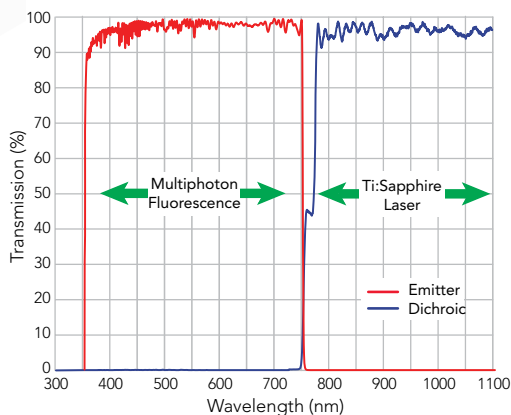
BrightLine® Multiphoton Fluorescence Filters

Our BrightLine multiphoton ultra-high-performance fluorescence filters serve a full range of applications, accommodating the wide range of fluorescent dyes that are the essential tools of the modern researcher. The transmission bands of the emitters are so wide that they appear clear at normal incidence. The long-wave-pass dichroic reflection bands are so wide that they look like mirrors when viewed at 45°. These filters virtually eliminate excitation laser noise at the detector. To reduce undesired fluorescence noise outside a desired band, simply add a BrightLine bandpass filter. The dichroics are designed to maintain low pulse dispersion upon reflection or transmission to enable deeper tissue imaging. These filters provide ideal solutions for non-linear imaging techniques such as multiphoton microscopy, and vibrational techniques such as CARS, CRS, and SRS.



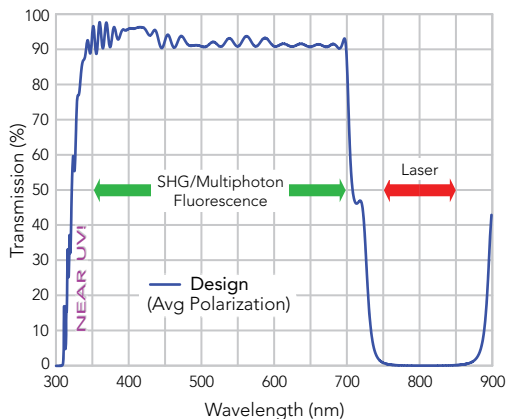
ORDER

To order BrightLine Multiphoton Fluorescence Filters, please visit www.semrock.com



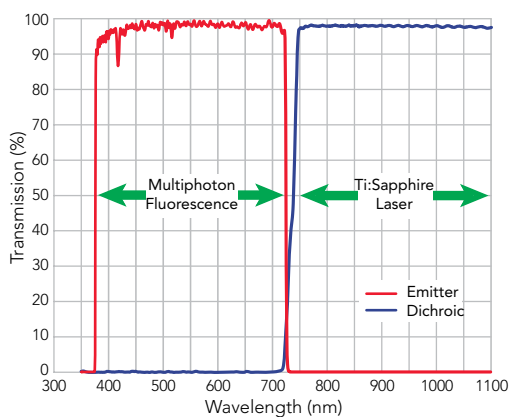
FF01-720/SP-25 and FF705-Di01-25x36 Spectra

Tune your Ti:Sapphire laser down to 720 nm and transmit signals up to 690 nm. Dichroic has extended passband out to 1600 nm for nonlinear laser fluorescence applications.



FF720-SDi01-25x36 Spectrum

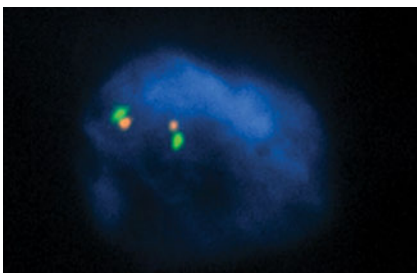
Short-wave-pass Dichroic Beamsplitter for SHG Low dispersion for minimal pulse broadening. Preserves polarization of both excitation and signal beams.



FF01-750/SP-25 and FF735-Di01-25x36 Spectra

Transmits Full Visible – Deep IR Blocking
These filters provide excellent detection of fluorescence throughout the full visible wavelength range, including red fluorophores like Cy5™.

BrightLine® (Cont.)



PathVysion® assay control sample with CEP 17 and HER-2/neu probes (100X oil-immersion objective).

BrightLine® Single-band & Multi-band Sets for FISH & Dense Multiplexing

Help ease the upstream battle against cancer with BrightLine FISH fluorescence filter sets.

Fluorescence In Situ Hybridization, or FISH, is an exciting fluorescence imaging technique that enables clinical-scale genetic screening based on molecular diagnostics. Semrock pioneered hard-coated BrightLine filters that are significantly brighter than and have superior contrast to older, soft-coated fluorescence filters, thus offering faster and more accurate measurements. Independent evaluations have shown that FISH images can be obtained in as little as one half the exposure time using BrightLine filters.

Switching to BrightLine filters is the simplest and least expensive way to dramatically increase the quality of your FISH images. Single-band and Multiband filter sets are available for imaging popular fluorophores such as DAPI, Spectrum Aqua™, Spectrum Green™, Spectrum Gold™, Spectrum Orange™, Spectrum Red™, etc.



APPLICATION NOTE

Full Spectrum of Solutions

Examples of popular assays using BrightLine FISH filter sets

| SINGLE-BAND FILTER SETS | ASSAY | PURPOSE |
|--|-------------|--|
| ■ ■ ■ DAPI, SpGr, SpOr | PathVysion® | Detects amplification of the HER-2 gene for screening and prognosis of breast cancer |
| ■ ■ ■ DAPI, SpAqua, SpGr, SpOr | AneuVysion® | Used as an aid in prenatal diagnosis of chromosomal abnormalities |
| ■ ■ ■ ■ DAPI, SpAqua, SpGr, SpGold, SpRed | UroVysion™ | Aid for initial diagnosis of bladder carcinoma and subsequent monitoring for tumor recurrence in previously diagnosed patients |
| ■ ■ ■ ■ ■ DAPI, SpAqua, SpGr, SpGold, SpRed, Cy5 | M-FISH | Permits the simultaneous visualization of all human (or mouse) chromosomes in different colors for karyotype analysis |



ORDER

To order BrightLine Single-band and Multi-band Sets for FISH and Dense Multiplexing, please visit www.semrock.com



APPLICATION NOTE

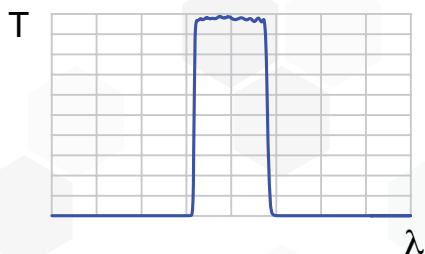
Crosstalk in FISH and Densely Multiplexed Imaging

When using multiple fluorophores with densely spaced spectra, rapid and accurate results rely on the ability to readily distinguish the fluorescence labels from one another. This dense multiplexing of images is particularly important when doing Fluorescence in Situ Hybridization (FISH) measurements. Thus, it is critical to minimize crosstalk, or the signal from an undesired fluorophore relative to that of a desired fluorophore. The table below quantifies crosstalk values for neighboring fluorophores when using a given BrightLine FISH filter set. Values are determined from the overlap of typical, normalized fluorophore spectra, the filter design spectra, and an intense metal halide lamp.

| Fluorophore | Relative Fluorophore Contributions for Each Filter Set | | | | | | | | |
|-------------|--|--------|---------|--------|----------|-------|------------|-------|------|
| | DAPI | SpAqua | SpGreen | SpGold | SpOrange | SpRed | Cy5 / FRed | Cy5.5 | Cy7 |
| DAPI | 100% | 30% | 0% | | | | | | |
| SpAqua | 0% | 100% | 1% | 0% | | | | | |
| SpGreen | 0% | 0% | 100% | 3% | 0% | | | | |
| SpGold | | 0% | 2% | 100% | 49% | 1% | | | |
| SpOrange | | | 0% | 36% | 100% | 11% | 0% | | |
| SpRed | | | | 0% | 15% | 100% | 1% | 0% | |
| Cy5 / FRed | | | | | 0% | 12% | 100% | 53% | 1% |
| Cy5.5 | | | | | | 0% | 53% | 100% | 6% |
| Cy7 | | | | | | | 0% | 12% | 100% |

Grey combinations are not recommended.

As an example, when imaging a sample labeled with the SpectrumGreen, SpectrumGold, and SpectrumRed fluorophores using the SpectrumGold filter set, the undesired SpectrumGreen signal will be less than 2% of the desired SpectrumGold signal, and the SpectrumRed signal will be less than 1%.

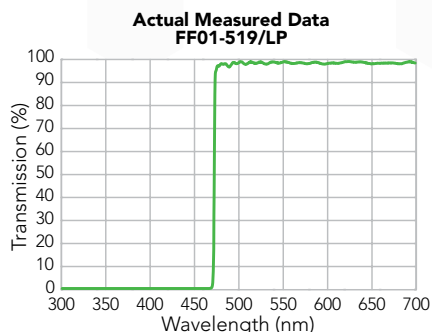


BrightLine® Single-band Bandpass Filters

› 100s of standard catalog filters with center wavelength from 254 to 1570 nm are available

We stock an exceptional range of high-performance, high-reliability individual fluorescence bandpass filters that have been optimized for use in a variety of fluorescence instruments. These filters exclusively utilize our patented single-substrate construction for the highest performance and reliability.

Unless otherwise noted, all filters are housed in a standard 25 mm round black-anodized aluminum ring with thickness as indicated, and a clear aperture of at least 21 mm.

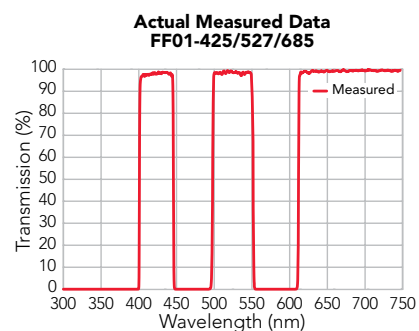


BrightLine Long / Short pass Single-edge Filters

› Standard catalog filters with center wavelength from 274 to 1550 nm are available

We stock an exceptional range of high-performance, high-reliability individual fluorescence edge filters that have been optimized for use in a variety of fluorescence instruments. These filters exclusively utilize our patented single-substrate construction for the highest performance and reliability.

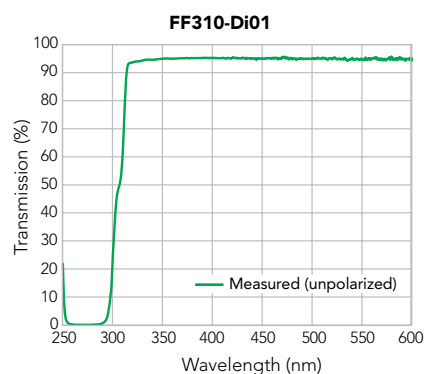
Unless otherwise noted, all filters are housed in a standard 25 mm round black-anodized aluminum ring with thickness as indicated, and a clear aperture of at least 21 mm. Parts with a "/LP" in the part number are long-wave-pass edge filters and parts with a "/SP" are short-wave-pass edge filters.



BrightLine Multiband Bandpass Filters

› Standard catalog multiband filters are available from dual-band to eleven-bands that cover 380 to 1550 nm

We offer a unique selection of individual high-performance multiband fluorescence bandpass filters that have been optimized for use in a variety of fluorescence instruments. These filters all utilize our exclusively single-substrate, low-autofluorescence glass construction. All filters are housed in a standard 25 mm round black-anodized aluminum ring with thickness as indicated, and have a clear aperture of at least 21 mm. These filters have extremely high transmission, steep and well-defined edges, and outstanding blocking between the passbands.



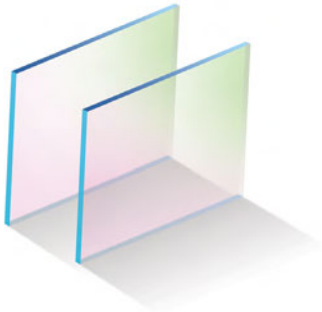
BrightLine Single-edge Dichroic Beamsplitters

› Single-edge General Purpose Dichroic Beamsplitters from 310 to 989 nm (polarization-insensitive; for use at 45°)

We offer a wide range of polarization-insensitive dichroic beamsplitters that exhibit steep edges with very high and flat reflection and transmission bands. More complete reflection and transmission mean less stray light for lower background and improved signal-to-noise ratio. These filters are optimized for fluorescence microscopes and instrumentation, and may also be used for a variety of other applications that require beam combining and separation based on wavelength. All Semrock filters are made with our reliable hard-coating technology and utilize high-optical-quality, ultralow-autofluorescence glass substrates. These filters are excellent for epifluorescence, TIRF and diverse laser applications.

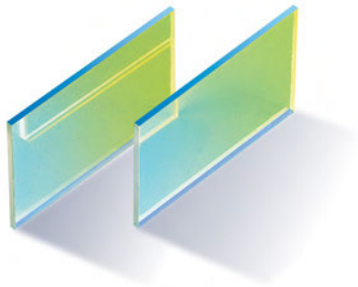
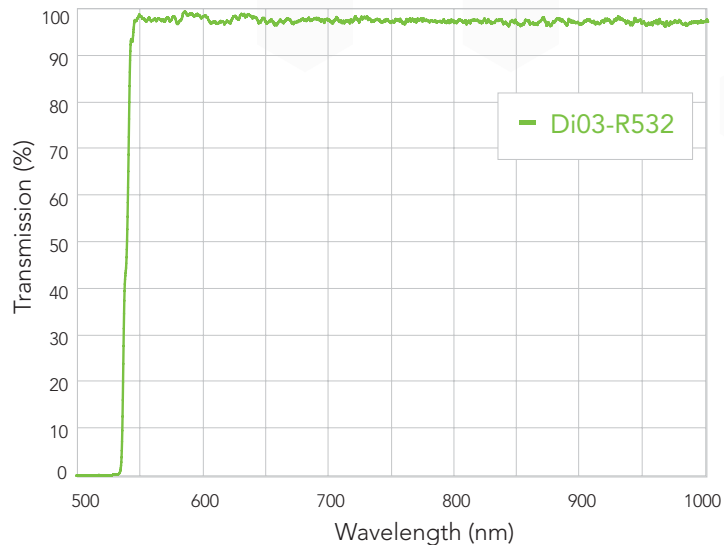
Parts with a "Di" are long-wave-pass (reflect shorter wavelengths and transmit longer wavelengths) and parts with a "SDi" are short-wave-pass (reflect longer wavelengths and transmit shorter wavelengths).

BrightLine® (Cont.)



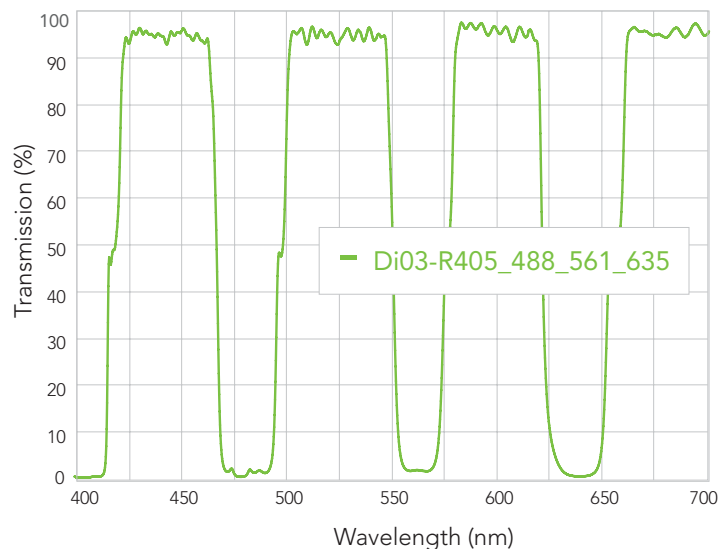
BrightLine® Single-edge Laser Dichroic Beamsplitters

Brightline laser dichroic beamsplitters have extended reflection down to 350 nm to enable photoactivation. These dichroic beamsplitters are optimized for the most popular lasers used for fluorescence imaging, including all-solid-state lasers. Reflection is guaranteed to be > 98% (s-polarization) and > 94% (average polarization) at the laser wavelengths, plus > 93% average transmission and very low ripple over extremely wide passbands – out to 900 and even 1600 nm.



BrightLine Laser Multiedge Dichroic Beamsplitters

Optimized for the most popular lasers used for fluorescence imaging, including all-solid-state lasers that are replacing older gas-laser technology. BrightLine® Laser Multiedge Dichroic Beamsplitters offer exceptionally high reflection at the laser wavelengths combined with very steep transitions from high reflection to high transmission (< 2.5% of the longest laser wavelength). They also offer needed flatness for laser applications.



ORDER

To order BrightLine optical filter products, please visit www.semrock.com



LaserMUX™

LaserMUX™ Beam Combining Filters

LaserMUX filters are designed to efficiently combine or separate multiple laser beams at a 45° angle of incidence. These dichroic laser beam combiners are optimized to multiplex (MUX) popular laser lines, and can also be used in reverse to demultiplex (DEMUX). The ultra-low autofluorescence filters are ideally suited for OEM multi-laser fluorescence imaging and measurement applications including laser microscopy and flow cytometry, as well as for myriad end-user applications in a laboratory environment.

With high reflection and transmission performance at popular laser lines, these filters allow combining multiple different laser beams with exceptionally low loss. LaserMUX filters are hard-coated and come in an industry-standard 25 mm diameter x 3.5 mm thick black-anodized aluminum ring with a generous 22 mm clear aperture.



To order LaserMUX Beam Combining Filters, please visit www.semrock.com

StopLine®



StopLine® Notch Dichroic Beamsplitters

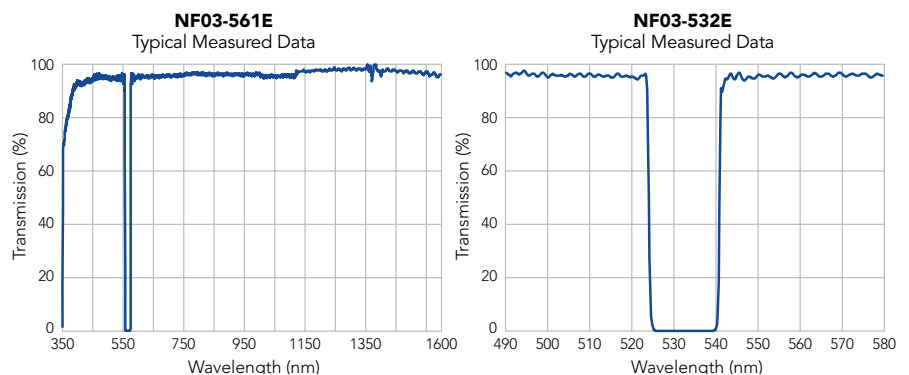
Our single-edge StopLine notch dichroics are designed for a 45° angle of incidence and will reflect just the incident laser source, while allowing wavelengths above and below the notch to transmit. These notch dichroics were designed specifically for Coherent Anti-Stokes Raman Spectroscopy (CARS) applications. The 1064 nm StopLine notch is also suitable for laser tweezing/trapping applications, reflecting just the trapping laser and allowing the fluorescence/bright-field wavelengths to transmit.

StopLine Single-notch Filters

StopLine deep notch filters rival the performance of holographic notch filters but in a less expensive, more convenient, and more reliable thin-film filter format (U.S. Patent No. 7,123,416). These filters are ideal for applications including Raman spectroscopy, laser-based fluorescence instruments, and biomedical laser systems.

- › The stunning StopLine E-grade notch filters offer high transmission over ultra-wide passbands (UV to 1600 nm)
- › Deep laser-line blocking for maximum laser rejection (OD > 6)
- › High laser damage threshold and proven reliability
- › Rejected light is reflected, for convenient alignment and best stray-light control
- › Multi-notch filters are available for blocking multiple laser lines

Semrock introduced a breakthrough invention in thin-film optical filters: our StopLine E-grade thin-film notch filters have ultrawide passbands with deep and narrow laser-line blocking. Unheard of previously in a thin-film notch filter made with multiple, discrete layers, these patent-pending notch filters attenuate the laser wavelength with OD > 6 while passing light from the UV well into the near-infrared (1600 nm). They are especially suited for optical systems addressing multiple regions of the optical spectrum (e.g., UV, Visible, and Near-IR), and for systems based on multiple detection modes (e.g., fluorescence, Raman spectroscopy, laser-induced breakdown spectroscopy, etc.).





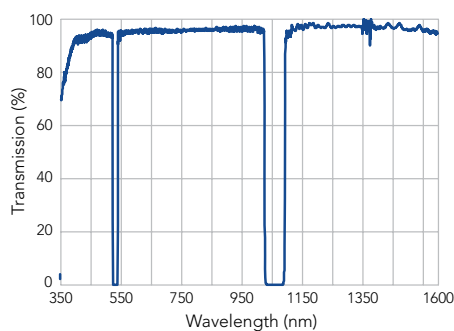
StopLine® Multi-notch Filters

Our unique multi-notch filters meet or exceed even the most demanding requirements of our end-users as well as OEM customers. These include dual-, triple-, and even quadruple-notch filters for a variety of multi-laser instruments.

Our advanced manufacturing process allows for notch wavelengths that are not integer multiples of the other.

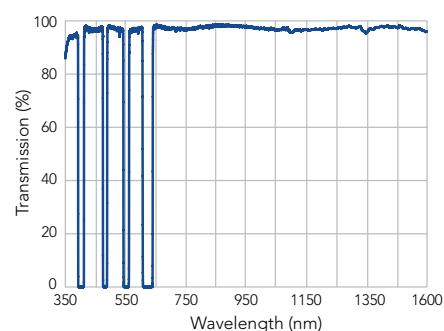
NF03-532/1064E-25 Dual-notch Filter

Actual measured data from typical filters is shown



NF03-405/488/561/635E-25 Quad-notch Filter

Actual measured data from typical filters is shown



APPLICATION NOTE

Applications include:

- › Laser-based fluorescence instruments
- › Confocal and multi-photon fluorescence microscopes
- › Analytical and medical laser systems



ORDER

To order StopLine optical products, please visit www.semrock.com

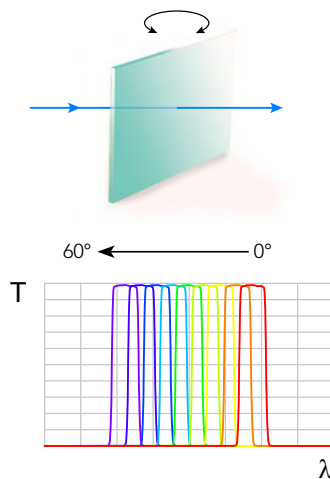
VersaChrome®



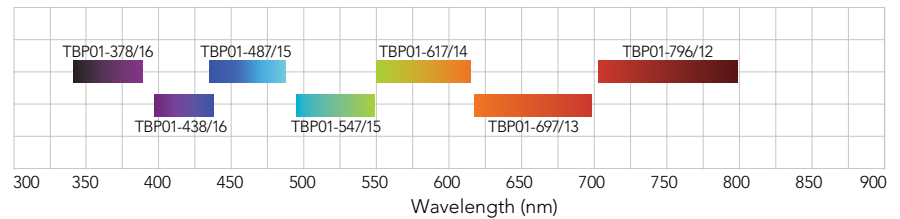
VersaChrome® Tunable Bandpass Filters

These game-changing optical filters do what no thin-film filter has ever done before: offer wavelength tunability over a very wide range of wavelengths by adjusting the angle of incidence with essentially no change in spectral performance. VersaChrome filters combine the highly desirable spectral characteristics and two-dimensional imaging capability of thin-film optical filters with the wavelength tuning flexibility of a diffraction grating. They are so innovative, they have been patented. U.S. Patent No. 8,441,710 with additional patents pending.

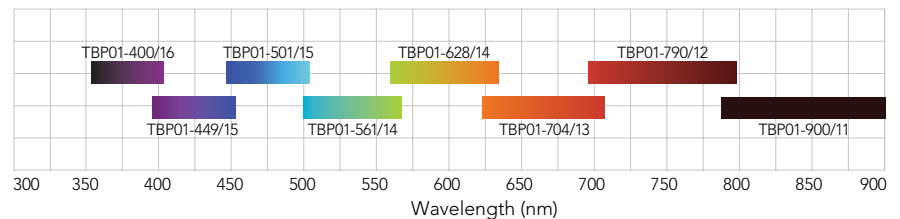
With a tuning range of greater than 11% of the normal-incidence wavelength (by varying the angle of incidence from 0 to 60°), only five filters are needed to cover the full visible spectrum. They are ideal for applications ranging from fluorescence imaging and measurements to hyperspectral imaging and high-throughput spectroscopy. With their excellent polarization insensitivity and high optical quality and damage threshold, they are well-suited for a wide range of laser applications as well.



Standard Overlap Tunable Filters



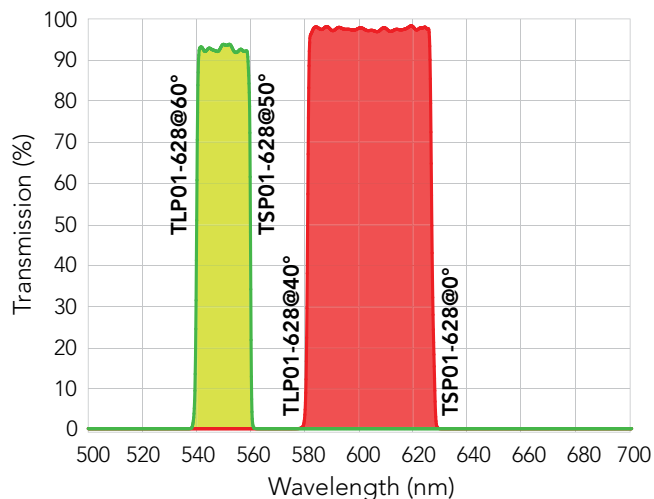
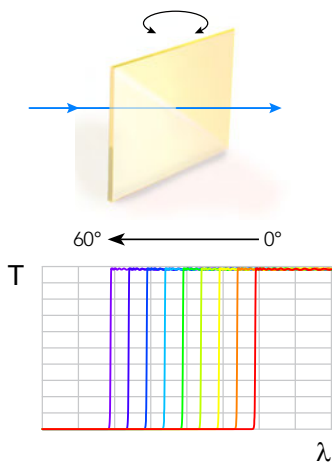
Extended Overlap Tunable Filters





VersaChrome Edge™ Tunable Filters

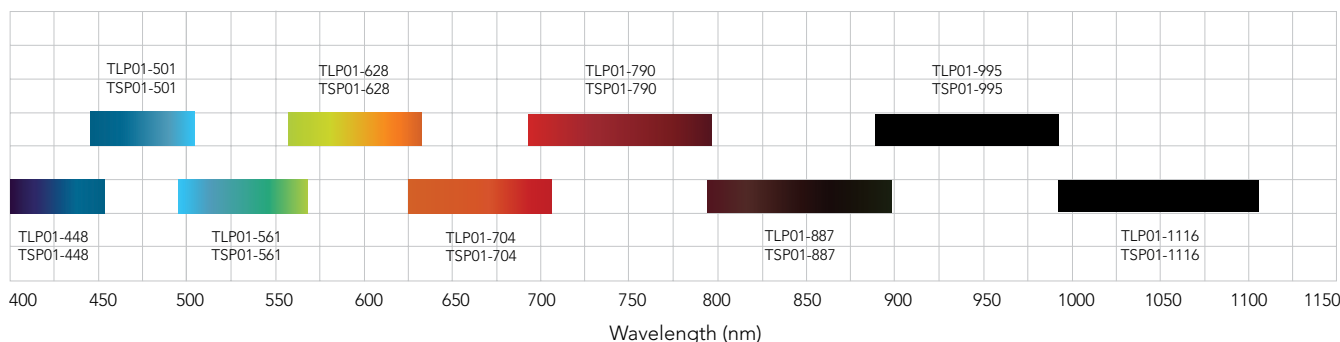
VersaChrome Edge™ tunable filters unlock virtually unlimited spectral flexibility for fluorescence microscopy and hyperspectral imaging, as well as for spectroscopy applications. By utilizing a combination of VersaChrome Edge tunable long-wave-pass (TLP) and short-wave-pass filters (TSP), a bandpass filter as narrow as sub 5 nm FWHM or as wide as 12% of the center wavelength throughout the visible and near-infrared wavelength ranges can be created. Semrock's patented tunable thin-film filters can't be found anywhere else in the market. U.S. Patent No. 8,441,710 with additional patents pending.



★ LEARN MORE

For more information about VersaChrome Edge™ Tunable Filters, and how to create a bandpass filter using Edge Tunable filters, please visit www.semrock.com/versachrome-edge-tunable-filters.aspx

Standard Edge Tunable Filters



RazorEdge®

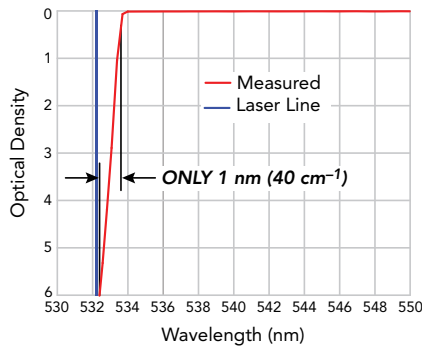


RazorEdge® Long Wave Pass Raman Edge Filters

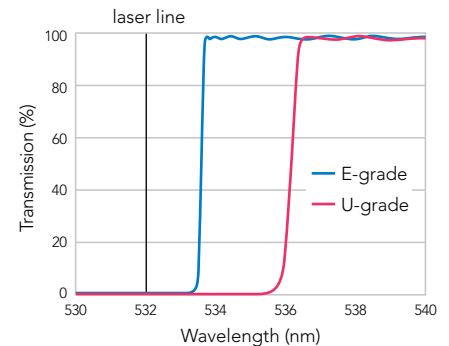
› The steepest edge filters on the market – RazorEdge E-grade filters

We stock an unsurpassed selection of the highest performance edge filters available for Raman Spectroscopy, with edge wavelengths from 224 to 1319 nm. Now you can see the weakest signals closer to the laser line than you ever have before. With their deep laser-line blocking, ultra-wide and low-ripple passbands, proven hard-coating reliability, and high laser damage threshold, they offer performance that lasts. U.S. Patent No. 7,068,430.

RazorEdge Raman Filter Spectra



Actual measured OD 532 nm E-grade filter

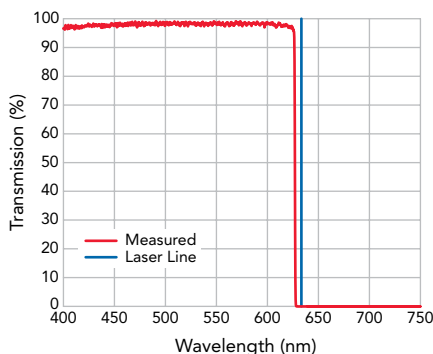


The spectral response of a U-grade filter is located anywhere between the red and blue lines below.



RazorEdge Short Wave Pass Raman Edge Filters

These unique filters are ideal for Anti-Stokes Raman applications with edge wavelengths available from 532 to 785 nm. An addition to the popular high-performance RazorEdge family of steep edge filters, these short-wave-pass filters are designed to attenuate a designated laser-line by six orders of magnitude, and yet maintain a typical edge steepness of only 0.5% of the laser wavelength. Both short and long-wave-pass RazorEdge filters are perfectly matched to Semrock's popular MaxLine® laser-line cleanup filters.



Actual measured data from a 632.8 nm RazorEdge filter



RazorEdge Dichroic™ Beamsplitters

Our unique RazorEdge Dichroic beamsplitters exhibit unparalleled performance. Each filter reflects a standard laser line incident at 45° while efficiently passing the longer Raman-shifted wavelengths. Edge wavelengths are available from 488 to 1064 nm. They exhibit ultrasteep transition from reflection to transmission, far superior to anything else available on the open market. The guaranteed transition width of < 1% of the laser wavelength for U-grade (regardless of polarization) makes these filters a perfect match to our popular normal-incidence RazorEdge ultrasteep long-wave-pass filters. These beamsplitters are so innovative that they are patent pending.



NOTE

Available as either mounted in 25 mm diameter x 3.5 mm thick black-anodized aluminum ring or unmounted as 25.2 x 35.6 x 1.1 mm or 25.2 x 35.6 x 2.0 mm.



ORDER

To order RazorEdge optical products, please visit www.semrock.com



EdgeBasic™

EdgeBasic™ Long / Short Wave Pass Filters

- › Deep laser-line blocking — for maximum laser rejection (OD > 6)
- › Extended short-wavelength blocking (LWP) — for high-fidelity fluorescence imaging
- › High signal transmission — to detect the weakest signals (> 98% typical)
- › Proven no burn-out durability — for lasting and reliable performance
- › For the ultimate performance, upgrade to state-of-the-art RazorEdge® Raman filters

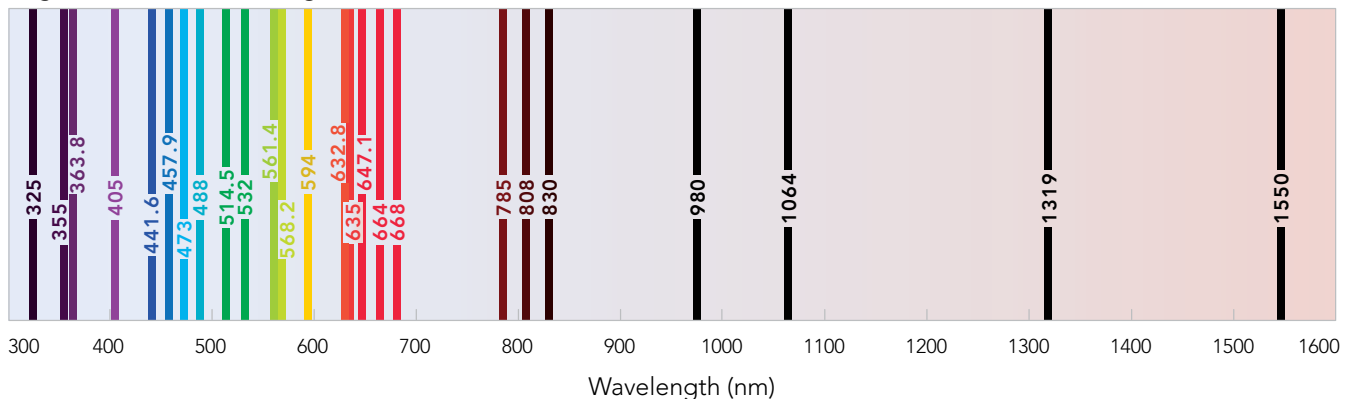
EdgeBasic long-wave-pass and short-wave-pass filters offer a superb combination of performance and value for applications in Raman spectroscopy and fluorescence imaging and measurements. This group of filters is ideal for specific Raman applications that do not require measuring the smallest possible Raman shifts, yet demand exceptional laser-line blocking and high transmission over a range of Raman lines.



ORDER

To order EdgeBasic optical products, please visit www.semrock.com

EdgeBasic™ Laser Wavelength Reference Chart





MaxLine®

MaxLine® Laser-line Filters

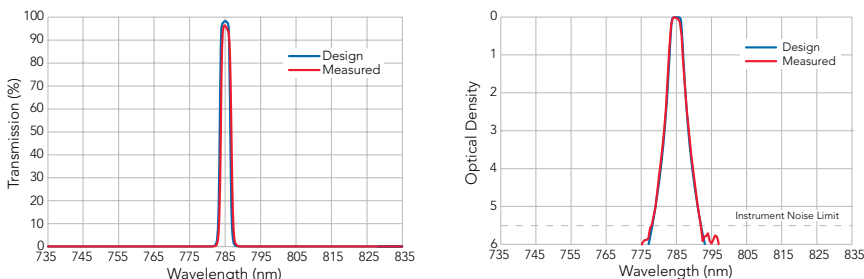
- › Highest laser-line transmission – stop wasting expensive laser light
- › Steepest edges – perfect match to RazorEdge® U-grade filters
- › Ideal complement to StopLine® deep notch filters for fluorescence and other applications
- › Hard dielectric coatings for proven reliability and durability
- › For diode lasers, use our MaxDiode™ Laser Clean-up filters



ORDER

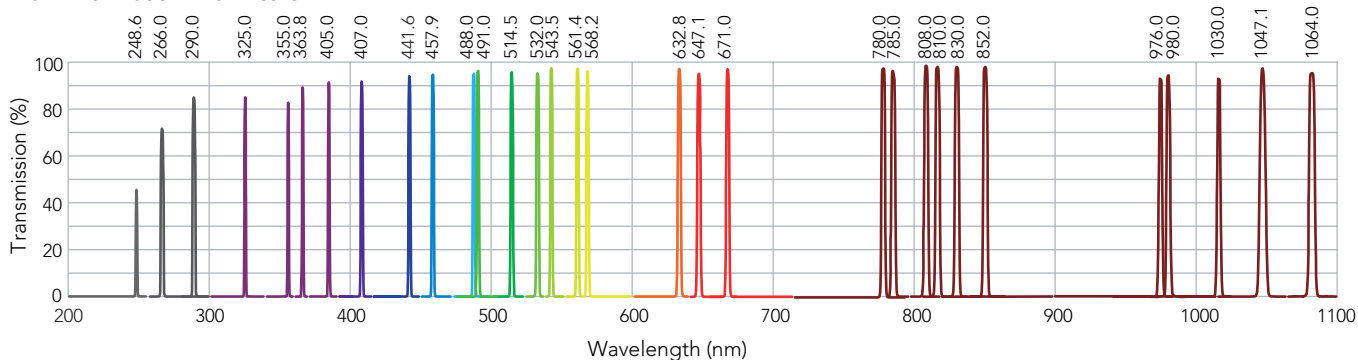
To order MaxLine optical products, please visit www.semrock.com

Our MaxLine Laser-line Filters have an unprecedented high transmission exceeding 90% at the laser line, while rapidly rolling off to an optical density (OD) > 5 at wavelengths differing by only 1% from the laser wavelength, and OD > 6 at wavelengths differing by only 1.5% from the laser wavelength. U.S. Patent No. 7,119,960.

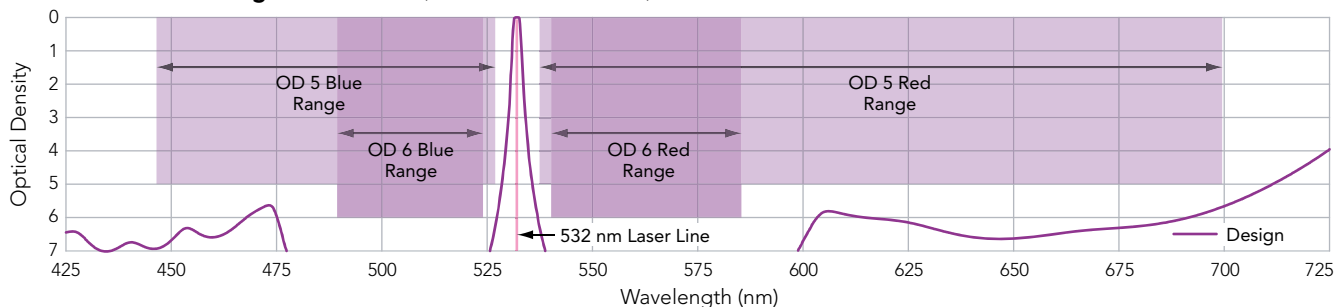


These graphs demonstrate the outstanding performance of the 785 nm MaxLine laser-line filter, which has transmission guaranteed to exceed 90% at the laser line and OD > 5 blocking less than 1% away from the laser line. Note the excellent agreement with the design curves.

MaxLine® Laser-line Filters



MaxLine Filter Blocking Performance (532 nm filter shown)





MaxDiode™

MaxDiode™ Laser Diode Clean-up Filters

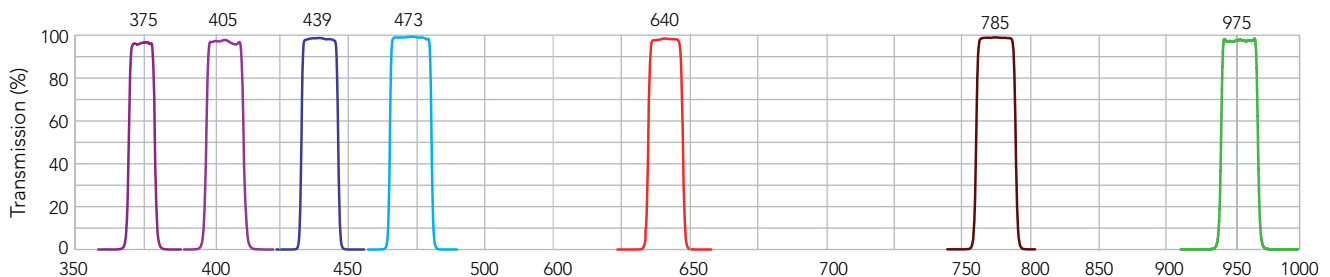
- › Square low-ripple passband for total consistency as your laser ages, over temperatures, or when installing a replacement laser
- › Highest transmission, exceeding 90% over each diode's possible laser wavelengths
- › Extremely steep edges transitioning to very high blocking to successfully filter undesired out-of-band noise
- › For narrow-line lasers, use our MaxLine® laser-line filters (see page 215)

Our MaxDiode filters are ideal for both volume OEM manufacturers of laser-based fluorescence instrumentation and laboratory researchers who use diode lasers for fluorescence excitation and other types of spectroscopic applications. Keep the desirable laser light while eliminating the noise with MaxDiode filters.



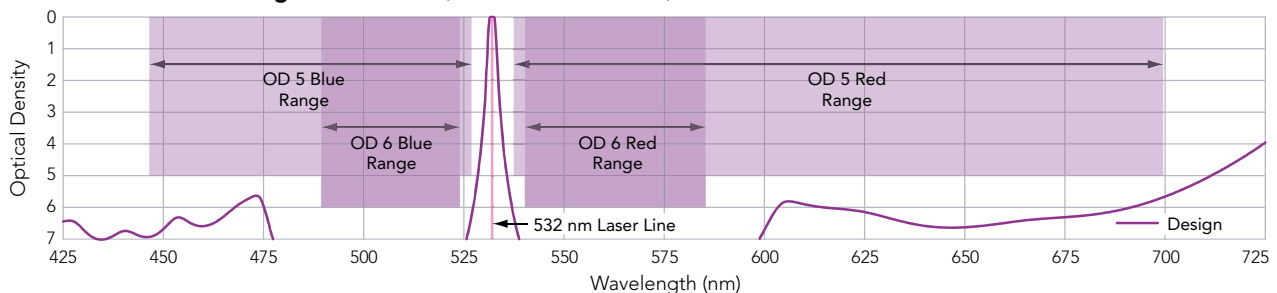
To order MaxDiode optical products, please visit www.semrock.com

MaxDiode™ Laser Diode Clean-up Filters



Actual measured data shown

MaxDiode Filter Blocking Performance (470 nm filter shown)



Near Infrared Bandpass Filters

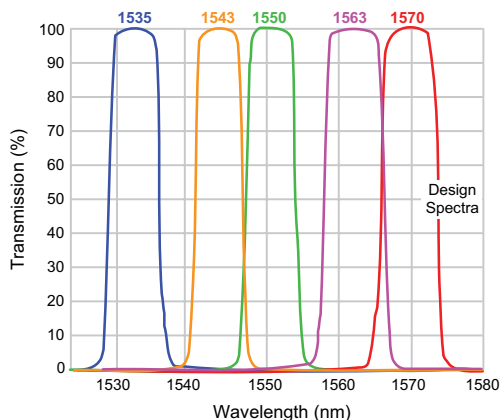
Our industry-leading ion-beam-sputtering manufacturing is now available for making optical filters with precise spectral features (sharp edges, passbands, etc.) at near-IR wavelengths, with features out to ~ 1700 nm, and high transmission to wavelengths > 2000 nm. The bandpass filters on this page are ideal as laser source clean-up filters and as detection filters which pass particular laser wavelengths and virtually eliminate background over the full InGaAs detector range (850 – 1750 nm). They are optimized for the most popular "retina-safe" lasers in the 1.5 μm wavelength range, where maximum permissible eye exposures are much higher than in the visible or at the 1.06 μm neodymium line. Applications include laser radar, remote sensing, rangefinding, and laser-induced breakdown spectroscopy (LIBS).



APPLICATION NOTE

Near-IR bandpass filters are a good match for:

- › Er-doped fiber and Er-doped glass lasers at 1535 nm
- › r-doped fiber and InGaAsP semiconductor lasers at 1550 nm
- › Nd:YAG-pumped optical parametric oscillators (OPO's) at 1570 nm



Custom Sized Optical Filters

Instantly Build and Purchase Custom Sized Filters

- › Select housed / unmounted options
- › Standard housing diameters available
- › Circular and rectangular shapes
- › Dimensional range of 5–50.8 mm*
- › Calculate price quickly for desired quantities
- › Instant part number and ordering
- › Rapid turnaround in a matter of days

**Dimensional range varies by filter/shape*



ORDER

Try our custom sizing tool and order Custom filters by visiting www.semrock.com

Educational Materials

Help is only a click away to access a wealth of product and application support information, including:

Chemical Compatibility

- › Use our compatibility charts to discover what materials are best suited for your application.

www.idex-hs.com/chemical-compatibility

Chromatography Forum

- › Browse or join this group that is devoted to the analytical and scientific communities.

www.idex-hs.com/chromatography-forum

Conversion Tools

- › Find useful Conversion Tools that allow you to easily convert temperatures, measurements, pressure ratings, and other functions.

www.idex-hs.com/conversions

FAQs

- › Explore our FAQs section to assist in finding the answers to issues you may be facing.

www.idex-hs.com/faqs

www.semrock.com/technical-faq.aspx

Fittings Primer

- › Learn the complexities and functions of nut- and ferrule fittings using our Fittings Primer.

www.idex-hs.com/fittings-primer

Glossary of Terms

- › Our Glossary of Terms provides a convenient list of definitions and/or explanations to language that is applicable in our industry.

www.idex-hs.com/glossary

HPLC Center

- › Visit our HPLC Center to learn about high- and ultra-high performance liquid chromatography.

www.idex-hs.com/hplc-center

Injectors Troubleshooting

- › This guide presents common problems when using manual sample injection valves.

www.idex-hs.com/injectors

IP Rating

- › Use our IP Rating chart to discover the environmental care of our electrical equipment.

www.idex-hs.com/ip-rating

Materials Guide

- › Our Materials Guide allows you to view material property and solvent compatibility.

www.idex-hs.com/materials-guide

Optical Filter Plotting Tool

- › Our SearchLight™ optical filter plotting tool allows you to easily select elements for your system, visualize the spectral properties, and quickly calculate critical parameters such as signal brightness, autofluorescence levels, and signal-to-noise ratio.

searchlight.semrock.com

Polymer Information

- › Study the Polymer Information chart to learn about analytical solvent compatibility for HPLC.

www.idex-hs.com/polymer-information

Pump School

- › Jump over to Pump School, an introduction to rotary positive-displacement (PD) pumps.

www.idex-hs.com/pump-school

Standard Port Drawings

- › We offer downloadable schematics of our Standard Port Drawings that allow you to easily create your own internal ports using our fittings.

www.idex-hs.com/standard-port-drawings

Tech Tips

- › Examine various topics that will maximize the precision performance of our products.

www.idex-hs.com/tech-tips

Webinars & Videos

- › IDEX Health & Science hosts ongoing educational webinars on specific topics, and has also created a product- and process-focused video library.

www.idex-hs.com/webinars-and-videos

Literature & Downloads

Our literature and downloads section provides a wide selection of valuable information about our products and our company. You can access and download a variety of support literature, manuals, designed to assist in the use of our products and services, including:

Operation Manuals & Instruction Cards

- › Product operation manuals and instruction cards are here for your convenience to download and use as reference.

www.idex-hs.com/manuals

Optical Filter Journals and White Paper Articles

- › Download and share our extensive collection of white papers and journal reprint articles written by our expert PhD staff. Browse varied topics, from coatings for ultrafast lasers, to polarization, super-resolution microscopy, tunable bandpass filters, and more.

www.semrock.com/tech-library.aspx

Optical Filter Technical Notes

- › Visit our General Filter information to learn more about the many optical filters we offer, how to find filter orientation, how to measure OD, and more.
- › Learn the basics of Fluorescence Filters, including different types of fluorescence filters, applications, uses, and information.
- › Our Raman & Laser Optical System Filters information pages give you an in-depth look into what you need to know and how to avoid issues integrating into your Raman & Laser Optical systems.

www.semrock.com/tech-notes.aspx

Optical Systems, Laser, & Shutter Technical Resources

Have a question or need some technical support? Consult our library of documentation, manuals, data sheets and specifications on our entire family of optical products, including:

- › Technical Note
- › White papers
- › Journal articles

www.mellesgriot.com/store/technical-library

Support Literature

- › Download informational IDEX Health & Science product and OEM catalogs, brochures, white papers, data sheets and more.

www.idex-hs.com/support-literature

Index by Part Number

| | | | |
|------------------|-----|---------------------|-----|
| 0001-6482..... | 155 | 04 UTS 226..... | 177 |
| 0001-6484..... | 155 | 04 UTS 228..... | 177 |
| 0001-6500..... | 155 | 04 UTS 234..... | 177 |
| 0001-6501..... | 155 | 04 UTS 236..... | 177 |
| 04 ESC 031..... | 178 | 04 UTS 242..... | 177 |
| 04 ESC 121..... | 178 | 04 UTS 244..... | 177 |
| 04 ESO 031..... | 178 | 04 UTS 250..... | 177 |
| 04 ESO 121..... | 178 | 04 UTS 252..... | 177 |
| 04 IES 211..... | 175 | 04 UTS 258..... | 177 |
| 04 IES 213..... | 175 | 04 UTS 260..... | 177 |
| 04 IES 214..... | 175 | 04 UTS 266..... | 177 |
| 04 IES 215..... | 175 | 04 UTS 268..... | 177 |
| 04 IES 218..... | 175 | 07 HIS 001..... | 179 |
| 04 IES 224..... | 175 | 25-LGP-173..... | 186 |
| 04 IES 230..... | 175 | 25-LGP-193..... | 186 |
| 04 IES 236..... | 175 | 25-LGR-173..... | 186 |
| 04 IPS 833..... | 182 | 25-LGR-193..... | 186 |
| 04 IPS 835..... | 182 | 25-LGR-393..... | 186 |
| 04 IPS 837..... | 182 | 25-LHP-073..... | 185 |
| 04 ISC 450..... | 182 | 25-LHP-111..... | 185 |
| 04 LSC 001..... | 170 | 25-LHP-121..... | 185 |
| 04 LSC 003..... | 170 | 25-LHP-151..... | 185 |
| 04 RDI 231..... | 171 | 25-LHP-171..... | 185 |
| 04 RDI 232..... | 171 | 25-LHP-213..... | 185 |
| 04 RDS 002..... | 169 | 25-LHP-691..... | 185 |
| 04 RDS 004..... | 169 | 25-LHP-828..... | 185 |
| 04 RDS 005..... | 169 | 25-LHP-925..... | 185 |
| 04 RDS 032..... | 169 | 25-LHP-928..... | 185 |
| 04 RDS 332..... | 169 | 25-LHP-991..... | 185 |
| 04 RDS 501..... | 166 | 25-LHR-073..... | 185 |
| 04 RDS 531..... | 166 | 25-LHR-111..... | 185 |
| 04 RDS 701..... | 167 | 25-LHR-121..... | 185 |
| 04 RDS 731..... | 167 | 25-LHR-151..... | 185 |
| 04 RSC 450..... | 181 | 25-LHR-171..... | 185 |
| 04 SMD 001..... | 173 | 25-LHR-213..... | 185 |
| 04 SMS 001..... | 173 | 25-LHR-691..... | 185 |
| 04 SMSi 001..... | 173 | 25-LHR-925..... | 185 |
| 04 UTS 201..... | 177 | 25-LHR-991..... | 185 |
| 04 UTS 203..... | 177 | 25-STP-910..... | 187 |
| 04 UTS 204..... | 177 | 25-STP-912..... | 187 |
| 04 UTS 205..... | 177 | 56-CRN-405-100..... | 188 |
| 04 UTS 208..... | 177 | 56-CRN-405-200..... | 188 |
| 04 UTS 210..... | 177 | 56-CRN-445-040..... | 188 |
| 04 UTS 218..... | 177 | 56-CRN-445-080..... | 188 |
| 04 UTS 220..... | 177 | 56-CRN-488-050..... | 188 |

| | | | | | |
|----------------|-----|-----------|---------|----------|-----|
| 56-CRN-488-150 | 188 | 1581 | 18 | 7020 | 127 |
| 56-CRN-515-060 | 188 | 1593 | 73 | 7021 | 127 |
| 56-CRN-640-050 | 188 | 1876 | 127 | 7022 | 127 |
| 56-CRN-642-100 | 188 | 1958-01 | 78 | 7023 | 127 |
| 57-CFP-405-025 | 188 | 1959-01 | 76 | 7024 | 127 |
| 57-CFP-405-050 | 188 | 3000 | 123 | 7025 | 127 |
| 57-CFP-445-025 | 188 | 3055-018 | 130 | 7026 | 127 |
| 57-CFP-445-040 | 188 | 3055-019 | 130 | 7027 | 127 |
| 57-CFP-488-025 | 188 | 3055-023 | 130 | 7028 | 127 |
| 57-CFP-488-050 | 188 | 3055-025 | 130 | 7029 | 127 |
| 57-CFP-515-025 | 188 | 3065-018 | 127 | 7030 | 123 |
| 57-CFP-642-050 | 188 | 3065-019 | 127 | 7030-003 | 125 |
| 57-CFP-648-025 | 188 | 3065-023 | 127 | 7030-014 | 125 |
| 57-CFS-405-025 | 188 | 3065-025 | 127 | 7030-015 | 125 |
| 57-CFS-405-050 | 188 | 3255 | 23 | 7030L | 123 |
| 57-CFS-445-025 | 188 | 3505 | 23 | 7031-05 | 107 |
| 57-CFS-445-040 | 188 | 3725-006 | 125 | 7031-20 | 107 |
| 57-CFS-488-025 | 188 | 3725-018 | 125 | 7060 | 123 |
| 57-CFS-488-050 | 188 | 3725-038 | 123 | 7060-039 | 125 |
| 57-CFS-515-025 | 188 | 3725-999 | 125 | 7060-064 | 125 |
| 57-CFS-640-025 | 188 | 3725i | 123 | 7060-065 | 125 |
| 57-CFS-642-050 | 188 | 3725i-038 | 123 | 7060-070 | 125 |
| 59 OSC 205 | 182 | 3755 | 23 | 7060-074 | 125 |
| 85-BDD-020 | 190 | 5001-999 | 125 | 7112-999 | 125 |
| 85 BLS 301 | 194 | 5100-999 | 125 | 7123-047 | 125 |
| 85 BLS 601 | 194 | 5104-999 | 125 | 7123-127 | 125 |
| 85-GCA-020 | 192 | 6000-076 | 66 | 7123-128 | 125 |
| 85-GHS-201 | 195 | 6000-078 | 61, 130 | 7123-142 | 125 |
| 85-GHS-301 | 195 | 6000-079 | 61, 130 | 7123-145 | 125 |
| 85-GHS-305 | 195 | 6000-082 | 33 | 7123-147 | 125 |
| 85-GHS-309 | 195 | 6000-083 | 33 | 7123-148 | 125 |
| 85-YCA-020 | 193 | 6000-209 | 33 | 7123-149 | 125 |
| 85-YCA-050 | 193 | 6000-210 | 33 | 7123-180 | 125 |
| 1006-999 | 125 | 6000-211 | 33 | 7123-221 | 125 |
| 1020-05 | 107 | 6000-251 | 61, 130 | 7123-223 | 125 |
| 1020-20 | 107 | 6000-254 | 61, 130 | 7123-227 | 130 |
| 1328 | 54 | 6000-255 | 61 | 7123-548 | 125 |
| 1356 | 54 | 6000-262 | 33 | 7123-550 | 125 |
| 1531 | 18 | 6000-282 | 32 | 7123-568 | 125 |
| 1531B | 18 | 6000-360 | 61 | 7125-047 | 125 |
| 1532 | 18 | 6255 | 23 | 7125-054 | 131 |
| 1533 | 18 | 6505 | 23 | 7125-079 | 125 |
| 1534 | 18 | 6755 | 23 | 7125-999 | 125 |
| 1535 | 18 | 6810 | 51, 133 | 7150-999 | 125 |
| 1536 | 18 | 7000 | 123 | 7152-999 | 125 |
| 1538 | 18 | 7000-016 | 125 | 7155-999 | 125 |
| 1544 | 18 | 7000L | 123 | 7160 | 133 |
| 1560 | 18 | 7004-999 | 125 | 7160-010 | 133 |
| 1561 | 18 | 7010 | 123 | 7160-029 | 133 |
| 1568 | 18 | 7010-039 | 125 | 7410-038 | 125 |
| 1569 | 18 | 7010-040 | 125 | 7410-041 | 125 |
| 1570 | 18 | 7010-069 | 125 | 7410-999 | 125 |
| 1571 | 18 | 7010-071 | 125 | 7413-013 | 125 |
| 1572 | 18 | 7010-997 | 125 | 7501-999 | 125 |
| 1574 | 18 | 7010-998 | 125 | 7502-999 | 125 |
| 1576 | 18 | 7010-999 | 125 | 7507-999 | 125 |
| 1577 | 18 | 7012 | 131 | 7520-030 | 125 |

| | | | | | |
|-----------|-----|------------|-----|-----------|--------------|
| 7520-035 | 125 | 9000-1549 | 153 | 62515 | 23 |
| 7520-999 | 125 | 9010 | 123 | 62520 | 23 |
| 7531-999 | 125 | 9010-051 | 125 | 62550 | 23 |
| 7650-002 | 125 | 9010-065 | 125 | 63005 | 23 |
| 7725 | 123 | 9010-999 | 125 | 65010 | 23 |
| 7725-010 | 125 | 9012 | 131 | 65015 | 23 |
| 7725-999 | 125 | 9013 | 131 | 65020 | 23 |
| 7725i | 123 | 9055-020 | 130 | 65050 | 23 |
| 7725i-188 | 123 | 9055-021 | 130 | 67510 | 23 |
| 7750-038 | 125 | 9055-022 | 130 | 67515 | 23 |
| 7750-070 | 125 | 9055-023 | 130 | 67520 | 23 |
| 7755-015 | 130 | 9055-024 | 130 | 67550 | 23 |
| 7755-020 | 127 | 9055-025 | 130 | 79801-999 | 125 |
| 7755-021 | 127 | 9055-026 | 130 | 79861-999 | 125 |
| 7755-022 | 127 | 9055-027 | 130 | 310010 | 23 |
| 7755-023 | 127 | 9055-028 | 130 | 310015 | 23 |
| 7755-024 | 127 | 9055-029 | 130 | 310020 | 23 |
| 7755-025 | 127 | 9055-033 | 130 | 310050 | 23 |
| 7755-026 | 127 | 9085-05-10 | 106 | 315010 | 23 |
| 7755-027 | 127 | 9085-20-10 | 106 | 315015 | 23 |
| 7755-028 | 127 | 9125-043 | 125 | 315020 | 23 |
| 7755-029 | 127 | 9125-076 | 131 | 315050 | 23 |
| 7770-039 | 133 | 9125-082 | 125 | 610010 | 23 |
| 7770-040 | 133 | 9125-095 | 125 | 610015 | 23 |
| 7770-044 | 133 | 9125-999 | 125 | 610020 | 23 |
| 7770-124 | 133 | 9196-20 | 157 | 610050 | 23 |
| 7770-229 | 125 | 9196-P | 157 | 615010 | 23 |
| 7788-999 | 125 | 9196-P-AR | 157 | 615015 | 23 |
| 7900-146 | 125 | 9196-S | 157 | 615020 | 23 |
| 7900-179 | 125 | 9197-20 | 157 | 615050 | 23 |
| 7900-183 | 125 | 9197-P | 157 | 617515 | 23 |
| 7900-999 | 125 | 9197-P-AR | 157 | 617520 | 23 |
| 7920-999 | 125 | 9197-S | 157 | 617550 | 23 |
| 7960-014 | 125 | 9650-009 | 125 | 620015 | 23 |
| 7960-999 | 125 | 9725 | 123 | 620020 | 23 |
| 7961-999 | 125 | 9725-999 | 125 | 620050 | 23 |
| 7970-999 | 125 | 9725i | 123 | 630010 | 23 |
| 7980-004 | 125 | 9750-021 | 125 | 630015 | 23 |
| 7980-999 | 125 | 9960-002 | 125 | 630020 | 23 |
| 7984-999 | 125 | 31005 | 23 | 630050 | 23 |
| 7986-004 | 125 | 31505 | 23 | A-100 | 96, 104, 160 |
| 7986-999 | 125 | 32510 | 23 | A-101 | 96, 106 |
| 8020 | 127 | 32515 | 23 | A-102 | 96, 106 |
| 8021 | 127 | 32520 | 23 | A-103 | 96, 160 |
| 8022 | 127 | 32550 | 23 | A-105 | 96 |
| 8023 | 127 | 35010 | 23 | A-106 | 96 |
| 8083-MOD | 157 | 35015 | 23 | A-107 | 96 |
| 8125 | 123 | 35020 | 23 | A-120 | 96 |
| 8125-038 | 125 | 35050 | 23 | A-122 | 96 |
| 8125-097 | 125 | 37510 | 23 | A-224 | 96, 104 |
| 8125-098 | 125 | 37515 | 23 | A-225 | 102 |
| 8125-119 | 125 | 37520 | 23 | A-225A | 102 |
| 8125-999 | 125 | 37550 | 23 | A-227A | 102 |
| 9000-1540 | 153 | 61005 | 23 | A-228 | 102 |
| 9000-1541 | 153 | 61505 | 23 | A-230A | 102 |
| 9000-1544 | 153 | 62005 | 23 | A-231A | 102 |
| 9000-1545 | 153 | 62510 | 23 | A-242 | 102 |

| | | | | | |
|--------------|---------|----------------|------------|----------------|------------|
| A-243 | 102 | A-702 | 98 | F-112 | 34 |
| A-302 | 102 | A-703 | 98 | F-113 | 35 |
| A-302A | 102 | A-704 | 98 | F-120x | 32 |
| A-304 | 51 | A-706 | 98 | F-124Hx | 34 |
| A-305 | 51 | A-707 | 98 | F-124Sx | 34 |
| A-309 | 102 | A-708 | 98 | F-125Hx | 34 |
| A-310 | 102 | A-710 | 98 | F-125x | 34 |
| A-311 | 102 | A-720 | 98 | F-126Sx | 34 |
| A-311A | 102 | A-722 | 98 | F-130x | 32 |
| A-313 | 104 | A-735 | 110 | F-132 | 34 |
| A-314 | 104 | B-310 | 88 | F-142Nx | 35, 37, 80 |
| A-315 | 106 | C-128 | 160 | F-142x | 35 |
| A-318 | 106 | C-128-31 | 96, 160 | F-148 | 35 |
| A-320 | 51 | C-128-40 | 160 | F-151 | 35 |
| A-327 | 28 | C-130-20 | 160 | F-152 | 34, 132 |
| A-328 | 28 | C-130-40 | 160 | F-152BLK | 34 |
| A-329 | 28 | C-130B | 160 | F-156 | 41, 93 |
| A-330 | 107 | C-140-30 | 96 | F-172 | 34 |
| A-331 | 96, 107 | C-235x | 33, 38, 41 | F-180 | 54 |
| A-332 | 96, 107 | C-236x | 33 | F-181 | 54 |
| A-337 | 96, 107 | C-270 | 160 | F-182 | 54 |
| A-343 | 96 | C-281 | 160 | F-183 | 54 |
| A-350 | 28 | C-282 | 160 | F-184 | 54 |
| A-355 | 106 | C-401 | 96 | F-185 | 54 |
| A-356 | 106 | C-402 | 96 | F-186 | 54 |
| A-360 | 107 | C-407 | 96 | F-187 | 54 |
| A-410 | 107 | C-408 | 96, 160 | F-188 | 54 |
| A-411 | 107 | C-409 | 96 | F-192x | 36 |
| A-420 | 96 | C-420 | 96, 110 | F-193x | 36 |
| A-427 | 101 | C-425 | 96, 110 | F-195x | 36 |
| A-428x | 104 | C-751 | 160 | F-196x | 36 |
| A-429x | 104 | C-752 | 160 | F-225 | 54 |
| A-430 | 104 | C-1000 | 160 | F-226 | 54 |
| A-431 | 104 | C-1030 | 160 | F-227 | 54 |
| A-435 | 101 | C-1035 | 160 | F-228 | 54 |
| A-437 | 101 | CV-3000 | 135 | F-229 | 54 |
| A-438 | 101 | CV-3001 | 135 | F-230 | 54 |
| A-440 | 101 | CV-3010 | 135 | F-231 | 54 |
| A-441 | 101 | CV-3301 | 136 | F-232 | 54 |
| A-445 | 101 | CV-3302 | 136 | F-233 | 54 |
| A-446 | 101 | CV-3315 | 136 | F-234 | 54 |
| A-451 | 101 | CV-3316 | 136 | F-237 | 54 |
| A-510 | 107 | CV-3320 | 138 | F-238 | 54 |
| A-520x | 101 | CV-3321 | 138 | F-239 | 54 |
| A-522x | 101 | CV-3322 | 138 | F-240 | 54 |
| A-550 | 101 | CV-3323 | 138 | F-241 | 54 |
| A-551 | 101 | CV-3324 | 138 | F-242 | 54 |
| A-610 | 111 | CV-3325 | 138 | F-243 | 54 |
| A-620 | 111 | CV-3330 | 138 | F-244 | 54 |
| A-622 | 111 | CV-3335 | 138 | F-245 | 54 |
| A-626 | 112 | CV-3336 | 138 | F-246 | 54 |
| A-627 | 112 | CV-3340 | 138 | F-247 | 54 |
| A-628 | 112 | CV-3500 | 137 | F-252 | 54 |
| A-629 | 112 | D-646 | 93 | F-252x | 43 |
| A-630 | 111 | D-647 | 93 | F-262x | 28 |
| A-700 | 98, 106 | D-648 | 93 | F-287x | 36 |
| A-701 | 98, 106 | F-100x | 32 | F-300x | 35 |

| | | | | | |
|---------------|--------|------------------|---------|--------------|--------|
| F-330x..... | 35 | M-548..... | 109 | P-207Sx..... | 43 |
| F-331x..... | 35 | M-550..... | 110 | P-207x..... | 43 |
| F-333Nx..... | 37, 80 | M-560..... | 110 | P-213..... | 41 |
| F-345..... | 51 | M-572..... | 71 | P-217..... | 41 |
| F-346..... | 51 | M-615-1..... | 133 | P-219..... | 41 |
| F-347..... | 51 | M-615-2..... | 133 | P-229x..... | 41 |
| F-350x..... | 36 | M-644-03x..... | 41 | P-232..... | 41 |
| F-354x..... | 38 | M-645x..... | 32 | P-240x..... | 47 |
| F-356x..... | 41 | M-650x..... | 41 | P-246x..... | 41 |
| F-364x..... | 38, 41 | M-652x..... | 41 | P-247x..... | 43 |
| F-374..... | 54 | M-653x..... | 41 | P-248x..... | 41 |
| F-375..... | 54 | M-655x..... | 41 | P-249x..... | 41 |
| F-376..... | 54 | M-660x..... | 41 | P-250x..... | 41 |
| F-381..... | 54 | MXP7900-000..... | 119 | P-255x..... | 41 |
| F-382..... | 54 | MXP7920-000..... | 119 | P-259..... | 93 |
| F-384..... | 54 | MXP7960-000..... | 119 | P-259x..... | 41 |
| F-385..... | 54 | MXP7970-000..... | 119 | P-260x..... | 41 |
| F-386..... | 54 | MXP7980-000..... | 119 | P-268..... | 51 |
| F-387..... | 54 | MXP7986-000..... | 119 | P-270x..... | 99 |
| F-388..... | 54 | MXP9900-000..... | 119 | P-272x..... | 99 |
| FS-110..... | 18 | MXP9960-000..... | 119 | P-273x..... | 99 |
| FS-115..... | 18 | MXT715-000..... | 119 | P-274x..... | 99 |
| FS-120..... | 18 | MXT715-102..... | 119 | P-275x..... | 99 |
| FS-150..... | 18 | MXT715-105..... | 119 | P-277..... | 51 |
| FS-175..... | 18 | MXX777-601..... | 119 | P-278..... | 51 |
| FS-315..... | 28 | MXX777-603..... | 119 | P-279..... | 51 |
| LT-100x..... | 38 | MXX777-605..... | 119 | P-281..... | 41 |
| LT-105x..... | 41 | MXX777-612..... | 119 | P-287..... | 41 |
| LT-110x..... | 38 | MXX777-616..... | 119 | P-291..... | 51 |
| LT-115x..... | 41 | MXX778-605..... | 119 | P-292..... | 51 |
| LT-132x..... | 38 | N-123-02..... | 80 | P-295..... | 132 |
| LT-200x..... | 38 | N-290..... | 51 | P-296..... | 132 |
| LT-210x..... | 38, 41 | N-291..... | 51 | P-297..... | 51 |
| LT-300..... | 51 | N-333..... | 80 | P-298..... | 51 |
| M-120x..... | 108 | OC-802..... | 98, 107 | P-299..... | 51 |
| M-121..... | 109 | OC-803..... | 98, 107 | P-300Nx..... | 47 |
| M-125..... | 109 | OC-805..... | 98, 107 | P-300x..... | 43, 47 |
| M-126..... | 109 | OC-815..... | 98 | P-307Sx..... | 43 |
| M-128..... | 109 | P-100..... | 32 | P-307x..... | 43 |
| M-131..... | 109 | P-116..... | 34 | P-309..... | 55 |
| M-133..... | 109 | P-120..... | 55 | P-311..... | 55 |
| M-134..... | 109 | P-123..... | 55 | P-312x..... | 47 |
| M-140x..... | 108 | P-133Nx..... | 56 | P-314..... | 55 |
| M-215..... | 35 | P-133x..... | 56 | P-316..... | 55 |
| M-250x..... | 41 | P-134..... | 82 | P-317..... | 41 |
| M-410..... | 144 | P-135..... | 66 | P-319..... | 41 |
| M-412..... | 144 | P-137x..... | 41 | P-321..... | 55 |
| M-420..... | 144 | P-140x..... | 41, 56 | P-329x..... | 41 |
| M-432..... | 132 | P-141x..... | 41 | P-331..... | 41 |
| M-432-03..... | 132 | P-150..... | 81 | P-336..... | 41 |
| M-447..... | 79 | P-154..... | 81 | P-337x..... | 41 |
| M-500..... | 110 | P-155..... | 81 | P-340x..... | 47 |
| M-510..... | 110 | P-170..... | 70 | P-342x..... | 43 |
| M-520..... | 108 | P-190..... | 81 | P-343x..... | 43 |
| M-525..... | 108 | P-191..... | 81 | P-344x..... | 43 |
| M-540..... | 68 | P-200Nx..... | 47 | P-347x..... | 43 |
| M-547..... | 109 | P-200x..... | 43, 47 | P-349x..... | 41 |

| | | | | | |
|---------------|-------------|---------------|-----|-------------|-----|
| P-350x..... | 41 | P-612S..... | 148 | P-703..... | 85 |
| P-352x..... | 41 | P-618..... | 88 | P-704..... | 69 |
| P-353x..... | 43 | P-619..... | 88 | P-710..... | 85 |
| P-355x..... | 41 | P-620..... | 85 | P-712..... | 86 |
| P-357-2x..... | 41 | P-622..... | 85 | P-713..... | 86 |
| P-357x..... | 41 | P-623..... | 85 | P-714..... | 86 |
| P-359..... | 93 | P-624..... | 88 | P-718..... | 66 |
| P-359x..... | 41 | P-625..... | 88 | P-719..... | 88 |
| P-360x..... | 41 | P-626..... | 66 | P-720..... | 71 |
| P-363Rx..... | 43 | P-627..... | 66 | P-721..... | 142 |
| P-366x..... | 41 | P-628..... | 88 | P-722..... | 86 |
| P-372x..... | 99 | P-629..... | 88 | P-723..... | 86 |
| P-373x..... | 99 | P-630..... | 85 | P-727..... | 70 |
| P-374x..... | 99 | P-631..... | 85 | P-728..... | 70 |
| P-381..... | 41 | P-632..... | 86 | P-729..... | 70 |
| P-387..... | 41 | P-633..... | 86 | P-732..... | 142 |
| P-399..... | 51 | P-634..... | 86 | P-733..... | 142 |
| P-401x..... | 44 | P-635..... | 86 | P-742..... | 69 |
| P-407x..... | 44 | P-642..... | 88 | P-754..... | 55 |
| P-416..... | 34, 57 | P-645..... | 85 | P-755..... | 55 |
| P-416BLK..... | 34, 57, 132 | P-646..... | 93 | P-756..... | 55 |
| P-416G..... | 34 | P-647..... | 93 | P-757..... | 93 |
| P-420..... | 41, 93 | P-648..... | 93 | P-760..... | 69 |
| P-430..... | 82 | P-650..... | 66 | P-761..... | 147 |
| P-432..... | 82 | P-652..... | 66 | P-762..... | 147 |
| P-440..... | 82 | P-654..... | 66 | P-763..... | 147 |
| P-441..... | 82 | P-655..... | 88 | P-764..... | 147 |
| P-441N..... | 82 | P-656..... | 88 | P-765..... | 147 |
| P-445..... | 141 | P-657..... | 88 | P-767..... | 93 |
| P-446..... | 141 | P-658..... | 88 | P-770..... | 78 |
| P-447..... | 141 | P-659..... | 88 | P-771..... | 71 |
| P-450..... | 140 | P-660..... | 88 | P-772..... | 71 |
| P-451..... | 140 | P-661..... | 88 | P-775..... | 68 |
| P-455..... | 145 | P-662..... | 88 | P-777..... | 68 |
| P-460S..... | 140 | P-663..... | 93 | P-779..... | 69 |
| P-460T..... | 140 | P-668..... | 93 | P-782..... | 142 |
| P-465..... | 146 | P-669-01..... | 66 | P-783..... | 142 |
| P-470..... | 140 | P-670..... | 66 | P-785..... | 145 |
| P-482BLK..... | 44 | P-671..... | 66 | P-786..... | 145 |
| P-501x..... | 44 | P-672..... | 66 | P-787..... | 145 |
| P-507x..... | 44 | P-673..... | 66 | P-788..... | 145 |
| P-512..... | 83 | P-675..... | 88 | P-789..... | 145 |
| P-513..... | 83 | P-677..... | 88 | P-790..... | 145 |
| P-514..... | 83 | P-678..... | 88 | P-791..... | 145 |
| P-515..... | 83 | P-680..... | 88 | P-794..... | 93 |
| P-520..... | 55 | P-681..... | 66 | P-795..... | 147 |
| P-550..... | 55 | P-683..... | 88 | P-796..... | 147 |
| P-551..... | 55 | P-684..... | 66 | P-797..... | 93 |
| P-553..... | 71 | P-686..... | 88 | P-798..... | 93 |
| P-554..... | 78 | P-689..... | 93 | P-799..... | 93 |
| P-555..... | 34, 55 | P-691..... | 93 | P-801..... | 93 |
| P-556..... | 55 | P-692..... | 93 | P-802..... | 93 |
| P-558..... | 55 | P-694..... | 66 | P-830..... | 89 |
| P-602..... | 85 | P-696..... | 139 | P-830T..... | 89 |
| P-603..... | 85 | P-697..... | 139 | P-831..... | 89 |
| P-604..... | 88 | P-699..... | 139 | P-835..... | 89 |
| P-612..... | 148 | P-702..... | 85 | P-836..... | 89 |

| | | | | | |
|------------|-----|------------|----|--------|-----|
| P-837 | 89 | PK-100x | 58 | U-160 | 21 |
| P-838 | 89 | PK-110x | 58 | U-161 | 21 |
| P-840 | 42 | PK-112 | 57 | U-162 | 21 |
| P-842x | 42 | PK-120BLKx | 58 | U-163 | 21 |
| P-844x | 42 | PK-126Hx | 58 | U-164 | 21 |
| P-845-01 | 85 | PK-126x | 58 | U-165 | 21 |
| P-846x | 42 | PK-132x | 58 | U-320x | 33 |
| P-849 | 55 | PK-152 | 57 | U-321x | 33 |
| P-850 | 93 | U-101 | 21 | U-322 | 73 |
| P-851 | 93 | U-102 | 21 | U-400x | 33 |
| P-852 | 93 | U-103 | 21 | U-401x | 33 |
| P-854 | 93 | U-104 | 21 | U-402 | 73 |
| P-857 | 93 | U-105 | 21 | U-410x | 33 |
| P-858 | 93 | U-106 | 21 | U-411 | 73 |
| P-859 | 93 | U-107 | 21 | U-412 | 73 |
| P-860 | 93 | U-108 | 21 | U-428 | 72 |
| P-861 | 93 | U-111 | 21 | U-429 | 72 |
| P-862 | 93 | U-112 | 21 | U-430 | 72 |
| P-863 | 93 | U-113 | 21 | U-431 | 72 |
| P-864 | 93 | U-114 | 21 | U-435 | 73 |
| P-870 | 93 | U-115 | 21 | U-438 | 73 |
| P-872 | 93 | U-116 | 21 | U-450x | 33 |
| P-874 | 71 | U-117 | 21 | U-455 | 148 |
| P-875 | 68 | U-118 | 21 | U-456 | 148 |
| P-880 | 145 | U-126 | 21 | U-466 | 68 |
| P-881 | 78 | U-127 | 21 | U-466S | 68 |
| P-882 | 78 | U-128 | 21 | U-467R | 55 |
| P-885 | 68 | U-129 | 21 | U-469 | 146 |
| P-887 | 68 | U-130 | 21 | U-500 | 66 |
| P-888 | 68 | U-131 | 21 | U-504 | 66 |
| P-889 | 68 | U-132 | 21 | U-510 | 66 |
| P-890 | 68 | U-133 | 21 | U-514 | 66 |
| P-891 | 68 | U-134 | 21 | U-605 | 145 |
| P-920-01 | 66 | U-135 | 21 | U-606 | 145 |
| P-930x | 42 | U-136 | 21 | U-607 | 145 |
| P-931x | 42 | U-137 | 21 | U-608 | 145 |
| P-938x | 42 | U-138 | 21 | U-609 | 145 |
| P-940x | 42 | U-139 | 21 | U-610 | 145 |
| P-942x | 42 | U-140 | 21 | U-650x | 56 |
| P-945x | 42 | U-141 | 21 | U-659 | 66 |
| P-946x | 42 | U-142 | 21 | U-660x | 56 |
| P-948x | 42 | U-143 | 21 | U-665 | 66 |
| P-982BLKx | 44 | U-144 | 21 | U-800 | 21 |
| P-1000 | 51 | U-145 | 21 | U-803 | 21 |
| P-1082BLKx | 44 | U-146 | 21 | U-805 | 21 |
| P-1087x | 44 | U-147 | 21 | U-825 | 21 |
| PD715-000 | 120 | U-148 | 21 | U-1114 | 20 |
| PD715-102 | 120 | U-149 | 21 | U-1115 | 20 |
| PD715-105 | 120 | U-150 | 21 | U-1116 | 20 |
| PD7900 | 120 | U-151 | 21 | U-1117 | 20 |
| PD7920 | 120 | U-152 | 21 | U-1120 | 20 |
| PD7960 | 120 | U-153 | 21 | U-1122 | 20 |
| PD7970 | 120 | U-154 | 21 | U-1125 | 20 |
| PD7980 | 120 | U-155 | 21 | U-1126 | 20 |
| PD7986 | 120 | U-156 | 21 | U-1128 | 20 |
| PD9900 | 120 | U-157 | 21 | U-1130 | 20 |
| PD9960 | 120 | U-158 | 21 | U-1131 | 20 |

| | | | | | |
|--------------|----|--------------|-----|----------|-----|
| U-1132 | 20 | UPFP-6300350 | 49 | VHP-505 | 104 |
| U-1133 | 20 | UPFP-6300500 | 49 | VHP-506 | 104 |
| U-1140 | 20 | UPFP-6300600 | 49 | VHP-550 | 106 |
| U-1141 | 20 | UPFS-6100070 | 49 | VHP-551 | 106 |
| U-1142 | 20 | UPFS-6100150 | 49 | VHP-555 | 106 |
| U-1143 | 20 | UPFS-6100250 | 49 | VHP-556 | 106 |
| U-1145 | 20 | UPFS-6100350 | 49 | VHP-600 | 55 |
| U-1146 | 20 | UPFS-6100500 | 49 | VHP-700x | 59 |
| U-1148 | 20 | UPFS-6100600 | 49 | VHP-920x | 60 |
| UH-402 | 73 | UPFS-6125070 | 49 | VHP-1000 | 51 |
| UH-427 | 74 | UPFS-6125150 | 49 | VHP-1001 | 60 |
| UH-432 | 76 | UPFS-6125250 | 49 | VHP-2000 | 51 |
| UH-436 | 76 | UPFS-6125350 | 49 | VHP-3200 | 60 |
| UH-630 | 78 | UPFS-6125500 | 49 | VHP-4000 | 51 |
| UH-631-01 | 78 | UPFS-6125600 | 49 | VHP-9000 | 51 |
| UH-632 | 76 | UPFS-6254070 | 49 | XF-358x | 47 |
| UH-634 | 78 | UPFS-6254150 | 49 | XF-368x | 47 |
| UH-700 | 74 | UPFS-6254250 | 49 | XLT-111x | 47 |
| UH-750 | 74 | UPFS-6254350 | 49 | XP-130x | 56 |
| UH-752 | 74 | UPFS-6254500 | 49 | XP-131x | 56 |
| UH-753 | 78 | UPFS-6254600 | 49 | XP-132x | 56 |
| UH-904x | 58 | V-100D | 123 | XP-136x | 56 |
| UH-906 | 78 | V-100L | 123 | XP-137x | 56 |
| UP-700 | 69 | V-100T | 123 | XP-141x | 56 |
| UPFP-6025070 | 49 | V-101D | 123 | XP-201x | 47 |
| UPFP-6025150 | 49 | V-101L | 123 | XP-202x | 47 |
| UPFP-6025250 | 49 | V-101T | 123 | XP-218x | 47 |
| UPFP-6025350 | 49 | V-240 | 123 | XP-230x | 47 |
| UPFP-6025500 | 49 | V-241 | 123 | XP-235x | 47 |
| UPFP-6025600 | 49 | V-340 | 123 | XP-238x | 47 |
| UPFP-6050070 | 49 | V-341 | 123 | XP-245x | 47 |
| UPFP-6050150 | 49 | V-447 | 132 | XP-286x | 47 |
| UPFP-6050250 | 49 | V-450 | 123 | XP-301x | 47 |
| UPFP-6050350 | 49 | V-451 | 123 | XP-302x | 47 |
| UPFP-6050500 | 49 | V-540 | 123 | XP-305x | 47 |
| UPFP-6050600 | 49 | V-541 | 123 | XP-308x | 47 |
| UPFP-6075070 | 49 | VHP-200-01x | 59 | XP-315x | 47 |
| UPFP-6075150 | 49 | VHP-200x | 59 | XP-330x | 47 |
| UPFP-6075250 | 49 | VHP-320x | 60 | XP-335x | 47 |
| UPFP-6075350 | 49 | VHP-325x | 60 | XU-620x | 56 |
| UPFP-6075500 | 49 | VHP-500 | 104 | XU-655x | 56 |
| UPFP-6075600 | 49 | VHP-501 | 104 | XU-662x | 56 |
| UPFP-6100070 | 49 | | | | |
| UPFP-6100150 | 49 | | | | |
| UPFP-6100250 | 49 | | | | |
| UPFP-6100350 | 49 | | | | |
| UPFP-6100500 | 49 | | | | |
| UPFP-6100600 | 49 | | | | |
| UPFP-6150070 | 49 | | | | |
| UPFP-6150150 | 49 | | | | |
| UPFP-6150250 | 49 | | | | |
| UPFP-6150350 | 49 | | | | |
| UPFP-6150500 | 49 | | | | |
| UPFP-6150600 | 49 | | | | |
| UPFP-6300070 | 49 | | | | |
| UPFP-6300150 | 49 | | | | |
| UPFP-6300250 | 49 | | | | |



TRADEMARKS & REGISTERED TRADEMARKS

For a complete list of IDEX Health & Science registered trademarks and their proper attribution, please refer to our trademarks list at: www.idex-hs.com/trademarks



For ordering and technical support, please contact:

Fluidics Products www.idex-hs.com | Laser Products +1 760 438 2131
Optical Filters www.semrock.com | Shutter Products +1 585 244 7220