Cytiva™ protein chromatography sample and buffer filtration

See information on our new starter kit!
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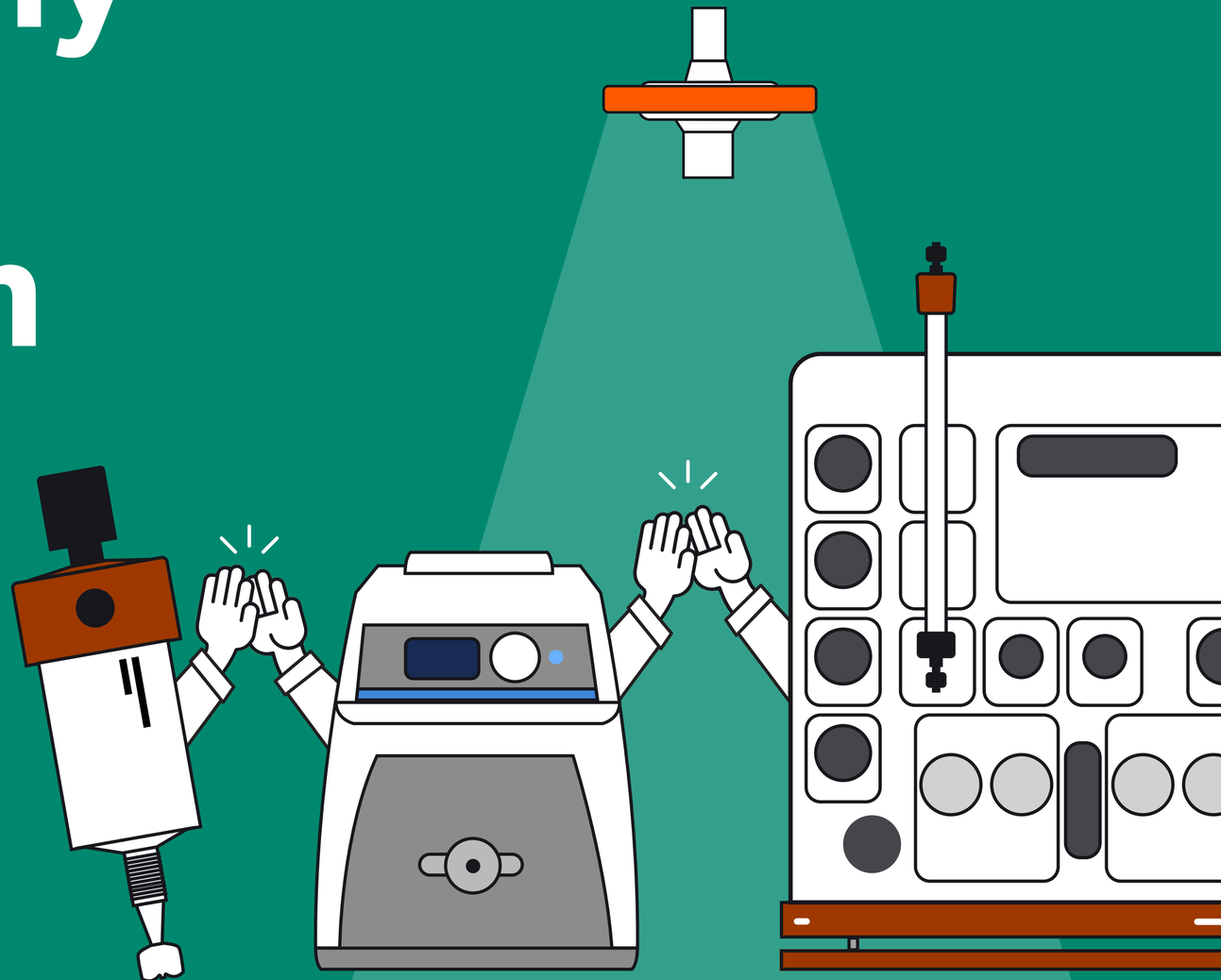
Optimize protein purification with ÄKTA™ systems using filtration solutions



cytiva

Introduction

Protein samples are precious and crucial in advancing your goal to discover new therapeutics and understanding disease pathways. They provide vital insights into biological targets critical to disease mechanisms.

Filtering protein samples removes impurities and debris, so you get accurate and reliable results in downstream experiments. Removing particulates from samples using filtration prevents clogging of chromatography columns, protects tubing within your ÄKTA system and helps you avoid replacing columns prematurely.

Filtration devices can also be used to enable optimal selection of chromatography resins. Other filtration techniques, such as ultrafiltration or diafiltration, are often used for pre-and post-purification, concentration, desalting, or buffer exchange applications.

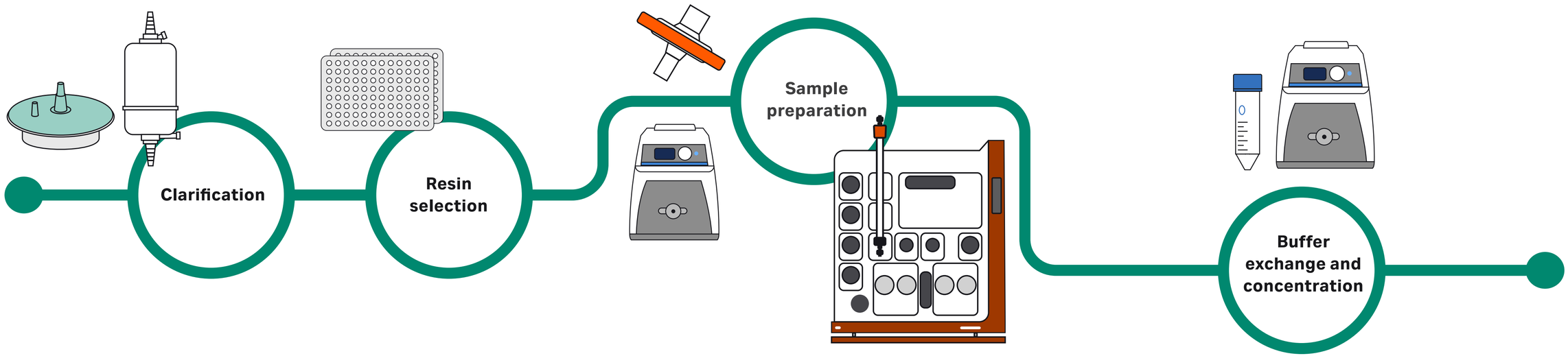
Our laboratory filtration products work together with our chromatography resins and ÄKTA systems, establishing Cytiva as your comprehensive solutions provider for protein research.

1. Clarification
Initial clarification using filtration to remove debris and impurities in buffers used in chromatography systems.

2. Resin selection
Selection and optimization of the correct chromatography resin and conditions is critical for process performance.

3. Sample preparation
Sample filtration prior to purification on ÄKTA system prevents unwanted particles from entering the column, prolonging column life and providing clear and concise peaks.

4. Buffer exchange and concentration
Following purification steps, ultrafiltration, and tangential flow filtration (TFF) can be used for salt removal, buffer exchange, and concentration of protein fractions.



Buffer filtration and resin selection

Clarification

Clarification by filtration is a critical step in protein purification workflows. Filtration removes insoluble particles from complex biological samples. These particles include cell debris and protein aggregates.

Reducing the contaminant load streamlines subsequent purification steps and enhances purity and yield of the target protein. Additionally, filtration can prevent protein loss by removing insoluble particles that might otherwise absorb or trap proteins.

Filtration is also used to prepare buffer solutions for chromatography steps, ensuring the removal of any particulates or contaminants that could interfere with your process.

We supply a range of membrane filter devices for the clarification of biological solutions. These include membrane circles, vacuum devices, and capsule filters.

VacuCap™ vacuum filtration devices

Innovative bottle-top filters for fast vacuum filtration of 100 mL to 5 L of aqueous solutions.

- Filters directly into the desired container, eliminating the possibility of contamination from transfer steps.
- Available built-in prefilter increases throughput of particulate-laden solutions.
- Sustainable design, with minimal plastic waste compared to other bottle-top style filters.

AcroPak™ capsule filters

The AcroPak capsule filter family are designed for efficient, cost effective filtration and high throughput of liquid volumes up to 150 liters.

- Capsules provide higher throughputs and faster flow rates than similar-size competitive devices.
- Low protein binding to minimize sample loss.

Resin selection

Choosing the best resin can be tricky and time consuming. When developing a purification process, each step requires optimization to maximize yield and purity of the final product.

We supply a range of multi-well filter plates that can be used for parellel screening of resins and chromatographic conditions.

PreDictor™ 96-well filter plates are prefilled with Cytiva's chromatography resins. PreDictor plates support high-throughput process development (HTPD) by allowing parallel screening either in a manual or in an automated workflow.

AcroPrep™ Advance filter plates can be combined with resins to form high-throughput screening chromatography platforms. Resin slurry can be introduced to the individual wells of a filter plate allowing for screening of multiple resin types and the analysis of different binding, washing, and elution characteristics.

When performing chromatography screening, we recommend using AcroPrep Advance filter plates that contain the Supor™ membrane. The membrane offers optimal support to retain chromatography resins while allowing for the smooth flow of buffers.

PreDictor 96-well filter plates

Learn more about our clarification solutions

Sample preparation

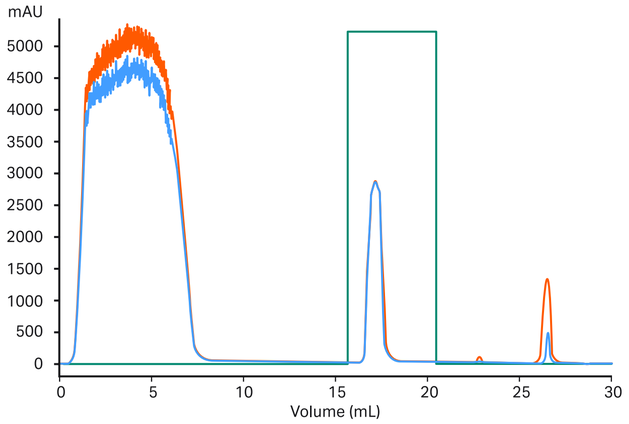
Is back pressure slowing you down?

Good practice in liquid chromatography (LC) is to filter samples prior to injection onto the column. Sample filtration prevents unwanted particulates from entering the column. Particulate contamination can reduce column lifetime, increase run time, and distort peak shape. In addition to impacting the quality of your results, particulates might clog the column inlet, causing increased back pressure and premature ending of chromatography runs. Although filtration prior to chromatography is common practice, the factors that impact ideal filter selection often are not considered and can lead to suboptimal results. The best filter for you depends on the method that the sample is being prepared for, the chemical properties of the solvent being used, and the physical and chemical properties of the sample itself. Cytiva offers a wide range of syringe filters:

- Acrodisc™ syringe filters delivers high flow rates with low protein binding
- Whatman™ GD/X syringe filters for heavy particulate samples with abundant protein concentration
- Protein prep syringe filters – Certified and designed for use with ÄKTA systems and protein samples.

To demonstrate the effectiveness of filtering samples before performing LC, we applied 6 mL cell supernatant containing a human monoclonal antibody onto a HiTrap™ MabSelect PrismA™ column, with and without filtration. The filtered sample was prepared using a protein prep 30 mm syringe filter containing a 0.45 µm regenerated cellulose membrane. After the 30 min chromatography run, the column was cleaned with 1 M sodium hydroxide, visible on the chromatogram as a clean-in-place (CIP) peak (Fig 1). The CIP peak (eluted at ~27 mL) was much larger after purification of the unfiltered mAb, indicating that UV-absorbing material remained on the column and was removed with sodium hydroxide treatment. To avoid subjecting columns to extra cleaning cycles, we recommend filtering samples prior to loading on chromatography columns. Filtration to remove particulates can protect the column and maintain the column lifetime (Fig 2).

Learn more: Read our white paper on prolonging your ÄKTA system's life span with Protein Prep syringe filters.



Filtered mAb sample with Protein Prep 0.45 µm
Concentration B
Unfiltered mAb sample

Column:	HiTrap MabSelect PrismA 1 mL
Sample:	6 mL cell supernatant containing a human monoclonal antibody, either unfiltered or filtered through 0.45 µm, 30 mm regenerated cellulose membrane syringe filter
Binding buffer:	20 mM phosphate, 150 mM NaCl, pH 7.4
Elution buffer:	50 mM phosphate acetate, pH 3.5
Flow rate:	0.5 mL/min
Residence time:	2 min
System:	ÄKTA pure 25

Fig 1. mAb purification on a 1 mL HiTrap™ MabSelect™ PrismA column ÄKTApure 25 chromatography system. Detection was performed at A280nm.

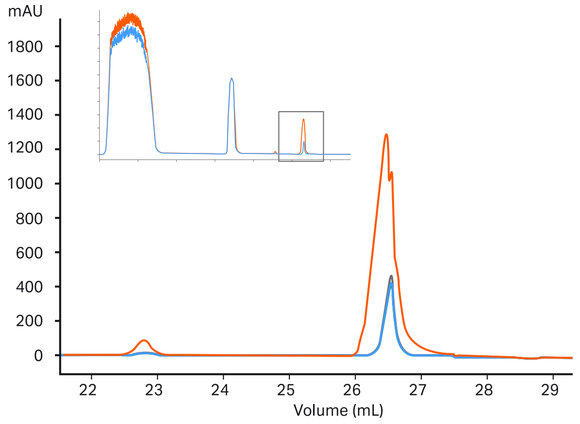


Fig 2. The clean-in-place (CIP) peak after purification of the unfiltered (orange) and filtered (green and blue) mAb samples.

Protein Prep syringe filters for ÄKTA system to maintain column life and run times.

Ultrafiltration

How concentrated is your protein?

Ultrafiltration is a membrane separation technique used to separate extremely small particles and dissolved molecules in fluids.

Ultrafiltration membranes, with small pore sizes between 0.001 µm and 0.1 µm, are used for concentrating and desalting dissolved molecules, exchanging buffers, and gross fractionation. Ultrafiltration membranes are typically classified by molecular weight cut-off (MWCO) rather than pore size.

The primary basis for separation is molecular size, although other factors such as molecule shape and charge can also play a role. Molecules larger than the membrane pores will be retained, but not bound, at the surface of the membrane and concentrated during the ultrafiltration process.

Our centrifugal devices house the Omega™ membrane, available in a range of MWCO's, which provide consistent concentration and >90% recovery rates of your target protein.

Tangential flow filtration (TFF), also known as cross flow filtration, is a rapid and efficient method for the separation and purification of biomolecules.

The process fluid passes tangentially across the surface of a filter membrane, and as a pressure differential is applied to the system, constituents in the sample that are small enough to travel through the pore structure of the membrane will pass into the filtrate. Larger constituents will be retained and recirculate around the flow path of the system.

Our Minimate™ EVO TFF system is designed to simplify ultrafiltration processes.

- Plug-and-play benchtop TFF system designed for highly reliable buffer exchange or concentration of samples up to 1 L. Allows for either continuous or discontinuous diafiltration to be performed in the same system without sample transfer.
- Designed to work with Minimate TFF capsules, available with Omega membrane with a range of MWCOs.
- A low system working volume achieved through the use of a conical bottom reservoir and compact design enables high concentration factors to be achieved. Concentrate your sample down to as little as 15 mL.

Nanosep™ centrifugal devices

Simple, reliable processing of samples from 50 to 500 µL

Microsep™ advance centrifugal devices

Concentrate from starting volumes up to 5.0 mL

Macrosep™ advance centrifugal devices

Rapidly concentrates 20 mL sample volumes to 0.5 mL

Jumbosep™ centrifugal devices

Convenient and reliable concentration and diafiltration of 15 to 60 mL

Minimate EVO TFF system

Streamlines lab-scale concentration, desalting, and buffer exchange processes of volumes up to 1 L

Learn more about our ultrafiltration solutions.

Surface protection

Is your instrument protected from spills?

Benchkote™ sheets for ÄKTA systems protect the top buffer trays from spillages and salt deposits. Benchkote sheets are manufactured from an absorbent, hydrophobic material designed to protect lab surfaces against hazardous spills.

The high-quality, smooth, and absorbent Whatman™ paper quickly absorbs liquid spills, and the laminated polyethylene layer prevents flow-through to the working surface.

- Simplifies daily and weekly preventive maintenance of the top buffer tray.
- Laminated polyethylene layer prevents flow-through to the working surface.
- Comes in three convenient pack sizes: 10, 25, and 50 sheets.
- Fits ÄKTA start™, ÄKTA pure, ÄKTA avant™, and ÄKTA go™ protein purification systems.
- Convenient and easy to use.

Benchkote sheets protect buffer trays from spillages and salt deposits

Cytiva protein chromatography sample and buffer filtration starter kit

Introducing our all-in-one comprehensive sample and buffer filtration starter kit, designed to enhance your purification processes, protect your valuable equipment from contaminants, and ensure your data is always publication ready.

Our laboratory filtration products integrate seamlessly with our chromatography resins and ÄKTA™ systems, positioning Cytiva protein chromatography sample and buffer filtration starter kit as your go-to solution for protein research.

The starter kit includes:

- Syringe filters
- Vacuum filtration device
- Capsule filters
- Membrane filters
- Centrifugal device filters

Part name and descriptions are found in ordering information, page 8.

Order your kit today or request more information from a product specialist

Ordering information

Description	Product code
Cytiva protein chromatography sample and buffer filtration starter kit	2977

Clarification and buffer preparation

VacuCap 0.2 µm, 90 mm, 10/pkg	4622*
AcroCap™ positive pressure device, PES, 0.45 µm, gamma-irradiated	6004482*
Acropak 20, 0.8/0.2 µm, non-sterile, with filling bell	12202*
Polydisc™ SPF Filter, polypropylene, 1 µm	6724-5000*
Supor PES membrane disc filters, 0.45 µm, 47 mm, plain, 100/pkg	60173*
Regenerated Cellulose Membrane, 0.45, 47 mm, 100 pcs	10410212*

Sample preparation

Whatman GD/X 25 mm Syringe Filter, PES filtration medium, 0.45 µm	6876-2504*
Whatman GD/X 25 mm Syringe Filter, PES filtration medium, 0.2 µm	6876-2502*
Whatman GD/X 25 mm syringe filter, RC,0.45 µm	6882-2504*
Whatman GD/X 25 syringe filter, RC,0.2 µm	6887-2502*
Acrodisc syringe filter 0.45 µm Supor™ PES, 25 mm	4508*
Acrodisc syringe filter 0.2 µm Supor PES, 25 mm	4506*
Protein Prep for ÄKTA systems 30/0.45 µm, RC	10463033*
Protein Prep for ÄKTA systems 30/0.2 µm, RC	10463043*

Instrument protection accessories

Benchkote sheets for ÄKTA avant, 25/pkg	2300-10073
Benchkote sheets for ÄKTA start, 25/pkg	2300-10064
Benchkote sheets for ÄKTA go, 25/pkg	2300-10093
Benchkote sheets for ÄKTA pure, 25/pkg	2300-10061

* Marked products are present in the “Cytiva protein chromatography sample and buffer filtration starter kit”.

Buffer exchange and concentration

Description	Product code
Minimate capsules with Omega™ membrane, 30K	OA030C12
Minimate capsules with Omega membrane, 50K	OA050C12
Minimate capsules with Omega membrane, 70K	OA070C12
Minimate capsules with Omega membrane, 100K	OA100C12
Minimate capsules with Omega membrane, 300K	OA300C12
Minimate capsules with Omega membrane, 500K	OA500C12
Minimate capsules with Omega membrane, 1000K	OA990C12
Nanosep centrifugal filters, Omega membrane, 3K, grey, 24/pkg	OD003C33
Nanosep centrifugal filters, Omega membrane, 10K, blue, 24/pkg	OD010C33
Nanosep centrifugal filters, Omega membrane, 30K, red, 24/pkg	OD030C33
Nanosep centrifugal filters, Omega membrane, 100K, clear, 24/pkg	OD100C33
Nanosep centrifugal filters, Omega membrane, 300K, orange, 24/pkg	OD300C33
Microsep centrifugal filters, Omega membrane, 1K, yellow, 24/pkg	MCP001C41
Microsep centrifugal filters, Omega membrane, 3K, gray, 24/pkg	MCP003C41
Microsep centrifugal filters, Omega membrane, 10K, blue, 24/pkg	MCP010C41*
Microsep centrifugal filters, Omega membrane, 30K, red, 24/pkg	MCP030C41
Microsep centrifugal filters, Omega membrane, 100K, clear, 24/pkg	MCP100C41
Macrosep centrifugal filters, Omega membrane, 1K, yellow, 24/pkg	MAP001C37
Macrosep centrifugal filters, Omega membrane, 3K, gray, 24/pkg	MAP003C37
Macrosep centrifugal filters, Omega membrane, 10K, blue, 24/pkg	MAP010C37*
Macrosep centrifugal filters, Omega membrane, 30K, red, 24/pkg	MAP030C37
Macrosep centrifugal filters, Omega membrane, 100K, clear, 24/pkg	MAP100C37

Note: Nanosep, Microsep and Macrosep centrifugal filters are available in larger pack sizes and in 0.2 and 0.45 µm pore sizes, please connect with your sales representative for more options.

Where to find more product information

Description	Product code	Link for more information
Whatman GD/X 25 mm Syringe Filter, polyethersulfone filtration medium, 0.45 µm	6876-2504	Instructions for use
Whatman GD/X 25 mm Syringe Filter, polyethersulfone filtration medium, 0.2 µm	6876-2502	Instructions for use
Whatman GD/X 25 mm Syringe Filter, regenerated cellulose filtration medium, 0.45 µm	6882-2504	Instructions for use
Whatman GD/X 25 mm Syringe Filter, regenerated cellulose filtration medium, 0.2 µm	6887-2502	Instructions for use
Acrodisc syringe filter 0.45 µm Supor PES, 25 mm	4508	Instructions for use
Acrodisc syringe filter 0.2 µm Supor PES, 25 mm	4506	Instructions for use
Protein Prep for ÄKTA systems, 0.45 µm regenerated cellulose 30 mm	10463033	Website link
Protein Prep for ÄKTA systems, 0.2 µm regenerated cellulose 30 mm	10463043	Website link
AcroCap positive pressure device, PES, 0.45 µm, gamma-irradiated	4482	Website link
Polydisc SPF Filter, polypropylene, 1 µm	6724-5000	Instructions for use
Microsep Advance centrifugal filters with Omega membrane 10K, blue	MCP010C41	Website link
Macrosep Advance centrifugal devices with Omega membrane 10K, blue	MAP010C37	Website link
VacuCap 0.2 µm, 90 mm, gamma-irradiated	4622	Website link
Acropak 20, 0.8/0.2 µm, non-sterile, with filling bell	12202	Website link
Supor PES membrane disc filters, 0.45 µm, 47 mm, plain	60173	Website link
Regenerated Cellulose Membrane (RC55), 0.45 µm pore size, 47 mm circle	10410212	Website link

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For local office contact information, visit cytiva.com/contact

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