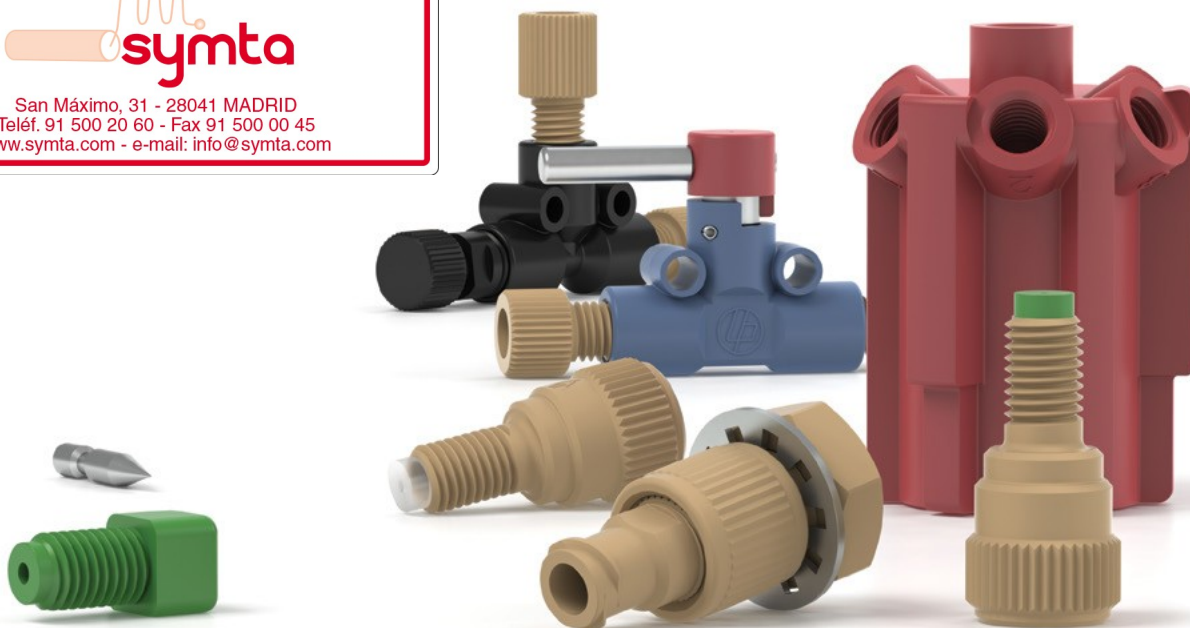


Previously known as UPCHURCH



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FLOW REGULATING VALVES

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

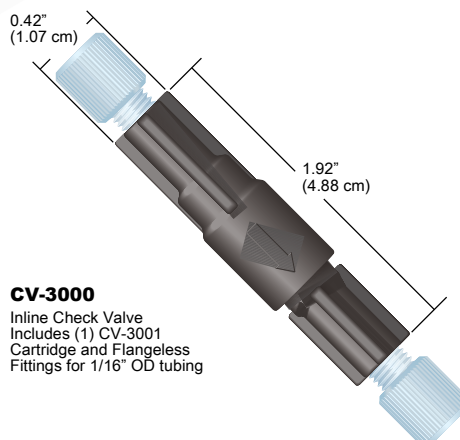
- 135** CHECK VALVES
- 140** MICRO-SPLITTER VALVES
- 141** MICRO-METERING VALVES
- 142** SHUT-OFF VALVES



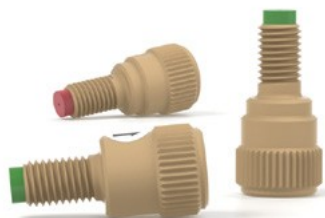
Inline Cartridge Check Valves

- › Low cracking pressures
- › Less than 150 μL internal volume
- › **Materials of construction:**
PEEK; perfluoroelastomer (CV-3001);
gold-plated stainless steel spring
(CV-3001); ethylene propylene (CV-3011);
and stainless steel spring (CV-3011)

Our cartridge-style Inline Check Valves are designed to limit flow to one direction. These assemblies withstand system pressures of 1,000 psi (69 bar). The cracking pressures for the Inline Check Valve Cartridges are 1.5 psi (0.1 bar) for the CV-3001 and 3 psi (0.2 bar) for the CV-3011. Tolerance on the cracking pressure for CV-3001 is ± 0.5 psi (0.03 bar) and ± 1.5 psi (0.1 bar) on CV-3011.



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



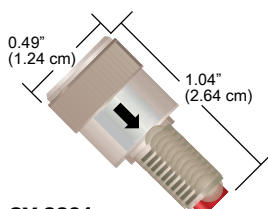
Standard 1/4-28 Inline Check Valves

- › Add back-flow protection to any 1/4-28 flat-bottom port
- › 15 psi (1 bar) and 3 psi (0.2 bar) cracking pressure versions
- › Excellent chemical resistance

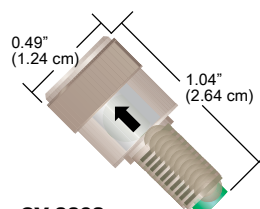
› Materials of construction:

PEEK; PCTFE; perfluoroelastomer; PTFE (CV-3301 and CV-3302); stainless steel (CV-3301 and CV-3302); or gold-plated stainless steel (CV-3315 and CV-3316)

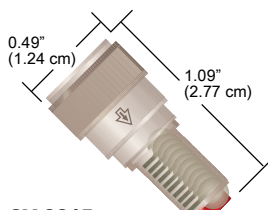
Connect these Inline Check Valves to any 1/4-28 flat-bottom port. Then thread your 1/4-28 flat-bottom fitting into the check valve to connect the tubing. Once installed, the spring-actuated sealing system eliminates back flow, helping to prevent upstream contamination or damage. In addition, the unique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



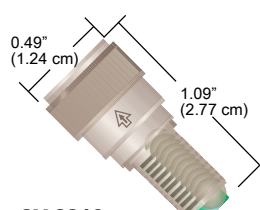
CV-3301
Standard, Inlet
1/4-28 FB Male to 1/4-28 FB Female
15 psi (1 bar) cracking pressure



CV-3302
Standard, Outlet
1/4-28 FB Male to 1/4-28 FB Female
15 psi (1 bar) cracking pressure



CV-3315
Standard, Inlet
1/4-28 FB Male to 1/4-28 FB Female
3 psi (0.2 bar) cracking pressure



CV-3316
Standard, Outlet
1/4-28 FB Male to 1/4-28 FB Female
3 psi (0.2 bar) cracking pressure



RELATED PRODUCTS

- › 1/4-28 Inline Check Valves and Non-Metallic Check Valves with 1/4-28 flat-bottom ports (next page) can be used with any 1/4-28 Flangeless, Super Flangeless, and VacuTight[®] fitting on pages 45, 39, and 42, respectively, of the Fittings Chapter.
- › Micro-Volume Inline Check Valves and Non-Metallic Check Valves with 10-32 coned ports (next page) can be used with any 10-32 polymer Fingertight or SealTight[®] fitting on page 36. Connect capillary tubing using the optional ferrules listed on page 35 or the NanoTight[™] Fittings and Tubing Sleeves on page 37.

Part No.	Description	Cracking Pressure	Qty.
STANDARD 1/4-28 INLINE CHECK VALVES			
CV-3301	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	15 psi (1 bar)	ea.
CV-3302	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	15 psi (1 bar)	ea.
CV-3315	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	3 psi (0.2 bar)	ea.
CV-3316	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	3 psi (0.2 bar)	ea.

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



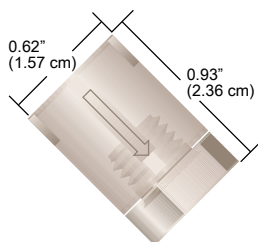
Non-Metallic Check Valves

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

Our Non-Metallic Check Valves are biocompatible and delivers a low cracking pressure. With a swept volume of only 7.4 μL , our Check Valve is perfect for applications where low flow path volume is critical, such as delivery to lab-on-a-chip, single-cell analysis and micro- or nano-LC post-column derivatization. Once installed, this check valve helps prevent back flow and the potential for contamination or damage to sensitive upstream equipment.

10-32 Micro-Volume Inline Check Valves

With a swept volume of only 7.4 μL , our 10-32 Micro-Volume Inline Check Valves are perfect for applications where low flow path volume is critical, such as delivery to lab-on-a-chip, single-cell analysis and micro- or nano-LC post-column derivatization. Once installed, this check valve helps prevent back flow and the potential for contamination or damage to sensitive upstream equipment.



CV-3500
Micro-Volume Inline
10-32 C Female to 10-32 C Female

NOTE

Check valves are specified by:

- › **Cracking Pressure:** pressure required for the valve to open in the direction of the arrow.
- › **Maximum Pressure:** maximum pressure the valve can experience in the reverse direction without leaking backwards.
- › **Back Pressure Created:** amount of back pressure generated by the check valve with 50 mL/min room temperature water flowing in the direction of the arrow.

SPECIFICATIONS & DETAILS

	Swept Volume	Thru-Hole	Max. Pressure Rating	Back Pressure Created	Cracking Pressure Tolerance
STANDARD 1/4-28 FB					
CV-3301, CV-3302	20 μL	0.020" (0.50 mm)	2,000 psi (138 bar)	45 psi (3.1 bar)	± 5 psi (0.34 bar)
CV-3315, CV-3316	16 μL	0.020" (0.50 mm)	2,000 psi (138 bar)	10 psi (0.7 bar)	± 1.5 psi (0.10 bar)
NONMETALLIC 10-32 CONED MICRO-VOLUME					
CV-3500	7.4 μL	0.010" (0.25 mm)	3,000 psi (207 bar)	25 psi (1.7 bar)	± 5 psi (0.34 bar)

10-32 Micro-Volume Inline Check Valves

Part No.	Description	Cracking Pressure	Qty.
NONMETALLIC 10-32 MICRO-VOLUME INLINE CHECK VALVE			
CV-3500	Inlet/Outlet Check Valve, 10-32 C, F to 10-32 C, F*	8 psi (0.6 bar)	ea.

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

Non-Metallic Check Valves (Cont.)

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

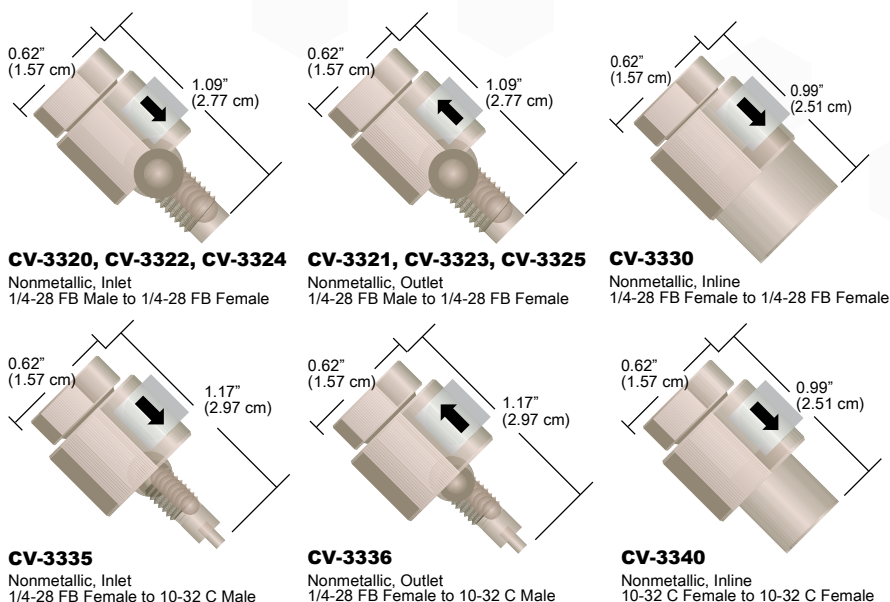
1/4-28 & 10-32 Inline Check Valves

Our 1/4-28 & 10-32 Non-Metallic Inline Check Valves provide excellent backflow protection for sensitive equipment along with outstanding chemical resistance guaranteed by the PEEK polymer and perfluoroelastomer construction. Metal-free composition makes these check valves perfect for use with corrosive fluids or biological samples.

These check valves function well up to moderately-high pressure applications. Low internal volume also allows them to be used in areas where flow path volume is important; however, higher flow rates can pass through with minimal pressure drop.

APPLICATION NOTE

- › The CV-3320 or CV-3321 style can be connected to any 1/4-28 flat-bottom port for trouble-free back flow protection.
- › When using a pump after the analytical column, consider placing a CV-3330 Check Valve after the column to prevent fluid from the post-column pump from flowing backwards through the column. This product also serves as an excellent nonmetallic alternative to our CV-3010 (page 135) in sparging applications where the mobile phase may be corrosive to the stainless steel or ethylene propylene components inside the CV-3010 assembly.
- › The CV-3335 Inlet and CV-3336 Outlet Check Valves allow tubing larger than 1/16" OD (up to 1/8") to be connected into a 10-32 coned internal port. Use both of these check valves when attaching a larger-volume sample loop to an analytical-scale injection valve. This setup limits the flow of the sample into the loop to one direction, minimizing back flow and sample carry-over.
- › The CV-3340 is useful in virtually any high pressure fluid pathway using 1/16" or smaller OD tubing, where limiting the direction of flow is desirable.



SPECIFICATIONS & DETAILS

	Swept Volume	Max. Pressure Rating	Back Pressure Created	Cracking Pressure Tolerance
CV-3320, CV-3321	37 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3330	34 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3335, CV-3336	49 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3340	34 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3322, CV-3323	49 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)
CV-3324, CV-3325	182 µL	2,000 psi (138 bar)	30 psi (2.1 bar)	± 0.5 psi (0.03 bar)

NOTE

Upon initial use — or following a period of extended inactivity — the cracking pressure for these check valves may be somewhat higher than the stated cracking pressure.

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

Part No.	Description	Cracking Pressure	Thru-Hole	Qty.
NONMETALLIC 1/4-28 AND 10-32 INLINE CHECK VALVES				
CV-3320	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.020" (0.50 mm)	ea.
CV-3321	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.020" (0.50 mm)	ea.
CV-3322	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.040" (1.0 mm)	ea.
CV-3323	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.040" (1.0 mm)	ea.
CV-3324	Inlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.060" (1.60 mm)	ea.
CV-3325	Outlet Check Valve, 1/4-28 FB, M to 1/4-28 FB, F*	1 psi (0.07 bar)	0.060" (1.60 mm)	ea.
CV-3330	Inlet/Outlet Check Valve, 1/4-28 FB, F to 1/4-28 FB, F*	1 psi (0.07 bar)	0.020" (0.50 mm)	ea.
CV-3335	Inlet Check Valve, 1/4-28 FB, F to 10-32 C, M*	1 psi (0.07 bar)	0.020" (0.50 mm)	ea.
CV-3336	Outlet Check Valve, 1/4-28 FB, F to 10-32 C, M*	1 psi (0.07 bar)	0.020" (0.50 mm)	ea.
CV-3340	Inlet/Outlet Check Valve, 10-32 C, F to 10-32 C, F*	1 psi (0.07 bar)	0.020" (0.50 mm)	ea.

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



Quick-Stop Luer Inline Check Valve

- › Check valve protection with luer convenience
- › Remains open when engaged
- › **Materials of construction:** PEEK, perfluoroelastomer, and gold-plated stainless steel spring

The Quick-Stop Luer Check Valve is designed to provide inline luer connect/disconnect convenience without the mess and hazard of spills. Just connect the valve assembly to your inline tubing using standard 1/4-28 flat-bottom fittings (see pages 39 – 46). The check valve is automatically opened once the luer connection is engaged, allowing flow in either direction. Disconnecting the luer union causes the check valve to close. Please see the “Application Note” on this page for specific ideas regarding use of this valve.



RELATED PRODUCTS

- › 1/4-28 Inline Check Valves and Non-Metallic Check Valves with 1/4-28 flat-bottom ports (next page) can be used with any 1/4-28 Flangeless, Super Flangeless and VacuTight® fitting on pages 45, 39, and 42, respectively, of the Fittings Chapter.
- › Micro-Volume Inline Check Valves and Non-Metallic Check Valves with 10-32 coned ports (page 137) can be used with any 10-32 polymer Fingertight or SealTight™ fitting on page 36. Connect capillary tubing using the optional ferrules listed on page 35 or the NanoTight™ Fittings and Tubing Sleeves on page 37.



APPLICATION NOTE

Inlet Solvent Reservoir:

Quickly change your solvent on the low pressure end of an HPLC system, while preventing potentially hazardous spills! Just install a Quick-Stop Luer Check Valve Assembly between your solvent reservoir and the pump, with the valve towards the bottle. The valve will prevent solvent leakage from the line coming from the reservoir, while the check valves in your pump prevent spills from the line leading to the pump. With both lines still full of solvent, this system also helps reduce the need to reprime your pump.

FIA Sample Injection:

The Quick-Stop Luer Check Valve provides a practical means to introduce a sample into FIA and other low pressure systems, when used in conjunction with a P-612 Pressure Relief Valve Tee (page 148). Simply connect the Tee into the appropriate flow path line with the included fittings and thread the P-697 Quick-Stop Luer Valve onto the 1/4-28 male end of the Tee. Sample can then be introduced conveniently by using a standard luer-tipped syringe. The check valve is automatically opened when the syringe is attached and closed when the syringe is removed.

Post Column Derivatization:

For post-column derivatization, place a CV-3000 Inline Check Valve on the effluent side of your column to prevent derivatizing agents from flowing backwards and poisoning the column. Placement on the post-column reagent line will also prevent mobile phase from contaminating the reagent if the auxiliary pump fails.

Helium Sparging Tank Protection:

Try the CV-3010 Assembly, designed specifically for degassing (sparging) lines to prevent solvent backup if the sparging gas runs out. This check valve will help prevent potential solvent cross-contamination and damage to the gas regulating valve.

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



Micro-Splitter Valves

- › For interfacing LC-MS systems
- › Adjustable split stream flow rates
- › Versions for up to 800 psi (55 bar) and up to 4,000 psi (276 bar)



APPLICATION NOTE

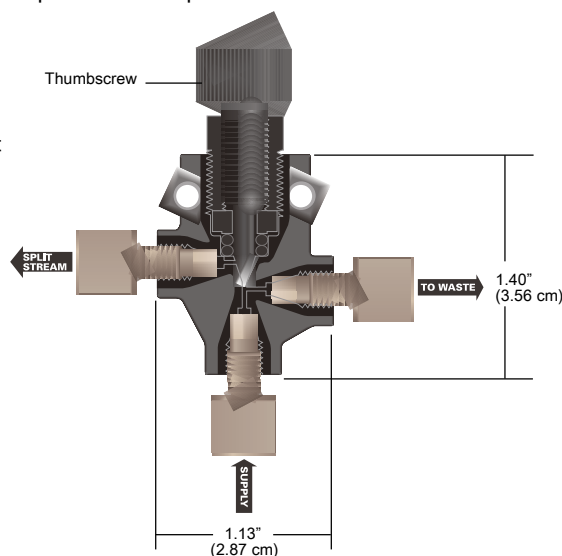
- › With an incoming flow rate of 1 mL/min using room temperature water and equal pressures on both outlet lines, the minimum split flow rate is 2 µL/min for the standard micro-splitter valves and 4.8 µL/min for the high pressure micro-splitter valves.
- › All Micro-Splitter Valves have been tested at flow rates to 100 mL/min, with a maximum resulting pressure drop of only 45 psi (3.1 bar) when the valve is fully opened.

Our Micro-Splitter Valves are designed to accurately split and control a low-flow stream off a single incoming supply.

Choose between 1/4-28 flat-bottom and 10-32 coned threaded versions.

The High Pressure Micro-Splitter Valves are designed to operate successfully up to 4,000 psi (276 bar) and the standard Micro-Splitter valves are pressure rated to 800 psi (55 bar).

The Graduated Valve offers many of the benefits and features of Micro-Splitter Valves, plus the ability to adjust and set the split flow to repeatable settings. This allows documentation of settings and the resulting flow rates for easier method development. The graduations also make it easier to employ the valve in a system used to run multiple analyses that require different split flow rates.



P-451
Standard Micro-Splitter Valve



SPECIFICATIONS & DETAILS

Part No.	Valve Type	Threads	Internal Volume (closed/fully open)	Max. Operating Pressure
P-450	Standard	1/4-28	2.1 / 4.1 µL	800 psi (55 bar)
P-451	Standard	10-32	1.2 / 2.8 µL	800 psi (55 bar)
P-460S, T	High Pressure	10-32	1.2 / 2.8 µL	4,000 psi (276 bar)
P-470	High Pres. Graduated	10-32	1.2 / 2.8 µL	4,000 psi (276 bar)

¹ The supply and waste port thru-holes have IDs of 0.020" (0.50 mm). The ID for the split-stream port thru-hole is 0.020" (0.50 mm) in standard versions; in capillary versions it is 0.010" (0.25 mm).

Part No.	Description	Includes	Qty.
MICRO-SPLITTER VALVES			
P-450	Standard, 1/4-28, Biocompatible	(3) XP-235	ea.
P-451	Standard, 10-32, Biocompatible	(3) F-120	ea.
P-460S	High Pressure, 10-32, with Stainless Steel Needle	(3) F-120	ea.
P-460T	High Pressure, 10-32, with Titanium Needle	(3) F-120	ea.
GRADUATED MICRO-SPLITTER VALVES			
P-470	High Pressure Graduated, 10-32, with Stainless Steel Needle	(3) F-120	ea.

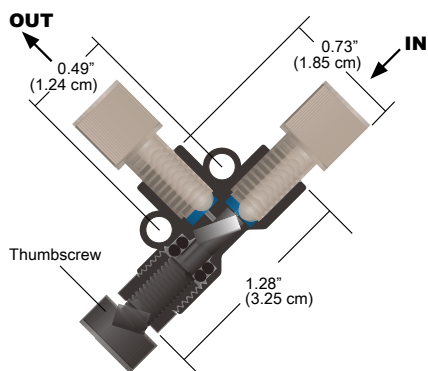
* Use with the MicroTight Tubing Sleeves, found on page 52.



Micro-Metering Valves

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

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



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

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

Our Micro-Metering Valves can also be used to regulate gas flow in helium sparging lines and as a flow-dependent variable back pressure regulator. For flow independent regulation of back pressure, please see page 147.

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



APPLICATION NOTE

Back Pressure Considerations

The Micro-Splitter Valves are designed to work when both effluent flow path pressures are nearly identical. However, the split flow path will often have higher back pressure than the waste flow path, making it hard to achieve any split flow at all. There are two possible solutions. Place a back pressure regulator (page 143) on the waste flow path that is equal to or slightly greater than the pressure on the split flow path.

Or, switch the two effluent pathways such that the split flow pathway is attached to the "waste" port on the valve and the waste flow pathway is attached to the "split" port on the valve. (*Please Note: This second method may result in a loss of adjustment sensitivity.*)

Multi-Column and Detector Systems

Does your work require analyses with multiple columns and detectors that use the same mobile phase? If so, install one of our High Pressure Micro-Splitter Valves after your injector. A single injection can then be split to two separate columns and detector systems, at two different flow rates. This economical set-up eliminates the need for an additional pump and injector valve, while allowing data to be obtained simultaneously.

Post-Detector Interfacing

Use a Standard Micro-Splitter Valve to route fluid exiting an initial detector to other devices, such as a mass spectrometer and a fraction collector. The valve will split and reduce the flow rate to that required for MS interfacing, while diverting the remainder of the flow to the collector (a back pressure regulator may also be required for this set up, available on page 143).

Other Applications

These valves are also suited for other applications, such as adapting a standard HPLC system to handle microbore analyses. For more information and plumbing diagrams for this application and those listed above, please contact your local distributor or IDEX Health & Science directly.

Part No.	Material	OD Tubing	Thru-hole	Internal Volume*	Includes	Qty.
MICRO-METERING VALVES						
P-445	PEEK, Black	1/16"	0.020" (0.50 mm)	7.7 μL	(2) XP-230	ea.
P-446	PEEK, Black	1/16"	0.020" (0.50 mm)	7.2 μL	(2) F-120	ea.
P-447	PEEK, Black	1/8"	0.020" (0.50 mm)	7.7 μL	(2) XP-330	ea.

* Maximum internal volume, with valve fully open.

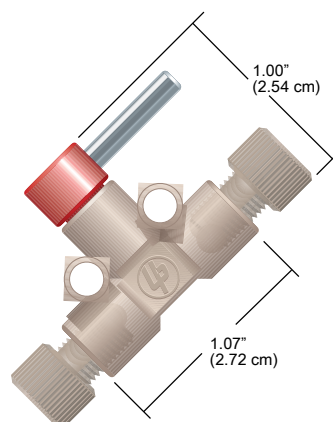


Shut-Off Valves

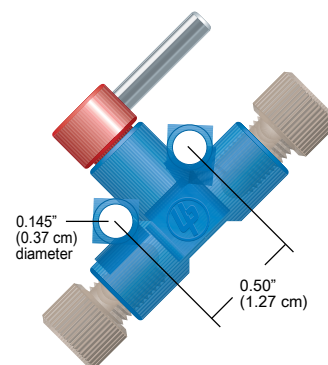
- › Biocompatible, all-polymer flow path
- › Available for 1/16" and 1/8" OD tubing
- › Pressure rated to 500 psi (34 bar)

Stop a flow stream quickly with IDEX Health & Science biocompatible Shut-Off Valves. The bodies are manufactured from either PEEK or ETFE, and both versions feature a PCTFE rotor, making them highly resistant to chemical attack. The blue colorant used in some valve configurations has proven not to leach out with common HPLC solvents.

Connect semi-rigid or rigid tubing, such as PEEK, stainless steel or fluoropolymer, with the 1/4-28 Flangeless Fittings provided. Soft tubing, such as Pharmat Tygon® (see page 14), may be connected to these valves using our 1/4-28 barbed adapters, found on page 90.



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



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

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

* Maximum internal volume, with valve fully open.