PALL®

Laboratory



**High-performance sterile and non-sterile filtration for mass spectrometry, chromatography, media preparation, cell culture, and protein purification. Pall Laboratory offers a complete portfolio of filtration solutions ranging from research-grade to GMP pharmaceutical manufacturing. Pall is your partner for all your filtration needs.**

# Pall Acrodisc® Syringe Filters

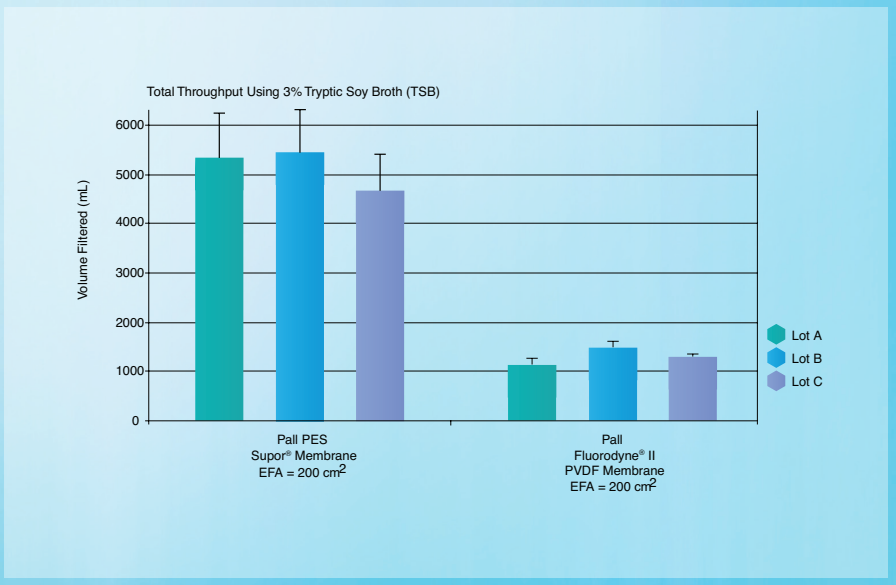
*Filtration. Separation. Solution.*SM

# Best-in-Class Performance for High Throughput and Capacity

In 1974, Pall Laboratory revolutionized sample preparation for analytical chemists with the development of the Acrodisc syringe filter. The high-performance proprietary membranes are the heart of a comprehensive family of syringe filters offering a full range of sizes, volumes, and flow rates. Pall Laboratory syringe filters come in sterile and non-sterile versions and are supported by the company's global supply chain and world-class technical support.

## Protect what really matters with Pall Laboratory syringe filter technology

With 70 years of membrane development expertise, Pall Laboratory proprietary filtration technology drives our performance for high throughput, excellent capacity, and great membrane compatibility. Exceptionally consistent pore size maximizes sterility. Plus, our products feature low leachables, extractables, and protein binding. The superior performance of Pall Laboratory's filters protects your samples without adding contaminants or interfering with your analytes or proteins.







PALL Laboratory

# Non-Sterile Syringe Filtration

## Data quality is critical in mass spectrometry and liquid chromatography applications. Extractables and leachables must be minimized to assure reliable results.

Syringe filters perform sample clean-up and preparation functions ensuring the purest samples are analyzed in liquid chromatography, mass spectrometry, and ion chromatography applications. Reliable results depend upon accurate data, achieved by the low extractables and high particulate retention of Pall Laboratory's Acrodisc syringe filters.

They also protect the costly detectors and columns found in analytical instruments. For example, filtration can extend ultra-high-pressure liquid chromatography (UHPLC) column life over 100 times versus an unfiltered sample — saving consumable costs and the expenses associated with downtime for maintenance and recalibration.

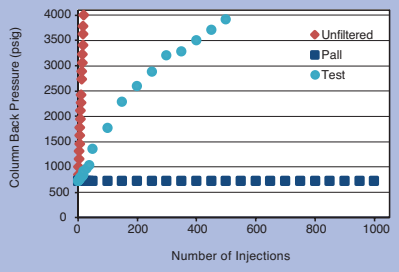
As researchers work with sample sizes as small as 100 µL, filtration must have little or no liquid retention to avoid lost volume. At the same time, in laboratories that filter many samples each day, syringe filters must protect analysts against repetitive-use joint injuries from sample back pressure.

### Key Applications

During **dissolution testing,** non-sterile syringe filters are essential to remove undissolved particulates from a drug sample before analysis by high-pressure liquid chromatography (HPLC). Since dissolution testing mimics the process of drug absorption in the human body, these particles must be filtered so the HPLC instrument will provide accurate measurements of drug release from the pill or tablet.

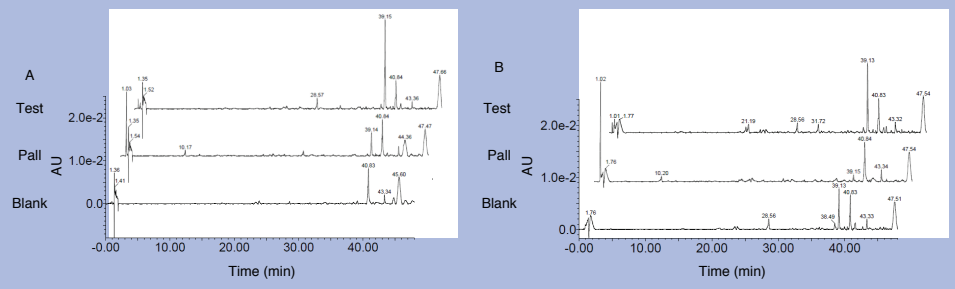
Non-sterile filtration also is important in **content uniformity testing,** which measures the amount and uniformity of active ingredients in a drug sample. This test helps the pharmaceutical manufacturer make sure that correct and safe amounts of active ingredients are present in each pill and that they are released over the correct time span.

HPLC COLUMN LIFE




Note: Effects of filters on HPLC column life following injections of unfiltered and filtered 0.05% latex sphere suspensions (1). With unfiltered samples, the column failed due to plugging after 19 injections. Samples passed through test filters plugged the columns after 500 injections. No increase in Back Pressure was observed after 1000 injections of samples filtered with Pall Acrodisc One™ syringe filter with wwPTFE membrane.

SOLVENT-EXTRACTABLE CHROMATOGRAPHS




Note: Solvent extractable properties of syringe filters equipped with 0.45 µm hydrophilic PTFE membranes (Pall and test). For Panel A, the solvent was methanol and acetonitrile for Panel B. Fifty microliter volumes of filtrate (Pall and test) and solvent blank (Blank) were analyzed using a Waters ♦Acquity UPLC system with a Diode Array Detector and a 2.1 x 50 mm, 4 µm Waters ♦Nova-Pak C18, 4.6 mm x 150 mm reverse-phase column under gradient conditions, with a mobile phase consisting of water and acetonitrile with a flow rate of 1 mL/min and a column temperature of 30 °C. Initial conditions of 5% acetonitrile were held for 3 min, then to remain at 100% acetonitrile for 91 min. The column was then equilibrated for 108 min at 5% acetonitrile before injection of the next sample. Data was collected at a wavelength of 214 nm.

## Pall Laboratory's non-sterile syringe filters deliver greater performance and cleanliness

Our proprietary manufacturing process produces non-sterile syringe filters that incorporate the highest-quality membranes and plastics. The premium syringe filter (PSF) offers two-piece, sealed construction designed to resist damage when processed with robotics and liquid handlers. PSF syringe filters provide the highest effective filtration area (EFA) in a 25 mm filter — 30% more than traditional 25 mm syringe filters.

Our non-sterile syringe filters offer the following advantages:

- Extend UHPLC column life over 100 times compared to an unfiltered sample
- Protect expensive instrument detectors and columns
- Contribute minimal extractable material that contaminates critical data
- Available pre-filters produce lower back pressure and higher flow rates for easier sample filtration



# Sterile Syringe Filter

## Researchers engaged in media preparation, protein purification, and cell culture know that sterility is imperative in their processes and workflows.

The syringe filter is the laboratory workhorse that protects sample or culture quality and sterility. The filter must provide enough capacity to filter the entire sample. Replacing a syringe filter midway through the process may lead to contamination, spills, and workflow disruption. Laboratory users also want syringe filters that can handle multiple cell types, densities, and pH values to simplify workflows and inventory management. In addition, the syringe filter must have minimal back pressure and resistance to eliminate repetitive-use injuries and achieve faster filtration.

## Key Applications

### Media Filtration and Cell Culture

When culturing cells, it's critical that the antibiotics, buffers, reagents, or nutrients are sterile when added to the media or culture to prevent contamination. Pall Laboratory's sterile syringe filters with 0.2 µm membranes remove bacteria, microorganisms, and fungi that can contaminate valuable cultures.

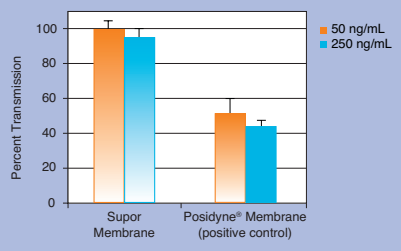
### Protein Purification

Higher cell densities can be difficult to filter downstream due to bioburden, which can cause premature filter clogging. This problem can be aided by syringe filters that incorporate an integrated pre-filter to collect the larger debris, while keeping the downstream membrane clear. Syringe filters must also have low protein binding to ensure proteins are not retained in the filter.

### Sample Clean-Up, Virus Filtration, and Mycoplasma Reduction

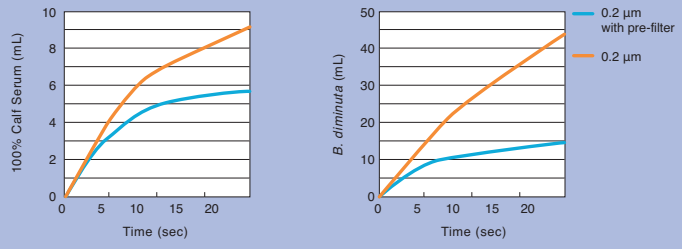
Laboratories need a wide range of membrane types and pore sizes for all varieties of sample clean-up, cell debris removal, virus filtration, or general filtration purposes. In addition, specialized sterile syringe filters can be used for serum, DMSO, white blood cells, and mycoplasma reduction. Pall Laboratory offers syringe filters for virtually all laboratory applications.

**BSA PROTEIN TRANSMISSION THROUGH 25 MM ACRODISC SYRINGE FILTERS**




Error bars indicate standard deviation, n=30.

**BUILT-IN PRE-FILTER ENHANCES THROUGHPUT OF VISCOUS, PARTICULATE-LADEN, OR PROTEINACEOUS SOLUTIONS**




Acrodisc and Acrodisc PF (with pre-filter) syringe filters with 0.2 µm Supor membrane were challenged with bovine serum or a bacterial culture ($10^7$ cfu/mL) at a constant pressure of 1.4 bar (20 psi).

## Pall Laboratory syringe filters meet the challenges of sterile applications

- Gamma-irradiated, sterile packaging
- Ergonomic, individually blister packaged
- Dual-layer membrane with integrated pre-filter for high dirt-holding capacity and improved filterability
- Low back pressure for ease of use
- High quality: works the first time, every time



www.pall.com/lab

# Don't Get Clogged or Risk Sample or Data Contamination

From mass spectrometry and chromatography to media preparation, cell culture, and protein purification, Pall Laboratory is the single source for all your syringe filtration needs.

## Non-Sterile Filters



### Primary Applications

- Dissolution testing
- Content uniformity testing

### Pall Advantages

- Achieve cleaner samples
- Minimize leachables and extractables that alter data
- Protect expensive detectors and columns
- Provide the highest effective filtration area
- Minimize back pressure and resistance to eliminate repetitive-use injuries

## Sterile Filters

### Primary Applications

- Media filtration and cell culture
- Protein purification
- Sample clean-up
- Virus filtration
- Mycoplasma reduction



### Pall Advantages

- Gamma-irradiated individual blister packs ensure sterility
- Ergonomic blister packs assure sterile storage, handling, and connections
- Greater reliability and confidence — works the first time, every time
- Integrated dual-layer pre-filter for high dirt-holding capacity and thorough, fast filtering
- Low protein binding ensures high protein recovery
- Superior membrane performance achieves high filtration flow and capacity
- Low back pressure promotes ease of use and quick filtering




## Scale up filtration for easier validation, tech transfer, and faster time to market

Pall Laboratory offers products that use the same membranes and materials that scale up from syringe filters to GMP manufacturing-scale filters. This means scientists can research, develop, and validate their processes with lab-scale filters and then, as volumes increase or processes move to manufacturing scale, the same filters are available in larger sizes with pharmaceutical certificates. This advantage ensures the same filtration performance, chemical and biological compatibilities, and efficiencies as a process scales up in size — shortening redevelopment and accelerating time to market.

UpScale ScaleUp

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# Acrodisc Syringe Filter Products

## Non-Sterile Acrodisc Syringe Filters

Pall Laboratory offers a comprehensive line of non-sterile syringe filters with five membrane types and two application-specific types:

- wwPTFE
- Nylon
- PTFE
- IC and Supor
- Versapor®

Pore sizes range from 0.2 µm to 1 µm to accommodate almost all applications.

Pall Laboratory's non-sterile syringe filters are certified for the following applications:

Our 25 mm polypropylene filters come in two styles: standard and PSF. The PSF products are purpose-built for automation compatibility, with tight tolerances and robust construction. Optional pre-filters are available for higher dirt-holding capacity that provides greater throughput and volume.

An optional Minispike outlet is available for low hold-up volume on 13 mm syringe filters. This feature filters four times as much sample with the same hold-up loss as a standard 4 mm filter.

## Sterile Acrodisc Syringe Filters

Pall Laboratory's sterile syringe filters are available with a variety of high-performance membranes:

- Supor PES
- Supor EKV asymmetric PES
- Fluorodyne II PVDF
- Ultipor® nylon
- Posidyne-charged nylon

The filters are available in 13 mm, 25 mm, and 32 mm sizes for filtering sample volumes up to 150 mL.

Our product line includes pore sizes ranging from 0.1 µm to 5.0 µm to ensure a syringe filter for any application.

Pall Laboratory's product line includes high-performance dual-membrane technology for improved speed and higher debris clean-up in a single syringe filter.

Our filters are sterilized by gamma irradiation, preventing the contamination risk that can result from ethylene oxide sterilization. They are individually blister packed to ensure sterility during storage and handling.



## Non-Sterile Syringe Filters

Pall Laboratory's non-sterile syringe filters are certified for the following applications:

- HPLC-certified for low UV absorbing extractables
- IC-certified for low levels of chloride, nitrate, phosphate, and sulfate
- Mass spectrometry-certified for low levels of extractable material
- Automation-certified to be compatible with automated and semi-automated workstations

## Sterile Syringe Filter Quality Claims*

- Endotoxin level: <0.25 EU/mL using Limulus Amebocyte Lysate test
- Bacterial retention: 0.2 µm lot samples retain $10^7$ cfu/cm$^2$ of *B. diminuta* per modified ASTM F838
- Mycoplasma reduction: 0.1 µm lot samples retain $10^7$ cfu/cm$^2$ *A. Laidlawii* per modified ASTM F838
- Biological safety: passes United States Pharmacopeia (USP) biological reactivity test, *in vivo* <88>

*Refer to product data sheets for specific tests and claims on individual products.

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*Filtration. Separation. Solution.*SM

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