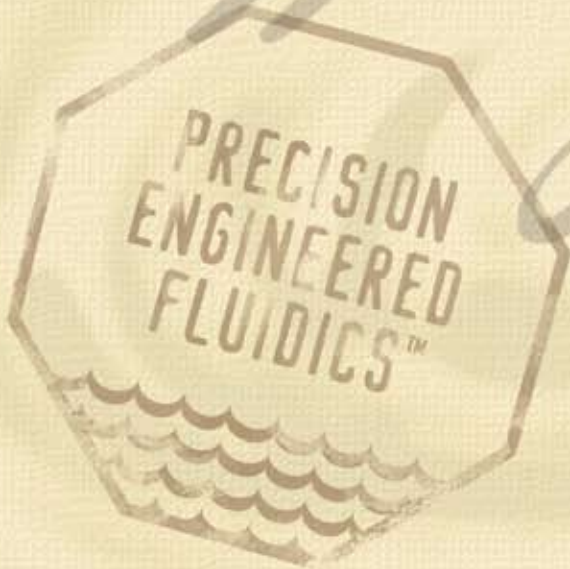




High Pressure

High Pressure Fittings and Connectors

Fittings



ULTRA PERFORMANCE FITTINGS INTRODUCTION

- » High Temperature Versions Withstand Temperatures up to 200°C
- » High Pressure Versions Rated to 28,800 psi
- » For Coned and Flat-Bottom Ports
- » SealTight™, LiteTouch® and Super Flangeless™ versions available

Upchurch Scientific® introduces an innovative line of Ultra Performance fittings, designed to withstand extreme temperatures and pressures. This line of ground-breaking fittings systems is perfect for use within the increasingly demanding requirements of today's high performance analytical systems.

Innovations in the HPLC market include using smaller column packing materials or higher temperatures to increase resolution and speed of analysis. Our line of Ultra Performance Fittings helps equip HPLC systems in handling these additional system stresses.

The High Temperature Fittings are made from polyketone (PK), and are available in both coned and flat-bottom configurations. Ultra-High Pressure fittings are made from stainless steel and hold to much higher pressures than standard fittings made of the same material; these are configured for coned ports.

Our PK Ultra Performance Fittings have been designed as high temperature versions of some of our best selling Upchurch Scientific lines of fittings systems, such as the SealTight, LiteTouch and Super Flangeless lines. For more information on the benefits of the SealTight, LiteTouch and Super Flangeless systems, please see pages 13, 16 and 18, respectively.



Ultra Performance Fittings Pressure Ratings* (psi/bar):

Product	Material	Pressure rating 200°C / Room Temp.
One-Piece Fitting		
PK-120	Polyketone	6,000 (414) / 12,000 (827)
Two-Piece Fittings (nut/ferrule)		
PK-110/PK-132	Polyketone	13,000 (896) / 23,000 (1,585)
UH-196	Stainless Steel	28,800 (1,930)**
UH-296	Stainless Steel	28,800 (1,930)
PK-110/PK-100	Polyketone	13,500 (931) / 19,000 (1,310)
PK-115/PK-250	Polyketone	10,000 (689) / 12,000 (827)
PK-195	Polyketone	10,500 (724) / 12,000 (827)

* Tested with water, using stainless steel tubing and stainless steel port
** Tested at room temperature

Application Note*

Our new Ultra Performance polyketone fittings are well suited for high temperature applications in which biocompatibility is important and metal fittings are undesirable, such as protein analysis and ion chromatography.

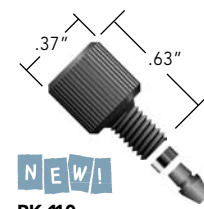


HIGH TEMPERATURE FINGERTIGHT FITTINGS

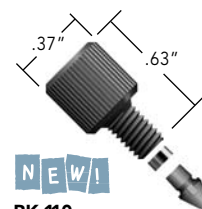
Polyketone (PK) is a versatile material, ideal for creating high temperature, high pressure polymer fittings. With chemical compatibility properties identical to PEEK™, this strong new material is unique in its ability to withstand temperatures up to 200°C! This feature makes it the first Upchurch Scientific® fittings line with such an extensive temperature range. For the pressure ratings of our Ultra Performance Fittings line, please see the table on p.8.

These High Pressure Fittings are available in the popular one-piece 10-32 fingertight style, as well as two-piece 10-32 and 1/4-28 styles and are designed for use with 1/16" and 1/32" OD tubing.

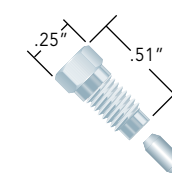
Please see page 10 for traditional high pressure polymer One-Piece Fingertight Fittings.



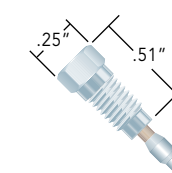
NEW!
PK-110
10-32 PK Fitting
shown with PK-100
for 1/16" OD tubing



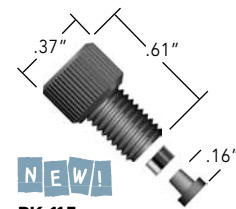
NEW!
PK-110
10-32 PK Fitting
shown with PK-132
for 1/32" OD tubing



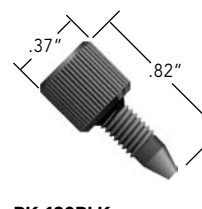
UH-196
10-32 Stainless Steel Nut
with UH-193
for 1/16" OD tubing



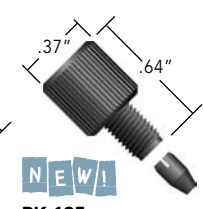
UH-296
10-32 Stainless Steel Nut
with UH-293
for 1/32" OD tubing



NEW!
PK-115
1/4-28 PK Fitting
shown with PK-250
for 1/16" OD tubing



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



NEW!
PK-195
10-32 PK Fitting
with PK 192
for 1/16" OD tubing

*Note**

» The nuts and ferrules on this page are NOT interchangeable; they can only be used in the combinations that are shown on this page. Please contact Upchurch Scientific for more information.

HIGH TEMPERATURE FINGERTIGHT FITTINGS

For 1/32" OD Tubing		Qty.
NEW PK-110x	PK Nut, Black, 10-32	10-pk
NEW PK-132x	PK Ferrule, Black	10-pk
For 1/16" OD Tubing		
NEW PK-100x	PK Ferrule, Black	10-pk
NEW PK-110x	PK Nut, Black, 10-32	10-pk
NEW PK-115x	PK Nut, Black, 1/4-28	10-pk
NEW PK-120BLKx	PK Nut, Black, 10-32	10-pk
NEW PK-192	PK Ferrule, Black	ea.
NEW PK-195x	PK Nut, Black, with PK-192 Ferrule, 10-32	10-pk
NEW PK-250x	PK Ferrule, Black	10-pk

ULTRA-HIGH PRESSURE FITTINGS

For 1/32" OD Tubing		Qty.
UH-293x	SST Ferrule	10-pk
UH-296x	SST Nut, with UH-293 Ferrules, 10-32 ¹	10-pk
For 1/16" OD Tubing		
UH-193x	SST Ferrule	10-pk
UH-196x	SST Nut, with UH-193 Ferrules, 10-32	10-pk

PK = polyketone; SST = stainless steel

¹ Comes with a PEEK tubing sleeve for 1/32" OD tubing





ONE-PIECE FINGERTIGHT FITTINGS

For Coned Ports

Upchurch Scientific's original One-Piece Fingertight Fittings have 10-32 threads and are designed to be used with 1/16" OD tubing, except the M-645 (6-40, 1/32") and P-100 (1/4-28, 1/8").

The F-120 is Upchurch Scientific's most popular high pressure Fingertight, while the F-195 (page 13) and F-331 (page 14) are two-piece versions of this product.

Our M-645 Fitting is a direct replacement for the 6-40 threaded VICI® (Valco) fitting. For more information on this product and other 6-40 threaded fittings, please see pages 42 – 43.

Upchurch Scientific One-Piece Fingertight Fittings are rated between 1,000 – 6,000 psi (69 – 414 bar), depending on the fitting. Please see the specific pressure ratings for these and other high pressure fittings on page 11.

RheFlex® One-Piece Fittings are designed for use with many of the Rheodyne® manual valves, starting on page 83. The One-Piece RheFlex M4 Fittings, designed for use with Rheodyne MX Nano-Scale Modules, are listed on page 42.

Color your World:

Add a splash of color to your lab with our F-120FUNPACK. Includes six colorful F-120 PEEK Fingertight Fittings.



CHROMTRAC™

» Brightly colored knobs to easily track inlets and outlets of valves, columns, and detectors

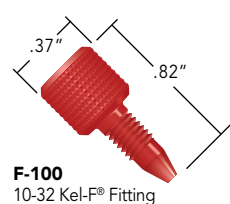
All ChromTRAC-compatible RheFlex® fittings offer the ChromTRAC knob option. Specify the ChromTRAC two letter suffix for the color choice when ordering (please see the ChromTRAC Suffix Codes table below. "MC" refers to "multi-color" which includes two each of blue, green, gray, red, and yellow). For example, to order red ChromTRAC knobs with the RheFlex One-Piece Fitting (page 10), specify 6000-282RD. No suffix indicates black knobs.

View the online product product bulletin at:
<http://www.rheodyne.com/products/fluidic/accessories/chromfittings.asp>

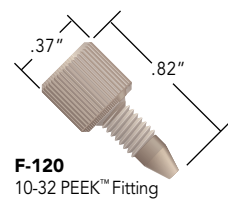
ChromTRAC Suffix Codes:

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

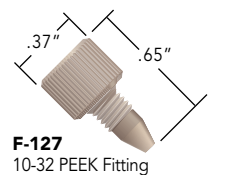
Add these two letter suffixes to the end of the seven-digit part numbers of the 10-32 and M4 threaded RheFlex Fittings on pages 10, 12, 15 and 42



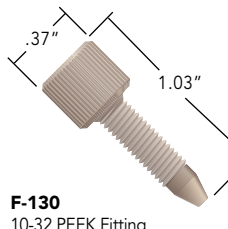
F-100
10-32 Kel-F® Fitting



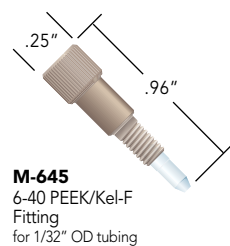
F-120
10-32 PEEK™ Fitting



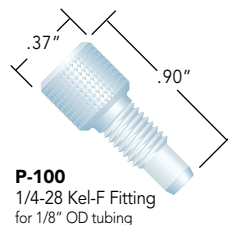
F-127
10-32 PEEK Fitting



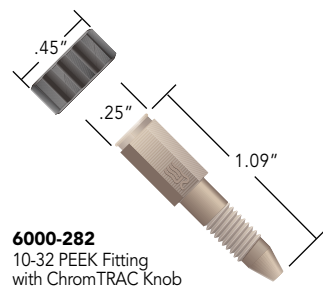
F-130
10-32 PEEK Fitting



M-645
6-40 PEEK/Kel-F Fitting
for 1/32" OD tubing



P-100
1/4-28 Kel-F Fitting
for 1/8" OD tubing



6000-282
10-32 PEEK Fitting
with ChromTRAC Knob

ONE-PIECE UPCHURCH FINGERTIGHT FITTINGS^{1,2} Qty.

F-100x	Kel-F, Red, 10-32 , for 1/16" OD tubing	10-pk
F-100Nx	Kel-F, Natural, 10-32 , for 1/16" OD tubing	10-pk
F-120x	PEEK, Natural, 10-32 , for 1/16" OD tubing	10-pk
F-120BLK	PEEK, Black, 10-32 , for 1/16" OD tubing	ea.
F-120FUNPACK	PEEK, Assorted Colors³, 10-32 , for 1/16" OD tubing	6-pk
F-127x	PEEK, Natural, 10-32, Short , for 1/16" OD tubing	10-pk
F-130x	PEEK, Natural, 10-32, Long , for 1/16" OD tubing	10-pk
M-645x	PEEK/Kel-F, Natural, 6-40 , for 1/32" OD tubing	10-pk
P-100	Kel-F, Natural, 1/4-28 , for 1/8" OD tubing	ea.

ONE-PIECE RHEFLEX FINGERTIGHT FITTING⁴ Qty.

6000-282	PEEK, Natural, 10-32 , for 1/16" OD tubing	10-pk
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¹ For your convenience we ship most Upchurch Scientific Fingertight Fittings in 10-packs. However, if you prefer, you may order individual pieces (an "x" in the product part number simply designates "10-pk").

² Some of the Upchurch Scientific fittings on this page are available in additional colors. Please contact us for more information.

³ Includes six F-120 Fittings in the following colors: natural, blue, black, green, red and yellow.

⁴ ChromTRAC™ compatible. Specify the two-letter suffix (see ChromTRAC Suffix Codes Table, page 11) after the fittings's seven-digit part number for the ChromTRAC knob color of your choice. No suffix indicates black knobs.

Pressure Ratings for HIGH PRESSURE Fingertight Fittings:

Use this table to help select the Fingertight Fittings best suited for your high-pressure coned or flat-bottom port applications. For Two Piece Fittings, only ferrules are included since they determine pressure ratings.

Item	Material	Max. Pressure (psi/bar)	Tubing Size, Threads/Port ¹	Notes
High Temperature Fitting (pages 8 – 9)				
PK-120BLK	PK	6,000 (414)	1/16", 10-32 C	2, 3
Fittings (page 10)				
F-100, F-100N	Kel-F®	4,000 (276)	1/16", 10-32 C	
F-120, F-120BLK, F-127, F-130	PEEK™	6,000 (414)	1/16", 10-32 C	2
M-645	PEEK/Kel-F	1,750-3,250 (121-224)	1/32", 6-40 C	2, 4
P-100	Kel-F	1,000 (69)	1/8", 1/4-28 C	
6000-282	PEEK	5,000 (345)	1/16", 10-32 C	2
Ferrules for Rheodyne® Two-Piece Fittings (page 12)				
6000-251	PEEK	7,000 (483)	1/16", 10-32 C	2
6000-079	PEEK	5,000 (345)	1/8", 5/16-24 C	2
SealTight™ Ferrule (page 13)				
F-192	PEEK	3,000-9,000 (207-620)	1/16", 10-32 C, M6 C	2
Ferrules for Upchurch Two-Piece Fittings (page 14)				
F-113	PEEK	3,500-6,000 (241-414)	1/32", 10-32 C	2, 5
F-142	PEEK	6,000 (414)	1/16", 10-32 C	2, 6
F-142N	Tefzel®	1,750 (121)	1/16", 10-32 C	
F-148	Kel-F	6,000 (414)	190µm, 10-32 C	
F-151	Kel-F	6,000 (414)	360µm, 10-32 C	
M-215	Perfluoroelastomer	1,500 (103)	360µm, 10-32 C	7
LiteTouch® Ferrules (page 16)				
LT-132	PEEK w/SST ring	5,000 (345)	1/32", 10-32 C	2
LT-100	PEEK w/SST ring	5,000 (345)	1/16", 10-32 C	2
LT-135	PEEK w/SST ring	15,000 (1,034)	1/16", 10-32 C	2
LT-200	PEEK w/SST ring	4,500 (310)	1/8", 1/4-28 C	2
Ferrules for FlushNut™ Fittings (page 17)				
Uses ferrules from our other systems		700-9,000 (48-620)	1/32", 1/16", 1/8", 10-32 C, 1/4-28 C, FB	2
Flangeless SealTight Ferrules (page 17)				
F-290	PEEK	5,000 (345)	1/16", 1/4-28 FB	2
Super Flangeless™ Ferrules (pages 18 – 20)				
M-650	PEEK w/SST ring	750-3,750 (52-259)	1/16", 10-32 FB	2
P-248	Tefzel w/SST ring	2,500 (172)	1/32", 1/4-28/M6 FB	
P-250, P-259, P-260	PEEK or Tefzel w/SST ring	1,800-7,000 (124-483)	1/16", 1/4-28/M6 FB	2
P-350, P-352, P-359, P-360	PEEK or Tefzel w/SST ring	700-5,800 (48-400)	1/8", 1/4-28/M6 FB	2
P-355	Kel-F w/SST ring	1,500 (103)	1.8/2.0mm, 1/4-28/M6 FB	

NOTES:

These data are generated under optimal conditions, using water at room temperature (except as noted). The data presented refers to the capability of the fittings, not the tubing. Your results may vary, depending on variables such as: the solvent used; the materials of the tubing, port, nut and ferrule used; and the temperature at which your analyses are run.

- C = Coned; FB = Flat-bottom.
- PEEK and PK are not recommended for use with concentrated nitric or sulfuric acids, or halogenated acids (ex. HCl).
- Designed for 6,000 psi (414 bar) at high temperatures (200° C); 12,000 psi (872 bar) at ambient temperatures.
- See page 42 for more details.
- Pressure rated to 3,500 psi (241 bar) in plastic ports and to 6,000 psi (414 bar) in metal ports.
- Wrench tightens to 10,000 psi (690 bar) when used with SST nut, such as F-140.
- Conductive — for electrospray applications.

HIGH PRESSURE FITTINGS AND CONNECTORS

HIGH PRESSURE FITTINGS AND CONNECTORS



TWO-PIECE FINGERTIGHT FITTINGS INTRODUCTION

For Coned Ports

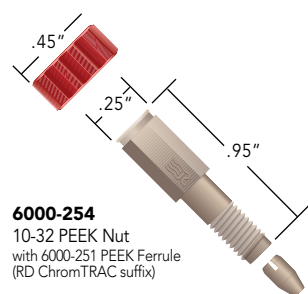
Two-Piece Fingertight Fittings feature a separate ferrule. With a two-piece design, you can replace just the ferrule instead of the entire unit, making these Fingertights more economical than the one-piece version.

TWO-PIECE RHEFLEX® FINGERTIGHT FITTINGS

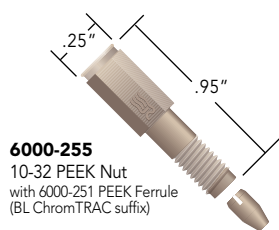
For Coned Ports

The Rheodyne® RheFlex Precision Two-Piece PEEK™ Fittings sets provide inert, biocompatible connections for instrumentation. These dependable 1/16" PEEK fittings have a reliable, time-tested design. Each 1/16" fittings set contains a 10-32 threaded nut and a 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.

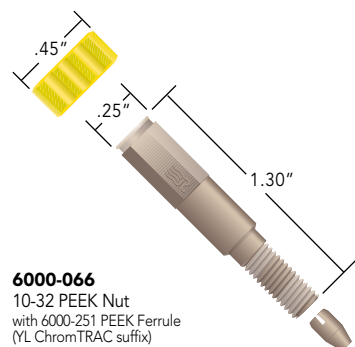
View the online product product bulletin at:
<http://www.rheodyne.com/products/fluidic/accessories/rhefittings.asp>



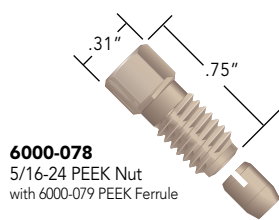
6000-254
10-32 PEEK Nut with 6000-251 PEEK Ferrule (RD ChromTRAC suffix)



6000-255
10-32 PEEK Nut with 6000-251 PEEK Ferrule (BL ChromTRAC suffix)



6000-066
10-32 PEEK Nut with 6000-251 PEEK Ferrule (YL ChromTRAC suffix)



6000-078
5/16-24 PEEK Nut with 6000-079 PEEK Ferrule

Application Note

Installing High Pressure Fittings

Before connecting fittings, ensure the end of the tubing has a clean, square, burr-free cut. This is very important, as the square cut makes a flat surface for the tubing to contact the bottom of the mating port. Neglecting to properly cut the tubing could lead to dead volume, resulting in peak distortion such as fronting, tailing or broadening.

POLYMER ONE-PIECE FITTINGS

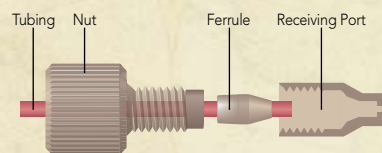
1. Slide the fitting at least 3/16" from the end of the clean cut tubing.
2. Insert the assembly into the receiving port, pushing the tubing into the port until it bottoms out.
3. Finger tighten the nut into the port until snug.¹
4. After several uses (especially at high pressures) the fitting should be replaced.

TWO-PIECE FITTINGS WITH POLYMER FERRULES

1. Slide the nut then ferrule at least 3/16" from the end of the clean cut tubing (see figure below).
2. Follow steps 2-3, above.
3. After several uses (especially at high pressures) the ferrule should be replaced.

STAINLESS STEEL NUTS AND FERRULES

1. Follow steps 1-2 in the "Two-Piece Fittings with Polymer Ferrules" section above.
2. Using an appropriate wrench, tighten an additional 1/4 - 1/2 turn past fingertight. Remove the fitting to confirm the ferrule is swaged onto the tube.
3. Because the ferrule is permanently attached to the tubing we highly recommend that the fitting only be used in the mating port into which it was initially swaged. Failure to do this may result in dead volume and/or leaks.



¹ Overtightening can cause leakage.

TWO-PIECE RHEFLEX FINGERTIGHT FITTINGS

Ferrule	Qty.
6000-251 PEEK Ferrules, for 1/16" OD tubing	10-pk
6000-079 PEEK Ferrules, for 1/8" OD tubing	5-pk
Nuts* (All Two-Piece RheFlex Nuts include the appropriate ferrule(s))	
6000-254 Stnd. Length, Natural PEEK, 10-32, for 1/16" OD tubing	10-pk
6000-255** Short, Natural PEEK, 10-32, for 1/16" OD tubing	10-pk
6000-066 Extra Long, Natural PEEK, 10-32, for 1/16" OD tubing	ea.
6000-078 Stnd. Length, Natural PEEK, 5/16-24, for 1/8" OD tubing	ea.
6000-283 ChromTRAC Fittings Identification Kit	20-pk

* ChromTRAC compatible, except 6000-078. Specify the two-letter suffix (see ChromTRAC Suffix Codes Table, page 11) after the fitting's seven-digit part number for the ChromTRAC knob color of your choice. No suffix indicates black knobs, with the exception of 6000-255.

** 6000-255 comes without knobs (even black) unless a color is specified.



TWO-PIECE SEALTIGHT™ FINGERTIGHT FITTINGS

For Coned Ports

» Hold up to 9,000 psi (620 bar) with Fingertight Convenience!

The dual compression created by the specially designed nut and ferrule enables the Upchurch Scientific® SealTight Fittings system to outperform standard finger tightened fittings. The forward cone of the SealTight Ferrule provides gripping power via conventional compression by the receiving port. The slotted end creates the second compression zone in conjunction with a SealTight Nut (see diagram on page 12). The SealTight Nuts are for use with 1/16" OD tubing and are designed to be used with the F-192 Ferrule. This fittings system is also interchangeable with Two-Piece RheFlex Fittings.

Try our F-350 FlushNut™ for the ultimate streamline design. For more information on these innovative products, please see page 17.

SealTight Pressure Ratings (psi/bar)¹:

Product	Tightening Method ²	On PEEK Tubing ³	On Stainless Steel Tubing ³
F-154, F-190, F-195, F-196, F-197	Finger tightened	7,000 (483)	9,000 (620)
F-193, F-194, F-281, F-282	1/2 turn past finger tightened	7,000 (483)	9,000 (620)
F-198, F-284, F-285	Finger tightened Wrench tightened ⁴	3,000 (207) 7,000 (483)	3,000 (207) 9,000 (620)
F-287, F-288	Finger tightened	7,000 (483)	9,000 (620)
F-350	Wrench tightened ⁵	7,000 (483)	9,000 (620)

¹ This chart is intended for reference purposes only. Your results may vary depending on nut, receiving port and tubing materials, actual tubing diameter (due to manufacturer's tolerances), chemical compatibility, etc.
² Tightened into a stainless steel port.
³ Using 1/16" OD x .010" ID tubing.
⁴ One-half turn past finger tightened, with our P-297 Headless Nut Extender Tool (page 18).
⁵ Tightened with our F-345 FlushNut Tool (page 17).

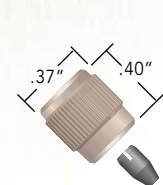


» For the Ultra Performance version of a SealTight fitting please see page 9.

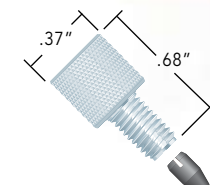
TWO-PIECE SEALTIGHT FITTINGS FOR 1/16" OD TUBING

Ferrule	Qty.
F-192x SealTight Ferrules, Black PEEK	10-pk
Nuts (All SealTight Nut 10-pks include a 10-pk of F-192x Ferrules — except F-350x)	
F-154x Female Nuts, Stnd. Head, Natural PEEK, 10-32	10-pk
F-190x Stnd. Length Nuts, Stnd. Head, SST, 10-32	10-pk
F-193x Short Nuts, Hex Head, Black PEEK, 10-32	10-pk
F-194x Short Nuts, Hex Head, SST, 10-32	10-pk
F-195x Short Nuts, Stnd. Head, Black PEEK, 10-32	10-pk
F-196x Long Nuts, Stnd. Head, Black PEEK, 10-32	10-pk
F-197x Long Nuts, Stnd. Head, Black PEEK, M6	10-pk
F-198x Short Nuts, Headless, Black PEEK, 10-32	10-pk
F-281x Long Nuts, Hex Head, Black PEEK, 10-32	10-pk
F-282x Long Nuts, Hex Head, Brown PPS, 10-32	10-pk
F-284x Long Nuts, Headless, Black PEEK, 10-32	10-pk
F-285x Long Nuts, Headless, Brown PPS, 10-32	10-pk
F-287x Long Nuts, Knurl/Hex Fat Head, Black PEEK, 10-32	10-pk
F-288x Long Nuts, Knurl/Hex Fat Head, Brown PPS, 10-32	10-pk
F-350x FlushNuts*, SST, 10-32 (order F-192 Ferrules separately)	10-pk

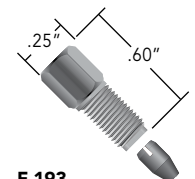
* A tightening tool is required for this fitting (see page 17).
 SST = Stainless Steel



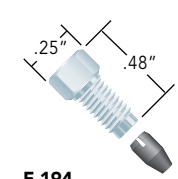
F-154
10-32 Female PEEK™ Nut, with F-192 Ferrule



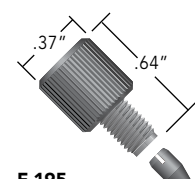
F-190
10-32 Standard Stainless Steel Nut, with F-192 Ferrule



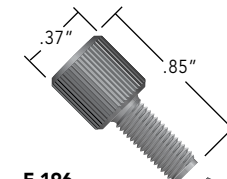
F-193
10-32 Short PEEK Hex Head Nut, with F-192 Ferrule



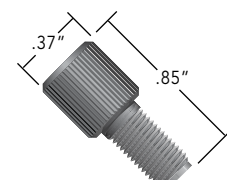
F-194
10-32 Short Stainless Steel Hex Head Nut, with F-192 Ferrule



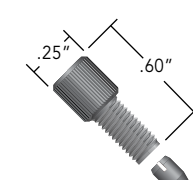
F-195
10-32 Short PEEK Nut, with F-192 Ferrule



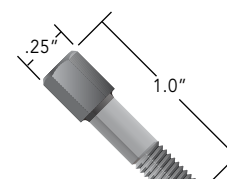
F-196
10-32 Long PEEK Nut, with F-192 Ferrule



F-197
M6 Long PEEK Nut with F-192 Ferrule



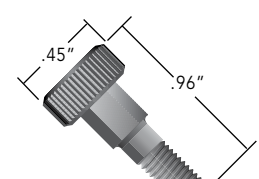
F-198
10-32 Short PEEK Headless Nut, with F-192 Ferrule



F-281
10-32 Long PEEK Hex Head Nut, with F-192 Ferrule



F-285
10-32 Long PPS Headless Nut, with F-192 Ferrule



F-287
10-32 Long PEEK Knurl/Hex Head Nut, with F-192 Ferrule



F-350
10-32 Stainless Steel FlushNut (order F-192 Ferrule separately)

Please Note: Overtightening these fittings on DuPont Teflon® brand resin or Tefzel® tubing can cause the ID of your tubing to collapse.

Please Note: Use our NanoTight™ Kits (page 38) to easily connect capillary tubing to any 10-32 threaded, coned port designed for 1/16" OD tubing.

See our nut tightening tools on pages 15, 17 and 18.

✶ORDER✶ Tel: 800.426.0191 / 360.679.2528 · www.upchurch.com

TWO-PIECE FINGERTIGHT FITTINGS

For Coned Ports

Upchurch Scientific's original Two-Piece Fingertight Fittings were designed exclusively for 1/16" OD tubing. We offer optional ferrules for connecting 1/32", 360µm and 190µm OD tubing into coned ports designed for 1/16" OD tubing. These special ferrules work with any Fingertight nut on this page. Our M-215 Conductive Perfluoroelastomer Ferrule is designed for mass spectrometer electrospray applications. For more information on this product, please turn to page 40.

To order, please follow these guidelines:

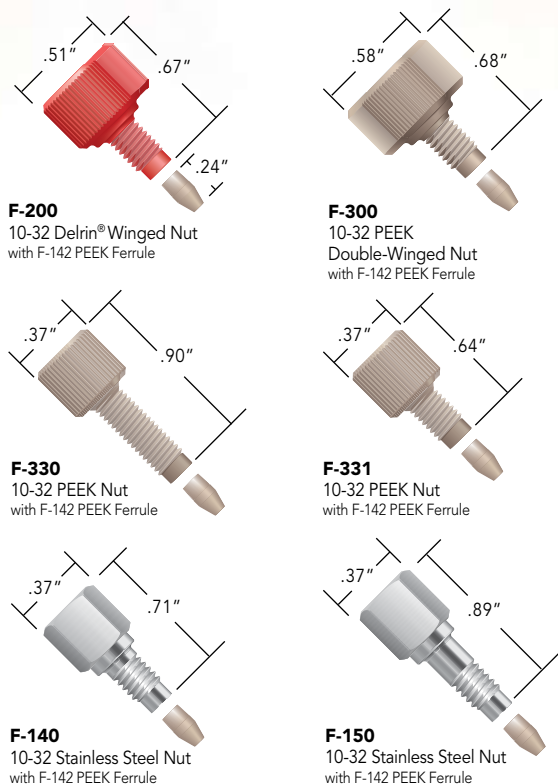
1/16" OD tubing – Select the desired nut, which comes complete with the appropriate ferrule. Or, order the optional F-142N Ferrule, along with the desired nut by replacing the "x" at the end of its product number with "-01". For instance, if you want an F-200 Nut, order F-200-01, not F-200x. *Please Note:* "-01" denotes a single nut without the ferrule.

1/32" OD tubing – Select the F-113 Ferrule. Order the desired nut by replacing the "x" at the end of its product number with "-01", as described above.

360µm OD tubing – Select the F-151 Ferrule. For electrospray applications, choose the M-215 Conductive Ferrule. Order the desired nut by replacing the "x" at the end of its product number with "-01", as described above.

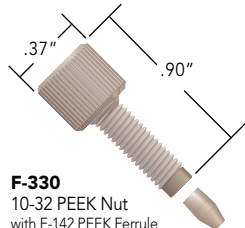
190µm OD tubing – Select the F-148 Ferrule. Order the desired nut by replacing the "x" at the end of its product number with "-01", as described above.

See the pressure rating for these and other high pressure fittings on page 11.

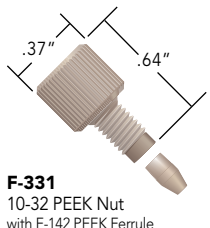


F-200
10-32 Delrin® Winged Nut with F-142 PEEK Ferrule

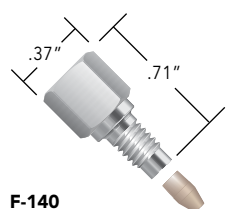
F-300
10-32 PEEK Double-Winged Nut with F-142 PEEK Ferrule



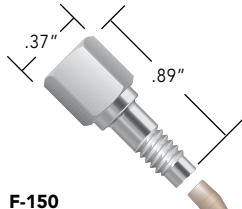
F-330
10-32 PEEK Nut with F-142 PEEK Ferrule



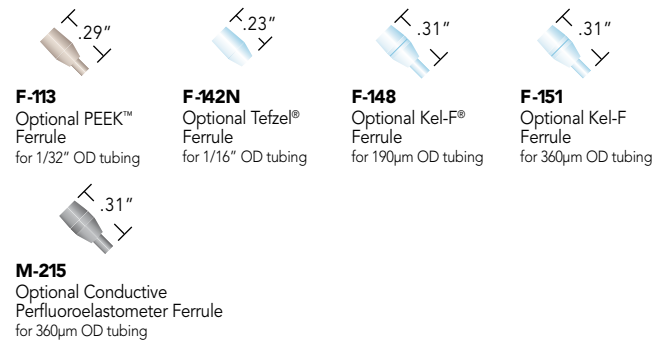
F-331
10-32 PEEK Nut with F-142 PEEK Ferrule



F-140
10-32 Stainless Steel Nut with F-142 PEEK Ferrule



F-150
10-32 Stainless Steel Nut with F-142 PEEK Ferrule



F-113 Optional PEEK™ Ferrule for 1/32" OD tubing
F-142N Optional Tefzel® Ferrule for 1/16" OD tubing
F-148 Optional Kel-F® Ferrule for 190µm OD tubing
F-151 Optional Kel-F Ferrule for 360µm OD tubing

M-215 Optional Conductive Perfluoroelastomer Ferrule for 360µm OD tubing

Just Wing It!

Some Upchurch Scientific Fingertight Nuts feature knurled wings for a firmer grip when tightening. Choose our single- or double-winged design.



TWO-PIECE POLYMER FINGERTIGHT FITTINGS Qty.		
F-200x	Delrin Nuts, Red, with F-142 Ferrules, 10-32	10-pk
F-300x	PEEK Nuts, Natural, with F-142 Ferrules, 10-32	10-pk
F-330x	Long PEEK Nuts, Natural, with F-142 Ferrules, 10-32	10-pk
F-331x	Short PEEK Nuts, Natural, with F-142 Ferrules, 10-32	10-pk

TWO-PIECE SST* FINGERTIGHT FITTINGS Qty.		
F-140x	Stainless Steel Nuts with F-142 Ferrules, 10-32	10-pk
F-150x	Long Stainless Steel Nuts with F-142 Ferrules, 10-32	10-pk

REPLACEMENT FERRULES Qty.		
For 1/16" OD Tubing		
F-142x	PEEK Ferrules, Natural	10-pk
F-142Nx	Tefzel Ferrules, Natural	10-pk
For 1/32" OD Tubing		
F-113	PEEK Ferrule, Natural	ea.
For 360µm OD Tubing		
F-151	Kel-F Ferrule, Natural	ea.
M-215	Conductive Perfluoroelastomer Ferrule, Black	ea.
For 190µm OD Tubing		
F-148	Kel-F Ferrule, Natural	ea.

* Stainless Steel



» For higher pressure Fingertight performance, please see the Ultra Performance or Two-Piece RheFlex® and SealTight™ Fittings on pages 9, 12 and 13, respectively.

» If you need Fingertight fittings to connect 1/16" OD tubing into 1/4-28 coned ports, please order one of the following products: F-201x, F-301x, or F-160x. For more information, please contact us or search on these product numbers at our website, www.upchurch.com.

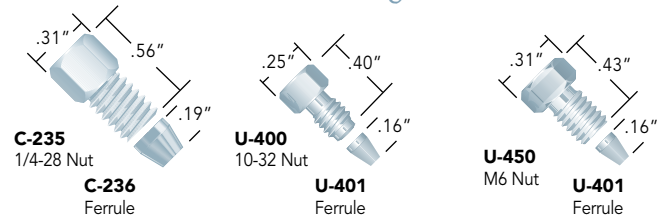


STAINLESS STEEL FITTINGS

For Coned Ports

These 316 Stainless Steel Fittings are rated to 10,000 psi (690 bar) when wrench tightened. Choose Upchurch Scientific Standard Fittings, or select from the Rheodyne RheFlex® or other manufacturer-compatible offerings.

Standard Stainless Steel Fittings

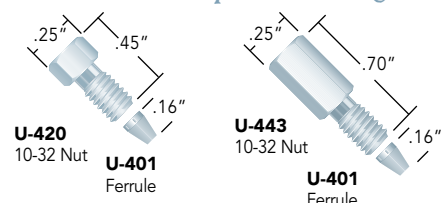


C-235
1/4-28 Nut

U-400
10-32 Nut

U-450
M6 Nut

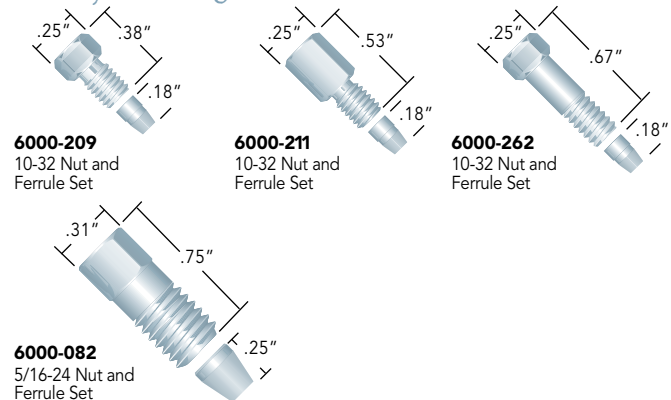
Beckman® Compatible Fittings



U-420
10-32 Nut

U-443
10-32 Nut

Rheodyne Fittings



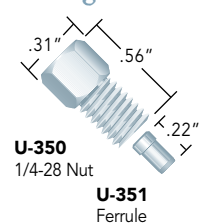
6000-209
10-32 Nut and Ferrule Set

6000-211
10-32 Nut and Ferrule Set

6000-262
10-32 Nut and Ferrule Set

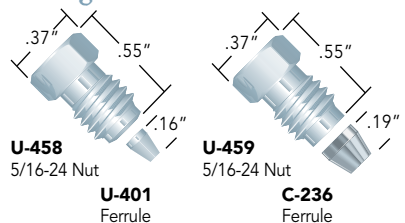
6000-082
5/16-24 Nut and Ferrule Set

SSI Compatible Fittings



U-350
1/4-28 Nut

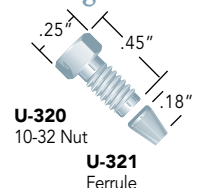
TSP/LDC Compatible Fittings



U-458
5/16-24 Nut

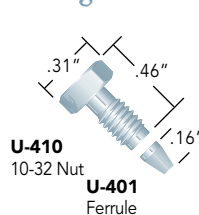
U-459
5/16-24 Nut

VICI® (Valco) Compatible Fittings



U-320
10-32 Nut

Waters® Compatible Fittings



U-410
10-32 Nut

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 22 (for unions 1593 and U-352, you need one A-304 and one A-320 wrench).



The Rheodyne Wrench is slotted to fit over 1/16" and 1/8" OD tubing, and has 1/4" and 5/16" ends.



» Do not use metal fittings in plastic ports, as this can damage the port! Please see the "Fittings Applications" chart on page 153 for more information about fittings compatibility with tubing and port materials.

» See our Ultra Performance Fittings on page 9!

» Our 10-32 stainless steel plug, P-520, is on page 60.

STANDARD STAINLESS STEEL FITTINGS Qty.		
C-235x	Nuts, 1/8", 1/4-28 (use with C-236 Ferrule)	10-pk
C-236x	Ferrules, 1/8"	10-pk
U-400x	Nuts, 1/16", 10-32 (use with U-401 Ferrule)	10-pk
U-401x	Ferrules, 1/16"	10-pk
U-450x	Nuts, 1/16", M6 (use with U-401 Ferrule)	10-pk

BECKMAN COMPATIBLE FITTINGS Qty.		
U-401x	Ferrules, 1/16"	10-pk
U-420x	Nuts, 1/16", 10-32	10-pk
U-443	Long Nut, 1/16", 10-32	ea.

RHEODYNE RHEFLEX FITTINGS ¹ Qty.		
6000-209	Standard Nuts, with 6000-210 Ferrules, 1/16", 10-32	10-pk
6000-211	Long Nuts, with 6000-210 Ferrules, 1/16", 10-32	10-pk
6000-262	Extra-Long Nuts, with 6000-210 Ferrules, 1/16", 10-32	10-pk
6000-210	Ferrules, 1/16"	10-pk
6000-082	Nuts with 6000-083 Ferrules, 1/8", 5/16-24	ea.
6000-083	Ferrules 1/8"	5-pk

SSI COMPATIBLE FITTINGS Qty.		
U-350x	Nuts, 1/16", 1/4-28	10-pk
U-351x	Ferrules, 1/16"	10-pk

TSP/LDC COMPATIBLE FITTINGS Qty.		
C-235x	Nuts, 1/8", 1/4-28 (use with C-236 Ferrule)	10-pk
C-236x	Ferrules, 1/8" (for pump inlet)	10-pk
U-401x	Ferrules, 1/16" (for pump outlet)	10-pk
U-458	Nut, 1/16", 5/16-24 (for pump outlet) (use with U-401 Ferrule)	ea.
U-459	Nut, 1/8", 5/16-24 (for pump inlet) (use with U-401 Ferrule)	ea.

VICI (VALCO) COMPATIBLE FITTINGS Qty.		
U-320x	Nuts, 1/16", 10-32	10-pk
U-321x	Ferrules, 1/16"	10-pk

WATERS COMPATIBLE FITTINGS Qty.		
U-401x	Ferrules, 1/16"	10-pk
U-410x	Nuts, 1/16", 10-32	10-pk

WRENCHES		
A-304	Fittings Wrench, 1/4" x 5/16"	
A-305	Fittings Wrench, 1/2" x 9/16"	
A-320	Fittings Wrench, 3/8" x 7/16"	
6810	Rheodyne Wrench, 1/4" x 5/16" ²	

¹ Designed for use with Rheodyne's manual valves with metal stators. These valves start on page 83.
² For more information, please see page 97.

HIGH PRESSURE FITTINGS AND CONNECTORS

HIGH PRESSURE FITTINGS AND CONNECTORS

LITE TOUCH® FITTINGS

For Coned Ports

- » Prevents Twisting of Polymer Tubing
- » High Pressure with Fingertight Convenience
- » For 1/32", 1/16" and 1/8" OD Tubing

The LiteTouch Fittings System from Upchurch Scientific® 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" and 1/8" OD tubing sizes, and for 10-32 and 1/4-28 coned ports.

For those space-limited applications where nut heads interfere with each other, try our FlushNut™ Fittings (Note: FlushNut Fittings require a tightening tool. Please see page 17 for more information about these products).

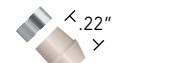
To avoid collapsing the ID of your tubing, Upchurch Scientific recommends the LiteTouch system be used on hard tubing only, such as stainless steel, PEEK™ polymer or titanium. We do not recommend the LiteTouch Ferrule System for repeated use in plastic ports.



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

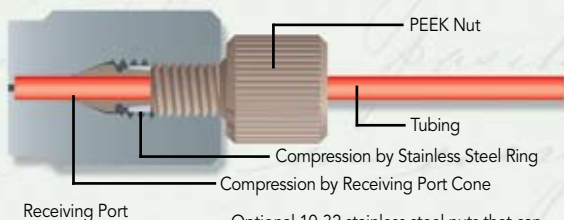
LT-100
PEEK Ferrule with
Stainless Steel Lock Ring
for 1/16" OD tubing

LT-135
One-Piece LiteTouch
SealTight™ Ferrule with
Stainless Steel Lock Ring
for 1/16" OD tubing



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

LiteTouch Fittings Systems:

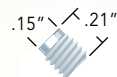


Optional 10-32 stainless steel nuts that can be used with the LiteTouch Ferrules are found on page 15.

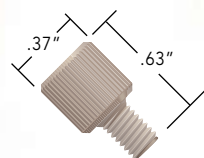
LiteTouch Ferrule Pressure Ratings*

LT-132 for 1/32" OD tubing	5,000 psi (345 bar)
LT-100 for 1/16" OD tubing	5,000 psi (345 bar)
LT-135 for 1/16" OD tubing	15,000 psi (1,034 bar)
LT-200 for 1/8" OD tubing	4,500 psi (310 bar)

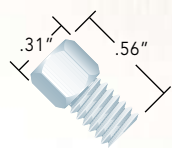
* This chart is intended for reference only. The data presented refer to the capability of the ferrules, not the tubing. Your results may vary depending on nut, receiving port and tubing materials, actual tubing diameter (due to manufacturer's tolerances), chemical compatibility, etc.



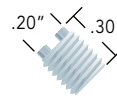
F-354
10-32 Stainless Steel
FlushNut
for 1/32" and 1/16" OD tubing



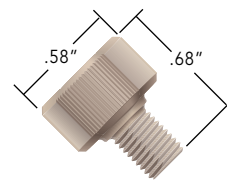
LT-110
10-32 PEEK Nut
for 1/32" and 1/16" OD tubing



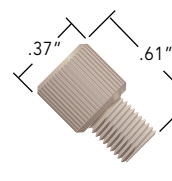
C-235
1/4-28 Stainless Steel
Nut
for 1/8" OD tubing



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



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



LT-215
1/4-28 PEEK Nut
for 1/8" OD tubing

REMOVAL TOOL

Use our 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. The ring will pop off, releasing the ferrule from the tubing.



Note

» For the Ultra Performance version of a LiteTouch Fitting please see page 9.

LITETOUCH FERRULE SYSTEMS

For 1/32" OD Tubing		Qty.
LT-132x	PEEK Ferrules ¹ , Natural, with SST lock rings	10-pk

For 1/16" OD Tubing		
LT-100x	PEEK Ferrules, Natural, with SST lock rings	10-pk
LT-135x	PEEK Ferrules, Black, with SST lock rings	10-pk

For 1/8" OD Tubing		
LT-200x	PEEK Ferrules ² , Natural, with SST lock rings	10-pk

LITETOUCH NUTS

For 1/32" and 1/16" OD Tubing		Qty.
F-354x	Stainless Steel FlushNuts ³ , 10-32	10-pk
LT-110x	PEEK Nuts, Natural, 10-32	10-pk

For 1/8" OD Tubing		
C-235x	Short Stainless Steel Nuts, 1/4-28	10-pk
F-364x	Stainless Steel FlushNuts ³ , 1/4-28	10-pk
LT-210x	PEEK Nuts, Natural, 1/4-28	10-pk
LT-215x	Short PEEK Nuts, Natural, 1/4-28	10-pk

REMOVAL TOOL

LT-300 Removal Tool for LiteTouch and Super Flangeless Ferrules

¹ LT-132, LT-100 and LT-135 can be used with all 10-32 nuts found on this page and page 15.
² LT-200 can also be used with all 1/4-28 nuts for 1/8" OD tubing found on page 15.
³ A tightening tool is required for these fittings (see page 17).
SST = Stainless Steel

FLUSHNUT™ FITTINGS

For Coned and Flat-Bottom Ports

- » Tightens Flush with the Top of the Receiving Port
- » Several Ferrule Options

Upchurch Scientific® FlushNut Fittings are designed for those tight-space applications where nut heads often interfere with each other. When coupled with an appropriate ferrule and tightened into a receiving port, the FlushNut's slotted head seats at or near flush with the top of the port. This feature allows FlushNut Fittings to reside in closer proximity than any other option on the market.

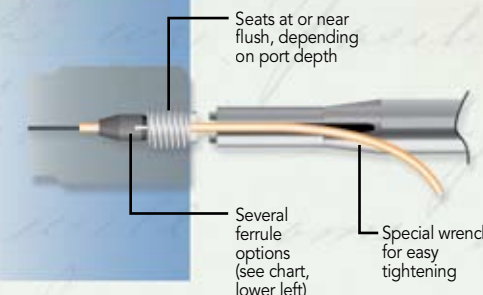
FlushNut Fittings are available for use with a number of ferrule systems and for use with 1/32", 1/16" and 1/8" OD tubing (see table below). Pressure ratings for these products range from 700-9,000 psi (48-620 bar), determined by the tubing and ferrule system selected. Please see the pages indicated in the table below for specific pressure ratings. All FlushNut Fittings are manufactured from 316 stainless steel.¹

Tighten or remove FlushNut Fittings with our specially designed FlushNut Wrenches, available in 10-32 and 1/4-28 versions.

¹ Except the P-321 Plug, which is made of PEEK™ polymer.



FlushNut Fittings System:



FLANGELESS SEALTIGHT FITTINGS

For Flat-Bottom Ports

- » Hold up to 5,000 psi in 1/4-28 Flat-Bottom Ports
- » All Polymer Construction

The Upchurch Scientific Flangeless SealTight Fittings system has redefined the pressure range of applications for traditional 1/4-28 flat-bottom ports. Our innovative F-290 Ferrule incorporates the dual compression mechanism of the F-192 coned SealTight Ferrule in a design that allows its use in a flat-bottom port. With this ferrule and a Flangeless SealTight nut, it is now possible to hold pressures up to 5,000 psi (345 bar) with all-polymer components in flat-bottom ports!

All Flangeless SealTight nuts require the PEEK F-290 Flangeless SealTight Ferrule. This fittings system, for use with 1/16" OD tubing only, is particularly well suited for applications where metal is undesirable, such as those involving NMR or microwaves.



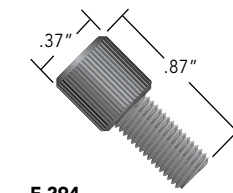
FlushNut Ferrule Options:

FlushNut	Threads/Port*	For Tubing OD	Ferrule Options	Page
F-350	10-32 C	1/16"	SealTight™ F-192	13
F-354	10-32 C	1/32"	LiteTouch® LT-132	16
	10-32 C	1/16"	LiteTouch LT-100	16
	10-32 C	1/16"	LiteTouch SealTight LT-135	16
F-364	1/4-28 C	1/8"	LiteTouch LT-200	16
	1/4-28 FB	1/8"	Super Flangeless™ P-350, P-352, P-359, P-360	20
	1/4-28 FB	1.8/2.0mm	Super Flangeless P-355	20
F-356	1/4-28 FB	1/32"	Super Flangeless P-248	19
	1/4-28 FB	1/16"	Super Flangeless P-250, P-259, P-260	19
F-358	1/4-28 FB	1/16"	Flangeless P-200, P-200N, P-200R, P-221, P-240	56
F-368	1/4-28 FB	1/8"	Flangeless P-300, P-300N, P-340	57
	1/4-28 FB	1.8/2.0mm	Flangeless P-342	58
	1/4-28 FB	3.0mm	Flangeless P-343	58
P-321	1/4-28 FB	N/A	Plug — No ferrule required	60

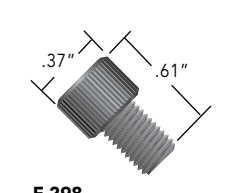
* C = Coned; FB = Flat-bottom.

F-290
Flangeless SealTight Ferrule

F-292
Standard Length Delrin® Nut



F-294
Standard Length PEEK Nut



F-298
Short PEEK Nut

FLANGELESS SEALTIGHT FITTINGS FOR 1/16" OD TUBING

Ferrule		Qty.
F-290x	Flangeless SealTight Ferrules, Black PEEK	10-pk
Nuts		
F-292x	Stnd. Length Nuts, Stnd. Head, Blue Delrin, 1/4-28	10-pk
F-294x	Stnd. Length Nuts, Stnd. Head, Black PEEK, 1/4-28	10-pk
F-298x	Short Nuts, Stnd. Head, Black PEEK, 1/4-28	10-pk

FLUSHNUT WRENCHES

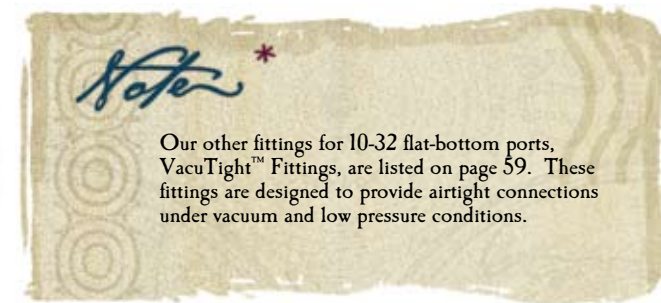
F-345	Wrench for 10-32 threaded FlushNut Fittings
F-346	Wrench for 1/4-28 threaded FlushNut Fittings

SUPER FLANGELESS™ FITTINGS INTRODUCTION

For Flat-Bottom Ports

- » Designed to Hold to Higher Pressures than Standard Flangeless Fittings
- » Eliminates Loosening of Nuts Caused by Tubing Twist

Upchurch Scientific® Super Flangeless Fittings are designed to provide significant improvements over standard Flangeless Fittings (see pressure ratings on pages 19 and 20). The lock ring offers uniform compression on the ferrule while operating as a bearing against the nut. Thus, the nut can spin freely against the ferrule, preventing the tubing from twisting during the tightening process. This feature eliminates subsequent loosening of the nut, making the Super Flangeless system ideal for applications subject to vibration. These products are also well suited for connections that need to be broken frequently, since the lock ring holds the ferrule in place on the tubing until intentionally removed. Use the LT-300 Removal Tool (page 16) to release Super Flangeless Ferrules from tubing for repositioning.



FLANGELESS NUT EXTENDER TOOLS

Use the P-298, P-299 or P-399 Extender Tool to tighten any standard, short or extra long style nut in hard-to-reach places. For our Headless nuts, try the P-297 Tool. These tools can tighten any Upchurch Scientific knurl-headed male nut on pages 10, 13, 14 and 16 – 20 (except F-287, F-288 and winged nuts). They can also be used with many of the low pressure nuts — please see page 56 for more information. The F-346 Tool tightens FlushNut™ Fittings (page 17).

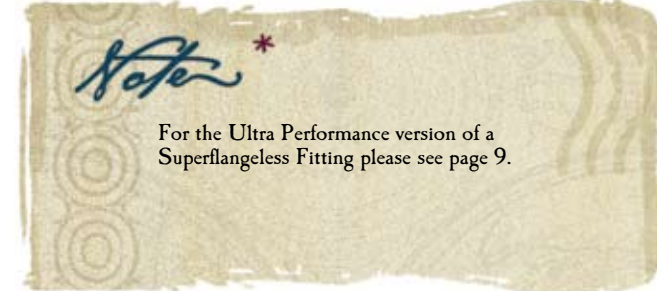
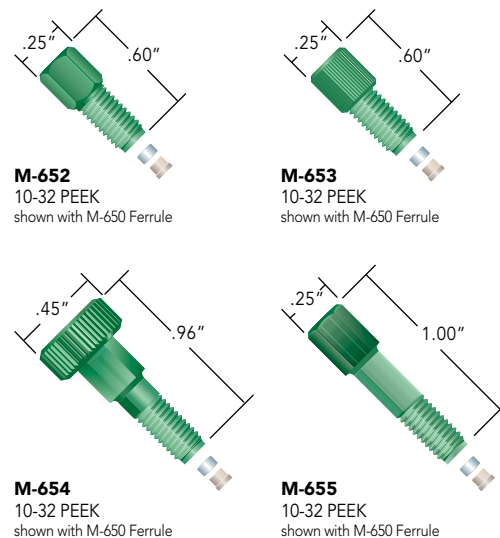


SUPER FLANGELESS FITTINGS

For 1/16" OD Tubing (10-32 Flat-Bottom Ports)

Several PEEK™ nut styles are available to connect 1/16" OD tubing into 10-32 flat-bottom ports. Use these fittings with rigid and semi-rigid tubing, such as PEEK, stainless steel and DuPont Teflon® brand resin. Connect capillary tubing using our NanoTight™ FEP Tubing Sleeves (see page 38). Pressure ratings for these fittings are included on page 19.

The M-650 Ferrule is made of PEEK polymer and the lock ring is passivated 316 stainless steel.



SUPER FLANGELESS FITTINGS FOR 1/16" OD TUBING

Ferrules	Qty.
M-650x PEEK Ferrules, Natural with SST lock rings, 10-32 FB	10-pk
Nuts	Qty.
M-652x PEEK Short Hex Head Nuts, Green, 10-32 FB	10-pk
M-653x PEEK Headless Short Nuts, Green, 10-32 FB	10-pk
M-654x PEEK Long Knurl/Hex Fat Head Nuts, Green, 10-32 FB	10-pk
M-655x PEEK Long Hex Head Nuts, Green, 10-32 FB	10-pk

FLANGELESS NUT EXTENDER TOOLS

F-346	FlushNut Tool for 1/4-28 Nuts
P-297	For Headless Style Nuts, aluminum
P-298	For Standard Head Nuts, Delrin®
P-299	For Standard Head Nuts, aluminum
P-399	For Standard Head Nuts, Short, aluminum

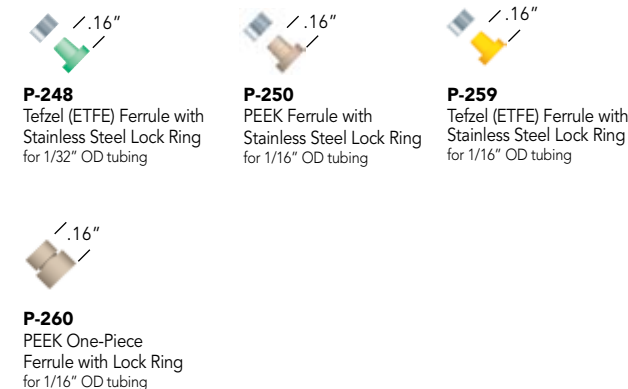
SST = Stainless Steel

SUPER FLANGELESS™ FITTINGS (CONT.)

For 1/32" and 1/16" OD Tubing (1/4-28, M6 Flat-Bottom Ports)

Several nut styles are available to connect 1/32" and 1/16" OD tubing into 1/4-28 and M6 flat-bottom ports, including our unique F-356 FlushNut™, a fitting designed to seat at or near flush with the top of a port when tightened. Please see page 17 for more information regarding this product line.

The ferrules are made of Tefzel® or PEEK™ polymer, and the lock rings are made of passivated 316 stainless steel (except the P-260 lock ring, which is PEEK). Any nut on this page can be used with any ferrule on this page, except as noted in footnote 3. Connect capillary tubing into 1/4-28 and M6 flat-bottom ports using these ferrules and NanoTight™ Tubing Sleeves (page 38).



Super Flangeless Ferrule Pressure Ratings:

For 1/16" OD Tubing, 10-32 FB Ports

M-650 Ferrule (using the M-654 PEEK Nut)	Fused Silica Tubing* DuPont Teflon® brand resin FEP Tubing PEEK Tubing Stainless Steel Tubing	750 psi (52 bar) 1,700 psi (121 bar) 3,750 psi (259 bar) 3,750 psi (259 bar)
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For 1/32" OD Tubing, 1/4-28 and M6 FB Ports

P-248 Ferrule (using the P-287 PPS Nut)	PEEK Tubing (.008" ID)	2,500 psi (172 bar)
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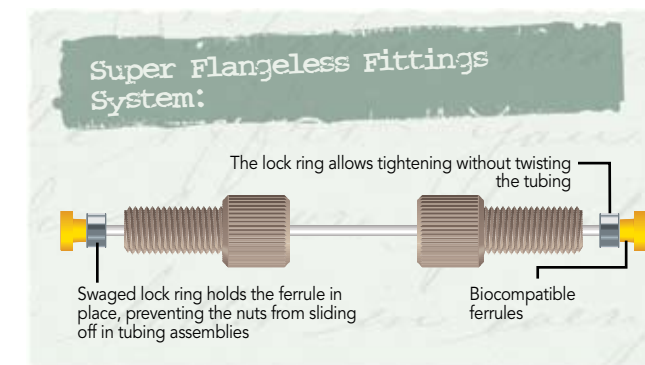
For 1/16" OD Tubing, 1/4-28 and M6 FB Ports

P-250 Ferrule (using the P-252 Delrin® Nut)	ETFE Tubing	2,400 psi (165 bar)
	PEEK Tubing	5,000 psi (345 bar)
	Stainless Steel Tubing	7,000 psi (483 bar)
P-259 Ferrule (using the P-255 PEEK Nut)	Teflon FEP Tubing	2,500 psi (172 bar)
	PEEK Tubing	2,400 psi (165 bar)
	Stainless Steel Tubing	2,000 psi (138 bar)
P-260 Ferrule (using the P-252 Delrin Nut)	ETFE Tubing	2,600 psi (179 bar)
	PEEK Tubing	2,800 psi (193 bar)
	Stainless Steel Tubing	1,800 psi (124 bar)

FB = Flat-bottom port.

* With F-242 FEP NanoTight Sleeve (page 38).

These data were generated under optimal conditions, using water at room temperature. The data presented refer to the capability of the fittings, not the tubing. Your results may vary, depending on variables such as: the solvent used, the materials of the tubing, port, nut and ferrule used, and the temperature at which your analyses are run.



SUPER FLANGELESS FITTINGS FOR 1/32" AND 1/16" OD TUBING¹

Ferrules	Qty.
P-248x Tefzel Ferrules, Green, with SST lock rings, for 1/32" OD tubing	10-pk
P-250x PEEK Ferrules, Natural, with SST lock rings, for 1/16" OD tubing	10-pk
P-259x ETFE Ferrules, Yellow, with SST lock rings, for 1/16" OD tubing	10-pk
P-260x PEEK One-Piece Ferrules, Natural, for 1/16" OD tubing	10-pk
Nuts	Qty
F-356x Stainless Steel FlushNuts ² , 1/4-28	10-pk
LT-105x Stainless Steel Short Hex Head Nuts, 1/4-28	10-pk
LT-115x PEEK Short Nuts, Natural, 1/4-28	10-pk
P-213 PEEK Short Headless Nut ³ , Black, M6	ea.
P-217 PPS Nut, Black, M6	ea.
P-219 PEEK Short Nut, Black, M6	ea.
P-232 PEEK Short Headless Nut ³ , Natural, 1/4-28	ea.
P-246x Teflon PFA Nuts, Natural, 1/4-28	10-pk
P-251x PEEK Nuts with "wings", Natural, 1/4-28	10-pk
P-252x Delrin Nuts, Gray, 1/4-28	10-pk
P-255x PEEK Nuts, Natural, 1/4-28	10-pk
P-281 PPS Nut, Natural, 1/4-28	ea.
P-287 PPS Headless Nut ³ , Natural, 1/4-28	ea.
P-289 PPS Headless Nut ³ , Black, M6	ea.
P-418 PEEK Female Nut, Green, M6	ea.
P-420 PEEK Female Nut, Natural, 1/4-28	ea.

¹ Some of the nuts on this page are available in additional colors. Please contact us for more information.

² A tightening tool is required for this fitting (see page 17).

³ Use only the P-259 Ferrule with the 1/16" Super Flangeless Headless Nuts. SST = Stainless Steel

SUPER FLANGELESS™ FITTINGS (CONT.)

For 1/8" and 1.8/2.0mm OD Tubing (1/4-28, M6 Flat-Bottom Ports)

These fittings offer all of the benefits of Super Flangeless Fittings (see page 18) for 1/8" and 1.8/2.0mm OD tubing. Use any of the ferrules with any 1/4-28 nuts on this page, except as noted in footnote 3. Use the P-352 Ferrule with any M6 threaded nut on this page to connect 1/8" OD tubing into M6 ports.

The ferrules are made of PEEK™, Tefzel® or Kel-F® polymer, and the lock rings are made of passivated 316 stainless steel (except the P-360 lock ring, which is PEEK).

Please Note: for 3/16" OD tubing, use P-137 and P-140, found on page 61. See page 43 for Super Flangeless Fittings designed for 6-32 and 6-40 threaded ports, and page 18 for ones designed for 10-32 threaded ports.

Pressure Ratings for Super Flangeless Ferrule:

For 1/8" OD Tubing, 1/4-28 and M6 FB Ports

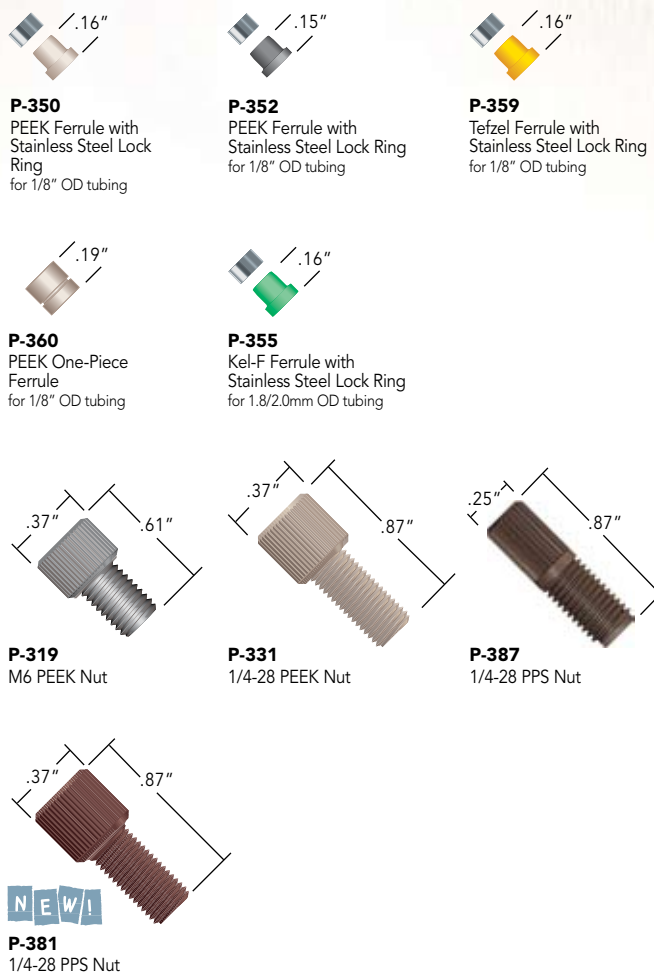
Ferrule	Tubing	Pressure Rating
P-350 and P-352 Ferrules (using the LT-210 PEEK Nut)	PEEK Tubing (.062" ID)	4,100 psi (283 bar)
	PEEK Tubing (.080" ID)	2,900 psi (200 bar)
	Stainless Steel Tubing	5,800 psi (400 bar)
P-359 Ferrule (using the LT-210 PEEK Nut)	DuPont Teflon® brand resin	
	FEP Tubing (.062" ID)	1,200 psi (83 bar)
	ETFE Tubing (.062" ID)	1,800 psi (124 bar)
	PEEK Tubing (.080" ID)	1,000 psi (69 bar)
P-360 Ferrule (using the LT-210 PEEK Nut)	Teflon FEP Tubing (.062" ID)	1,400 psi (97 bar)
	ETFE Tubing (.062" ID)	2,700 psi (186 bar)
	PEEK Tubing (.080" ID)	700 psi (48 bar)

For 1.8/2.0mm OD Tubing, 1/4-28 and M6 FB Ports

Ferrule	Tubing	Pressure Rating
P-355 Ferrule (using the P-317 PPS Nut)	Teflon FEP Tubing (2.0mm OD x 1.0mm ID)	1,000 psi (69 bar)
	ETFE Tubing (1.8mm OD x .020" ID)	1,250 psi (86 bar)
	PEEK Tubing (1.8mm OD x .020" ID)	1,500 psi (103 bar)

FB = Flat-bottom port.

These data were generated under optimal conditions, using water at room temperature. The data presented refer to the capability of the fittings, not the tubing. Your results may vary, depending on variables such as: the solvent used; the materials of the tubing, port, nut and ferrule used; and the temperature at which your analyses are run.



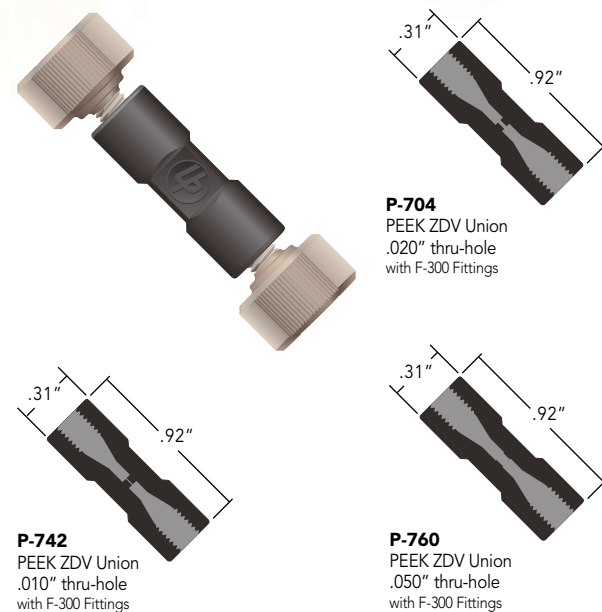
SUPER FLANGELESS FITTINGS FOR 1/8" AND 1.8/2.0MM OD TUBING¹

Ferrules	Qty.
P-350x PEEK Ferrules, Natural, with SST lock rings, for 1/8" OD tubing	10-pk
P-352x PEEK Ferrules, Black, with SST lock rings, for 1/8" OD tubing	10-pk
P-359x ETFE Ferrules, Yellow, with SST lock rings, for 1/8" OD tubing	10-pk
P-360x PEEK One-Piece Ferrules, Natural, for 1/8" OD tubing	10-pk
P-355x Kel-F Ferrules, Green, with SST lock ring, for 1.8/2.0mm OD tubing	10-pk
Nuts	Qty.
C-235x Stainless Steel Short Hex Head Nuts, 1/4-28	10-pk
F-156 PEEK Female Nut, Black, 1/4-28	ea.
F-364x Stainless Steel FlushNuts ² , 1/4-28	10-pk
LT-210x PEEK Nuts, Natural, 1/4-28	10-pk
LT-215x PEEK Short Nuts, Natural, 1/4-28	10-pk
P-317 PPS Nut, Black, M6	ea.
P-319 PEEK Short Nut, Black, M6	ea.
P-331 PEEK Nut, Natural, 1/4-28	ea.
P-332x Delrin® Nuts, Black, 1/4-28	10-pk
P-336 PEEK Short Headless Nut ³ , Natural, 1/4-28	ea.
P-337x PEEK Short Headless Nuts ⁴ , Black, M6	10-pk
P-381 PPS Nut, Natural, 1/4-28	ea.
P-387 PPS Headless Nut ³ , Natural, 1/4-28	ea.
P-400x Teflon PFA Nuts, Natural, 1/4-28	10-pk
P-419 PEEK Female Nut, Gray, M6	ea.

¹ Some of the nuts on this page are available in additional colors. Please contact us for more information.
² Requires the use of F-346 FlushNut Tool.
³ Use only P-359 Ferrules with these 1/8" Super Flangeless Headless Nuts.
⁴ Use only P-352 Ferrules with M6 Super Flangeless Headless Nuts. Requires the use of P-297 Headless Nut Extender Tool to tighten sufficiently.
 SST = Stainless Steel

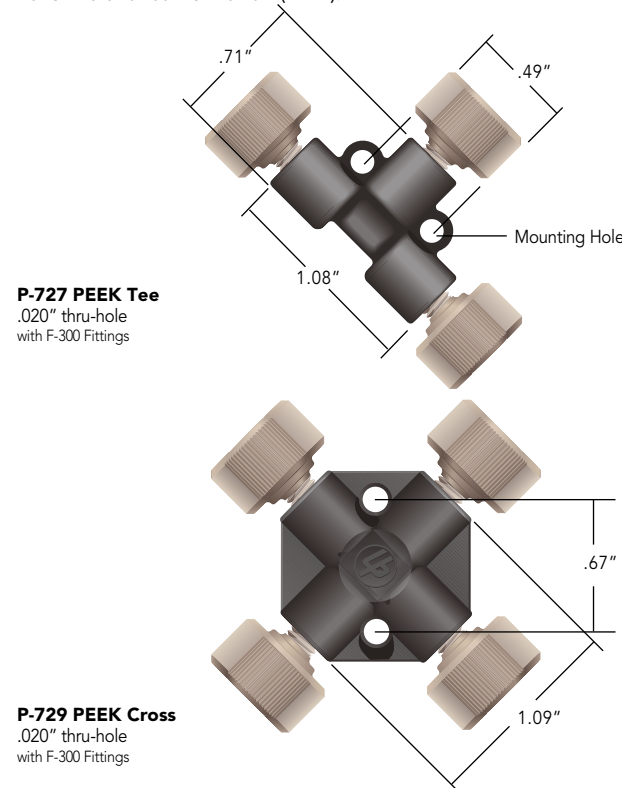
PEEK™ ZDV UNIONS

Upchurch Scientific® PEEK zero-dead-volume (ZDV) Unions come complete with two F-300 Fingertight Fittings for 1/16" OD tubing and are pressure rated to 6,000 psi (414 bar).



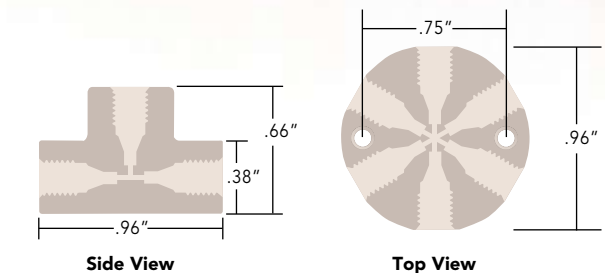
PEEK TEES & CROSSES

Our PEEK Tees and Crosses include high pressure F-300 PEEK Fingertight Fittings — allowing maximum operating pressures to 3,500 psi (241 bar) when used with 1/16" OD PEEK, titanium or stainless steel tubing. They can also operate in lower pressure applications using other tubing such as DuPont Teflon® brand resin or Tefzel® (ETFE).

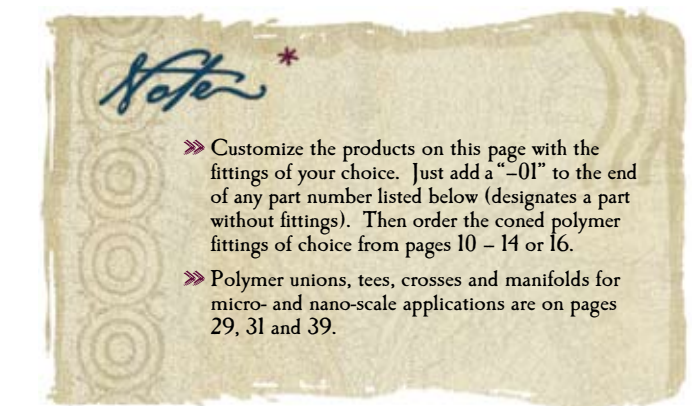


PEEK 7-PORT MANIFOLD

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 with a pressure rating of 6,000 psi (414 bar). Seal unused ports with any of our polymer 10-32 plugs on page 60.



P-170 PEEK 7-Port Manifold .020" thru-holes with F-331 Fittings



PEEK ZDV UNIONS

	Threads	Thru-hole	Includes	Swept Volume
P-704 Union	10-32	.020" (.50mm)	(2) F-300	.28µL
P-742 Union	10-32	.010" (.25mm)	(2) F-300	.07µL
P-760 Union	10-32	.050" (1.25mm)	(2) F-300	1.2µL

PEEK TEES AND CROSSES

	Threads	Thru-hole	Includes	Swept Volume
P-727 Tee	10-32	.020" (.50mm)	(3) F-300	.57µL
P-728 Tee	10-32	.050" (1.25mm)	(3) F-300	3.0µL
P-729 Cross	10-32	.020" (.50mm)	(4) F-300	.72µL
P-730 Cross	10-32	.050" (1.25mm)	(4) F-300	3.5µL

PEEK MANIFOLD

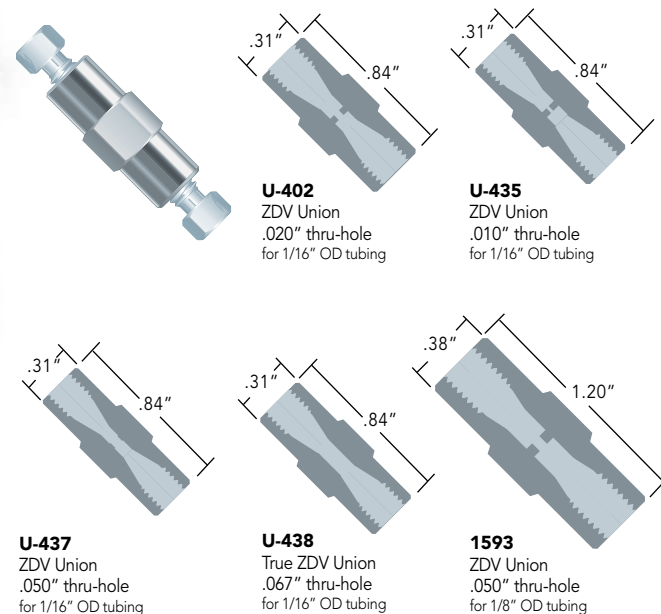
	Threads	Thru-hole	Includes	Swept Volume
P-170 7-Port	10-32	.020" (.50mm)	(7) F-331	2.2µL

STAINLESS STEEL ZDV UNIONS

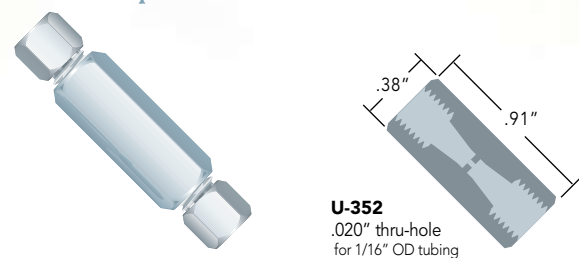
These high pressure, zero-dead-volume (ZDV) unions, manufactured by Upchurch Scientific®, are designed as direct replacements for specific manufacturers' parts. Each union is precision machined from 316 stainless steel, carefully passivated, then thoroughly rinsed. Each comes complete with stainless steel nuts and ferrules, and is rated to 10,000 psi (690 bar) when wrench tightened (wrenches are listed on page 15). *Please Note: Use our P-554 Gauge Plug on page 29 to assist in creating a true ZDV connection with the U-438 Union.*

For micro flow applications, please see our U-411 Stainless Steel Union on page 39. For stainless steel tubing, please see pages 74 – 76.

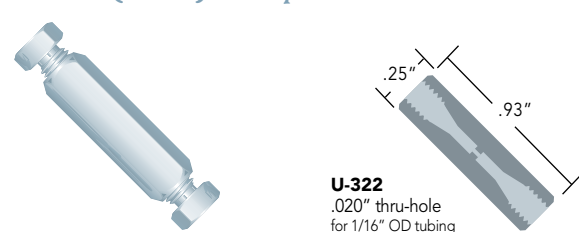
Standard ZDV Unions



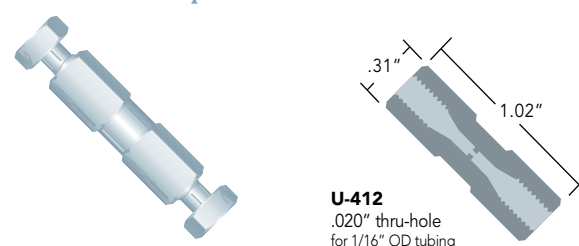
SSI Compatible ZDV Union



VICI® (Valco) Compatible ZDV Union



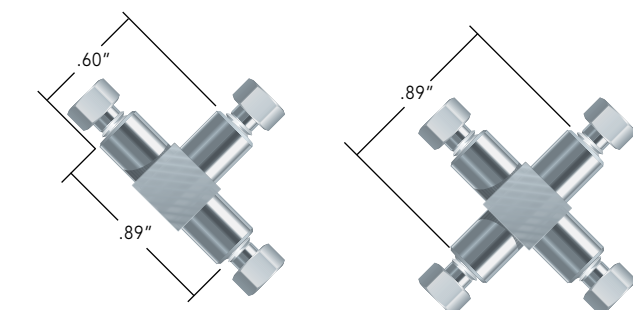
Waters® Compatible ZDV Union



Please 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 without fittings.

STAINLESS STEEL TEES & CROSSES

These 316 stainless steel products come complete with 10-32 fittings for use with 1/16" OD tubing and are rated to 10,000 psi (690 bar). They are also compatible with Parker and Valco male fittings.



STANDARD STAINLESS STEEL ZDV UNIONS					
	Threads	Thru-hole	Includes	Swept Volume	
U-402	10-32	.020" (.50mm)	(2) U-400/U-401	.13µL	
U-435	10-32	.010" (.25mm)	(2) U-400/U-401	.02µL	
U-437	10-32	.050" (1.25mm)	(2) U-400/U-401	.84µL	
U-438	10-32	.067" (1.70mm)	(2) U-400/U-401	Near 0µL	
1593	1/4-28	.050" (1.25mm)	(2) C-235/C-236	1.48µL	
for use with 1/8" OD tubing					
SSI COMPATIBLE ZDV UNION					
U-352	1/4-28	.020" (.50mm)	(2) U-350/U-351	.18µL	
VICI (VALCO) COMPATIBLE ZDV UNION					
U-322	10-32	.020" (.50mm)	(2) U-320/U-321	.15µL	
WATERS COMPATIBLE ZDV UNION					
U-412	10-32	.020" (.50mm)	(2) U-410/U-401	.10µL	
STAINLESS STEEL TEES AND CROSSES					
U-428	Tee	10-32	.020" (.50mm)	(3) U-400/U-401	.57 µL
U-429	Tee	10-32	.040" (1.00mm)	(3) U-400/U-401	2.1 µL
U-430	Cross	10-32	.020" (.50mm)	(4) U-400/U-401	.72 µL
U-431	Cross	10-32	.040" (1.00mm)	(4) U-400/U-401	2.5 µL

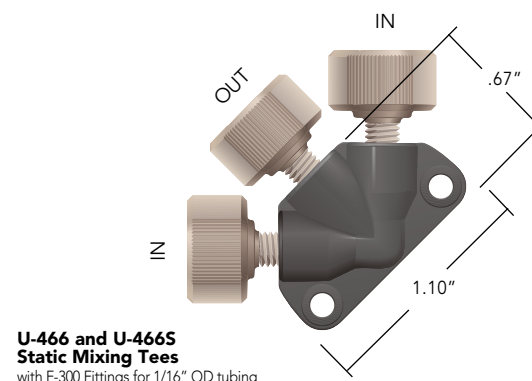
✱ORDER✱ Tel: 800.426.0191 / 360.679.2528 · www.upchurch.com

STATIC MIXING TEES

- » PEEK™ Body with Two-Piece Fingertight Fittings
- » Low Swept Volume

Upchurch Scientific® Static Mixing Tees are ideal for microbore or analytical gradient HPLC. They have a low swept volume of 2.2µL (includes frit volume) and are designed for flow rates of 0.5 to 3 mL/min and a maximum pressure of 6,000 psi (414 bar). The back pressure caused by the tee is typically only 10 to 20 psi (.7 to 1.4 bar) at these flow rates. The thru-holes are .020" and the center port features a 10µm UHMWPE or stainless steel frit that aids mixing.

Please Note: turbulent mixing of solvents often increases outgassing. To maintain a bubble-free fluid pathway, we recommend solvent degassing when using this product (see the Rheodyne® Vacuum Degassing Systems on pages 118 – 119).

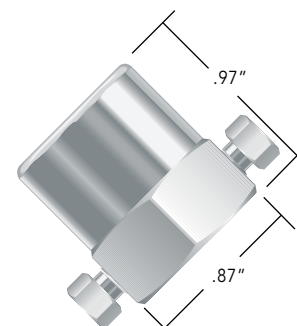


PRESSURE GAUGE TEE

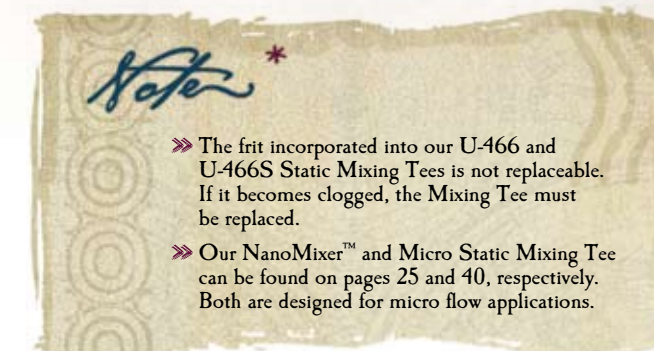
- » Complete with Stainless Steel Fittings

Many HPLC systems have pumps that provide a digital readout of the inline system pressure. However a number of systems do not, creating the need for a gauge along your 1/16" OD tubing pathway to monitor pressure. The Upchurch Scientific U-433 Pressure Gauge Tee is the solution. This Tee comes complete with 10-32 coned stainless steel fittings for 1/16" OD tubing and has an internal port suitable to connect to 1/4" pipe threads (NPT), standard to most gauges. *Please Note: a pressure gauge is not included with this Tee, however they are available from a number of laboratory supply companies.*

Before installing your gauge into this Tee, simply wrap DuPont Teflon® brand resin tape around the male threads of your pressure gauge four times. This will ensure a leak-free seal, even at standard HPLC operating pressures.



✱ORDER✱ Tel: 800.426.0191 / 360.679.2528 · www.upchurch.com



FITTINGS KITS

- » For HPLC and FIA Systems

The Upchurch Scientific 1400 Series Kits contain fittings for typical systems. Besides nuts and ferrules, most kits also include tubing, unions and other parts — all at a substantial savings over individually priced components. The HPLC Starter Kit includes 5-feet of 1/16" OD x .010" ID PEEK tubing, a tubing cutter and an F-120FUNPACK (page 10). Our Super Kit contains a wider selection of fittings and tubing, as well as filters, guard columns and a polymer tubing cutter.

For a complete listing of the components in each kit, please visit our website at www.upchurch.com and search on "Kits". You may also contact your local Distributor or Upchurch Scientific directly.



PRESSURE GAUGE TEE

	Includes
U-433 Pressure Gauge Tee	(2) U-400/U-401

STATIC MIXING TEE

	Includes
U-466 Static Mixing Tee, 10µm UHMWPE Frit	(3) F-300
U-466S Static Mixing Tee, 10µm Stainless Steel Frit	(3) F-300

FITTINGS KITS

1435 Super Kit
1458 FIA Fittings Kit
2100 HPLC Starter Kit
1457 PEEK Fittings Kit