

EXP[®] & EXP[®]2

A Guide to UHPLC Products



OPTIMIZE TECHNOLOGIES, INC.



Extreme Pressure

Welcome to the brand new standard of ultra high pressure liquid chromatography (UHPLC) hardware and consumables. Optimize Technologies' EXP product family includes fittings, filters, and packed-bed products which offer unparalleled convenience and ease of use through exciting new patented and patent-pending innovations. This advanced system is the first design to provide reusable hand-tight connections and hand-tight cartridge replacements for UHPLC. These innovations significantly accelerate challenging UHPLC applications and reduce costly instrument downtime.

Revolutionary features include:

- EXP titanium/PEEK hybrid ferrule, offering repeated zero-dead-volume (ZDV) connections, hand-tight to 8,700 psi or wrench-tight to 20,000+ psi (1,400+ bar).
- EXP holders and cartridges with ultra-low internal swept volume and hand-tight cartridge changeover for use to 20,000+ psi (1,400+ bar).

This rare combination of attributes enables our EXP components to provide excellent protection with negligible impact on analyte retention and peak shape. The elegant design of our EXP line showcases sleek architecture for easy installation in crowded instrument compartments without compromising accessibility. Our commitment to exceed industry standards yields an entire EXP product family conservatively rated to 20,000+ psi (1,400+ bar). The EXP product line, as well as virtually all Optimize products, are proudly designed and manufactured in our facility in Oregon, USA*.

From the name you've trusted for 30 years of precision innovation in HPLC accessories and consumables, EXP represents the culmination of a generation of research and development in our field. And though our exacting quality control consistently guarantees that every product bearing the EXP trademark exemplifies our high standards, our responsive customer service and expert technical support are always here for you.

**100% of all Optimize EXP products are made in the U.S.A. from raw materials originating in the U.S.A. 98% of all Optimize products are made in the U.S.A. from raw materials originating in the U.S.A.*



optimizetechnologies
INNOVATIVE HPLC, UHPLC & LC/MS PRODUCTS

EXP[®]

Extreme Pressure

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The Foundation of the EXP & EXP[®]2 Family

Optimize Technologies recognizes the challenges faced by scientists and technicians in the constantly evolving field of chromatography and LC instrumentation. Ultra high pressure liquid chromatography is one good example of how these advances present an opportunity for innovative products.

In response to evolving UHPLC technologies, Optimize delivers with the EXP Titanium PEEK Hybrid ferrule. The ingenuity of the EXP and EXP2 ferrule lies in a design which adjusts to **any 10-32, 6-40 or 6-32 port depth** and can subsequently be removed and reused in a different port while still maintaining adjustability. The ferrule provides the necessary zero-dead-volume seal to allow connections beyond 20,000+ psi (1,400+ bar).

The EXP and EXP2 ferrule, with its innovative capabilities, forms the foundation of our EXP product line. A quick look through these pages shows that the EXP ferrule is incorporated into the entire EXP product line, demonstrating its wide array of applications. If you are interested to see how the EXP products can work for you, please contact Optimize Technologies or one of our representatives. At Optimize, we strive to develop new products that are straight forward, yet elegant, solutions to daily issues in the lab.

ADVANTAGES OF THE ORIGINAL EXP FERRULE

- Rated to 20,000+ psi (1,400+ bar)
- Tested to 30,000 psi
- No more cut-off and replacement of swaged ferrules
- Auto-adjusting ZDV connection
- Intended for many repeat uses

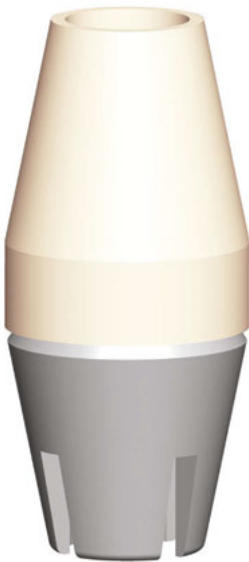
ADVANTAGES OF EXP[®]2 Ti-LOK FERRULE

- All of the Original EXP Ferrule benefits (listed above)
- Perfect for PEEKsil™, PEEK and Fused Silica Tubing
- Inverted Titanium Hybrid Ferrule geometry prevents delamination of PEEKsil tubing by bottom-of-the-port sealing

U.S. Pat. No. 8,201,854 and other U.S. and foreign patents pending.

A Perfect Seal with every connection

Original EXP Ferrule for Stainless Steel



PEEK:

Proven sealing ability
beyond 20,000+ psi
(1,400+ bar).

Titanium:

Enables the swage to
be released and reset.
Intended for many
repeat connections.

EXP2 Ti-Lok Ferrule for PEEKsil



EXP[®]2 fittings

NEW EXP2 FITTING SYSTEM - PEEKSIL TUBING

The EXP2 Fittings with Ti-LOK Ferrules offer UHPLC connections for 1/16" and 1/32" PEEKsil tubing that seal to 15,000+ psi – depending on the tubing I.D. For example, 50µm PEEKsil tubing can be hand tightened to over 20,000 psi. These fittings are ideal for making Nano HPLC and UHPLC connections and easily fit into tight spaces such as injection valves, column couplers, sample loops and column ovens.

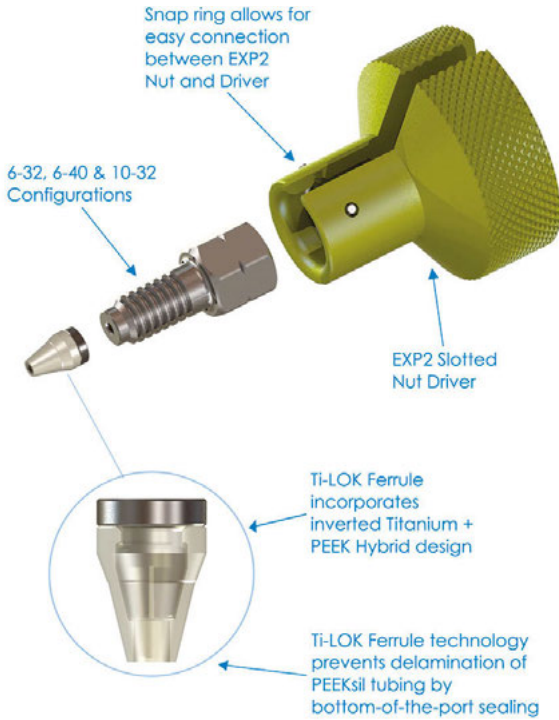
The EXP2 titanium hybrid Ti-LOK ferrules combine the robustness of titanium and the sealing capability of PEEK. Utilizing a unique inverted geometric design, the ferrules firmly press the PEEKsil tubing against the tube stop of any instrument port, creating a zero-dead-volume (ZDV) connection. The titanium portion of the ferrule does not permanently swage to the tubing, allowing for many repeat connections and the ability to adjust the tubing to different port depths. Included with the Ti-LOK ferrules are the new EXP2 3/16" hex head nuts and EXP2 Driver. The nuts are available with 6-32, 6-40 and 10-32 threads and have been scaled down to allow for maximum working room in cramped spaces. The EXP2 Driver is a small, easy to use knurled torque driver which snaps on to the nuts for hand-tightening and loosening. The EXP2 Driver is slotted and can be removed from the nut and tubing after use. EXP2 Ti-LOK fittings are currently available as kits with EXP2 nuts, Ti-LOK ferrules and EXP2 Driver.

The combination of bottom-of-the-port sealing, Titanium Hybrid technology and precision manufacturing make the EXP2 Fittings an unbeatable choice for any standard or nano UHPLC and UHPLC/MS application.

ADVANTAGES OF EXP2 FITTINGS FOR PEEKSIL

- Rated Hand-Tight to 20,000+ psi (1,400+ bar)
- Auto-adjusting, zero-dead-volume connection
- Extremely robust one-piece ferrule design
- Intended for many repeat uses
- Cost efficient with replaceable components
- Perfect for standard or nano UHPLC and UHPLC/MS

U.S. Pat. No. 8,201,854 and other U.S. and foreign patents pending.



EXP2 HAND-TIGHT FITTING KIT CONFIGURATIONS

Kits below include: 2 EXP2 Nuts, 2 EXP2 Ti-LOK Ferrules + 1 EXP2 Driver

15-20-04932 10-32 EXP2 Nut & 1/16" Ti-LOK Ferrules (2pk)

15-19-04931 6-40 EXP2 Nuts & 1/32" Ti-LOK Ferrules (2pk)

15-19-04930 6-32 EXP2 Nuts & 1/32" Ti-LOK Ferrules (2pk)

Kits below include: 10 EXP2 Nuts, 10 EXP2 Ti-LOK Ferrules + 1 EXP2 Driver

15-20-04920 10-32 EXP2 Nuts & 1/16" Ti-LOK Ferrules (10pk)

15-19-04927 6-40 EXP2 Nuts & 1/32" Ti-LOK Ferrules (10pk)

15-19-04929 6-32 EXP2 Nuts & 1/32" Ti-LOK Ferrules (10pk)

EXP[®] & EXP[®]2 fittings

ORIGINAL EXP FITTING SYSTEM - SS TUBING

The EXP Fitting System is the premier adjustable nut and ferrule compression fitting for extreme high-pressure connections between 1/32" or 1/16" tubing and any 6-40 or 10-32 port. The key advantages of the EXP fitting lie at the confluence of simplicity and versatility.

The patented Titanium Hybrid Ferrule integrates the resilience of titanium with the proven sealing ability of PEEK in a superb one-piece design. The Hybrid Ferrule provides a perfect seal with every connection, yet the swage can be released without tools to adjust to the different port depths of various hardware. This adjustability provides unlimited value through repeated zero-dead-volume connections with any port configuration.

NEW EXP2 FITTING SYSTEM - SS TUBING

Optimize is proud to introduce EXP2 - the next generation of EXP UHPLC fitting technology. Featuring a small 3/16" hex-head EXP2 nut, the new EXP2 Driver and the original titanium hybrid ferrule, the EXP2 fittings offer hand-tight connections rated to 20,000 psi+. The EXP2 nuts are available with 6-32, 6-40 and 10-32 threads and have been scaled down to allow for maximum working room in cramped spaces. The EXP2 Driver is a small, easy to use knurled torque driver which snaps on to the nuts for hand-tightening and loosening. The EXP2 Driver is slotted and can be removed from the nut and tubing after use.

With the EXP and EXP2 Fitting Systems, you no longer have to clip off and replace swaged ferrules or wonder if you are achieving the best possible connection.

ADVANTAGES OF EXP & EXP2 FITTINGS

- Available in Standard (1/16") and Nano (1/32") configurations
- Rated to 20,000+ psi (1,400+ bar)
- Tested to 30,000 psi
- Auto-adjusting zero-dead-volume connection
- Intended for many repeat uses
- Cost efficient with replaceable components

U.S. Pat. No. 8,201,854 and other U.S. and foreign patents pending.



NEW EXP2 HAND-TIGHT

Hand-Tight to 20,000+ psi



ORIGINAL EXP HAND-TIGHT

Hand-Tight to 8,700+ psi
Wrench-Tight to 20,000+ psi

EXP TITANIUM HYBRID FERRULES (FOR STAINLESS STEEL (SS) TUBING)

15-24-03831	1/16" Titanium Hybrid Ferrule
15-24-03832	1/16" Titanium Hybrid Ferrules (10pk)
15-19-04242	1/32" (Nano) Titanium Hybrid Ferrule
15-19-04243	1/32" (Nano) Titanium Hybrid Ferrules (10pk)

NEW EXP2 HAND-TIGHT FITTING KIT CONFIGURATIONS (FOR SS TUBING)

Kits below include: 2 EXP2 Nuts, 2 EXP Ferrules + 1 EXP2 Driver

15-20-04933	10-32 EXP2 Nuts & 1/16" Titanium Hybrid Ferrules (2pk)
15-19-04961	6-40 EXP2 Nuts & 1/32" Titanium Hybrid Ferrules (2pk)
15-19-04958	6-32 EXP2 Nuts & 1/32" Titanium Hybrid Ferrules (2pk)

Kits below include: 10 EXP2 Nuts, 10 EXP Ferrules + 1 EXP2 Driver

15-20-04924	10-32 EXP2 Nuts & 1/16" Titanium Hybrid Ferrules (10pk)
15-19-04962	6-40 EXP2 Nuts & 1/32" Titanium Hybrid Ferrules (10pk)
15-19-04959	6-32 EXP2 Nuts & 1/32" Titanium Hybrid Ferrules (10pk)

ORIGINAL EXP HAND-TIGHT FITTINGS (FOR SS TUBING)

15-20-03888	10-32 Hand-Tight Nut & 1/16" Titanium Ferrule
15-20-03930	10-32 Hand-Tight Nuts & 1/16" Titanium Ferrules (10pk)
15-19-04245	6-40 Hand-Tight Nut & 1/32" Titanium Hybrid Ferrule
15-19-04246	6-40 Hand-Tight Nuts & 1/32" Titanium Hybrid Ferrules (10pk)

ORIGINAL EXP HAND-TIGHT COUPLER

15-20-04128	1/16" OD x 0.005" ID x 5cm Stainless Steel Tubing (includes 2 Original EXP Hand-Tight Fittings)
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EXP STEM FILTER

Modern UHPLC and UHPLC/MS instrumentation pushes the envelope in fluid-handling with tiny passages and extremely high pressures. At any time, an unprotected system is virtually a stray $1\mu\text{m}$ seal fragment away from failure, loss of priceless data continuity, and subsequent troubleshooting and repair. The best assurance against this costly prospect comes from safeguarding your system with thorough filtration.

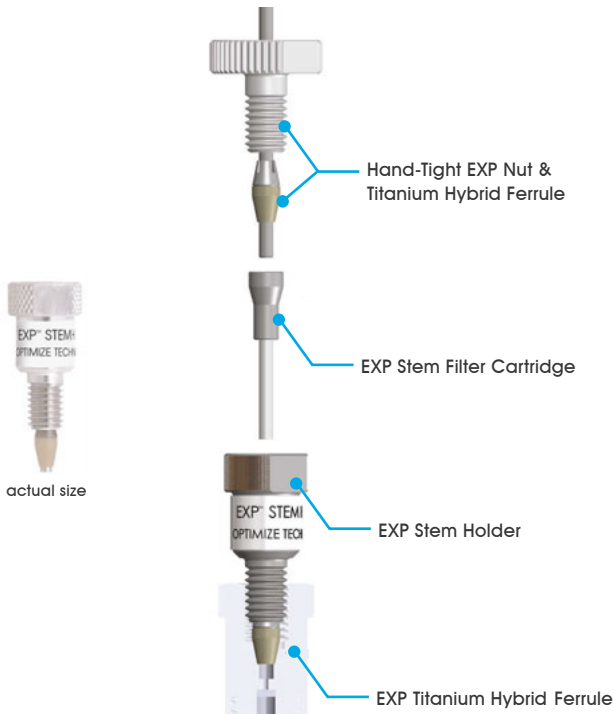
The EXP Stem Filter features a choice of frit porosities integrated with our patented auto-adjusting stem for repeated ZDV connections with any 10-32 port. The entire filter stem and reusable holder are only slightly larger than a standard HPLC fitting. This slim architecture allows it to easily fit into crowded instrument compartments, tightly spaced injection ports, and anywhere else you need an extra level of protection against clogging and contamination. The EXP Stem Filter is an ideal solution to protect expensive UHPLC columns, injectors, autosamplers, and MS electrospray tips without extra-column effects.

When tightened by hand, the EXP Stem Filter seals to 8,700+ psi. The reusable holder hardware also incorporates wrench flats to enable flawless sealing to 20,000+ psi (1,400+ bar). The EXP Stem Filter is the ultimate low-impact protection for your expensive UHPLC and MS equipment, assuring trouble-free performance so you can concentrate on the data, not troubleshooting.

ADVANTAGES OF EXP STEM FILTERS

- Approved for use at 20,000+ psi (1,400+ bar)
- Hand-tight and wrench-tight configuration
- Low-dispersion cartridges
- Custom volumes/porosities available
- Ultra-low $.27\mu\text{L}$ total swept volume
- Auto-adjusting ZDV connection
- Reusable holder intended for many repeat uses

U.S. Pat. No. 8,201,854 and other U.S. and foreign patents pending.



EXP STEM FILTER KITS

15-04-04122 0.2 μ m **EXP** Stem Filter Kit

15-04-04123 0.5 μ m **EXP** Stem Filter Kit

Kit includes: Holder, Fittings & 3 Stem Filter Cartridges

EXP STEM FILTER REPLACEMENT CARTRIDGES

15-04-04117 0.2 μ m **EXP** Stem Filter Cartridge (5pk)

15-04-04119 0.5 μ m **EXP** Stem Filter Cartridge (5pk)

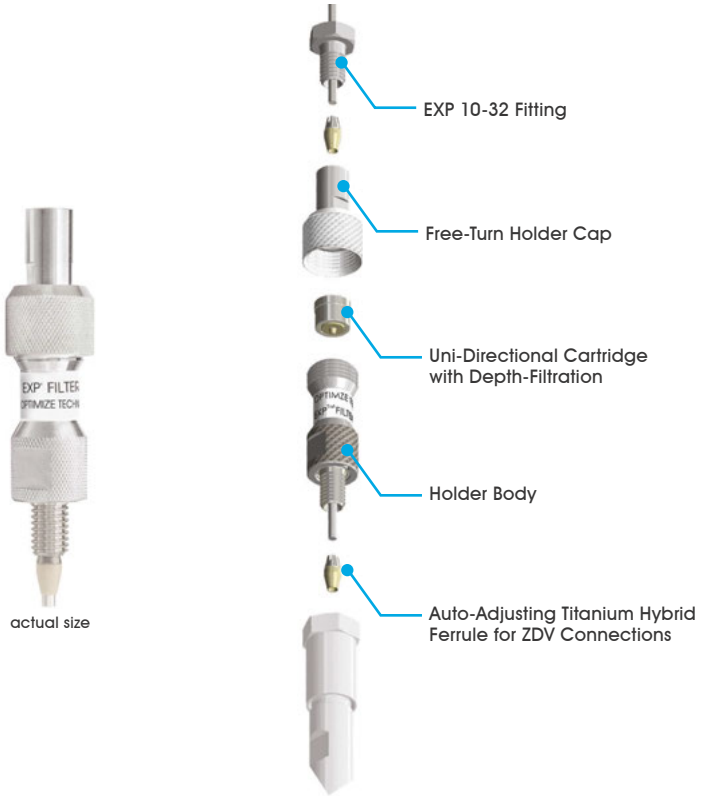
EXP PRE-COLUMN FILTER

The EXP Pre-Column Hand-Tight Filter is ideal for protecting small particle size UHPLC columns. Such techniques analyze samples in the most demanding applications, which can decrease the life of these expensive columns. EXP Pre-Column Filters help extend that life and protect your column investment without sacrificing performance. Free-turn[®] architecture allows the user to change cartridges by hand without breaking fluid connections on the holder inlet/outlet.

EXP Pre-Column Filter holders are available with Titanium Hybrid Ferrules for easy direct connection to any 10-32 port. The filter holder comes as a complete package including fittings to provide repeated zero-dead-volume column connections.

ADVANTAGES OF EXP PRE-COLUMN FILTERS

- Approved for use at 20,000+ psi (1,400+ bar)
- Tested to 30,000 psi
- Depth filtration maximizes capacity
- Custom volumes/porosities available
- Hand-tight filter replacement - NO TOOLS!
- Low-volume, low-dispersion cartridges
- Hardened stainless steel end cap eliminates galling
- Auto-adjusting ZDV column connection



EXP PRE-COLUMN FILTER HOLDER

15-04-03837

EXP Pre-Column Filter Holder
(fittings included)



EXP PRE-COLUMN REPLACEMENT FILTER CARTRIDGES

15-04-03093	0.5 μ m EXP Filter Cartridge (5pk)
15-04-03096	0.2 μ m EXP Filter Cartridge (5pk)
15-04-03094	0.5 μ m EXP Filter Cartridge (10pk)
15-04-03097	0.2 μ m EXP Filter Cartridge (10pk)

EXP[®] 2 multi-purpose packed beds

EXP2 NANO TRAP

The next-generation EXP2 Nano Trap System is a breakthrough in trapping hardware design and provides the finest low-volume hardware and connections to minimize extra column effects and sample dispersion. The EXP2 Nano Trap packed bed is extremely versatile: robust for applications calling for trapping in one direction followed by elution in the reverse while adding the absolute lowest swept volume for vented-trap applications where the trap is loaded and eluted in the same direction. Applications for the EXP2 Nano Trap include general sample cleanup, sample concentration and removal of detergents or salts at UHPLC pressures.

EXP2 Nano Traps are available in 3 formats: 10-32 threaded connections for 1/16" tube ports and 6-40 or 6-32 threaded connections for 1/32" tube ports. Multiple bed volumes and bonded phases allow customizable formats to achieve the separation, clean-up, and concentration that will be effective for your specific method.

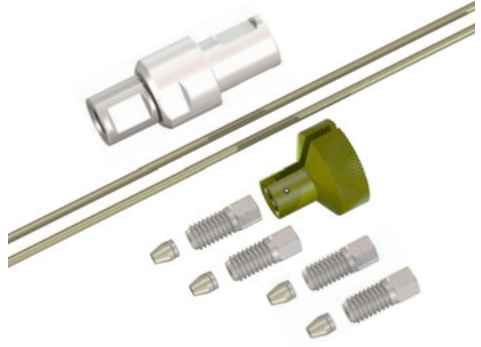
The new hand-tight EXP2 fittings from Optimize allow the Nano Trap to achieve the highest performance at UHPLC pressures while maintaining a small profile to fit tight spaces in switching or injection valves. The Nano Trap is best coupled with narrow bore (25um, 50um, 100um) PEEKsil tubing to deliver top performance. The EXP2 Nano Trap is available as individual packed beds or as a kit with PEEKsil Tubing, EXP2 fittings and EXP2 Driver.

ADVANTAGES OF EXP2 NANO TRAP

- Rated to 20,000+ psi (1,400+ bar)
- Reduced column volume for superior performance
- Available as a .125uL bed volume. Call for other sizes.
- Kits include EXP2 Ti-Lok fittings for repeated ZDV hand-tight connections
- For multi-directional and uni-directional trapping
- Lowest swept volume design for peak sharpness

U.S. and foreign patents pending.

EXP2 NANO TRAP KIT



Includes: 1 EXP2 Nano Trap, 4 EXP2 Fittings, 1 EXP2 Driver and 2 pieces of 50um i.d. X 100mm PEEKsil tubing (1/32" OD for 6-32 / 6-40 THD and 1/16" OD for the 10-32 THD style).

EXP2 NANO TRAP SELECTION GUIDE

Example: a 6-40 Nano Trap Kit with HALO C18 would have part number 15-04954-HA.

		Bed Volume	Dimensions	Dimension Code	Phase Code	Phase	
KIT	6-32 Nano Trap	0.125µL	180µm x 5mm	0 4 9 5 3	H P H Q H R H S H T H U H V	C18 C8 HILIC Phenyl-Hexyl PFP ES-CN Penta-HILIC	5.0µm HALO™
	6-40 Nano Trap	0.125µL	180µm x 5mm	0 4 9 5 4			
	10-32 Nano Trap	0.125µL	180µm x 5mm	0 4 9 5 5	H A H B H D H E H F H N	C18 C8 HILIC RP-Amide Phenyl-Hexyl Peptide ES-C18	
SINGLE TRAP	6-32 Nano Trap	0.125µL	180µm x 5mm	0 4 8 5 6	H G H H H I H J H K H L H M	C18 C8 C4 HILIC Phenyl-Hexyl SAX SCX	3µm EXP
	6-40 Nano Trap	0.125µL	180µm x 5mm	0 4 8 6 2			
	10-32 Nano Trap	0.125µL	180µm x 5mm	0 4 8 7 3	E S	Custom	

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Part Number

* Please visit www.optimizech.com or call us to learn more about other EXP2 Nano Trap sizes and configurations. *

EXP STEM TRAP

The entire EXP Stem Trap and reusable holder are only slightly larger than a standard HPLC fitting. Its slim architecture allows it to easily fit into crowded instrument compartments or to connect directly to tightly-spaced injection ports. When tightened by hand, the EXP Stem Trap seals to 8,700+ psi. All configurations incorporate wrench-flats to enable flawless sealing to 20,000+ psi (1,400+ bar). The unique packed floating stem installs directly into any 10-32 port and automatically adjusts to provide a perfect ZDV connection.

Our specialized features, patented technology, precision engineering and state-of-the-art manufacturing make the new EXP Stem Trap an unbeatable choice for ultra high-pressure trapping applications.

ADVANTAGES OF EXP STEM TRAPS

- Rated to 20,000+ psi (1,400+ bar)
- Hand-tight and wrench-tight configurations
- Custom packing available
- Available in bed volumes from 0.17 μ L to 2.6 μ L
- Low-volume, low-dispersion cartridges
- Auto-adjusting ZDV connection
- Intended for many repeat uses

EXP STEM HOLDER

15-02-03996

EXP Stem Holder
(fittings included)



actual size

U.S. Pat. No. 8,201,854 and other U.S. and foreign patents pending.

EXP STEM TRAP KIT



Please use the table below to find the bed volume and phase you require. **Example:** a three pack of 0.17 μ L Stem Traps with HALO C8 would have part number 15-03992-HB.

EXP STEM TRAP SELECTION GUIDE

	Bed Volume	Suggested Max Load Rate**	Dimensions	Dimension Code	Phase Code	Phase	
Stem Trap Kit	0.17 μ L	60 μ L/min	125 μ m x 13.5mm	0 3 9 9 7	HP HQ HR HS HT HU HV	C18 C8 HILIC Phenyl-Hexyl PFP ES-CN Penta-HILIC	5.0 μ m HALO
Replacement Stems*	0.17 μ L			0 3 9 9 2			
Stem Trap Kit	0.33 μ L	120 μ L/min	180 μ m x 13.5mm	0 4 0 0 3			5.0 μ m HALO
Replacement Stems*	0.33 μ L			0 4 0 0 1			
Stem Trap Kit	0.68 μ L	250 μ L/min	250 μ m x 13.5mm	0 4 0 0 9	HA HB HD HE HF HN	C18 C8 HILIC RP-Amide Phenyl-Hexyl Peptide ES-C18	2.7 μ m HALO
Replacement Stems*	0.68 μ L			0 4 0 0 8			
Stem Trap Kit	1.5 μ L	500 μ L/min	350 μ m x 13.5mm	0 4 0 1 5	HG HH HI HJ HK HL HM	C18 C8 C4 HILIC Phenyl-Hexyl SAX SCX	3 μ m EXP
Replacement Stems*	1.5 μ L			0 4 0 1 4			
Stem Trap Kit	2.6 μ L	1mL/min	500 μ m x 13.5mm	0 4 0 2 1			3 μ m EXP
Replacement Stems*	2.6 μ L			0 4 0 2 0			
					ES	Custom	

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 Part Number

* Includes 3 replacement stems. To be used with reusable EXP Stem Holder only.
 ** Suggested max load rate is based on 60/40 Acetonitrile/Water Mobile phase.

EXP TRAP COLUMN

The patent-pending hand-tight EXP Trap Column is rated for use up to 20,000+ psi (1,400+ bar). This unique design connects directly to any injection valve (with 10-32 threads) or in-line with 1/16" stainless tubing for unparalleled convenience and efficiency.

The EXP Cartridge System enables chemists to quickly remove detergents or salts which can affect the ionization process in MS work. This trapping technique can concentrate the sample directly on-line thus allowing for increased recovery of precious sample material compared to off-line techniques. On-line trapping readily lends itself to automation for high-throughput analysis in UHPLC/MS applications. Free-Turn[®] architecture allows the user to change cartridges by hand without breaking fluid connections on the holder inlet/outlet.

ADVANTAGES OF EXP TRAP COLUMNS

- Hand-tight to 20,000+ psi (1,400+ bar)
- Hand-tight trap replacement - NO TOOLS
- Uni-directional cartridge
- Custom packing available
- Available in bed volumes from 4 μ L to 100 μ L
- Hardened stainless steel end cap eliminates galling
- Auto-adjusting ZDV connections

EXP HOLDERS

15-02-03956	EXP Direct Connect Holder (fittings included)
15-02-03946	EXP In-Line Holder (fittings included)
15-02-04041	EXP All-In-One Holder Kit (includes: In-Line + Direct-Connect Holder Components and fittings)

U.S. Pat. No. 8,201,854 and other U.S. and foreign patents pending.

extreme pressure

EXP In-Line Holder



EXP Direct Connect Holder



Please use the table below to find the bed volume and phase you require. **Example:** a three pack of 4 μ L Cartridges with HALO C8 would have part number 15-03964-HB.

EXP TRAP CARTRIDGE SELECTION GUIDE

	Bed Volume	Suggested Max Load Rate*	Dimensions	Dimension Code	Phase Code	Phase	
3 PACKS	4 μ L	2mL/min	1.0 x 5mm	0 3 9 6 4	H P H Q H R H S H T H U H V	C18 C8 HILIC Phenyl-Hexyl PPP ES-CN Penta-HILIC	5.0 μ m HALO
	10 μ L	4mL/min	1.5 x 5mm	0 3 9 6 9			
	20 μ L	6mL/min	2.1 x 5mm	0 3 9 7 3	H A H B H D H E H F H N	C18 C8 HILIC RP-Amide Phenyl-Hexyl Peptide ES-C18	
	40 μ L	8mL/min	3.0 x 5mm	0 3 9 7 8			
	100 μ L	10mL/min	4.6 x 5mm	0 3 9 8 3	H G H H H I H J H K H L H M	C18 C8 C4 HILIC Phenyl-Hexyl SAX SCX	3 μ m EXP
					E S	Custom	

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Part Number

* Suggested max load rate is based on 60/40 Acetonitrile/Water Mobile phase. Custom packing is also available, please contact us for details.

EXP GUARD COLUMN

The EXP Guard Column Cartridge System is rated to 15,000 psi with hand-tight replaceable cartridges. This unique design connects directly to any UHPLC column with the auto-adjusting Titanium Hybrid Ferrule and EXP Fittings, providing repeated zero-dead-volume connections and easy adjustability between various column types.

Free-Turn[®] architecture allows the user to change cartridges by hand without breaking fluid connections on the holder inlet/outlet. The combination of low-dispersion and ultra high-pressure capabilities provides effective protection with negligible effects on retention time, plate count, and peak shape.

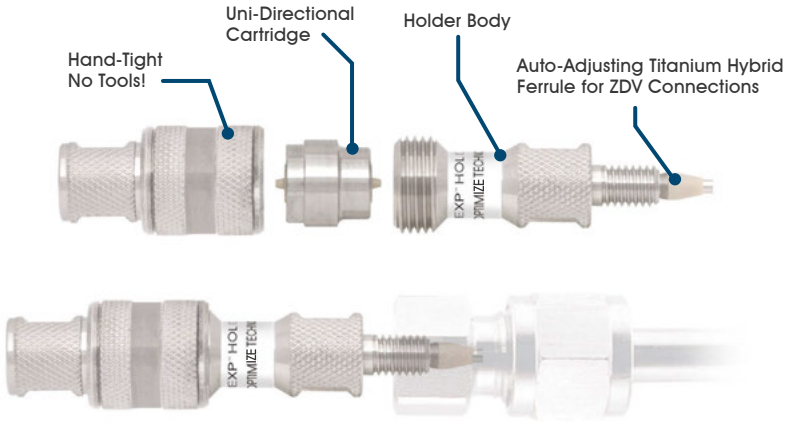
ADVANTAGES OF EXP GUARD COLUMNS

- Hardware rated to 20,000+ psi (1400+ bar)
- Hand-tight guard replacement - NO TOOLS!
- Packed guard rated for routine use to 15,000 psi (1,000 bar)
- 1.4 μ L Swept Volume (excluding packed bed)
- Hardened stainless steel end cap eliminates galling
- Low-volume, low-dispersion cartridges
- Auto-adjusting ZDV column connection

EXP HOLDER

15-02-03956

EXP Direct Connect Holder
(fittings included)



Please use the table below to find the bed volume and phase you require. **Example:** a three pack of 2.1x5mm Guards with 3 μ m EXP C8 would have part number 15-04104-HF.

EXP GUARD CARTRIDGE SELECTION GUIDE

	Dimensions	Dimension Code	Phase Code	Phase	
3 PACKS	1.0 x 5mm	0 4 1 0 0	HA	C18	1.8 μ m EXP
			HB	C8	
			HC	C4	
			HD	HILIC	
	1.5 x 5mm	0 4 1 0 2	HE	C18	3 μ m EXP
			HF	C8	
			HG	C4	
			HH	HILIC	
			HI	Phenyl-Hexyl	
			HJ	SAX	
2.1 x 5mm	0 4 1 0 4	HK	SCX		
3.0 x 5mm	0 4 1 0 6	ES	Custom		
4.6 x 5mm	0 4 1 0 8				

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Part Number

Custom packing is also available, please contact us for details.

EXP ANALYTICAL COLUMN

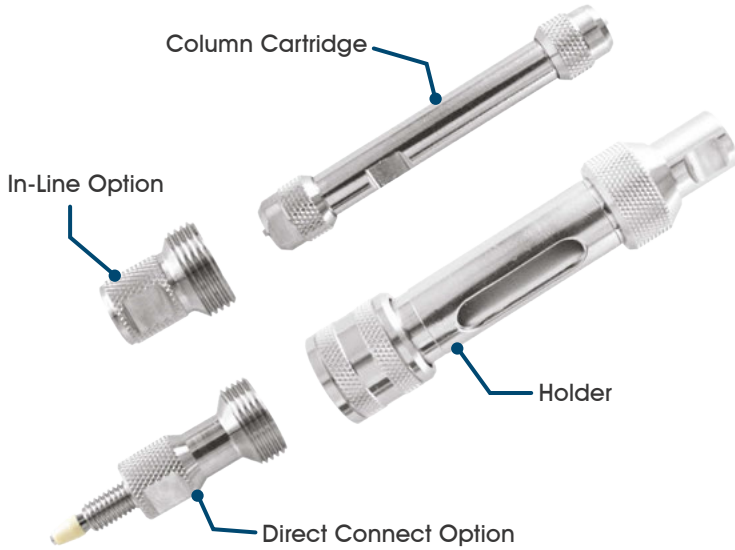
The cartridge-based EXP Analytical Column System is designed for superior chromatographic analysis with each injection rated for routine use up to 20,000 psi. The Analytical Column System is designed for superior chromatographic analysis with each injection.

The new EXP Analytical Column Holders incorporate Free-Turn[®] architecture allowing the user to quickly exchange columns without breaking any fluid connections. The EXP Analytical Column Holders are available in two formats: the standard In-Line format and Direct Connect, allowing the user to bypass additional tubing and connect directly to the detector for even greater resolution. Holder kits also include EXP Nuts and Titanium Hybrid Ferrules to ensure repeated zero-dead-volume connections.

The new EXP Analytical Column Hardware is precision machined and held to the highest of specifications to ensure excellent performance and repeatability. EXP Analytical Column Hardware is available for purchase as empty columns. The column hardware is assembled up to the point of packing, allowing the customer to completely control the resins used, packing processes and testing conditions. Packing fixtures are also available and are compatible with all column dimensions.

ADVANTAGES OF EXP ANALYTICAL COLUMNS

- Hardware rated to 20,000+ psi (1400+ bar)
- Cartridge-Based Format
- Repeated Column Performance
- Free-Turn[®] architecture for quick exchanges of columns
- Quick Connect/Disconnect
- Repeated ZDV connections



EXP ANALYTICAL COLUMN HOLDERS

15-70-04448	50mm In-Line Holder Kit
15-70-04450	100mm In-Line Holder Kit
15-70-04454	50mm Direct Connect Holder Kit
15-70-04455	100mm Direct Connect Holder Kit

EXP ANALYTICAL COLUMN HARDWARE KITS

15-70-04457	1.0mm x 50mm
15-70-04461	1.0mm x 100mm
15-70-04471	2.1mm x 50mm
15-70-04473	2.1mm x 100mm
15-70-04476	3.0mm x 50mm
15-70-04479	3.0mm x 100mm
15-70-04483	4.6mm x 50mm
15-70-04487	4.6mm x 100mm

EXP CHECK VALVE

Introducing the new OPTI-MAX[®] EXP Check Valve Cartridge System for UHPLC instruments. Rated for routine use at UHPLC system pressures, the unique housing design connects directly to the existing OEM Pump Heads and allows for quick and easy exchange between check valve cartridges.

The new OPTI-MAX EXP Check Valve Housings incorporate Free-Turn[®] architecture allowing the user to change check valve cartridges with the tubing still attached. This dramatically accelerates check valve maintenance, while reducing the wear on fittings.

The OPTI-MAX EXP Check Valve Cartridge features a higher density ceramic ball and seat enabling the valve to be more responsive and seat faster in lighter solvents. Each ball and seat set is individually matched to ensure a lock-and-key fit, guaranteeing 3 bubbles/minute or less in the industry standard nitrogen bubble test (common acceptable standards are 12 bubbles/minute or less). As with all OPTI-MAX check valve products, ball travel within the cartridge is minimized to ensure quicker seating and more accurate pump metering.

The combination of specialized features, innovative technology, and precision manufacturing make the OPTI-MAX EXP Check Valve Cartridge System an unbeatable choice for pumps operating at UHPLC pressures.

ADVANTAGES OF EXP CHECK VALVES

- Hardware rated to 20,000+ psi (1400+ bar)
- Cartridge based system - can be used between multiple brands
- Ceramic ball and seat - increased inertness and response
- Free-Turn[®] architecture for quick exchanges of cartridges
- Minimized ball travel distance - faster seating and accurate flows
- Body offers same outer dimensions as existing OPTI-MAX cartridges



EXP CHECK VALVES

10-86-02004

OPTI-MAX EXP Replacement Check Valve Cartridges (2pk)

Please visit [optimize-tech.com](https://www.optimize-tech.com) and click the “replacements parts” tab to purchase your specific check valve.

If your pump model is not listed on our website, please contact us directly as the new OPTI-MAX product line is continually expanding.

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EXP[®] HYBRID FERRULE: U.S. Pat. No. 8,201,854

Other U.S. and foreign patents pending.

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