

HPLC and Chromatography Sample Prep



As the world's largest producer of membrane filters, Pall offers more types of membranes for quality control testing than any other company. Our patented GH Polypro (GHP) membrane, with its uniquely broad solvent compatibility, is globally recognized as the universal membrane for HPLC sample preparation applications. Our diversified portfolio of membranes enables us to select the most appropriate materials and optimize them for each unique application. That's why you can depend on Pall to consistently provide dependable products that deliver superior performance for confident decisions.

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General HPLC and Chromatography Sample Prep Application Selector

	Page Number	Sample Filtration HPLC (0.45 µm)	Sample Filtration UHPLC (0.2 µm)	HPLC (0.45 µm) Mobile Phase/ UHPLC (0.2 µm) Mobile Phase	Sample Filtration Gas Chromatography	Sample Filtration Ion Chromatography	Sample Clarification (1 µm and Larger)	Cell Reduction
Membranes								
GH Polypro (GHP) membrane disc filters	178			•				•
HPLC mobile phase filtration membranes	177			•				•
Nylaflo™ membrane disc filters	179			•				•
PTFE membrane disc filters	180			•				•
PVDF membrane disc filters	181			•				•
Syringe Filters								
Acrodisc® MS syringe filter	184		•		•			•
Acrodisc PSF GxF syringe filters with glass/GHP membrane	186	•	•		•			•
Acrodisc PSF GxF syringe filters with glass/glass fiber	199				•		•	•
Acrodisc PSF GxF syringe filters with glass/nylon membrane	190	•	•		•			•
Acrodisc PSF GxF syringe filters with glass/PTFE membrane	192	•	•		•			•
Acrodisc PSF GxF syringe filters with glass/PVDF membrane	188	•	•		•			•
Acrodisc PSF GxF syringe filters with glass/Supor® membrane	198	•	•		•			•
Acrodisc PSF syringe filters with GHP membrane	186	•	•		•			•
Acrodisc PSF syringe filters with HT Tuffryn® membrane	197	•			•			•
Acrodisc PSF syringe filters with nylon membrane	190	•	•		•			•
Acrodisc PSF syringe filters with PTFE membrane	192	•	•		•			•
Acrodisc PSF syringe filters with PVDF membrane	188	•	•		•			•
Acrodisc PSF syringe filters with Versapor® membrane	196	•			•		•	•
Acrodisc syringe filters with glass fiber	199				•		•	•
Acrodisc syringe filters with GHP membrane	186	•	•		•			•
Acrodisc syringe filters with nylon membrane	190	•	•		•			•
Acrodisc syringe filters with PTFE membrane	192	•	•		•		•	•
Acrodisc syringe filters with PVDF membrane	188	•	•		•			•
Acrodisc syringe filters with Versapor membrane	196	•			•		•	•
Ion Chromatography (PES) Acrodisc syringe filters	194		•			•		•
Ion Chromatography (PES) Acrodisc PSF syringe filters	194	•	•			•		•
Centrifugal Devices								
Microsep® Advance centrifugal devices with Supor membrane	205	•	•		•			•
Microsep™ Advance centrifugal devices with Supor membrane	204	•	•		•			•
Nanosep MF centrifugal devices with GHP membrane	203	•			•			•
Filter Plates								
AcroPrep™ 24 filtration system	200	•	•					•
AcroPrep Advance 96-well filter plates, 1 mL	69 - 73	•	•				•	•
AcroPrep Advance 96-well filter plates, 350 µL	69 - 73	•	•				•	•
Hardware								
47 mm filter funnels, glass	206			•				
AcroPrep 24 filtration system	200	•	•					
SolVac® filter holder	182			•				
Stainless steel forceps	230, 280			•				

Solid Oral Dosage Sample Filtration Application Selector*

	Page Number	Aqueous - Acidic	Aqueous - Basic	Organic - Strong	Organic - Weak
Membranes					
GH Polypro (GHP) membrane disc filters	178	•	•	•	•
Nylaflo™ membrane disc filters	179			•	•
PTFE membrane disc filters	180			•	•
PVDF membrane disc filters	181	•			•
Syringe Filters					
Acrodisc MS syringe filter	184	•	•	•	•
Acrodisc PSF GxF syringe filters with glass/GHP membrane	186	•	•	•	•
Acrodisc PSF GxF syringe filters with glass/glass fiber	199	•	•	•	•
Acrodisc PSF GxF syringe filters with glass/nylon membrane	190			•	•
Acrodisc PSF GxF syringe filters with glass/PTFE membrane	192			•	•
Acrodisc PSF GxF syringe filters with glass/PVDF membrane	188	•			•
Acrodisc PSF GxF syringe filters with glass/Supor® membrane	198	•	•		•
Acrodisc PSF syringe filters with GHP membrane	186	•	•	•	•
Acrodisc PSF syringe filters with HT Tuffryn® membrane	197	•	•		
Acrodisc PSF syringe filters with nylon membrane	190			•	•
Acrodisc PSF syringe filters with PTFE membrane	192			•	•
Acrodisc PSF syringe filters with PVDF membrane	188	•			•
Acrodisc PSF syringe filters with Versapor® membrane	196		•		•
Acrodisc syringe filters with GHP membrane	186	•	•	•	•
Acrodisc syringe filters with glass fiber	199	•	•	•	•
Acrodisc syringe filters with nylon membrane	190			•	•
Acrodisc syringe filters with PTFE membrane	192			•	•
Acrodisc syringe filters with PVDF membrane	188	•			•
Acrodisc syringe filters with Versapor® membrane	196		•		•
Ion Chromatography (PES) Acrodisc syringe filters	194	•	•		•
Ion Chromatography (PES) Acrodisc PSF syringe filters	194	•	•		•
Centrifugal Devices					
Macrosep® Advance centrifugal devices with Supor membrane	205	•	•		•
Microsep™ Advance centrifugal devices with Supor membrane	204	•	•		•
Nanosep MF centrifugal devices with GHP membrane	203	•	•	•	•
Hardware					
47 mm filter funnels, glass	206	•	•	•	•
SolVac® filter holder	182	•	•	•	•
Stainless steel forceps	230, 280	•	•	•	•

*Pall's analytical quality control filters are used in typical HPLC applications including dissolution, content uniformity, pharmaceutical finished product, pharmaceutical raw material, and food and beverage testing. The choice of membrane filters for these tests is based on chemical compatibility of the membrane and the liquid being filtered. For additional guidance, review the Chemical Compatibility guide on page 292 - 293. Active Pharmaceutical Ingredients (API) adsorption should also be a consideration when making your selection.

HPLC and Chromatography Sample Prep

Supporting the Integrity of Your Sample Prep Results

Whether you are pursuing goals in the life sciences, pharmaceutical methods, research and development, quality control, or specialty environmental applications, Pall's HPLC and chromatography sample prep products offer unflinching quality in a range of processing volumes. Our superior media separation technology ensures:

- ▶ Accurate pore size ratings for better chromatography, and instrument and column protection.
- ▶ Uniform membrane materials (lot-to-lot) for consistent analytical results.
- ▶ Low extractable materials for less chromatographic interference.
- ▶ Materials of construction selected specifically for analytical analysis with lower extractables and lower API adsorption.

Multiple Sample Processing

AcroPrep™ Advance 96-Well Filter Plates

AcroPrep Advance filter plates are excellent for sample clean-up in sample prep or molecular biology applications. These plates alleviate the most common problems of filter-bottom plates with special design features:

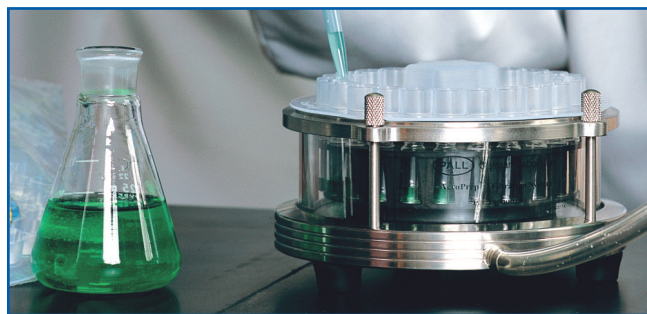
- ▶ Optimized outlet tips minimize sample leakage during incubation steps and reduce the presence of hanging drops following filtration.
- ▶ Automation compatible. Manufactured in accordance with SBS guidelines, allowing plates to be run in manual, semi-automated, and automated processes.
- ▶ Polypropylene filter plate assembly is chemically resistant and low biomolecule binding.

See page 65 for information on how to select a filter plate for your application.

AcroPrep 24 Filtration System

The AcroPrep 24 filtration system accelerates sample preparation and reduces labor by simultaneously filtering up to 24 samples:

- ▶ Designed for use with Waters' Alliance♦ HPLC systems.
- ▶ Eliminates the need for individually-wrapped syringes.
- ▶ System is economical and requires less bench space compared to the traditional syringe filter technique.
- ▶ HPLC certified to ensure analytical results will not be compromised by extractable materials.
- ▶ No cross-contamination because each well is individually sealed.



The AcroPrep 24 filtration system simultaneously processes up to 24 samples.

Single Sample Processing

Acrodisc® MS Syringe Filters

LCMS is a very sensitive analysis technique. It requires careful sample preparation to maintain sample purity. The Acrodisc MS syringe filter is the first syringe filter to be LCMS-certified low in extractables.

- ▶ LCMS-certified low in extractables provides confidence in your results.
- ▶ Low matrix effects means quicker, more accurate results.
- ▶ WWPTFE (water wettable PTFE) membrane provides chemical compatibility with aqueous and organic samples.

Acrodisc PSF Syringe Filters

Acrodisc PSF syringe filters are available in many membrane types, sizes, and packaging configurations to fit all applications ensuring:

- ▶ Smooth operation and worry-free performance in automated applications with smooth filter-to-filter release, consistent turret advancement, exceptional housing strength, and strict outside filter geometry.
- ▶ Best protection for HPLC columns – extend column life as much as 46 times.
- ▶ Maximum throughput with the GxF multi-layer prefilter.

Nanosep® MF Centrifugal Devices

Centrifugal devices are a simple-to-use alternative for analytical sample preparation, especially when your application calls for maximum filtrate recovery from limited sample volumes. These devices provide:

- ▶ Rapid and high recovery (96.5%) of critical proteins.
- ▶ Low extractables. Our HPLC-grade centrifugal devices are certified to be low in UV extractables.
- ▶ Low hold-up volume (< 5 µL) makes these devices ideal for expensive samples.
- ▶ High g-force ratings. Can be spun at 14,000 x g assuring rapid sample processing.

How to Choose a Filter for Your Application

When selecting the best filter for your application, four main considerations need to be addressed:

1. Is an automation-certified filter required?
2. What is the filter's chemical compatibility?
 - ▶ Resistance of membrane to fluid contact
 - ▶ Extractables
 - ▶ Adsorption
3. What Effective Filtration Area (EFA) is needed for filtration?
4. What pore size rating is optimal for sample clean-up?

AUTOMATION CERTIFICATION IS IMPORTANT

Pall Life Sciences has specifically designed and certified our Acrodisc® PSF syringe filters to be fully compatible and reliable for use with automated equipment. The following special features make our syringe filters reliable for worry-free performance 24 hours a day:

- ▶ Smooth filter-to-filter release
- ▶ Consistent turret advancement
- ▶ Exceptional housing strength
- ▶ Strict “outside filter geometry”



Acrodisc PSF syringe filters from Pall Life Sciences are the only syringe filters to receive the SOTAX♦ and Zymark♦ Automation Certified guarantee. This certification is only granted to syringe filters that meet the stringent requirements for automated dispensing and robotic handling. Pall works in close partnership with the SOTAX AG manufacturing and engineering teams to ensure proper fit, function, and compatibility with SOTAX and Zymark workstations.



Pall's Acrodisc PSF syringe filters work best with SOTAX AG's Zymark TPW♦, APW♦, and MultiDose♦ workstations. Pall's standard Acrodisc syringe filters work best with SOTAX's AT-70 SMART♦, CTS, and FS workstations. These robotic workstations are all uniquely designed to work with SOTAX and Zymark Automation Certified filters for proper operation.

CONSIDER CHEMICAL COMPATIBILITY

Does the filter need to be resistant to bases, acids, or organic solvents? Chemical compatibility is a critical consideration when selecting the sample prep syringe filter or mobile phase disc filter for your application. The following broad guidelines can be used for basic information. Please refer to the Chemical Compatibility charts on pages 286 - 289 to determine which filter is best for your application.

Aqueous Samples

Hydrophilic membranes, which have an affinity for water, are preferable when filtering aqueous samples. Use Pall Life Sciences filters with GHP, PVDF, nylon, or PES membranes.

Gases and Aggressive Organic Solvents

Hydrophobic membranes repel water and are inert to aggressive organic solvents, making them ideal for gases and organic solvents. Choose Pall Life Sciences filters with PTFE membrane.

Aqueous and Organic Solvent Solutions

Different polymeric membranes have different chemical compatibilities. Based on the application and chemical compatibility, there may be one or several membrane and Acrodisc syringe filter possibilities. Generally, one filter type will not function for all applications due to limitations in hydrophobicity/hydrophilicity and chemical compatibility. However, Pall Life Sciences patented hydrophilic polypropylene (GHP) membrane is a universal membrane for both aqueous and organic applications.

Exceptionally Low Extractable Levels

A filter is designed to increase accuracy by removing unwanted particles. However, the wrong filter can be a source of contaminants in the form of extractables that elute into the sample from the filter device. These undesired artifacts can jeopardize analytical results. Some extractable concerns include coelution, false quantitation, and extraneous peaks.

Pall Life Sciences specifically selects the highest grade of materials and performs rigorous extraction methods on our membrane products to reduce undesired artifacts.

HPLC Certified for Low Extractables

Pall Life Sciences HPLC certification ensures that analytical results will not be compromised by extractable filter materials. To verify low levels of UV-detectable extractables, samples of the HPLC Acrodisc syringe filter line are randomly taken and tested for compatibility with common HPLC solvents using standard HPLC conditions.

How to Choose a Filter for Your Application (continued)

IC Certified for Low Levels of Inorganic Extractables

Pall Life Sciences certifies that Ion Chromatography (IC) Acrodisc® syringe filters have been tested using a highly sensitive IC protocol to monitor inorganic extractables. For IC applications, only the IC Acrodisc (PES) syringe filter is certified for low levels of inorganic extractables. Actual background levels of filter extractables are typically less than 20 ppb for chloride, 6 ppb for nitrate, 1 ppb for phosphate, and 10 ppb for sulfate.

Sample Adsorption

Choose a low adsorbing filter such as the Acrodisc syringe filter with GHP membrane. GHP membrane is extremely low in biomolecule binding. Typical binding levels are far below 1%.

Easy Identification

All analytical sample prep Acrodisc syringe filters and their packaging have color-coded printing with membrane type and pore size on each filter:

- GHP
- PTFE
- PVDF
- Nylon
- Glass Fiber
- Polyethersulfone (PES)

CONSIDER EFFECTIVE FILTRATION AREA

The particulate contained within a fluid affects the life of a filter. As particles are removed from the fluid, they block pores and reduce the useable portion of the filter. Particulate-laden fluids plug a filter more quickly than "clean" fluids. Increasing the EFA can lengthen the life of a filter.

Filters come in a variety of sizes ranging from the area within a single well of a 96-well plate, to spin filters and syringe filters.

Acrodisc syringe filters are available in 25 mm Acrodisc PSF syringe filters as well as in 13 and 4 mm diameters for smaller sample volumes. All are available in a variety of membrane and pore size choices.

Hold-Up Volume

Another aspect of choosing the right filter size is the hold-up volume. This is the volume of liquid remaining in the filter after use. A filter with a low hold-up volume is recommended for use with expensive fluids or those with limited availability. What device size will assure complete sample filtration with minimal hold-up volumes? Pall Life Sciences offers a broad range of device sizes. The minispike outlet, available on the 13 mm device, allows for minimal sample hold-up and easy dispensing into autosampler vials. Additional options include the 4 mm Acrodisc syringe filter, the Nanosep® MF centrifugal device, and the AcroPrep™ filter plate.

The table below outlines general guidelines to the appropriate filter size for different volumes of fluid.

Volume to be Filtered	Filter Type	Typical Hold-Up Volume
< 500 µL	Nanosep MF Device	< 2 µL
< 900 µL	AcroPrep 96 1 mL Filter Plate	< 18 µL/well
< 2 mL	4 mm Acrodisc Syringe Filter	< 10 µL
< 2 mL	AcroPrep 24 Filter Plate	< 50 µL/well
< 10 mL	13 mm Acrodisc Syringe Filter (Minispike)	< 14 µL
< 10 mL	13 mm Acrodisc Syringe Filter	< 30 µL
< 125 mL	25 mm Acrodisc PSF Syringe Filter	< 200 µL

Prefiltration

For difficult-to-filter samples, it is best to use a product with a glass fiber prefilter over the membrane. The Acrodisc PSF syringe filter with GxP multi-layered glass fiber prefilter is the best option for extremely particulate-laden samples. Our traditional Acrodisc syringe filters with GHP and nylon membranes are also available with a single layer glass fiber prefilter.

Acrodisc PSF Filter Design Extends Filter Life

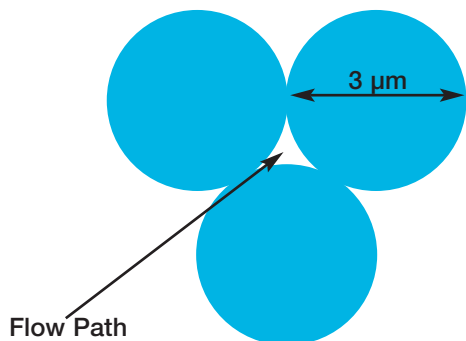
- *Special rib design and proprietary weld ensure robust seal under high operating pressures.*
- *Ample headspace for filter cake to build providing optimal throughput.*
- *Free-floating prefilter prevents premature clogging.*
- *Multi-layered prefilter traps heterogeneous particulate throughout the matrix and on the surface, extending filter life.*
- *Heat sealed final membrane ensures particulate retention with no chance of breakthrough.*

The Acrodisc PSF GxP syringe filter has a serial glass fiber (GxP) prefilter to allow for maximum throughput and faster flow rates than standard glass fiber prefilter devices. The multi-layered prefilter, rated from > 40 to 1 µm, traps particulate, thereby extending filter life.

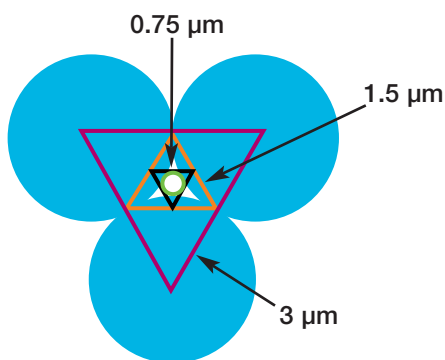
CONSIDER PORE SIZE

Assumption: it is desirable to extend the life of your HPLC column and reduce maintenance due to particulate in the pumping system; thereby giving more analyses per dollar spent.

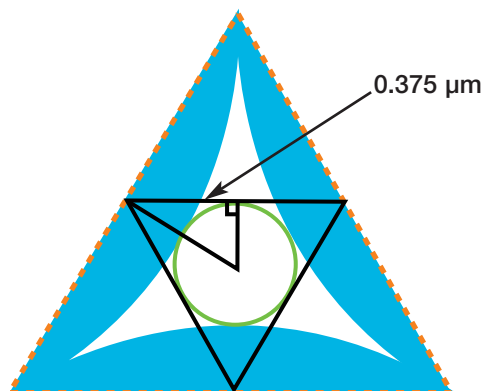
Given this assumption, the filter pore size should be determined based on the column packing size. As you can see below, the column packing particles touch each other. Ideally, you would not want contamination to fit into the space between the particles of packing. This space (labeled Flow Path) is identified below. The recommendation is to find out how large that space is and remove particles of that size.



For example, start with a 3 μm packing size and draw a few well-placed equilateral triangles as suggested in the image below. Determine the largest particle capable of fitting through the column by circumscribing an equilateral triangle with a side length of 0.75 μm.



Now enlarge the diagram and look further. Visualize a series of equilateral triangles whose side length gets down to 0.75 μm. The following image illustrates a right triangle whose short side describes the radius of the sphere. The angle is one half of 60°, or 30°. The horizontal side of this new right triangle has a length of 0.375 μm (half of 0.75 μm). Calculating the tangent of 30° gives the ratio of the length of the opposite side over the adjacent side, in this case 0.58. This means that the short side of the triangle is equal to 0.58 x 0.375 or 0.217 μm. Coincidentally, this is also the radius of the particle. So, if the column packing is 3 μm in diameter, the flow path is 0.43 μm.



When an HPLC column has a packing size of 3 μm or smaller, you should use a 0.2 μm filter because a 0.45 μm filter may let particles through that will plug the column.

Are You Concerned About Accurate Retention of Particulate?

For liquid chromatography systems using columns with larger than 3 μm packings, the filtration industry standard is 0.45 μm for syringe filters and mobile phase membranes. For columns with 3 μm or smaller packings, including UHPLC, microbore columns, or when concerned about microbial growth, a 0.2 μm filter is recommended.

Once the best pore size rating is chosen for the application, you must rely on the filter manufacturer to provide an accurate pore size rating. For more information on the importance of accurate pore size rating – and how to prolong the life of your HPLC column – please visit www.pall.com/lab and access our Literature Library online.

HPLC and Chromatography Sample Prep – Online Reference Library

Pall's website offers an extensive collection of product, technical, and application information. This valuable online reference library features hundreds of technical articles, posters, podcasts, application notes, and more that can help you get the most out of your process. To view the following titles online – and many others – click the Literature Library link in the left sidebar when you visit www.pall.com/lab.

- ▶ Acrodisc® MS Syringe Filter Video
- ▶ Acrodisc Syringe Filters for Analytical Sample Preparation: Quality Assurance and Certifications
- ▶ Analytical Sample Prep Filters
- ▶ Certification of Pall Acrodisc PSF Syringe Filters for Use with Zymark® Workstations
- ▶ Chemical Compatibility Guide and Life Expectancy for the SolVac® Filter Holder
- ▶ Clarification of 0.1-1.0 mL Samples Using AcroPrep™ 96 and 384 Multi-Well Filter Plates
- ▶ Clarification of Samples (< 1 mL) by MF Filtration in Nanosep® Spin Filters
- ▶ Clarification of Samples (1-100 mL) in an Acrodisc Syringe Filter
- ▶ Exploring IC Syringe Filters
- ▶ Filtration: Preventative Maintenance for HPLC
- ▶ Getting More Life and Better Performance From Your HPLC Column
- ▶ Instantly Increase Your HPLC Column Life - Up to 46 Times
- ▶ Low Extractable Syringe Filters for LCMS Applications
- ▶ Maintaining Analytical Integrity During Sample Preparation
- ▶ Reduction of Matrix Effects from Filter Effluents Using Pall Acrodisc MS Syringe Filters for LCMS Sample Preparation
- ▶ Suitability of Various Filters for Sample Preparation in Dissolution Testing, Based on Drug Binding
- ▶ Syringe Filter Efficiency and the Effect of Filtration on HPLC Column Life
- ▶ Use of Acrodisc Syringe Filters for Analytical Sample Preparation, Including HPLC and Dissolution Testing
- ▶ Using the SolVac Filter Holder for Mobile Phase Filtration



HPLC Mobile Phase Filtration Membranes

Membranes designed specifically for the stringent requirements of mobile phase filtration



- ▶ Membranes are identical in composition and quality to those used in Pall's HPLC-certified Acrodisc® syringe filters.
- ▶ HPLC certification assures that the filters will not add artifacts to your analysis.
- ▶ GH Polypro membrane is the best choice for filtering mobile phases.
- ▶ PTFE membrane provides the ultimate in chemical compatibility for filtering harsh chemicals and HPLC mobile phases.

Applications

- ▶ Purification and degassing of mobile phase solvents used in liquid chromatography applications.

Specifications

Filter Media

GH Polypro (GHP, hydrophilic polypropylene), TF (PTFE, hydrophobic polytetrafluoroethylene), PVDF (hydrophilic polyvinylidene fluoride), and Nylaflo™ (hydrophilic nylon) membranes

Pore Size

0.2 and 0.45 µm

Typical Thickness

GHP Membrane

0.2 µm: 101 µm (4.0 mils)
0.45 µm: 114 µm (4.5 mils)

TF (PTFE) Membrane

0.2 µm: 139 µm (5.5 mils)
0.45 µm: 135 µm (5.3 mils)

PVDF Membrane

0.2 µm: 140 µm (5.5 mils)
0.45 µm: 127 µm (5.0 mils)

Nylaflo Membrane

0.2 and 0.45 µm: 127 µm (5.0 mils)

Maximum Operating Temperature

GHP Membrane

55 °C (131 °F)

PVDF, TF (PTFE), and Nylaflo Membranes

100 °C (212 °F)

Minimum Bubble Point – Water

GHP Membrane

0.2 µm: 2.9 bar (290 kPa, 42 psi)
0.45 µm: 1.38 bar (138 kPa, 20 psi)

PVDF Membrane

0.2 µm: 2.3 bar (230 kPa, 34 psi)
0.45 µm: 1.1 bar (110 kPa, 16 psi)

Nylaflo Membrane

0.2 µm: 3.4 bar (340 kPa, 49 psi)
0.45 µm: 2.6 bar (260 kPa, 37 psi)

Minimum Bubble Point - IPA

TF (PTFE) Membrane

0.2 µm: 1.0 bar (100 kPa, 15 psi)
0.45 µm: 0.4 bar (40 kPa, 6 psi)

Ordering Information

HPLC Mobile Phase Filtration Membranes, 47 mm

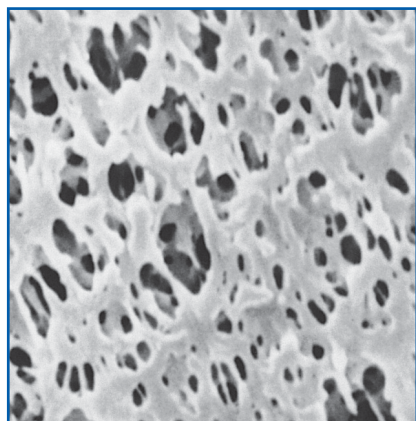
Part Number	Description	Pkg
66557	0.2 µm, GH Polypro (PP) membrane	100/pkg
66548	0.45 µm, GH Polypro (PP) membrane	100/pkg
66143	0.2 µm, TF (PTFE) membrane	100/pkg
66149	0.45 µm, TF (PTFE) membrane	100/pkg
66477	0.2 µm, PVDF membrane	100/pkg
66480	0.45 µm, PVDF membrane	100/pkg
66602	0.2 µm, Nylaflo (nylon) membrane	100/pkg
66608	0.45 µm, Nylaflo (nylon) membrane	100/pkg

Related Products

47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	183
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

GH Polypro (GHP) Membrane Disc Filters

All purpose, universal membrane with maximum chemical compatibility for both aqueous solutions and aggressive solvents



- ▶ Maximum versatility. Filters aqueous solutions or aggressive chemicals.
- ▶ Low protein binding membrane gives high recovery of critical proteinaceous samples.
- ▶ HPLC certified. Provides assurance that the filter will not add artifacts to your analysis.
- ▶ Low API adsorption.

Applications

- ▶ Our number-one choice for filtering HPLC mobile phases.
- ▶ Available in 0.2 µm for UHPLC.
- ▶ Suitable for pharmaceutical HPLC applications.

Specifications

Filter Media

Hydrophilic polypropylene

Pore Size

0.2 and 0.45 µm

Typical Thickness

0.2 µm: 101 µm (4.0 mils)
0.45 µm: 114 µm (4.5 mils)

Typical Water Flow Rate

mL/min/cm² at 0.7 bar
(70 kPa, 10 psi)

0.2 µm: 20

0.45 µm: 31

Maximum Operating Temperature

55 °C (131 °F)

Minimum Bubble Point - Water

0.2 µm: 2.9 bar (290 kPa, 42 psi)

0.45 µm: 1.38 bar (138 kPa, 20 psi)

Performance

GHP Membrane is Virtually a Universal Membrane for All Applications

Membrane	Proteinaceous	General Aqueous	Non-Aggressive Organic	Aggressive Organic
GHP	++	++	++	++
PTFE	-	-	++	++
PVDF	++	++	+	-
Nylon	+*	++	+	-

++ Recommended

+ Suitable

- Not Recommended

* Dependent on protein type and concentration.

Ordering Information

GHP Polypro (GHP) Membrane Disc Filters

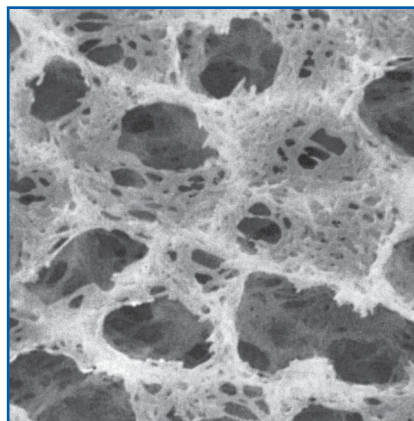
Part Number	Description	Pkg
60189	0.2 µm, 25 mm	100/pkg
66557	0.2 µm, 47 mm	100/pkg
66628	0.2 µm, 50 mm	100/pkg
66629	0.45 µm, 13 mm	100/pkg
66340	0.45 µm, 25 mm	100/pkg
66640	0.45 µm, 37 mm	100/pkg
66548	0.45 µm, 47 mm	100/pkg
66625	0.45 µm, 50 mm	100/pkg
66626	0.45 µm, 90 mm	100/pkg

Related Products

47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	183
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

Nylaflo™ Membrane Disc Filters

A highly versatile laboratory membrane filter



- ▶ Excellent chemical compatibility with esters, bases, and alcohols.
- ▶ Naturally hydrophilic.
- ▶ Available in 0.2 and 0.45 µm pore sizes, in diameters ranging from 13 to 142 mm.
- ▶ HPLC certified. Provides assurance that the filter will not add artifacts to your analysis.

Applications

- ▶ Useful for a wide range of applications. Offers broad chemical resistance to common solvents.
- ▶ Not recommended for acids > 1N or halogenated solvents.

Specifications

Filter Media

Hydrophilic nylon

Pore Size

0.2 and 0.45 µm

Typical Thickness

127 µm (5 mils)

Typical Water Flow Rate

mL/min/cm² at 0.7 bar

(70 kPa, 10 psi)

0.2 µm: 12

0.45 µm: 16

Maximum Operating Temperature - Water

100 °C (212 °F)

Minimum Bubble Point - Water

0.2 µm: 3.4 bar (340 kPa, 49 psi)

0.45 µm: 2.6 bar (260 kPa, 37 psi)

Ordering Information

Nylaflo Membrane Disc Filters, 0.2 µm

Part Number	Description	Pkg
66600	13 mm	100/pkg
66601	25 mm	100/pkg
66602	47 mm	100/pkg
66603	90 mm	100/pkg
66604	142 mm	25/pkg

Nylaflo Membrane Disc Filters, 0.45 µm

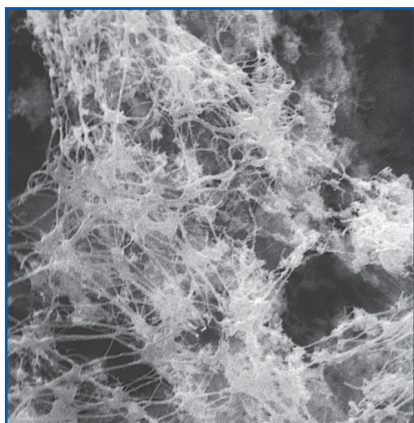
Part Number	Description	Pkg
66606	13 mm	100/pkg
66607	25 mm	100/pkg
66608	47 mm	100/pkg
66609	90 mm	100/pkg
66610	142 mm	25/pkg

Related Products

47 mm Filter Funnels, Glass	206
142 mm Disc Filter Holder, Stainless Steel	275
SolVac® Filter Holder	183
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

PTFE Membrane Disc Filters

Strong, chemically resistant membranes for solvent and HPLC mobile phase filtration



- ▶ Low chemical background permits highly sensitive, interference-free determinations.
- ▶ Ideal for filtration of gas and/or organic solvents.

Applications

- ▶ Ultimate in chemical compatibility for filtering harsh chemicals and HPLC mobile phases that destroy other membrane materials.

Specifications

Filter Media

Hydrophobic polytetrafluoroethylene (PTFE) on a polypropylene support

Pore Size

0.2, 0.45 μm , and 1 μm

Typical Thickness

0.2 μm : 139 μm (5.5 mils)
0.45 and 1 μm : 135 μm (5.3 mils)

Typical Air Flow Rate

L/min/cm² at 0.7 bar (70 kPa, 10 psi)

0.2 μm : 2
0.45 μm : 3
1 μm : 7

Maximum Operating Temperature

100 °C (212 °F)

Minimum Bubble Point - IPA

0.2 μm : 1.0 bar (100 kPa, 15 psi)
0.45 μm : 0.4 bar (40 kPa, 6 psi)
1 μm : 0.1 bar (10 kPa, 2 psi)

Ordering Information

TF (PTFE) Membrane Disc Filters

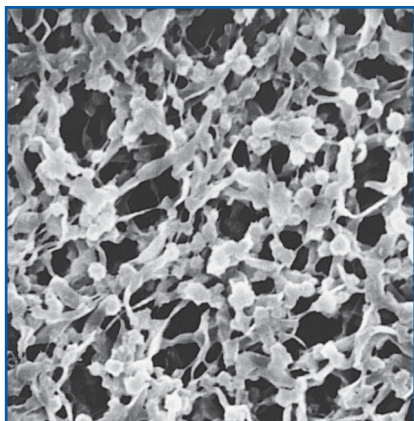
Part Number	Description	Pkg
66141	TF 200, 0.2 μm , 13 mm	100/pkg
66142	TF 200, 0.2 μm , 25 mm	100/pkg
66143	TF 200, 0.2 μm , 47 mm	100/pkg
66630	TF 200, 0.2 μm , 50 mm	100/pkg
66145	TF 200, 0.2 μm , 142 mm	25/pkg
66146	TF 200, 0.2 μm , 293 mm	25/pkg
66147	TF 450, 0.45 μm , 13 mm	100/pkg
66148	TF 450, 0.45 μm , 25 mm	100/pkg
66149	TF 450, 0.45 μm , 47 mm	100/pkg
66631	TF 450, 0.45 μm , 50 mm	100/pkg
66151	TF 450, 0.45 μm , 142 mm	25/pkg
66152	TF 450, 0.45 μm , 293 mm	25/pkg
66153	TF 1000, 1 μm , 13 mm	100/pkg
66154	TF 1000, 1 μm , 25 mm	100/pkg
66159	TF 1000, 1 μm , 37 mm, with support pads	100/pkg
66155	TF 1000, 1 μm , 47 mm	100/pkg
66158	TF 1000, 1 μm , 293 mm	25/pkg

Related Products

47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	183
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

PVDF Membrane Disc Filters

Compatible with aggressive and non-aggressive solvent-based solutions



- ▶ Useful for a wide range of applications including aggressive and non-aggressive solvent-based mobile phase.
- ▶ HPLC certified. Provides assurance that the filter will not add artifacts to your analysis.
- ▶ Membrane is autoclavable.

Applications

- ▶ Offers excellent chemical compatibility, even with aggressive acids and alcohols.
- ▶ Not recommended for acetone, DMF, DMSO, or bases > 6N.

Specifications

Filter Media

Hydrophilic polyvinylidene fluoride (PVDF)

Pore Size

0.2 and 0.45 μm

Typical Thickness

0.2 μm : 140 μm (5.5 mils)
0.45 μm : 127 μm (5.0 mils)

Typical Water Flow Rate

mL/min/cm² at 0.7 bar
(70 kPa, 10 psi)
0.2 μm : 5
0.45 μm : 26

Maximum Operating Temperature - Water

100 °C (212 °F)

Minimum Bubble Point - Water

0.2 μm : 2.3 bar (230 kPa, 34 psi)
0.45 μm : 1.1 bar (110 kPa, 16 psi)

Sterilization

Provided non-sterile. Autoclavable if desired.

Ordering Information

PVDF 200 Membrane Disc Filters, 0.2 μm

Part Number	Description	Pkg
66475	13 mm	100/pkg
66476	25 mm	100/pkg
66477	47 mm	100/pkg

PVDF 450 Membrane Disc Filters, 0.45 μm

Part Number	Description	Pkg
66478	13 mm	100/pkg
66479	25 mm	100/pkg
66480	47 mm	100/pkg

Related Products

47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	183
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

SolVac® Filter Holder

Magnetic filter holder simplifies clean-up and degassing of mobile phase solvents and other solutions



- ▶ Versatile design fits most HPLC bottles, flasks, and containers, and eliminates the added steps of washing flasks and transferring mobile phase solvent from flask to reservoir.
- ▶ Draws directly from HPLC solvent bottle. Less likely to spill aggressive solvents than glass funnels or disposable cups.
- ▶ Durable plastic construction is less likely to break than glass funnels, assemblies, or adapters.
- ▶ Patented magnetic seal is reliable and leak proof. Eliminates the possibility of membrane shifting or tearing which can occur with aluminum clamps or threaded holders.
- ▶ Reusable, chemically resistant polypropylene construction is resistant to common HPLC mobile phase solvents such as methanol, acetonitrile, and tetrahydrofuran.

Applications

- ▶ Remove contaminating particulate from mobile phase or other solutions.
- ▶ De-gas mobile phase solvents and solutions.
- ▶ Eliminate pour-and-wait filtration.
- ▶ Remove microbial growth every 24 hours from aqueous buffer mobile phases.

Specifications

Materials of Construction

Upper Housing, Housing Base:
Polypropylene
Feedline Tubing: Ultra chemical-resistant Tygon*, 4.8 mm (3/16 in.) ID
Thumb Clamp: Celcon*
Feedline Sinkers: PTFE
Vacuum Port Adapter, Membrane Seal Gasket, and Seal Gasket:
Polyethylene

Effective Filtration Area

10.2 cm²

Filter Size

Accepts 47 mm filter

Inlet/Outlet Connections

Tapered inlet accepts 3.2 - 6.4 mm (1/8 - 1/4 in.) ID tubing; outlet seals to bottles with openings 17.8 mm (0.7 in.) ID to 48.3 mm (1.9 in.) OD

Vacuum Port Adapter

4.8 - 7.9 mm (3/16 - 5/16 in.) tapered hose barb

Maximum Vacuum

63.5 cm Hg (25 in. Hg)

Operating Temperature

Ambient; not to exceed 38 °C (100 °F); not autoclavable

Chemical Compatibility

For detailed information about chemical compatibility by membrane type, see the Chemical Compatibility Chart on pages 286 - 287.

Ordering Information

SolVac Filter Holder

Part Number	Description	Pkg
4020	SolVac holder with 61 cm (2 ft.) feedline tubing, thumb clamp, sinker, vacuum port adapter, 2 membrane seal gaskets, and 2 seal gaskets	1/pkg

Accessories and Replacement Parts

Part Number	Description	Pkg
4022	122 cm (4 ft.) replacement feedline tubing	1/pkg
4023	Replacement seal gaskets	10/pkg
4025	Membrane seal gasket kit	10/pkg
4026	Sinker replacement kit	2/pkg
4028	Clamp replacement kit	2/pkg

Related Products

GH Polypro (GHP) Membrane Disc Filters	178
Stainless Steel Forceps	230, 280
Vacushield™ Vent Device	165
Vacuum/Pressure Pumps	279

Instructions for Use



1. Place base on the receiving vessel. Place the membrane on the clean, dry filter support.



2. Attach inlet feedline tubing to the upper housing. Place upper housing onto housing base to securely seal the membrane.



3. Attach vacuum tubing from vacuum source to the vacuum port adapter on the housing base.



4. Place feedline tubing into solvent to be filtered.



5. Apply vacuum to pull liquid through the filter.

Always use a safety-coated receiving vessel that is less than 4 L and rated for vacuum applications. Failure to do so may result in implosion of the receiving vessel and potential injury to the user.

HPLC Mobile Phase Filtration Membranes

Membrane	Mobile Phase Application	Technical Information
TF (PTFE)	Recommended for use with all organic liquids	Page 180
GH Polypro (GHP, polypropylene)	Recommended for use with organic and aqueous liquids	Page 178
Nylaflo™ (nylon)	Not recommended for use with some acidic solutions	Page 179
PVDF	Not recommended for use with some basic solutions	Page 181

Acrodisc® MS Syringe Filter

Certified syringe filters for LCMS



- ▶ Minimize interference in your LCMS results with the first LCMS-certified filter with extremely low levels of extractables.
- ▶ Reduce the need for retesting. The Acrodisc MS syringe filters will not contribute extractables that will interfere with the ionization process.
- ▶ Protective packaging design saves money and prevents downtime due to accidental contamination. Packaged into separate tubes.
- ▶ The WWPTFE (water wetttable polytetrafluoroethylene) membrane can be used with both organic and aqueous solvents. When coupled with a polyethylene housing, this filter offers excellent chemical resistance.
- ▶ Low protein binding gives accurate and confident quantitative results. No minimal protein adsorption.
- ▶ Protects your columns and instrument from particulate build-up, making your columns last longer and your LCMS perform more consistently.

Applications

- ▶ Molecular identification
- ▶ Structural determination
- ▶ Pharmacokinetics
- ▶ Drug discovery and development
- ▶ Drug testing
- ▶ Environmental monitoring
- ▶ Food safety monitoring
- ▶ Oil composition determination

Specifications

Materials of Construction

Filter Media: WWPTFE (water-wettable polytetrafluoroethylene) membrane
Housing: HDPE (high density polyethylene)

Pore size

0.2 µm

Effective Filtration Area

13 mm: 1.0 cm²
25 mm: 3.9 cm²

Typical Sample Volume

13 mm: ≤ 10 mL
25 mm: < 150 mL

Inlet/Outlet Connections

13 mm: Female threaded luer inlet, minispikes outlet
25 mm: Female threaded luer inlet, male slip luer outlet

Maximum Operating Pressure/Temperature

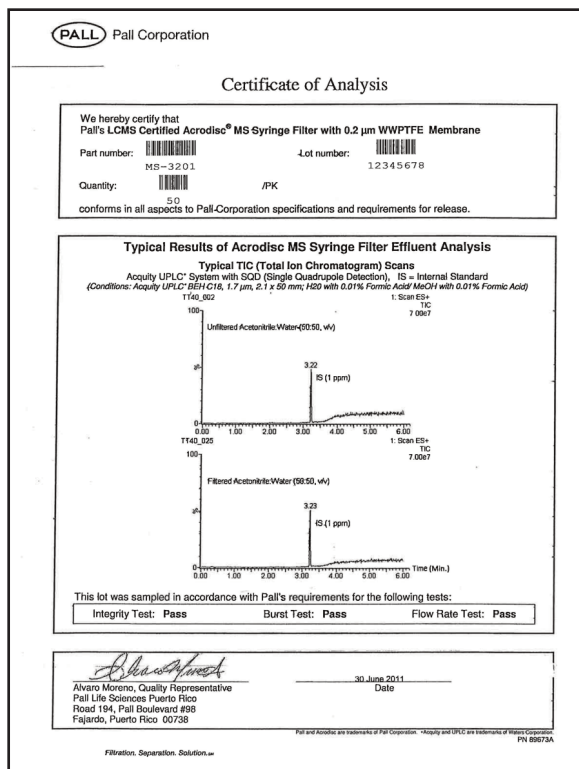
13 mm: 75 psi at 21-24 °C (70-75 °F),
30 psi at 55 °C (131 °F)
25 mm: 60 psi at 21-24 °C (70-75 °F),
30 psi at 55 °C (131 °F)

Typical Water Flow Rate

13 mm: 49 mL/min at 30 psi
25 mm: 140 mL/min at 30 psi

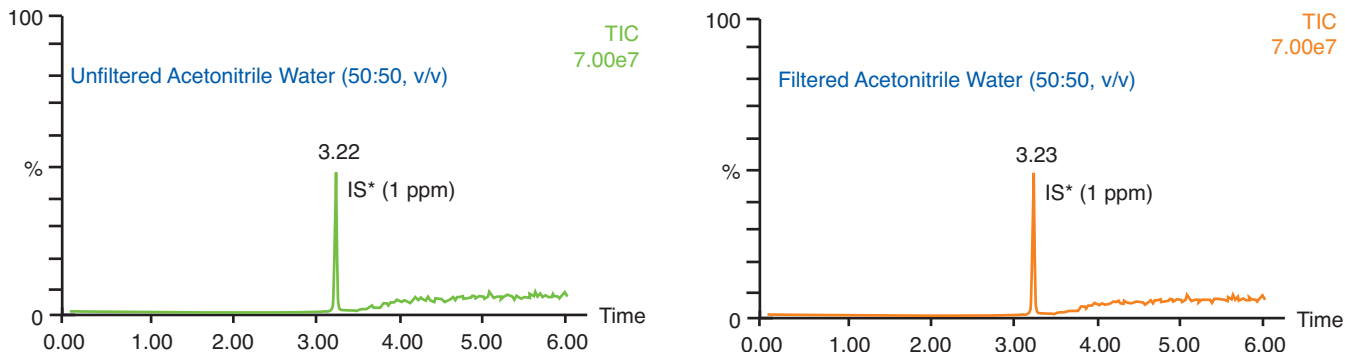
Certification

To ensure low levels of extractables, Pall certifies that all lots of WWPTFE membrane used in the Acrodisc MS syringe filters have been tested according to established LCMS techniques. Each box of product comes with a certificate containing Total Ion Current (TIC) chromatograms that show all detected peaks relative to an Internal Standard. Results for integrity, burst, and flow rate tests are also included on the certificate.



Performance

The following TIC chromatograms demonstrate full scans of unfiltered and filtered solutions of 50:50, v/v, acetonitrile:water over a six minute gradient UHPLC method.



Detection – Mass Spec: ES+ Mode; Mass Range: 100.00-1400.0
 Column: Waters Acquity UPLC BEH 1.7 μm – 2.1 x 50 mm
 Mobile Phase A: Methanol with 0.1% Formic Acid
 Mobile Phase B: Water with 0.01% Formic Acid
 Acquisition Program: Gradient – 6.0 minutes
 *IS = Internal Standard

Ordering Information

Acrodisc MS Syringe Filter

Part Number	Description	Pkg
MS-3301	0.2 μm , 13 mm, WWPTFE membrane	60/pkg
MS-3201	0.2 μm , 25 mm, WWPTFE membrane	50/pkg

Related Products

Acrodisc® Syringe Filters for HPLC/UHPLC Sample Prep	187-195, 198
HPLC Mobile Phase Filtration Membranes	177
SolVac® Filter Holder	182

Acrodisc® Syringe Filters With GHP Membrane

The "universal" membrane filter for all your analytical filtration requirements



- ▶ Acrodisc PSF syringe filters are Zymark® and SOTAX® Automation Certified to ensure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Avoid the expense and inconvenience of keeping a variety of filters on hand. Versatile filter for aqueous and aggressive organic solvent-based solutions.
- ▶ Low protein binding membrane gives high recovery of critical proteinaceous samples.
- ▶ Accurate analysis. HPLC certified for low levels of UV-absorbing extractables.
- ▶ Easy filtration of particulate-laden samples with glass fiber prefilter version.
- ▶ 13 mm Acrodisc syringe filter with minispike configuration offers low hold-up and easy filtration into autosampler vials.
- ▶ Protects columns and instrumentation from particulate buildup better than other filters.

Applications

- ▶ Highly recommended for filtering HPLC samples.
- ▶ Available in 0.2 μm for UHPLC applications.
- ▶ The Acrodisc PSF GxP syringe filter provides two to four times the throughput of standard prefilter devices for particulate-laden samples.
- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART® and CTS and Zymark TPW®, APW®, and MultiDose® dissolution systems.

Specifications

Materials of Construction

Filter Media: GH Polypro membrane (GHP, hydrophilic polypropylene)
Housing: Polypropylene
GxP Prefilter: Borosilicate glass

Pore Size

GHP Membrane: 0.2 and 0.45 μm
Glass Fiber (GF): 1 μm
GxP Prefilter: 40 - 1 μm

Effective Filtration Area

13 mm: 1.0 cm^2
25 mm PSF: 3.9 cm^2

Sample Volume

13 mm: < 10 mL
25 mm PSF: < 150 mL

Inlet/Outlet Connections

13 mm: Female luer lock inlet, minispike outlet
25 mm PSF: Female luer lock inlet, male slip luer outlet

Typical Hold-Up Volume

(with air purge)
13 mm: < 14 μL
25 mm PSF: < 125 μL
25 mm PSF GxP: < 200 μL

Maximum Operating Temperature

25 mm PSF: 55 °C (131 °F) at 2.1 bar (210 kPa, 30 psi)

Maximum Operating Pressure

13 mm: 6.3 bar (630 kPa, 90 psi)
25 mm PSF: 4.1 bar (410 kPa, 60 psi) at 21 - 24 °C (70 - 75 °F)
2.1 bar (210 kPa, 30 psi) at 55 °C (131 °F)

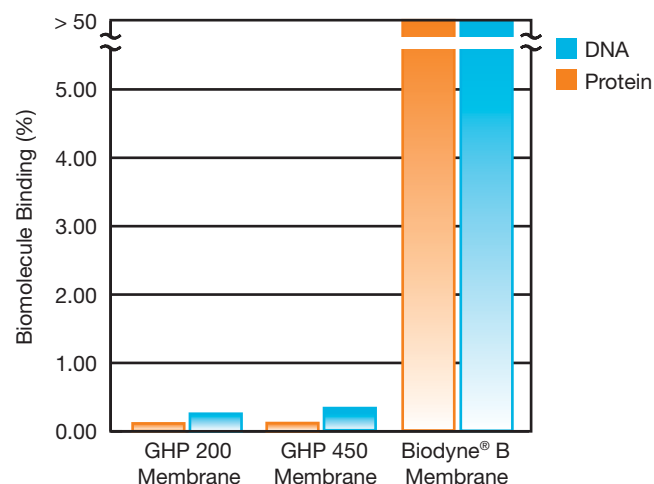
Typical Water Flow Rate

mL/min at 0.7 bar (70 kPa, 10 psi)
13 mm, 0.2 μm : 17
13 mm, 0.45 μm : 28

mL/min at 2.1 bar (210 kPa, 30 psi)
25 mm PSF, 0.2 μm : 215
0.45 μm : 300
25 mm GxP/PSF, 0.2 μm : 175
0.45 μm : 195

Performance

GHP Membrane is Extremely Low in Biomolecule Binding



¹²⁵I-labeled BSA (1.6 µg) or ³²P-labeled DNA (500 ng) were diluted to 5 mL in PBS (BSA) or Tris-EDTA (DNA) and filtered through a 13 mm disc of the indicated membrane. Filtration was carried out using a 10 mL syringe at a flow rate of 1.0 mL/min.

Binding was determined by comparing the amount of radioactivity remaining in the membrane (triplicate) to the activity of the starting material by placing the disc or solution directly into scintillation cocktail and counting in a scintillation counter. Biodyne B membrane is designed for biomolecule binding and was used as a positive control.

Ordering Information

Acrodisc® Syringe Filters With GHP Membrane, 13 mm

Part Number	Description	Pkg
4554	0.2 µm, minispike outlet	100/pkg, 300/cs
4567	0.2 µm, minispike outlet	1000/pkg
4556	0.45 µm, minispike outlet	100/pkg, 300/cs
4563	0.45 µm, minispike outlet	1000/pkg

Acrodisc Syringe Filters With GHP Membrane, 25 mm

Part Number	Description	Pkg
4564	0.2 µm	50/pkg, 200/cs
4566	0.2 µm	1000/pkg
4560	0.45 µm	50/pkg, 200/cs
4562	0.45 µm	1000/pkg

Acrodisc GF Syringe Filters With GHP Membrane, 25 mm

Part Number	Description	Pkg
4559	GF/0.45 µm	50/pkg, 200/cs
4558	GF/0.45 µm	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
AcroPrep™ 24 Filtration System	201
HPLC Mobile Phase Filtration Membranes	177
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

Zymark® and SOTAX® Automation Certified Acrodisc PSF Syringe Filters With GHP Membrane, 25 mm

Part Number	Description	Pkg
AP-4364	0.2 µm, AutoPack™ tubes	25/pkg, 200/cs
AP-4564	0.2 µm	50/pkg, 200/cs
AP-4566	0.2 µm	1000/pkg
AP-4357	0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4560	0.45 µm	50/pkg, 200/cs
AP-4562	0.45 µm	1000/pkg

Zymark and SOTAX Automation Certified Acrodisc PSF GxF Syringe Filters With GHP Membrane, 25 mm

Part Number	Description	Pkg
AP-4305	GxF/0.2 µm, AutoPack tubes	25/pkg, 200/cs
AP-4307	GxF/0.2 µm	50/pkg, 200/cs
AP-4306	GxF/0.2 µm	1000/pkg
AP-4557	GxF/0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4559	GxF/0.45 µm	50/pkg, 200/cs
AP-4558	GxF/0.45 µm	1000/pkg

Acrodisc® Syringe Filters With PVDF Membrane

Hydrophilic membrane compatible with a wide variety of solvents



Specifications

Materials of Construction

Filter Media: Hydrophilic polyvinylidene fluoride (PVDF)
Housing: Polypropylene
GxF Prefilter: Borosilicate glass

Pore Size

PVDF Membrane: 0.2 and 0.45 μm
GxF Prefilter: 40 - 1 μm

Effective Filtration Area

13 mm: 1.0 cm^2
25 mm PSF: 3.9 cm^2

Sample Volume

13 mm: < 10 mL
25 mm PSF: < 150 mL

Inlet/Outlet Connections

13 and 25 mm PSF: Female luer lock inlet, male slip luer outlet
13 mm: Available with minispikes outlet

Typical Hold-Up Volume

(with air purge)
13 mm (minispikes): < 14 μL
13 mm (male luer): < 30 μL
25 mm PSF: < 100 μL
25 mm PSF GxF: < 125 μL

Maximum Operating Temperature

13 mm: 55 $^{\circ}\text{C}$ (131 $^{\circ}\text{F}$)
25 mm PSF: 82 $^{\circ}\text{C}$ (180 $^{\circ}\text{F}$) at 2.1 bar (210 kPa, 30 psi)

Maximum Operating Pressure

13 mm: 3.5 bar (350 kPa, 50 psi)
25 mm PSF: 4.1 bar (410 kPa, 60 psi) at 21 - 24 $^{\circ}\text{C}$ (70 - 75 $^{\circ}\text{F}$);
2.1 bar (210 kPa, 30 psi) at 82 $^{\circ}\text{C}$ (180 $^{\circ}\text{F}$)

Typical Water Flow Rate

mL/min at 3.1 bar (310 kPa, 45 psi)
13 mm, 0.2 μm : 5
13 mm, 0.45 μm : 15
mL/min at 2.1 bar (210 kPa, 30 psi)
25 mm, 0.45 μm PSF and GxF: 144

- ▶ Acrodisc PSF syringe filters are Zymark® and SOTAX® Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Useful for a wide range of applications, including aggressive and non-aggressive solvent-based mobile phase.
- ▶ Reduces experimental variables. HPLC certified for low levels of UV-absorbing extractables.
- ▶ Protects columns and instrumentation against particulate build up.
- ▶ 13 mm device with minispikes configuration offers low hold-up and easy filtration into autosampler vials.

Applications

- ▶ Offers excellent chemical compatibility, even with aggressive acids and alcohols.
- ▶ Not recommended for acetone, DMF, DMSO, or bases > 6N.
- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART® and CTS and Zymark TPW®, APW®, and MultiDose® dissolution systems.

Ordering Information

Acrodisc® Syringe Filters With PVDF Membrane, 13 mm

Part Number	Description	Pkg
4450	0.2 µm, minispike outlet	100/pkg, 300/cs
4544	0.2 µm, minispike outlet	1000/pkg
4452	0.45 µm, minispike outlet	100/pkg, 300/cs
4545	0.45 µm, minispike outlet	1000/pkg
4455	0.2 µm, male slip luer outlet	100/pkg, 300/cs
4457	0.45 µm, male slip luer outlet	100/pkg, 300/cs

Acrodisc Syringe Filters With PVDF Membrane, 25 mm

Part Number	Description	Pkg
4406	0.2 µm	50/pkg, 200/cs
4520	0.2 µm	1000/pkg
4519	0.45 µm, AutoPack™ tubes	25/pkg, 200/cs
4408	0.45 µm	50/pkg, 200/cs
4500	0.45 µm	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
AcroPrep™ 24 Filtration System	201
HPLC Mobile Phase Filtration Membranes	177
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279



Zymark® and SOTAX® Automation Certified Acrodisc PSF Syringe Filters With PVDF Membrane, 25 mm

Part Number	Description	Pkg
AP-4795	0.2 µm, AutoPack tubes	25/pkg, 200/cs
AP-4796	0.2 µm	50/pkg, 200/cs
AP-4797	0.2 µm	1000/pkg
AP-4519	0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4408	0.45 µm	50/pkg, 200/cs
AP-4500	0.45 µm	1000/pkg



Zymark and SOTAX Automation Certified Acrodisc PSF GxS Syringe Filters With PVDF Membrane, 25 mm

Part Number	Description	Pkg
AP-4792	GxS/0.2 µm, AutoPack tubes	25/pkg, 200/cs
AP-4793	GxS/0.2 µm	50/pkg, 200/cs
AP-4794	GxS/0.2 µm	1000/pkg
AP-4309	GxS/0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4310	GxS/0.45 µm	50/pkg, 200/cs
AP-4308	GxS/0.45 µm	1000/pkg

Acrodisc® Syringe Filters With Nylon Membrane

Versatile filters for both aqueous and solvent-based sample filtration



Specifications

Materials of Construction

Filter Media: Nylon
Housing: Polypropylene
GxF Prefilter: Borosilicate glass

Pore Size

Nylon Membrane: 0.2 and 0.45 μm
GxF Prefilter: 40 - 1 μm

Effective Filtration Area

4 mm: 0.2 cm^2
13 mm: 1.0 cm^2
25 mm PSF: 3.9 cm^2

Sample Volume

4 mm: < 2 mL
13 mm: < 10 mL
25 mm PSF: < 150 mL

Inlet/Outlet Connections

4, 13, and 25 mm PSF: Female luer lock inlet, male slip luer outlet
13 mm: Available with minispikes outlet

Typical Hold-Up Volume

(with air purge)
4 mm: < 10 μL
13 mm (minispikes): < 14 μL
13 mm (male luer): < 30 μL
25 mm PSF: < 125 μL
25 mm PSF GxF: < 150 μL

Maximum Operating Temperature

55 $^{\circ}\text{C}$ (131 $^{\circ}\text{F}$) at 2.1 bar
(210 kPa, 30 psi)

Maximum Operating Pressure

4 mm: 5.2 bar (520 kPa, 75 psi)
13 mm: 6.9 bar (690 kPa, 100 psi)
25 mm PSF: 4.1 bar (410 kPa, 60 psi) at 21 - 24 $^{\circ}\text{C}$ (70 - 75 $^{\circ}\text{F}$);
2.1 bar (210 kPa, 30 psi) at
55 $^{\circ}\text{C}$ (131 $^{\circ}\text{F}$)

Typical Water Flow Rate

mL/min at 2.1 bar (210 kPa, 30 psi)
13 mm, 0.2 μm : 10
13 mm, 0.45 μm : 15
25 mm PSF, 0.2 μm : 115
0.45 μm : 245
25 mm PSF GxF/0.45 μm : 215

- ▶ Acrodisc PSF syringe filters are Zymark® and SOTAX® Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Excellent chemical compatibility with esters, bases, and alcohols.
- ▶ Saves time because no prewetting is required.
- ▶ Easy filtration of particulate-laden samples with the glass fiber prefilter version.
- ▶ 13 mm device with minispikes configuration offers low hold-up and easy filtration into autosampler vials.
- ▶ Prevents spurious peaks on chromatograms for accurate experimental results. HPLC certified for low levels of UV-absorbing extractables.

Applications

- ▶ The Acrodisc PSF GxF syringe filter provides two to four times the throughput of standard prefilter devices.
- ▶ Not recommended for acids > 1 N or halogenated solvents.
- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART® and CTS and Zymark TPW®, APW®, and MultiDose® dissolution systems.

Ordering Information

Acrodisc Syringe Filters With Nylon Membrane, 13 mm

Part Number	Description	Pkg
4550	0.2 µm, minispikes outlet	100/pkg, 300/cs
4561	0.2 µm, minispikes outlet	1000/pkg
4551	0.45 µm, minispikes outlet	100/pkg, 300/cs
4546	0.45 µm, minispikes outlet	1000/pkg

Acrodisc Syringe Filters With Nylon Membrane, 13 mm

Part Number	Description	Pkg
4427	0.2 µm, male slip luer outlet	100/pkg, 300/cs
4540	0.2 µm, male slip luer outlet	1000/pkg
4426	0.45 µm, male slip luer outlet	100/pkg, 300/cs
4541	0.45 µm, male slip luer outlet	1000/pkg

Acrodisc Syringe Filters With Nylon Membrane, 25 mm

Part Number	Description	Pkg
4436	0.2 µm	50/pkg, 200/cs
4522	0.2 µm	1000/pkg
4517	0.45 µm, AutoPack™ tubes	25/pkg, 200/cs
4438	0.45 µm	50/pkg, 200/cs
4502	0.45 µm	1000/pkg

Acrodisc GF Syringe Filters With Nylon Membrane, 25 mm

Part Number	Description	Pkg
4548	GF/0.45 µm, AutoPack tubes	25/pkg, 200/cs
4549	GF/0.45 µm	50/pkg, 200/cs
4528	GF/0.45 µm	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
AcroPrep™ 24 Filtration System	201
HPLC Mobile Phase Filtration Membranes	177
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279



Zymark® and SOTAX® Automation Certified Acrodisc PSF Syringe Filters With Nylon Membrane, 25 mm

Part Number	Description	Pkg
AP-4437	0.2 µm, AutoPack tubes	25/pkg, 200/cs
AP-4436	0.2 µm	50/pkg, 200/cs
AP-4522	0.2 µm	1000/pkg
AP-4517	0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4438	0.45 µm	50/pkg, 200/cs
AP-4502	0.45 µm	1000/pkg

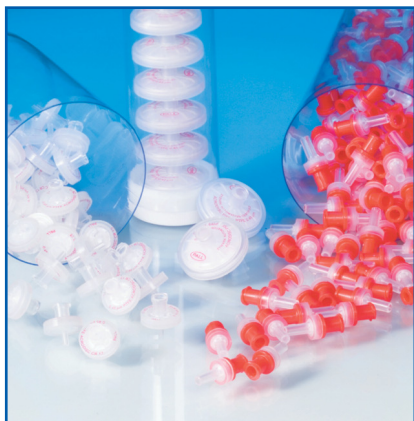


Zymark and SOTAX Automation Certified Acrodisc PSF GxS Syringe Filters With Nylon Membrane, 25 mm

Part Number	Description	Pkg
AP-4786	GxS/0.2 µm, AutoPack tubes	25/pkg, 200/cs
AP-4787	GxS/0.2 µm	50/pkg, 200/cs
AP-4788	GxS/0.2 µm	1000/pkg
AP-4548	GxS/0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4549	GxS/0.45 µm	50/pkg, 200/cs
AP-4528	GxS/0.45 µm	1000/pkg

Acrodisc® Syringe Filters With PTFE Membrane

Exceptional chemical and temperature compatibility



- ▶ Acrodisc PSF syringe filters are Zymark* and SOTAX* Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Ideal for filtration of gas and/or organic solvents.
- ▶ Prevents spurious peaks on chromatograms for accurate experimental results. HPLC certified for low levels of UV-absorbing extractables.
- ▶ Prevents "air bubble" lock when filling sample vials with 13 mm minispike outlet.
- ▶ 4 mm device offers the lowest sample hold-up (< 10 µL) and is useful for samples up to 2 mL in volume.

Applications

- ▶ Ultimate in chemical compatibility for filtering harsh chemicals that destroy other membrane materials.
- ▶ The Acrodisc PSF GxF syringe filter provides two to four times the throughput of standard prefilter devices.
- ▶ Moisture barrier for venting applications.
- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART* and CTS and Zymark TPW*, APW*, and MultiDose* dissolution systems.

Specifications

Materials of Construction

Filter Media: Hydrophobic PTFE membrane on a polypropylene support
 Housing: Polypropylene
 GxF Prefilter: Borosilicate glass

Pore Size

PTFE Membrane: 0.2 and 0.45 µm
 GxF Prefilter: 40 - 1 µm

Effective Filtration Area

4 mm: 0.2 cm²
 13 mm: 1.0 cm²
 25 mm PSF: 3.9 cm²

Sample Volume

4 mm: < 2 mL
 13 mm: < 10 mL
 25 mm PSF: < 150 mL

Inlet/Outlet Connections

4, 13, and 25 mm PSF: Female luer lock inlet, male slip luer outlet
 13 mm: Available with minispike outlet

Typical Hold-Up Volume

(with air purge)
 4 mm: < 10 µL
 13 mm (minispike): < 14 µL
 13 mm (male luer): < 30 µL
 25 mm PSF: < 125 µL

Typical Liquid Flow Rate (MeOH)

mL/min at 1.0 bar (100 kPa, 15 psi)
 25 mm PSF, 0.2 µm: 245
 25 mm PSF, 0.45 µm: 510
 25 mm PSF, GxF/0.2 µm: NA
 25 mm PSF, GxF/0.45 µm: 395

Maximum Operating Temperature

100 °C (212 °F) at 2.1 bar (210 kPa, 30 psi)

Maximum Operating Pressure

4 mm: 5.2 bar (520 kPa, 75 psi)
 13 mm: 6.9 bar (690 kPa, 100 psi)
 25 mm PSF: 4.1 bar (410 kPa, 60 psi) at 21 - 24 °C (70 - 75 °F);
 2.1 bar (210 kPa, 30 psi) at 100 °C (212 °F)

Sterilization of 25 mm Filters

Provided non-sterile. If desired, autoclave at 121- 123 °C (250 - 253 °F) at 1.0 bar (100 kPa, 15 psi) for a maximum of 15 min.

Ordering Information

Acrodisc® Syringe Filter With PTFE Membrane, 4 mm

Part Number	Description	Pkg
4472	0.45 µm	250/pkg, 750/cs

Acrodisc Syringe Filters With PTFE Membrane, 13 mm

Part Number	Description	Pkg
4552	0.2 µm, minispikes outlet	100/pkg, 300/cs
4553	0.45 µm, minispikes outlet	100/pkg, 300/cs
4555	0.45 µm, minispikes outlet	1000/pkg

Acrodisc Syringe Filters With PTFE Membrane, 13 mm

Part Number	Description	Pkg
4423	0.2 µm, male slip luer outlet	100/pkg, 300/cs
4542	0.2 µm, male slip luer outlet	1000/pkg
4422	0.45 µm, male slip luer outlet	100/pkg, 300/cs
4543	0.45 µm, male slip luer outlet	1000/pkg

Acrodisc Syringe Filters With PTFE Membrane, 25 mm

Part Number	Description	Pkg
4225	0.2 µm	50/pkg, 200/cs
4521	0.2 µm	1000/pkg
4518	0.45 µm, AutoPack™ tubes	25/pkg, 200/cs
4219	0.45 µm	50/pkg, 200/cs
4501	0.45 µm	1000/pkg
4226	1 µm	50/pkg, 200/cs
4503	1 µm	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
AcroPrep™ 24 Filtration System	201
HPLC Mobile Phase Filtration Membranes	177
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

Zymark® and SOTAX® Automation Certified Acrodisc PSF Syringe Filters With PTFE Membrane, 25 mm

Part Number	Description	Pkg
AP-4520	0.2 µm, AutoPack tubes	25/pkg, 200/cs
AP-4225	0.2 µm	50/pkg, 200/cs
AP-4521	0.2 µm	1000/pkg
AP-4518	0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4219	0.45 µm	50/pkg, 200/cs
AP-4501	0.45 µm	1000/pkg

Zymark and SOTAX Automation Certified Acrodisc PSF GxS Syringe Filters With PTFE Membrane, 25 mm

Part Number	Description	Pkg
AP-4789	GxS/0.2 µm, AutoPack tubes	25/pkg, 200/cs
AP-4790	GxS/0.2 µm	50/pkg, 200/cs
AP-4791	GxS/0.2 µm	1000/pkg
AP-4301	GxS/0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4303	GxS/0.45 µm	50/pkg, 200/cs
AP-4302	GxS/0.45 µm	1000/pkg

Ion Chromatography (IC) Acrodisc® Syringe Filters

Optimized to provide the most consistent results when analyzing ionic species



- ▶ Acrodisc PSF syringe filters are Zymark♦ and SOTAX♦ Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Accurate results for the most sensitive analysis of ionic species. Certified for low levels of extractables detected by conductivity.
- ▶ High flow rates with optimized Supor® polyethersulfone membrane.
- ▶ Conforms to quality release criteria for ion chromatography (IC) extractables.
- ▶ Convenient sizes for small sample volumes.

Applications

- ▶ Specifically designed for IC applications.
- ▶ Excellent filter selection for dissolution samples.
- ▶ Low drug and protein binding for pharmaceutical filtration.
- ▶ Supor (IC) membrane discs are recommended for aqueous samples only.
- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART♦ and CTS and Zymark TPW♦, APW♦, and MultiDose♦ dissolution systems.

Specifications

Materials of Construction

Filter Media: Supor [hydrophilic polyethersulfone (PES)] membrane
Housing: Polypropylene

Pore Size

0.2 and 0.45 µm

Effective Filtration Area

13 mm: 1.0 cm²
25 mm PSF: 3.9 cm²

Sample Volume

13 mm: < 10 mL
25 mm PSF: < 150 mL

Inlet/Outlet Connections

Female luer lock inlet, male slip luer outlet

Typical Hold-Up Volume

(with air purge)
13 mm: < 30 µL
25 mm PSF: < 125 µL

Maximum Operating Temperature

13 mm: 55 °C (131 °F)
25 mm PSF: 100 °C (212 °F) at 2.1 bar (210 kPa, 30 psi)

Maximum Operating Pressure

13 mm: 6.9 bar (690 kPa, 100 psi)
25 mm PSF: 4.1 bar (410 kPa, 60 psi) at 21 - 24 °C (70 - 75 °F);
2.1 bar (210 kPa, 30 psi) at 100 °C (212 °F)

Typical Water Flow Rate

mL/min at 1.0 bar (100 kPa, 15 psi)
13 mm, 0.2 µm: 15
13 mm, 0.45 µm: 20
mL/min at 2.1 bar (210 kPa, 30 psi)
25 mm, 0.2 µm PSF: NA
25 mm, 0.45 µm PSF: 420

Performance

Ion Chromatography Certification

Pall Life Sciences certifies that the maximum allowable levels of extractables from the filter are 50 ppb of Cl⁻, NO₃⁻, and SO₄⁻². Data shows that the actual background levels found are typically less than 20 ppb for chloride, 6 ppb for nitrate, 1 ppb for phosphate, and 10 ppb for sulfate. This is based on 2 mL of H₂O filtrate being concentrated on-line and injected into an ion chromatograph with conductivity detection.

Ordering Information

IC Acrodisc® Syringe Filters with Supor Membrane, 13 mm

Part Number	Description	Pkg
4483	0.2 µm	100/pkg, 300/cs
4683	0.2 µm	1000/pkg
4485	0.45 µm	100/pkg, 300/cs
4685	0.45 µm	1000/pkg

IC (PES) Acrodisc Syringe Filters with Supor Membrane, 25 mm

Part Number	Description	Pkg
4583	0.2 µm	50/pkg, 200/cs
4783	0.2 µm	1000/pkg
4585	0.45 µm	50/pkg, 200/cs
4785	0.45 µm	1000/pkg



Zymark® and SOTAX® Automation Certified IC Acrodisc PSF Syringe Filters with Supor Membrane, 25 mm

Part Number	Description	Pkg
AP-4801	0.2 µm AutoPack™ tubes	25/pkg, 200/cs
AP-4802	0.2 µm	50/pkg, 200/cs
AP-4803	0.2 µm	1000/pkg
AP-4587	0.45 µm AutoPack tubes	25/pkg, 200/cs
AP-4585	0.45 µm	50/pkg, 200/cs
AP-4785	0.45 µm	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

Acrodisc® Syringe Filters With Versapor® Membrane

Meets all prefiltration and clarification requirements



- ▶ Acrodisc PSF syringe filters are Zymark♦ and SOTAX♦ Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Meets aqueous sample filtration needs.

Applications

- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART♦ and CTS and Zymark TPW♦, APW♦, and MultiDose♦ dissolution systems.
- ▶ Useful for prefiltration of particulate-laden samples, serum filtration, and dissolution testing.
- ▶ Protects instrumentation against particulate build up.

Specifications

Materials of Construction

Filter Media: Versapor membrane
(acrylic copolymer on a non-woven support)
Housing: Polypropylene

Pore Size

0.45, 0.8, and 10 µm

Effective Filtration Area

4 mm: 0.2 cm²
13 mm: 1.0 cm²
25 mm PSF: 3.9 cm²

Inlet/Outlet Connections

Female luer lock inlet, male slip luer outlet

Typical Hold-Up Volume (with air purge)

4 mm: < 7.5 µL
13 mm: < 28 µL
25 mm PSF: < 125 µL

Maximum Operating Temperature

0.8 µm: 55 °C (131 °F) at 2.1 bar
(210 kPa, 30 psi)
10 µm: 82 °C (180 °F) at 2.1 bar
(210 kPa, 30 psi)

Maximum Operating Pressure

4 and 13 mm: 5.2 bar
(520 kPa, 75 psi)
25 mm PSF: 4.1 bar (410 kPa, 60 psi)
at 21 - 24 °C (70 - 75 °F)

Typical Water Flow Rate

mL/min at 3.1 bar (310 kPa, 45 psi)
4 mm, 0.45 µm: 3
13 mm, 0.8 µm: 180
25 mm PSF, 0.8 µm: 905

mL/min at 1.0 bar (100 kPa, 15 psi)
25 mm PSF, 10 µm: 1182

Ordering Information

Acrodisc Syringe Filters With Versapor Membrane, 4 and 13 mm

Part Number	Description	Pkg
4473	0.45 µm, 4 mm	250/pkg, 750/cs
4459	0.8 µm, 13 mm	100/pkg, 300/cs

Zymark and SOTAX Automation Certified Acrodisc PSF Syringe Filters With Versapor Membrane, 25 mm

Part Number	Description	Pkg
AP-4190	0.8 µm, AutoPack tubes	25/pkg, 200/cs
AP-4189	0.8 µm	50/pkg, 200/cs
AP-4568	0.8 µm	1000/pkg
AP-4000	10 µm, AutoPack tubes	25/pkg, 200/cs
AP-4001	10 µm	50/pkg, 200/cs
AP-4002	10 µm	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279
Versapor Acrylic Copolymer Membrane Disc Filters	113

Acrodisc® Syringe Filters With HT Tuffryn® Membrane

Proven performance



- ▶ Acrodisc PSF syringe filters are Zymark♦ and SOTAX♦ Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Reliable filter for dilute biological fluids.
- ▶ Available non-sterile for analytical preparation of biologicals.
- ▶ Low protein binding.

Applications

- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART♦ and CTS and Zymark TPW♦, APW♦, and MultiDose♦ dissolution systems.
- ▶ Useful for preparation of biological samples for HPLC or FPLC.
- ▶ For general aqueous samples.

Specifications

Materials of Construction

Filter Media: HT Tuffryn membrane
(polysulfone)
Housing: Polypropylene

Effective Filtration Area

3.9 cm²

Inlet/Outlet Connections

Female luer lock inlet, male slip
luer outlet

Typical Hold-Up Volume

(with air purge)
< 125 µL

Maximum Operating Temperature

25 mm: 55 °C (131 °F) at 2.1 bar
(210 kPa, 30 psi)

Maximum Operating Pressure

4.1 bar (410 kPa, 60 psi) at 21 - 24 °C
(70 - 75 °F)

Typical Water Flow Rate

mL/min at 3.1 bar (310 kPa, 45 psi):
390

Ordering Information



Zymark and SOTAX Automation Certified
Acrodisc PSF Syringe Filters With HT Tuffryn Membrane, 25 mm

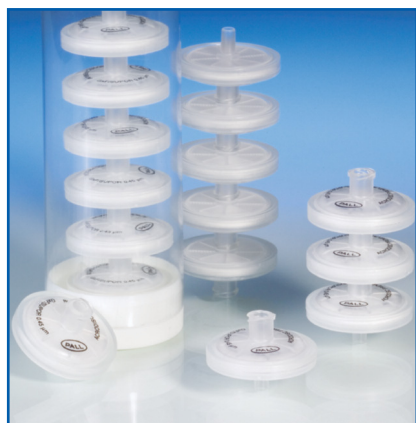
Part Number	Description	Pkg
AP-4498	0.45 µm, AutoPack tubes	25/pkg, 200/cs
AP-4497	0.45 µm	50/pkg, 200/cs
AP-4784	0.45 µm	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
HT Tuffryn Polysulfone Membrane Disc Filters	112
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

Acrodisc® Syringe Filters With Supor® Membrane

Universal life science membrane for general aqueous samples



- ▶ Acrodisc PSF syringe filters are Zymark® and SOTAX® Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Superior flow rates and higher throughputs than competitive devices.
- ▶ Low protein binding to minimize sample loss.
- ▶ Acrodisc PSF syringe filters feature unique built-in prefilter for increased throughput of difficult-to-filter liquids.

Applications

- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART® and CTS and Zymark TPW®, APW®, and MultiDose® dissolution systems.
- ▶ Widely used in dissolution testing.
- ▶ Larger pore size filters are used for prefiltration and particulate removal.
- ▶ > 0.8 µm pore sizes are excellent for difficult-to-filter dissolution samples.

Related Products

Supor PES Membrane Disc Filters	111
47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps.....	279

Specifications

Materials of Construction

Filter Media: Supor membrane (hydrophilic polyethersulfone)
 GxP Prefilter: Borosilicate glass
 Housing:
 25 mm PSF: Polypropylene
 32 mm: Modified acrylic

Pore Size

Supor Membrane: 0.2, 0.45, 1.2, and 5 µm
 GxP Prefilter: 40 - 1 µm

Effective Filtration Area

25 mm PSF: 3.9 cm²
 32 mm: 5.8 cm²

Inlet/Outlet Connections

Female luer lock inlet, male slip luer outlet

Typical Hold-Up Volume

(with air purge)
 25 mm PSF GxP: ≤ 200 µL
 32 mm: ≤ 100 µL

Maximum Operating Temperature

25 mm PSF GxP: 100 °C (212 °F) at 2.1 bar (210 kPa, 30 psi)
 32 mm: 55 °C (131 °F)

Maximum Operating Pressure

25 mm PSF GxP: 4.1 bar (410 kPa, 60 psi) at 21 - 24 °C (70 - 75 °F); 2.1 bar (210 kPa, 30 psi) at 100 °C (212 °F)
 32 mm: 5.2 bar (520 kPa, 75 psi)

Typical Water Flow Rate

mL/min at 2.1 bar (210 kPa, 30 psi)
 25 mm PSF, GxP/0.2 µm: NA
 25 mm PSF, GxP/0.45 µm: 360
 mL/min at 3.1 bar (310 kPa, 45 psi)
 32 mm, 0.2 µm: 490
 32 mm, 0.45 µm: 560
 32 mm, 0.8/0.2 µm: 440
 32 mm, 1.2 µm: 1700
 32 mm, 5 µm: 1750

Ordering Information

Zymark and SOTAX Automation Certified
Acrodisc PSF GxP Syringe Filters With Supor Membrane, 25 mm

Part Number	Description	Pkg
AP-4798	GxP/0.2 µm AutoPack Tubes	25/pkg, 200/cs
AP-4799	GxP/0.2 µm	50/pkg, 200/cs
AP-4800	GxP/0.2 µm	1000/pkg
AP-4424	GxP/0.45 µm AutoPack Tubes	25/pkg, 200/cs
AP-4425	GxP/0.45 µm	50/pkg, 200/cs
AP-4426	GxP/0.45 µm	1000/pkg

Acrodisc Syringe Filters With Supor Membrane, 32 mm (Bulk Packaging)

Part Number	Description	Pkg
4655	0.2 µm, modified acrylic housing	1000/pkg
4653	0.45 µm, modified acrylic housing	1000/pkg
4659	0.8/0.2 µm, modified acrylic housing	1000/pkg
4661	1.2/0.45 µm, modified acrylic housing	1000/pkg
4660	1.2 µm, modified acrylic housing	1000/pkg
4662	5 µm, modified acrylic housing	1000/pkg

Acrodisc® Syringe Filters With Glass Fiber

Maximize throughput for hard-to-filter samples



- ▶ Acrodisc PSF syringe filters are Zymark♦ and SOTAX♦ Automation Certified to assure smooth operation and worry-free performance 24 hours a day in automated workstations.
- ▶ Available with GxF multi-layered glass fiber prefilter, providing two to four times the throughput of standard glass fiber prefilter devices, and allowing quick and easy filtration of your most difficult-to-filter samples.
- ▶ Reduces clogging. Use alone or in series with final membrane filter to increase flow rate and throughput.
- ▶ Ensures broad chemical compatibility with polypropylene housing.

Applications

- ▶ For high throughput prefiltration of particulate-laden samples.
- ▶ Can be used alone or in series with another Acrodisc syringe filter.
- ▶ 25 mm Acrodisc PSF syringe filter is available in robotic-compatible AutoPack™ packaging for SOTAX AT-70 SMART♦ and CTS and Zymark TPW♦, APW♦, and MultiDose♦ dissolution systems.
- ▶ Removes particulate that interferes with UV/VIS spectrophotometric analysis.

Specifications

Materials of Construction

Filter Media: Borosilicate glass fiber
Housing: Polypropylene

Pore Size

40 - 1 µm

Effective Filtration Area

3.9 cm²

Sample Volume

< 150 mL

Inlet/Outlet Connections

Female luer lock inlet, male slip luer outlet

Typical Hold-Up Volume

(with air purge)
< 125 µL

Maximum Operating Temperature

82 °C (180 °F) at 2.1 bar (210 kPa, 30 psi)

Maximum Operating Pressure

4.1 bar (410 kPa, 60 psi) at 21 - 24 °C (70 - 75 °F);
2.1 bar (210 kPa, 30 psi) at 82 °C (180 °F)

Typical Water Flow Rate

795 mL/min at 1.0 bar (100 kPa, 15 psi)

Ordering Information

Acrodisc Syringe Filters With Glass Fiber, 25 mm

Part Number	Description	Pkg
4527	1 µm (nominal), AutoPack tubes	25/pkg, 200/cs
4523	1 µm (nominal)	50/pkg, 200/cs
4529	1 µm (nominal)	1000/pkg



Zymark and SOTAX Automation Certified Acrodisc PSF GxF Syringe Filters With Glass Fiber, 25 mm

Part Number	Description	Pkg
AP-4527	GxF/Glass, AutoPack tubes	25/pkg, 200/cs
AP-4523	GxF/Glass	50/pkg, 200/cs
AP-4529	GxF/Glass	1000/pkg

Related Products

47 mm Filter Funnels, Glass	206
HPLC Mobile Phase Filtration Membranes	177
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

AcroPrep™ 24 Filtration System

Eliminates the time-consuming, one-at-a-time syringe filter process by simultaneously filtering up to 24 samples in seconds



- ▶ Reduces labor time by 20 minutes per carousel over the conventional syringe filter technique.
- ▶ No need to use cumbersome, individually wrapped, disposable syringes. Use disposable pipette tips which are less costly, easier to use, and require less bench space.
- ▶ Designed for use with Waters Alliance• HPLC systems.
- ▶ Pall's HPLC certification ensures that analytical results will not be compromised by extractable filter material.
- ▶ No cross-contamination. Each 1.9 mL well is individually sealed, ensuring your sample will accurately dispense into the Waters Alliance sample carousel* with no cross-contamination or splashing.
- ▶ Materials of construction are identical to Pall's Acrodisc® syringe filters; if you are currently using Acrodisc syringe filters, this will reduce the requirements for validation of the AcroPrep 24 filter plates.
- ▶ Can be used with any conventional 12 x 32 mm vials; simply transfer your filtered samples from the Waters Alliance sample carousel to any HPLC sample carousel that houses 12 x 32 mm vials and save both time and labor.
- ▶ Can be used to process fewer than 24 samples. Simply label used wells or isolate unused wells with parafilm for application at a later time.

Applications

- ▶ Ideal for use with HPLC sample preparation.

Specifications

Materials of Construction

Filter Media: GH Polypro (GHP, hydrophilic polypropylene), nylon, PTFE, and PVDF membranes
Housing: Polypropylene

Pore Size

0.2 and 0.45 µm

Effective Filtration Area/Well

0.94 cm²

Filter Plate Diameter

15.24 cm (6.0 in.) plate containing 24 wells

Outlet Connections

Minispikes outlet

Maximum Well Volume

1.9 mL

Recommended Sample Volume

1.7 mL

Typical Hold-Up Volume/Well

< 50 µL

Operating Temperature Range

18 - 27 °C (64 - 80 °F); ambient

Maximum Vacuum

56.0 cm Hg (22 in. Hg)

Chemical Compatibility

For detailed information about chemical compatibility by membrane type, see the Chemical Compatibility Chart on pages 286 - 287.

Performance

The AcroPrep 24 Filtration System Saves Time and Materials

Syringe Filter Technique

24 disposable syringes
+ 24 syringe filters

25 minutes

AcroPrep 24 Filtration System

24 disposable pipette tips
+ 1 AcroPrep 24 filter plate

5 minutes

*The Waters Alliance 2690 Sample Carousel kit (PN WAT270328) can be ordered directly from your local Waters sales office or contact Waters Corporation at 800-252-4752 (in the USA) or 508-478-2000.

Instructions for Use

The AcroPrep™ 24 Filtration System operates by vacuum. Conventional lab pumps such as Pall Life Sciences' 115 V (PN 13157) or 230 V (PN 13158) Vacuum/Pressure pumps are

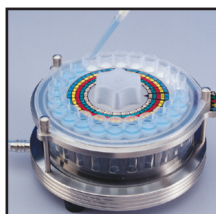
ideal for use. For maximum convenience, we recommend the use of snap-cap vials to eliminate the need to remove vials for screw capping after filtration.



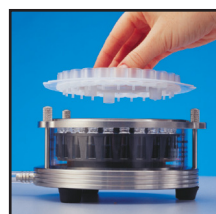
1. Attach vacuum hose to the connector on the base.
2. Place the Alliance* sample carousel with empty 2 mL vials into the manifold.



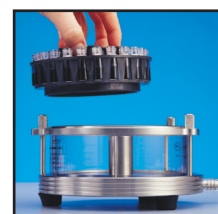
3. Place the filter plate onto the manifold. The filter plate has a numerically-sequenced label that matches the carousel's sample numbers.



4. Pipette 1.7 mL (1,700 µL) of sample into each of the filter wells.
5. Apply vacuum.



6. Allow vacuum to run until all wells are evacuated.
7. Shut off vacuum source. Dispose of filter plate.



8. Cap sample vials and place the sample carousel into the Waters Alliance HPLC system or simply transfer the vials to any HPLC sample carousel that houses 12 x 32 mm vials.

The cleanliness of the AcroPrep filter plate results in very low levels of extractables, therefore eliminating the need

to pre-rinse the filter.

Ordering Information

AcroPrep 24 Filtration System Manifold

Part Number	Description	Pkg
289000159	Filtration manifold	1/pkg

AcroPrep 24 Filter Plates

Part Number	Description	Pkg
186000158	0.2 µm, GHP membrane	10/pkg
600000158	0.45 µm, GHP membrane	2/pkg
186000154	0.45 µm, GHP membrane	10/pkg
186000154P	0.45 µm, GxP/GHP membrane	10/pkg
186000159	0.2 µm, nylon membrane	10/pkg
186000155	0.45 µm, nylon membrane	10/pkg
186000157	0.45 µm, PVDF membrane	10/pkg

Related Products

47 mm Filter Funnels, Glass	206
SolVac® Filter Holder	182
Stainless Steel Forceps	230, 280
Vacuum/Pressure Pumps	279

Accessories and Replacement Parts

Part Number	Description	Pkg
13157	Vacuum/Pressure pump, 115 V	1/pkg
13158	Vacuum/Pressure pump, 230 V CE	1/pkg
700000231	Glass housing for filtration manifold	1/pkg
700000232	O-ring kit	3/pkg
700000233	Rubber feet	3/pkg
700000234	Manifold alignment post	3/pkg

Vacuum General Information

- ▶ Do not exceed a vacuum level of 56.0 cm (22 in.) Hg.
- ▶ Allow vacuum to run until all filter wells are evacuated. Continue running vacuum for 10 to 20 seconds to eliminate potential dripping of samples from tips when plate is removed.

How to Choose a Centrifugal Device for HPLC

Nanosep® MF, Microsep™ Advance, and Macrosep® Advance centrifugal devices are ideal for particulate removal prior to sample analysis. Designed to rapidly process small- to medium-volume samples, these spin filters are simple to use and can save on sample preparation time.

Pall's Nanosep MF centrifugal devices are certified to be low in UV extractables and feature low hold-up volumes (< 5 µL). Their high g-force ratings allow them to be spun at up to 14,000 x g, resulting in rapid sample processing. Designed with a unique sealing technology, Pall's centrifugal devices assure leak-free operation without the use of O-rings or adhesives that can add extractables. For HPLC/UHPLC applications, GHP membrane (Nanosep MF) and Supor® membrane (Microsep Advance and Macrosep Advance) deliver low protein binding and decreased processing time for high recovery rates.

An added benefit of Pall's centrifugal devices is their ease of use. Each filter is color-coded by retention level and laser etched for easy identification. The sample to be processed is pipetted into the upper reservoir of the device. The device is then placed into the appropriate centrifuge (taking care that the rotor is balanced) and spun at the desired rate. Filtrate can be recovered by removing the lower reservoir of the device and using a pipette or pipette tip to remove the liquid.

Match Device Size to Sample Volume

After choosing membrane and pore size rating, the next consideration in selecting the correct centrifugal device is the volume of starting material. Pall's centrifugal devices are available in a range of sizes to accommodate your specific sample volumes.

Device	Retention	Sample Volume
Nanosep MF	0.45 µm, clear	< 0.5 mL
Microsep Advance	0.2 µm, aqua	0.5 - 5 mL
Microsep Advance	0.45 µm, wildberry	0.5 - 5 mL
Macrosep Advance	0.2 µm, aqua	5 - 20 mL
Macrosep Advance	0.45 µm, wildberry	5 - 20 mL



Nanosep® MF Centrifugal Devices With GHP Membrane

Ideal for particulate removal, especially when sample recovery is a concern



- ▶ Rapid processing of samples. Centrifugal devices are simple to use and save on sample preparation time. Spin multiple samples at once!
- ▶ Universal membrane filter. The GHP hydrophilic polypropylene membrane is ideal for aqueous solutions and offers maximum chemical compatibility for aggressive solvents.
- ▶ GHP membrane is a low protein binding membrane. It removes unwanted particulate from samples with high recovery of critical proteins.
- ▶ Low extractables. Our HPLC-grade centrifugal devices are certified to be low in UV extractables.
- ▶ Low hold-up volume (< 5 µL) makes these devices ideal for expensive samples.
- ▶ High g-force ratings. Can be spun at 14,000 x g for confident rapid sample processing.
- ▶ Leak-free operation. Unique sealing technology assures leak-free operation without the use of O-rings or adhesives that can add extractables.
- ▶ Constructed of low binding polypropylene.
- ▶ Fits standard centrifuge rotors that accept 1.5 mL tubes.

Applications

- ▶ Sample preparation (particulate removal prior to sample analysis - HPLC, IC, GC).
- ▶ Removal of precipitates (metals, polymers, or crystals).
- ▶ Applications requiring maximum filtrate recovery from limited sample volumes.
- ▶ Removal of cells from media prior to analysis.

Specifications

Materials of Construction

Filter Media: GH Polypro (GHP, hydrophilic polypropylene) membrane
Upper Housing, Filtrate Receiver: Polypropylene

Pore Size

0.45 µm

Effective Filtration Area

0.3 cm²

Dimensions

Overall Length (Fully Assembled With Cap): 4.5 cm (1.8 in.)

Capacities

Maximum Sample Volume: 500 µL
Final Concentrate Volume: 15 µL
Filtrate Receiver Volume: 500 µL
Hold-Up Volume (Membrane/Support): < 5 µL

Operating Temperature Range

0 - 40 °C (32 - 104 °F)

pH Range

3 - 14

Maximum Centrifugal Force

14,000 x g

Centrifuge

A rotor is required that accepts 1.5 mL tubes.

Sterilization

Provided non-sterile; may be sanitized by filtering 70% ethanol through the device prior to use.

Ordering Information

Nanosep MF Centrifugal Devices With GHP membrane*

Part Number	Description	Pkg
ODGHPC34	0.45 µm, clear	100/pkg
ODGHPC35	0.45 µm, clear	500/pkg

*For more information on Nanosep centrifugal devices with Bio-Inert® or Omega™ membrane, please see page 21.

Microsep™ Advance Centrifugal Devices With Supor® Membrane

Precise, quick recovery of microliter volumes



- ▶ Particulate removal for longer HPLC and UHPLC column life.
- ▶ High spin speed and larger EFA reduces spin times.
- ▶ Color-coded and laser etched for easy identification.
- ▶ For samples from 0.5 - 5 mL.

Applications

- ▶ Remove particulate from samples for HPLC analyses.
- ▶ Clarify samples with gross particulate.

Specifications

Materials of Construction

Filter Media: Supor (polyethersulfone) membranes
Sample Reservoir, Filtrate Receiver, and Cap: Polypropylene
Paddle: Polyethylene

Effective Filtration Area

3.3 cm²

Dimensions

Diameter: 17 mm (0.7 in.)
Length: 12.0 cm (4.9 in.)

Operating Temperature Range

0 - 40 °C (32 - 104 °F)

Capacities

Maximum Sample Volume: 5.0 mL

Final Concentrate Volume:

65 µL (swinging bucket)

80 µL (45° angle rotor)

100 µL (34° angle rotor)

Filtrate Receiver Volume: 6.5 mL

Hold-Up Volume: 40 µL (membrane and paddle)

pH Range

1 - 14

Maximum Centrifugal Force

14,000 x g (microfiltration)

Centrifuge

A fixed angle rotor that accepts standard 17 x 100 mm tubes and is capable of 3,000 to 14,000 x g.

Sanitization

Provided non-sterile. May be sanitized by filtering 70% ethanol through the device prior to use.

Ordering Information

Microsep Advance Centrifugal Devices With Supor Membrane*

Part Number	Description	Pkg
MCPM02C67	0.2 µm, aqua	24/pkg
MCPM02C68	0.2 µm, aqua	100/pkg
MCPM45C67	0.45 µm, wildberry	24/pkg
MCPM45C68	0.45 µm, wildberry	100/pkg

*For more information on Microsep Advance centrifugal devices with Omega™ 3K - 100K MWCO membrane, please see page 23.

Macrosep® Advance Centrifugal Devices With Supor® Membrane

Quickly concentrates up to 20 mL of biological sample



- ▶ Particulate removal for longer HPLC and UHPLC column life.
- ▶ High spin speed and larger EFA reduces spin times.
- ▶ Color-coded and laser etched for easy identification.
- ▶ For samples from 3 - 20 mL.

Applications

- ▶ Remove particulate from samples for HPLC analyses.

Specifications

Materials of Construction

Filter Media: Supor (polyethersulfone) membranes
 Sample Reservoir, Filtrate Receiver, and Cap: Polypropylene
 Paddle: Polyethylene

Effective Filtration Area

7.2 cm²

Dimensions

Diameter: 29 mm (1.2 in.)
 Length: 12.0 cm (4.7 in.)

Operating Temperature Range

0 - 40 °C (32 - 104 °F)

Capacities

Maximum Sample Volume: 20 mL
 Final Concentrate Volume: As low as 450 µL, depending on rotor used
 Filtrate Receiver Volume: 22 mL
 Hold-Up Volume: 80 µL (membrane and paddle)

pH Range

1 - 14

Maximum Centrifugal Force

14,000 x g (microfiltration)

Centrifuge

Fits centrifuges that accept standard 50 mL conical end tubes.

Sanitization

Provided non-sterile. May be sanitized by filtering 70% ethanol through the device prior to use.

Performance

Rotor Selection Determines Final Concentrate Volume

Rotor Angle	Deadstop Volume
Swinging Bucket	450 µL
45° Fixed Angle	1.2 - 1.5 mL
34° Fixed Angle	1.5 mL

Ordering Information

Macrosep Advance Centrifugal Devices With Supor Membrane*

Part Number	Description	Pkg
MAPM02C67	0.2 µm, aqua	24/pkg
MAPM02C68	0.2 µm, aqua	100/pkg
MAPM45C67	0.45 µm, wildberry	24/pkg
MAPM45C68	0.45 µm, wildberry	100/pkg

*For more information on Macrosep Advance centrifugal devices with Omega™ 3K - 100K MWCO membrane, please see pages 24 - 25.

47 mm Filter Funnels, Glass

Ideal for vacuum filtration of liquids and degassing of HPLC solvents and mobile phases



- ▶ Made of 100% borosilicate glass, assures resistance to even the most aggressive solvents.
- ▶ One-liter 47 mm glass funnel/support assembly permits filtration of an entire liter at once.
- ▶ Support assembly's unique base design with integral vacuum connection prevents contamination of the vacuum line with filtrate.
- ▶ One-liter glass funnel is graduated from 300 to 1,000 mL in 50 mL increments.
- ▶ 300 mL glass funnel is graduated from 100 to 250 mL in 25 mL increments. Stepped stem fits into standard one-hole stoppers (9 mm).

Applications

- ▶ Ideal for filtration and degassing of HPLC solvents and aqueous mobile phase solutions and buffers.
- ▶ Ideal for mobile phase particulate removal.

Specifications

47 mm Glass Filter Funnel With Stopper Support Assembly

Materials of Construction

All parts are borosilicate glass except:

Stopper: Silicone No. 8

Clamp: Aluminum

Effective Filtration Area

9.6 cm²

Dimensions

Overall Height:

Base: 11.7 cm (4.6 in.)

Funnel: 11.1 cm (4.4 in.)

Diameter:

Base: 5.8 cm (2.3 in.)

Funnel: 7.9 cm (3.1 in.)

Filter Size

Accepts 47 mm filter

Funnel Capacity

300 mL

47 mm Glass Filter Funnel With Sidearm Support Assembly and Flask

Materials of Construction

All parts are borosilicate glass except:

Clamp: Aluminum

Support Base/Flask Connection:

Standard taper 40/35 ground joint

Effective Filtration Area

9.6 cm²

Dimensions

Overall Height:

PN 4012 and 4013 Base:

11.7 cm (4.6 in.)

PN 4012 Funnel: 16.7 cm (6.6 in.)

PN 4013 Funnel: 11.1 cm (4.4 in.)

Diameter:

PN 4012 and 4013 Base:

5.8 cm (2.3 in.)

PN 4012 Funnel: 12.0 cm (4.7 in.)

PN 4013 Funnel: 7.9 cm (3.1 in.)

Filter Size

Accepts 47 mm filter

Funnel Capacity

300 mL or 1 L

Flask Capacity

1 or 4 L

Ordering Information

47 mm Filter Funnels, Glass

Part Number	Description	Pkg
4011	Glass filter funnel with No. 8 stopper support base (300 mL funnel, no flask)	1/pkg
4012	Glass filter funnel with sidearm support assembly and flask (1 L funnel with 4 L flask)	1/pkg
4013	Glass filter funnel with sidearm support assembly and flask (300 mL funnel with 1 L flask)	1/pkg

Accessories and Replacement Parts

Part Number	Description	Pkg
4014	Glass funnel, 300 mL	1/pkg
4015	Glass funnel, 1 L	1/pkg
4018	Glass flask, 1 L	1/pkg
4016	Glass flask, 4 L	1/pkg
4017	Fritted glass support base with sidearm	1/pkg
4019	Fritted glass support base/No. 8 silicone stopper	1/pkg
81595	Aluminum clamp, anodized	1/pkg