

Break free from routine HPLC sample prep Simplicity[®] Filtration System



HPLC sample prep doesn't have to be inefficient or painful.

If you're using chromatography to analyze dozens of pharmaceutical samples, food and beverage products or cosmetic formulations a day, especially hard-to-filter, viscous or particulate-laden samples, you know that traditional filtration methods can result in:

- Slow filtration speed/clogging
- Filter bursting or spillage
- Sample volume loss (most undesirable for small-volume samples)
- Operator fatigue

It's time to let vacuum force do the work: try [Merck Millipore's Smplicity® Filtration System](#).

The ideal sample prep system for most chromatographers.

The first vacuum-driven system with the flexibility to filter 1 to 8 samples directly into standard HPLC sample vials, the Smplicity® Filtration System addresses all of the challenges facing analytical chromatographers. Just attach a vacuum pump, load your samples, and flip the lever. Recover your particulate-free samples in seconds.

The Smplicity® Filtration System is ideal for QC and R&D labs, along with other analysts studying:

- **Drug dissolution** – mandatory testing of the dissolution rate of solid dosage forms using an *in vitro* test
- **Food safety** – testing foods and beverages for unknown and known toxins, including glycol, melamine, and cyanobacteria
- **Cosmetics** – separation and detection of cosmetic ingredients and formulations
- **Biofuels** – analysis and extraction of lipids from algae and other biomass
- **Pharmacokinetic/pharmacodynamic (PK/PD)** – quantification of interactions of drugs with the body with respect to time



Built upon decades of membrane filtration expertise.

The system's Millex Smplicity® filters have a unique funnel shape for easy pipette loading and are provided in strips of four for faster loading. Filter strips are perforated for use with fewer samples.

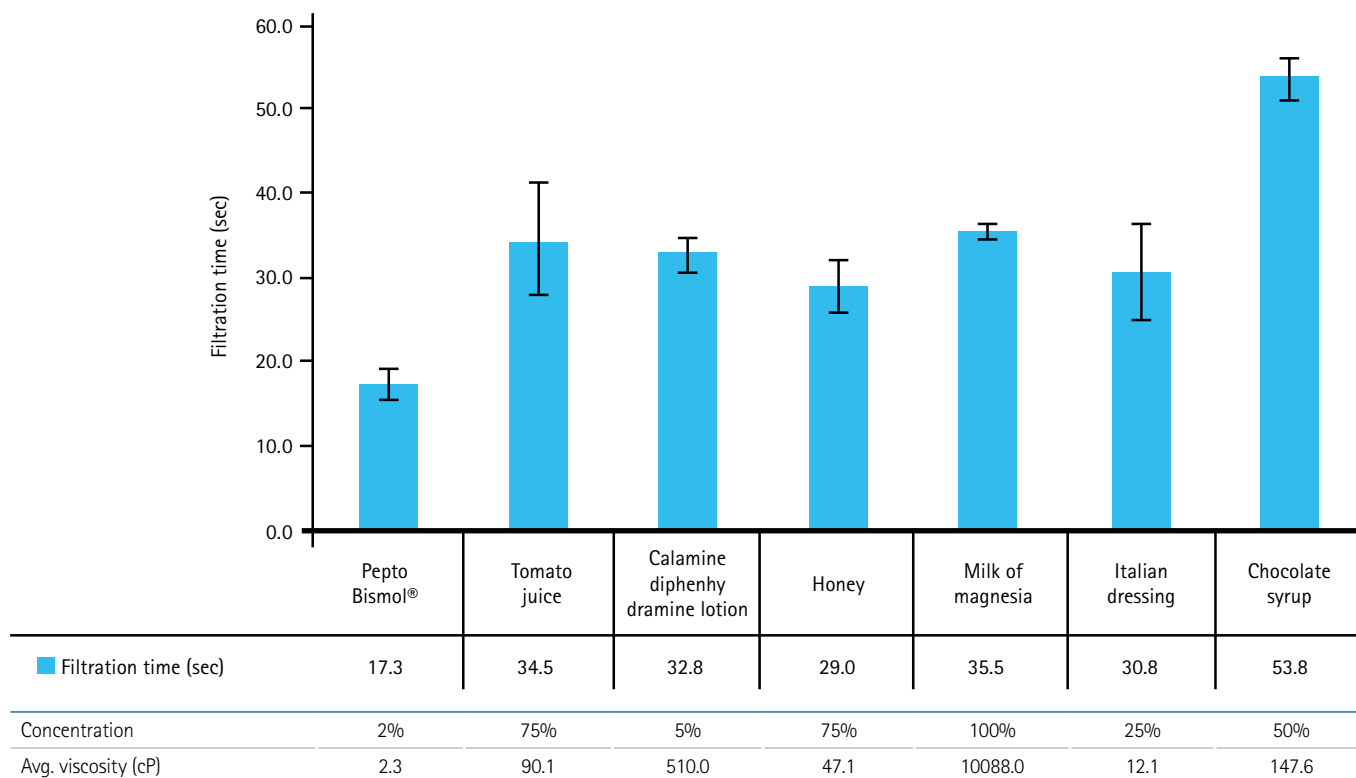
Ergonomic benefits.

Syringe filtration can be very labor-intensive; filtering large numbers of viscous or particulate-laden samples can lead to severe fatigue, musculoskeletal pain or repetitive stress injuries. One of the biggest ergonomic benefits of using the vacuum-driven Smplicity® system is that no manual force is needed to filter samples.

In response to a survey, users reported that they needed to apply more than nine times more mechanical force to syringe filters than was required by the Smplicity® system.

Efficient filtration of hard-to-filter samples.

Many chromatography samples, such as dissolution testing samples, food and beverage samples, are viscous and/or contain high levels of particulates. If manual filtration is used, these samples can require excessive manual force, greater time per sample, and lower recovery – all reducing laboratory efficiency. In contrast, the Smplicity® filtration system filters even highly viscous samples in seconds, with minimal manual force.



Efficient filtration of viscous samples using the Smplicity® filtration system with 0.45 µm PVDF Millex Smplicity® Filters. After the first 1 mL was filtered, the filtration time was recorded. Results represent average of four filters and error bars represent standard deviation.

Achieve higher recovery, with no sample foaming, bubbling or spilling.

In the Smplicity® system's unique design, the vials are held at an angle and the tip of the filter touches the side of the vial as the sample is being filtered. These features reduce foaming and sample spillover and trapping of air bubbles at the bottom of vials. This is especially important when working with vials containing low volumes or conical inserts.



High recovery of small volume samples.

Recover up to 80% of samples as small as 100 μL .

Today's researchers are often limited to samples that are less than 500 μL . To accommodate the decreased sample volume, chromatographers need to use HPLC vials which have inserts in them so that small samples can be reproducibly injected into an HPLC system. Using 0.2 μm filters, we obtained consistent filtration of 100 μL samples. For all the types of vials tested, greater than 70% recovery was obtained when filtering 4 or more samples at the same time (Table 1).

Volume Filtered	% Recovery	% RSD	Vendor	Vial Catalogue No.
100 μL	73	10	Waters	186001131c
100 μL	73	11	Waters	186001126DV
100 μL	78	14	Waters	186001127
100 μL	76	7	Verex	ARO-3625-12
100 μL	79	2	Restek	22439
100 μL	82	2	Restek	22433
100 μL	82	5	Waters	186002642

Table 1. Recovery by HPLC vial type. Sample recovery rates after Smplicity® filtration of 100 μL Milli-Q® water into different vials containing inserts. Four or eight samples were simultaneously filtered for each vial type.

Minimal evaporation of solvent.

Certain analytical methods require that the concentration of analyte in the sample be maintained during sample filtration, with minimal evaporation of solvent. We measured % recovery of the solvent immediately after filtration (Time 0) as well as after 10 minutes of exposure to vacuum following filtration (Time 10), and showed that minimal solvent was lost to evaporation.

Solvent	% Recovery		%RSD	
	Time 0	Time 10	Time 0	Time 10
Acetonitrile	88	89	1	1
Tetrahydrofuran	92	94	3	4
Acetone	99	96	2	5

Table 2. Percent recoveries of three volatile solvents were unchanged after exposure to vacuum for ten minutes.

High Quality Ultrapure Water

Can Improve Chromatographic Performance

Use Milli-Q® ultrapure water purification systems to ensure that your mobile phases are free of organic contaminants, for the best, most reproducible chromatographic results. Especially when fitted with a 0.2 µm final filter, Milli-Q® systems are the ideal water source for UHPLC, LC-MS, and other ultrasensitive analyses.

Laboratory Water Systems for Chromatography

Learn more at: www.merckmillipore.com/labwater

Description	Catalogue Number
Milli-Q® Integral 15 Pure (15 L/hour) and Ultrapure Water Production Unit with built-in resistivity and TOC meter	ZRXQ015T0*
Milli-Q® Advantage A10® Ultrapure Water Purification System	Z00Q0V0WW*
LC-Pak® point-of-use polisher for the production of at least 500 L of ultrapure water for organic trace analysis	LCPAK0001*

*Contact your local Merck Millipore sales representative for a country-specific part number.



Frequently Asked Questions

Q: Does cross-contamination between filter positions pose a problem?

A: No. Cross-contamination was not detected in an experiment in which alternating filter positions were used to filter 0.005% fluorescein in 80:20 (v/v) acetonitrile:water.

Q: How much analyte binding is exhibited by the Millex Smplicity® membrane?

A: Minimal analyte binding was detected after testing acetaminophen, loratadine, ranitidine and ibuprofen using both 0.45 µm and 0.20 µm filters.

Q: Should I be concerned about extractable impurities being leached from the Smplicity® system?

A: No. The Smplicity® filtration system was specifically developed for filtration of samples directly into a HPLC vial, thereby avoiding filtration into tubes and transfers into vials, both of which have potential for introducing extractable impurities into the sample. Assessed using UV, fluorescence and mass spectrometry detection, Millex Smplicity® filters provide very clean extracts without addition of extractable impurities to samples. Therefore, because the Millex Smplicity® filters themselves do not introduce any extractables, the sample should remain free of extractable impurities.

Q: How much vacuum pressure is required to operate the Smplicity® system?

A: Any vacuum source which can deliver 474 mbar (14 in. Hg) at 20 L/min is sufficient.

Ordering Information

Description	Qty/Pk	Catalogue No.
Samplicity® Filtration System, Blue	1	SAMPSYSBL
Millex Samplicity® Filters, hydrophilic PTFE, 0.45 µm	96	SAMPLCR01
Millex Samplicity® Filters, hydrophilic PTFE, 0.45 µm	384	SAMPLCR04
Millex Samplicity® Filters, hydrophilic PTFE, 0.20 µm	96	SAMPLG001
Millex Samplicity® Filters, hydrophilic PTFE, 0.20 µm	384	SAMPLG004
Millex Samplicity® Filters, hydrophilic PVDF, 0.45 µm	96	SAMPHV001
Millex Samplicity® Filters, hydrophilic PVDF, 0.45 µm	384	SAMPHV004



Related Products

Featured Mobile Phases and Columns for Liquid Chromatography

Description	Catalogue No. or URL
Acetonitrile, LiChrosolv® Gradient Grade	1.00030
Water for chromatography, LiChrosolv® LC-MS Grade	115333
Methanol, LiChrosolv® Gradient Grade	1.06007
Acetonitrile, LiChrosolv® Hypergrade for LC-MS	1.00029
Methanol, LiChrosolv® Hypergrade for LC-MS	1.06035
Purospher® STAR RP-18 Endcapped UHPLC Columns	1.50650
Chromolith® monolithic ready-to-use HPLC columns	www.merckmillipore.com/chromolith
ZIC®-HILIC HPLC columns for separation of polar hydrophilic compounds	www.merckmillipore.com/zic-hilic



Mobile Phase Filtration

Description	Catalogue No.
Disc Filters	
0.2 µm Durapore® PVDF Membrane Filter, 47 mm	GVWP04700
0.45 µm Durapore® PVDF Membrane filters, 47 mm	HVLP04700
0.45 µm LCR (hydrophilic PTFE) Membrane Filters, 47 mm	FHLC04700
0.45 µm Nylon Membrane Filters, 47 mm	HNWP04700
0.2 µm Nylon Membrane Filter, 47 mm	GNWP04700
Stericap®-GP Filter, 500 mL	SCGPU05RE
Steritop®-GP Filter, 500 mL	SCGPS05RE
Filter Holders	
47 mm, all glass filter holder with 250 mL funnel	XX1504700
90 mm glass filter holder with stainless steel screen, with 1 L funnel	XX1009020
Filter forceps, blunt-tipped, sterilizable	XX620006P



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