Laboratory Filtration Products

Simplifying Progress

Оборудование для Лабораторной Фильтрации

SARTORIUS

Лабораторное оснащение

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Filtration and ultrafiltration are essential process steps in nearly all environmental, chemistry and bioscientific laboratory applications.

Sartorius supplies a wide range of individual filter papers, microporous membranes, filtration devices, ultrafiltration units and protein purification devices to suit these applications. This catalog provides a condensed overview of the Sartorius Lab Filtration product range. Please contact us directly for specialty catalogs – available for in-depth technical information.

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Ultrafiltration

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Introduction

Ultrafiltration is a convective process using anisotropic semi-permeable membranes to separate macromolecular species and solvents – primarily on the basis of size.

By allowing solvents and salts to pass the ultrafiltration membrane, macromolecules which are hindered to pass it, are concentrated. Ultrafiltration can also be applied in solvent exchange applications. Multiple concentration and refilling steps will progressively lead to a buffer exchange, replacing lengthy techniques like dialysis. Although ultrafiltration is not a standard method for separating and fractionating macromolecules, it can be used as such if the macromolecules differ at least 10 times in size. Ultrafiltration is a gentle, non-denaturing method that is more efficient and flexible than other processes.

Ultrafiltration Methods

Sartorius offers you a comprehensive range of ultrafiltration process methods for the concentration of your biological samples.

- Centrifugal Concentration (0.1 to 100 mL starting volume)
- Pressure Ultrafiltration (5 to 100 mL starting volume)
- Crossflow (Tangential Flow) (0.1 to 5 L starting volumes)
- Static Absorption (3 to 20 mL starting volume)

Further information about the operational methods can be found on page 8.

Typical Applications for Ultrafiltration

- Concentration | desalting of proteins, enzymes, DNA, monoclonal antibodies, immunoglobulins, viruses and nanoparticles
- Bence Jones Protein concentration from urine samples prior to capillary electrophoresis
- Forensic DNA sample concentration prior to sequencing reaction
- Peptide fractionation in FASP (filter-aided sample preparation)
- Free drug | hormone assays
- Removal of primers from PCR amplified DNA
- Removal of labeled amino acids and nucleotides
- Deproteinization of samples
- General purpose laboratory concentration and desalting of proteins, enzymes, DNA, biomolecules, viruses, antibodies and immunoglobulins

Membrane Performance Characteristics

Sartorius offers an extended range of membranes to cover the great majority of ultrafiltration requirements.

- Polyethersulfone (PES)
- Cellulose Triacetate (CTA)
- Hydrosart®

Further information about the properties of the different membrane types can be found on page 9.

Process Optimization

When the highest recoveries are crucial, particularly with solute quantities in the microgram range, Sartorius recommends considering the following tips for optimal ultrafiltration results:

- Select the lowest MWCO membrane that suits your application. For the highest recovery, choose a membrane MWCO which is at least half of the molecular weight of the solute to be retained.
- Avoid over-concentration. The smaller the final concentrate volume, the more difficult it is to achieve complete recovery. If feasible, rinse the device with one or more drops of buffer after the first concentration cycle and then recover it again.
- Pretreat the device overnight in distilled water with a passivation solution such as 5% SDS, Tween 20 or Triton X-100. Rinse thoroughly before use.

Solute concentration for diagnostics

Ultrafiltration devices can be used in the clinical setting for the concentration and separation of disease markers, such as Bence Jones protein from urine for the diagnosis of acute multiple myeloma, and others from clinical samples, such as blood, serum, urine and cerebrospinal samples. Use of devices for these applications require dedicated *in vitro* Diagnostic (IVD) registered devices. IVD devices are only available in registered countries, according to country specific regulations. Please contact Sartorius for more information on registered countries and availability.

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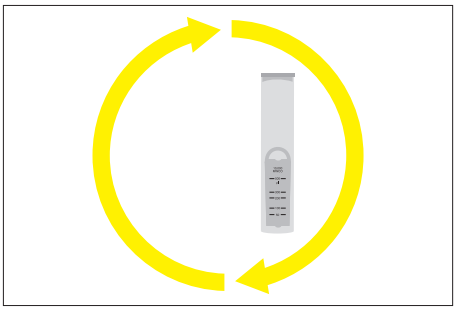
Membrane Selection Guide

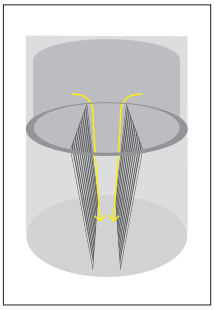
Ultrafiltration Methods

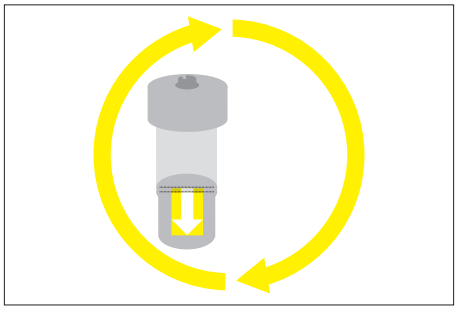
Sartorius offers you a comprehensive range of ultrafiltration process methods for the concentration of your biological samples. The guide below will help you select the most suitable device according to sample volume and available equipment, as well as your desired filtration speed and process control.



Centrifugal Concentration (0.1 to 100 mL Starting Volume)

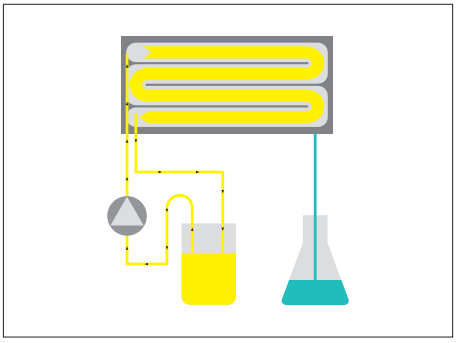
Driven by the centrifugal force, ultrafiltration can be used to purify and concentrate proteins, nucleic acids, viruses, macromolecules and nanoparticles. This gentle process is quick to set up and offers fast filtration speeds for most solutions. Sartorius offers seven Vivaspin® devices and the Vivacell® 100 and Centrisart® I for protein concentration, as well as Vivacon® devices for DNA and peptide concentration | fractionation.





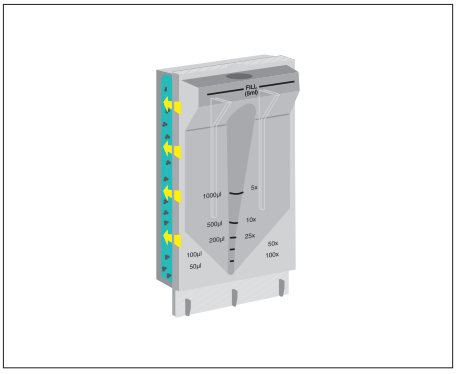
Pressure Ultrafiltration (5 to 100 mL Starting Volume)

Pressurized air or inert gas provide the filtration vector for ultrafiltration. To speed up the filtration process, the pressurized Vivacell® 100 or Vivaspin® 20 can be placed on an orbital laboratory shaker. Agitation helps to prevent membrane blocking and ensures high filtration speed. Vivaspin® 20 and Vivacell® 100 can be run with gas pressure. The Vivaspin® 20 can also be run by pressure-fugation, a unique Sartorius method combining gas and pressure with centrifugation. This is the fastest of all methods, providing process times that are typically 30 to 50 % faster than centrifugation.



Crossflow (Tangential Flow) (0.1 to 5 L Starting Volumes)

The sample is pumped across an ultrafiltration membrane and then returned to the original reservoir, with pressure built up in the device by a flow restrictor. The solution is progressively concentrated as solvent and micromolecules pass through the membrane into a separate filtrate vessel. Reusable Vivaflow® 50R and Vivaflow® 200, as well as disposable Vivaflow® 50, are offered for your dedicated laboratory crossflow filtration.



Static Absorption (3 to 20 mL Starting Volume)

This technique uses an absorbent cellulose pad mounted behind the ultrafiltration membrane to draw solvents and micromolecules through the membrane. The retained macromolecules thus concentrate at the bottom of the sample container. No additional equipment is needed. These devices are ideal for clinical applications like urine concentration prior to further analysis. Both Vivapore® 5 and Vivapore® 20 offer this procedure.

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Membrane Performance Characteristics

Sartorius offers an extended range of membranes to cover the great majority of ultrafiltration requirements. To select the most appropriate membranes for your application please refer to the following guide. Please note however that membrane behavior and ultimate performance, largely depends on the specific characteristics of the solution being processed. Where available, alternative membranes should be tested to optimize the process performance.

Polyethersulfone (PES)

Concentration | desalting of column eluates, cell culture supernatants, etc. This is a general purpose membrane that provides excellent performance with most solutions when retentate recovery is of primary importance. PES membranes are usually preferred for their low fouling characteristics, exceptional flux and broad pH compatibility.

Cellulose Triacetate (CTA)

Free | bound drug studies and whenever the filtrate is being analyzed. High hydrophilicity and very low non-specific binding characterize this membrane. Cast without any membrane support that could trap or bind passing micro solutes, these membranes are preferred for sample cleaning and protein removal, and when high recovery from the filtrate solution is of primary importance.

Hydrosart®

Concentration | desalting of column eluates, Hydrosart® membrane evaluation prior to upscaling. Hydrosart® demonstrates the same properties as regenerated cellulose, but with the added benefit of enhanced performance characteristics and extremely low protein binding, making it the membrane of choice for applications such as concentration and desalting of immunoglobulin fractions.

Regenerated Cellulose (RC)

This is a hydrophillic membrane suitable for general samples, wiith ultra-low protein adsorption and high chemical compatability. The membrane is especially well suited to oligonucleotides and peptides. This Sartorius RC membrane has been developed uniquely for the lab ultrafiltration devices and applications, ensuring optimal performance.

Membrane Selection Guide

The molecular weight cut-off (MWCO) is the molecular weight of molecules (e.g. globular proteins) which are retained by the membrane to an extent of 90 %. Therefore, to ensure the highest recovery, select a membrane with a MWCO that represents up to half the molecular weight of the solute to be retained.

Sartorius Vivaspin® ultrafiltration units are designed to concentrate protein solutions. Therefore, the membranes in the devices are tested for the retention of proteins and not the passage of proteins into the filtrate vessel. PES and Hydrosart® membranes have support structures, which might lead to some loss of protein after passage through the membrane.

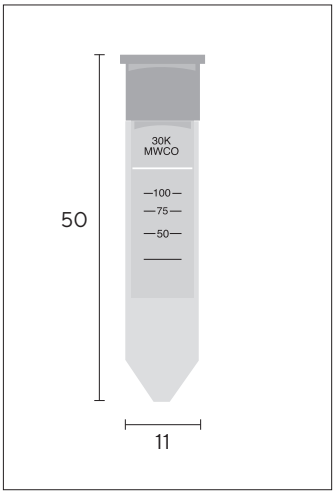
Recommended MWCO (Da):						
Application	**<5,000**	**10,000**	**30,000**	**50,000**	**100,000**	**>300,000**
Bacteria					▪	▪
DNA fragments		▪	▪	▪	▪	
Enzymes	▪	▪				
Extracellular Vesicles					▪	▪
Growth factors	▪	▪				
mAB			▪	▪	▪	
Nucleic acids	▪	▪	▪	▪	▪	
Oligonucleotides	▪					
Peptides	▪					
Virus			▪	▪	▪	
Yeast					▪	▪

Vivaspin® 500

100 to 500 µL Samples
Vivaspin® 500 centrifugal filter units offer a simple, one-step procedure for sample preparation. They can effectively be used in fixed-angle rotors accepting 2.2 mL centrifuge tubes.

The patented vertical membrane design and thin channel filtration chamber (US 5,647,990) minimizes membrane fouling and provides high-speed concentrations – even with particle-loaded solutions.

Please use a fixed angle rotor for 2 mL reaction vials.



Specifications

Vivaspin® 500		
Concentrator capacity	Swing bucket rotor Fixed angle rotor	do not use 500 µL
Dimensions	Total length Width Active membrane area Hold-up volume, membrane and support Dead-stop volume	50 mm 11 mm 0.5 cm² <5 µL 5 µL
Materials of construction	Body Filtrate vessel Concentrator cap Membrane	Polycarbonate Polypropylene Polycarbonate Polyethersulfone

Typical Performance Characteristics		
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]	
Rotor	Fixed angle	
Centrifugal force	12,000 g	
Start volume	500 µL	
	Min.	Rec.
Aprotinin 0.25 mg/mL (6,500 MW) 3,000 MWCO PES	 30	 96 %
BSA 1.0 mg/mL (66,000 MW) 5,000 MWCO PES 10,000 MWCO PES 30,000 MWCO PES	 15 5 5	 96 % 96 % 96 %
IgG 0.25 mg/mL (160,000 MW) 30,000 MWCO PES 50,000 MWCO PES 100,000 MWCO PES	 10 10 10	 96 % 96 % 96 %

Ordering Information

Vivaspin® 500 Polyethersulfone	Qty./Pkg.	Prod. No.
3,000 MWCO	25	VS0191
3,000 MWCO	100	VS0192
5,000 MWCO	25	VS0111
5,000 MWCO	100	VS0112
10,000 MWCO	25	VS0101
10,000 MWCO	100	VS0102
30,000 MWCO	25	VS0121
30,000 MWCO	100	VS0122
50,000 MWCO	25	VS0131
50,000 MWCO	100	VS0132
100,000 MWCO	25	VS0141
100,000 MWCO	100	VS0142
300,000 MWCO	25	VS0151
300,000 MWCO	100	VS0152
1,000,000 MWCO	25	VS0161
1,000,000 MWCO	100	VS0162
0.2 µm	25	VS0171
0.2 µm	100	VS0172

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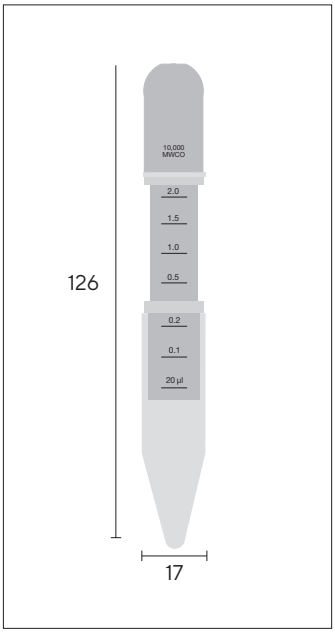
Vivaspin® 2

0.4 to 2 mL Samples
The Vivaspin® 2 bridges the gap between the 500 µL and 4 mL centrifugal concentrators. This device combines the speed of the classic Vivaspin® products with low internal surface and membrane area for superior recoveries from very dilute solutions.

Available with a choice of PES, Cellulose Triacetate or Hydrosart® membranes, Vivaspin® 2 offers the highest flexibility for process optimization.

Also unique to Vivaspin® 2 is the choice of directly pipetting the concentrate from the dead-stop pocket built into the bottom of the concentrator, or alternatively reverse spinning into the concentrator cap. Both methods result in near total concentrate recoveries.



Specifications

Vivaspin® 2		
Concentrator capacity	Swing bucket rotor Fixed angle rotor	3 mL 2 mL
Dimensions	Total length Width Active membrane area Hold-up volume of membrane Dead-stop volume	126 mm 17 mm 1.2 cm^2 <10 µL 8 µL
Materials of construction	Body Filtrate vessel Concentrator cap Membrane	Polycarbonate Polycarbonate Polycarbonate PES, CTA, HY

Performance Characteristics		
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]	
Rotor	Fixed angle	Swing bucket
Centrifugal force	8,000 g	4,000 g
Start volume	2 mL	
	Min.	Rec.
Aprotinin 0.25 mg/mL (6,500 MW) 3,000 MWCO PES	50	96 %
BSA 1.0 mg/mL (66,000 MW) 5,000 MWCO PES 5,000 MWCO CTA 5,000 MWCO Hydrosart® 10,000 MWCO PES 10,000 MWCO CTA 10,000 MWCO Hydrosart® 20,000 MWCO CTA 30,000 MWCO PES 30,000 MWCO Hydrosart®	 12 50 22 8 10 12 5 8 5	 98 % 98 % 98 % 96 % 98 % 97 % 97 % 95 %

Typical Performance Characteristics		
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]	
Rotor	Fixed angle	
Centrifugal force	5,000 g	
Start volume	2 mL	
	Min.	Rec.
IgG 0.25 mg/mL (160,000 MW)		
20,000 MWCO CTA	6	97 %
30,000 MWCO PES	10	96 %
50,000 MWCO PES	10	96 %
100,000 MWCO PES	8	95 %

Ordering Information

Vivaspin® 2 Polyethersulfone	Qty./Pkg.	Prod. No.
3,000 MWCO	25	VS0291
3,000 MWCO	100	VS0292
5,000 MWCO	25	VS0211
5,000 MWCO	100	VS0212
10,000 MWCO	25	VS0201
10,000 MWCO	100	VS0202
30,000 MWCO	25	VS0221
30,000 MWCO	100	VS0222
50,000 MWCO	25	VS0231
50,000 MWCO	100	VS0232
100,000 MWCO	25	VS0241
100,000 MWCO	100	VS0242
300,000 MWCO	25	VS0251
300,000 MWCO	100	VS0252
1,000,000 MWCO	25	VS0261
1,000,000 MWCO	100	VS0262
0.2 µm	25	VS0271
0.2 µm	100	VS0272

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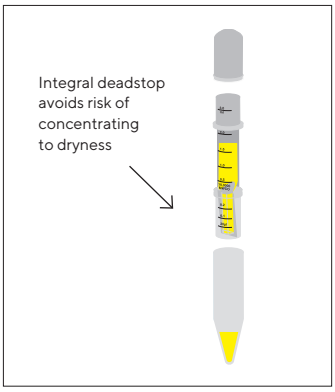
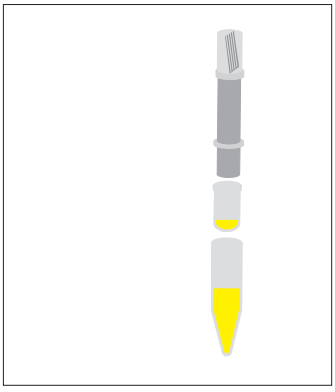


PES, CTA, or Hydrosart® membranes; Filtrate container fits standard 15 mL tube carriers



Direct pipette recovery or choice of reverse spinning concentrator into sample cap

Vivaspin® 2 Cellulose Triacetate	Qty./Pkg.	Prod. No.
10,000 MWCO	25	VS02V1
10,000 MWCO	100	VS02V2
20,000 MWCO	25	VS02X1
20,000 MWCO	100	VS02X2

Vivaspin® 2 Hydrosart®	Qty./Pkg.	Prod. No.
2,000 MWCO	25	VS02H91
2,000 MWCO	100	VS02H92
5,000 MWCO	25	VS02H11
5,000 MWCO	100	VS02H12
10,000 MWCO	25	VS02H01
10,000 MWCO	100	VS02H02
30,000 MWCO	25	VS02H21
30,000 MWCO	100	VS02H22

Ordering Tips

- Choose a membrane pore size at least 50 % smaller than the size of the molecule to be retained.
- It is usually best to select polyethersulfone membranes to achieve the fastest concentrations.
- Usually choose cellulose triacetate for protein removal or ultrafiltrate recovery.
- Usually choose Hydrosart® membranes for the highest recovery with Ig fractions.

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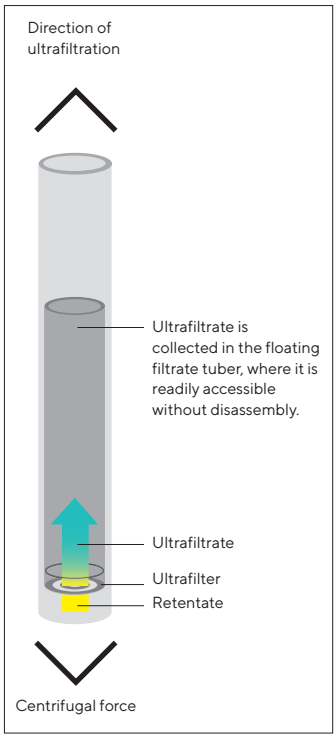
Centrisart® 1

Centrisart® 1* is a ready-to-use unit for small-volume, centrifugal ultrafiltration to separate proteins from low molecular weight substances in biological samples.

Centrisart® 1 features a unique design that enables ultrafiltration in the direction opposite to centrifugal force. This is so effective in preventing premature blockage of the filter that even whole blood samples can be deproteinized.

The ultrafiltrate is collected in the floatering filtrate tube, where it is readily accessible without disassembly.

Centrisart® 1 is ideal for the following applications:
- Drug binding studies
- Determination of metabolites in serum
- Protein removal from blood samples
- Cleaning of liposomes
- Virus removal



Specifications

Centrisart® 1		
Concentrator capacity	Swing bucket rotor Fixed angle rotor	2.5 mL 2.5 mL
Dimensions	Total length Width Active membrane area Hold-up volume of membrane Dead-stop volume	93 mm 14 mm 0.79 cm^2 < 5 µL 100 µL
Materials of construction	Centrifuge tube Floater tube Cap Membrane	Polystyrene Cellulose propionate Polyethylene CTA, PES

Typical Performance Characteristics

	Time to filter 50 % of sample volume	Time to filter 90 % of sample volume	Passage of test molecule
BSA 1.0 mg/mL (66,000 MW)			
5,000 MWCO	300 min	N | A	0 %
10,000 MWCO	35 min	80 min	2 %
20,000 MWCO	9 min	20 min	2 %
IgG 0.25 mg/mL (160,000 MW)			
100,000 MWCO	13 min	35 min	3 %
IBlue Dextran 0.1 mg/mL (2,000,000 MW)			
300,000 MWCO	9 min	25 min	28 %

2.5 mL samples were loaded into each device. The devices were centrifuged at 2,000 g until the required filtrate volumes had been reached.
Devices can be used in conical or flat bottom centrifuge adaptors.

* Centrisart is a registered trademark in the U.S. and the European Union

Ordering Information

	Qty./Pkg.	Prod. No.
5,000 MWCO CTA	12	13229----------E
10,000 MWCO CTA	12	13239----------E
20,000 MWCO CTA	12	13249----------E
100,000 MWCO PES	12	13269----------E*
300,000 MWCO PES	12	13279----------E

*IVD device article code available only in IVD registered countries, according to country specific regulations

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Clinical Chemistry 33, 606-608 (1987)

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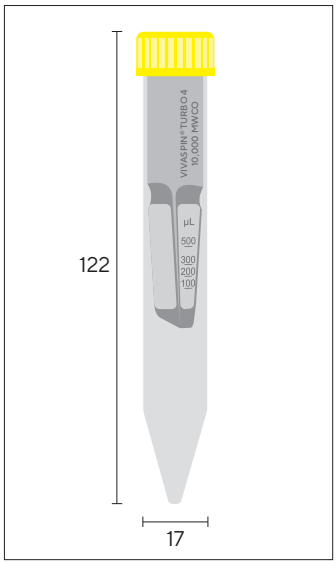
Vivaspin® Turbo 4 PES



2 to 4 mL Samples

Vivaspin® Turbo 4 PES is the newest member of the ultrafiltration family and allows the fastest sample concentration with the highest recoveries. This device can handle up to 4 mL sample volumes in swing bucket and fixed angle rotors that accept 15 mL conical bottom centrifuge tubes.

The Vivaspin® Turbo 4 PES optimized design and sleek internal profile ensure maximum process speeds all the way down to the last few microliters, resulting in more than 100-fold concentration.

The UV joining technology ensures smooth joint transition between the membrane and the plastic housing – allowing removal of the entire concentrated sample from the unique, pipette tip-friendly dead-stop pocket.

Specifications

Vivaspin® Turbo 4 PES		
Concentrator capacity	Swing bucket rotor Fixed angle rotor	4 mL 4 mL
Dimensions	Total length Width Active membrane area Hold-up volume of membrane Dead-stop volume swing bucket rotor Dead-stop volume fixed angle rotor (25°)	122.5 mm 17 mm 3.2 cm^2 <10 µL 40 µL 30 µL
Materials of construction	Body Filtrate vessel Concentrator cap Membrane	Styrene butadiene copolymere Polypropylene Polypropylene Polyethersulfone

Typical Performance Characteristics

	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]			
Rotor	Swing bucket		Fixed angle (25°)	
Centrifuge speed	4,000 g*		7,500 g*	
Start volume	4 mL		4 mL	
	Min.	Rec.	Min.	Rec.
Cytochrome c (12,400 MW)				
3,000 MWCO PES	60	98 %	80	96 %
5,000 MWCO PES	40	95 %	50	94 %
Lysozyme (14,300 MW)				
3,000 MWCO PES	65	95 %	70	93 %
5,000 MWCO PES	50	94 %	60	92 %
α-Chymotrypsin (25,000 MW)				
10,000 MWCO PES	10	95 %	8	95 %
BSA (66,000 MW)				
10,000 MWCO PES	10	98 %	7	97 %
30,000 MWCO PES	8	96 %	6	97 %

* 3,000g for 100K MWCO devices in swing bucket centrifuge, 5,000 g for 100K devices in fixed angle centrifuge.

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Performance Characteristics				
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]			
	Min.	Rec.	Min.	Rec.
IgG (160,000 MW)				
30,000 MWCO PES	18	94 %	13	92 %
50,000 MWCO PES	16	93 %	12	90 %
100,000 MWCO PES*	17	94 %	13	92 %

* 3,000 g swing-out | 5,000 g fixed angle

Ordering Information

Vivaspin® Turbo 4 Polyethersulfone	Qty./Pkg.	Prod. No.
3,000 MWCO	25	VS04T91
3,000 MWCO	100	VS04T92
5,000 MWCO	25	VS04T11
5,000 MWCO	100	VS04T12
10,000 MWCO	25	VS04T01
10,000 MWCO	100	VS04T02
10,000 MWCO	25	VS04T01IVD**
10,000 MWCO	100	VS04T02IVD**
30,000 MWCO	25	VS04T21
30,000 MWCO	100	VS04T22
50,000 MWCO	25	VS04T31
50,000 MWCO	100	VS04T32
100,000 MWCO	25	VS04T41
100,000 MWCO	100	VS04T42

** IVD device article codes available only in IVD registered countries, according to country specific regulations

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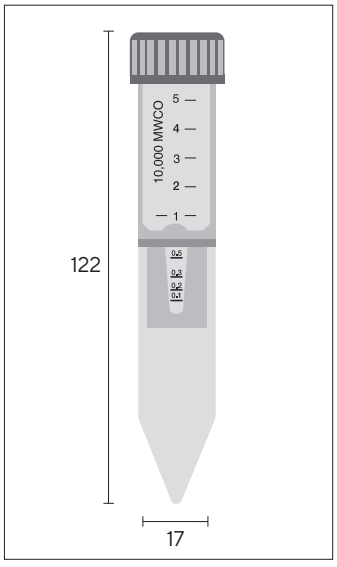
Vivaspin® 6



2 to 6 mL Samples
Vivaspin® 6 concentrators have been developed to offer increased volume flexibility and performance.

Vivaspin® 6 can process an impressive 6 mL in either swing bucket or fixed angle rotors accepting standard 15 mL conical bottom centrifuge tubes.

The Vivaspin® 6 features twin vertical membranes for unparalleled filtration speeds and more than 100-fold concentration. The remaining volume is easy to read off the printed graduations on the side of the concentrator and the modified dead-stop pocket further simplifies direct pipette recovery of the final concentrate.

Specifications

Vivaspin® 6		
Concentrator capacity	Swing bucket rotor Fixed angle rotor	6 mL 6 mL
Dimensions	Total length Width Active membrane area Hold-up volume of membrane Dead-stop volume	122 mm 17 mm 2.5 cm^2 <10 µL 30 µL
Materials of construction	Body Filtrate vessel Concentrator cap Membrane	Polycarbonate Polycarbonate Polypropylene Polyethersulfone

Typical Performance Characteristics

	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]			
Rotor	Swing bucket		Fixed angle [25°]	
Centrifuge speed	4,000 g		8,000 g*	
Start volume	6 mL		6 mL	
	Min.	Rec.	Min.	Rec.
Cytochrome c 0.25 mg/mL (12,400 MW) 5,000 MWCO PES	–	–	90	97 %
BSA 1.0 mg/mL (66,000 MW)				
5,000 MWCO PES	20	98 %	12	98 %
10,000 MWCO PES	13	98 %	10	98 %
30,000 MWCO PES	12	98 %	9	97 %
IgG 0.25 mg/mL (160,000 MW)				
30,000 MWCO PES	18	96 %	15	95 %
50,000 MWCO PES	17	96 %	14	95 %
100,000 MWCO PES	15	91 %	12	91 %
Latex beads 0.004 % in DMEM + 10 % FCS (0.055 µm) 300,000 MWCO PES	–	–	25	99 %
Latex beads 0.004 % in DMEM + 10 % FCS (0.24 µm) 1,000,000 MWCO PES	–	–	4	99 %
Yeast 1.0 mg/mL (S. Cerevisiae) 0.2 µm PES	4	97 %	3	97 %

* 6,000 g for 100K MWCO devices

Ordering Information

Vivaspin® 6 Polyethersulfone	Qty./Pkg.	Prod. No.
3,000 MWCO	25	VS0691
3,000 MWCO	100	VS0692
5,000 MWCO	25	VS0611
5,000 MWCO	100	VS0612
10,000 MWCO	25	VS0601
10,000 MWCO	100	VS0602
10,000 MWCO	25	VS0601IVD*
10,000 MWCO	100	VS0602IVD*
30,000 MWCO	25	VS0621
30,000 MWCO	100	VS0622
50,000 MWCO	25	VS0631
50,000 MWCO	100	VS0632
100,000 MWCO	25	VS0641
100,000 MWCO	100	VS0642
300,000 MWCO	25	VS0651
300,000 MWCO	100	VS0652
1,000,000 MWCO	25	VS0661
1,000,000 MWCO	100	VS0662
0.2 µm	25	VS0671
0.2 µm	100	VS0672

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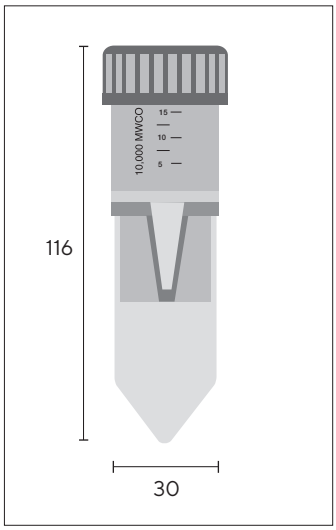
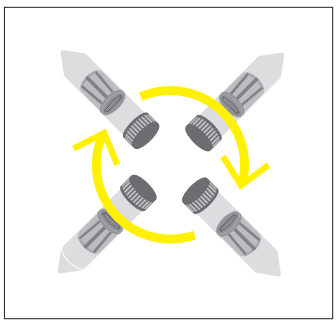
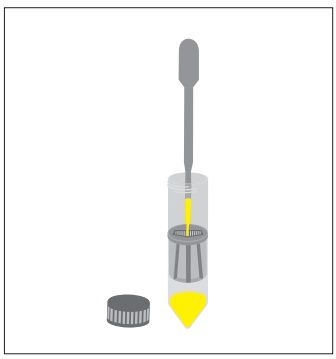
Vivaspin® 15R





Spin



Recover

2 to 15 mL Samples

Vivaspin® 15R is designed for initial sample volumes of 2 to 15 mL and features a modified regenerated cellulose membrane; Hydrosart®. This membrane is ideal where extremely high recovery with very low adsorption is needed. Examples of these applications include desalting and concentration of Ig fractions.

Advantages

- Ultimate recovery with low adsorption (95 – 98 %)
- Exceptionally fast concentration time (30 x in 15 min.)
- Convenient application protocol with easy handling
- Easy scale-up to 0.1 to 5 L with Vivaflow® 50R or 200 with Hydrosart® membranes
- Very low hold-up volume (< 20 µL)

Specifications

Vivaspin® 15R		
Concentrator capacity	Swing bucket rotor	15 mL
	Fixed angle rotor	12.5 mL
Dimensions	Total length	116 mm
	Width	30 mm
	Active membrane area	3.9 cm²
	Hold-up volume of membrane	< 20 µL
	Dead-stop volume	30 µL
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polypropylene
	Concentrator cap	Polypropylene
	Membrane	Hydrosart®

Typical Performance Characteristics				
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]			
Rotor	Swing bucket		Fixed angle [25°]	
Centrifuge speed	3,000 g		6,000 g	
Start volume	15 mL		12.5 mL	
	Min.	Rec.	Min.	Rec.
Aprotinin 0.1 mg/mL* (6,500 MW)				
5,000 MWCO	47	95 %	45	95 %
Cytochrome c 0.25 mg/mL* (12,400 MW)				
5,000 MWCO	45	96 %	45	96 %
10,000 MWCO	25	94 %	18	94 %
α-Chymotrypsin 0.25 mg/mL* (25,000 MW)				
5,000 MWCO	50	98 %	45	98 %
10,000 MWCO	25	98 %	18	98 %
Ovalbumin 1.0 mg/mL* (45,000 MW)				
10,000 MWCO	20	98 %	14	98 %
30,000 MWCO	15	94 %	12	94 %

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Performance Characteristics				
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]			
	Min.	Rec.	Min.	Rec.
BSA 1.0 mg/mL* (66,000 MW) 30,000 MWCO	18	98 %	15	98 %
IgG 0.1 mg/mL* in DMEM (160,000 MW) 30,000 MWCO	30	98 %	25	96 %

* proteins other than IgG made up in 50 mM potassium phosphate, 150 mM sodium chloride, pH 7.4

Ordering Information

Vivaspin® 15R Hydrosart®	Qty./Pkg.	Prod. No.
2,000 MWCO	12	VS15RH91
2,000 MWCO	48	VS15RH92
5,000 MWCO	12	VS15RH11
5,000 MWCO	48	VS15RH12
10,000 MWCO	12	VS15RH01
10,000 MWCO	48	VS15RH02
30,000 MWCO	12	VS15RH21
30,000 MWCO	48	VS15RH22

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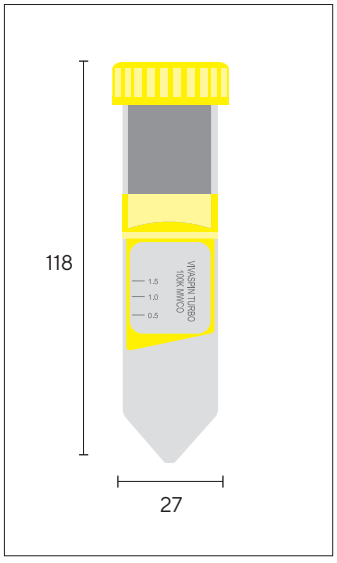
Vivaspin® Turbo 15 PES



4 to 15 mL Samples
Vivaspin® Turbo 15 enables the fastest sample concentration with the highest recoveries. This device can handle a sample volume of up to 110 or 15 mL in fixed angle or swing bucket rotors that accept 50 mL conical bottom centrifuge tubes.

The optimized design and sleek internal profile of Vivaspin® Turbo 15 ensure maximum process speeds all the way down to the last few microliters, which results in more than 100-fold concentration.

The UV joining technology ensures smooth joint transition between the membrane and the plastic housing – allowing removal of the entire sample concentrated in the unique, pipette-friendly dead-stop pocket.

Specifications

Vivaspin® Turbo 15 PES		
Concentrator capacity	Swing bucket rotor	15 mL
	Fixed angle rotor (25 °)	9 mL
Dimensions	Total length (concentrator insert)	77 mm
	Total length (in tube with cap)	118 mm
	Diameter (concentrator insert)	27 mm
	Active membrane area	7.2 cm²
	Hold-up volume of membrane	<10 µL
	Dead-stop volume for swing-bucket rotor	100 µL
	Dead-stop volume for fixed-angle rotor	60 µL
Materials of construction	Body	Styrene butadiene copolymer
	Filtrate vessel	Polypropylene
	Concentrator cap	Polypropylene
	Membrane	Polyethersulfone (PES)

Typical Performance Characteristics

	Time to concentrate up to 20× [min.] at 20 °C and solute recovery [%]			
Rotor	Swing bucket		Fixed angle [25°]	
Centrifuge speed	4,000 g*		4,000 g*	
Start volume	15 mL		9 mL	
	Min.	Rec.	Min.	Rec.
Cytochrome c* (12,400 MW) 5,000 MWCO PES	30	98 %	50	98 %
Lysozyme* (14,300 MW) 5,000 MWCO PES	33	96 %	50	96 %
α-Chymotrypsin** (25,000 MW) 10,000 MWCO PES	10	95 %	10	95 %
BSA** (66,000 MW) 10,000 MWCO PES 30,000 MWCO PES	10 8	99 % 98 %	10 10	99 % 98 %

*2,000 g for 100K MWCO devices

Typical Performance Characteristics				
	Time to concentrate up to 20× [min.] at 20 °C and solute recovery [%]			
	Min.	Rec.	Min.	Rec.
IgG** (160,000 MW) 30,000 MWCO PES	23	95 %	17	95 %

* 0.25 mg/mL ** 1 mg/mL

Ordering Information

Vivaspin® Turbo 15 Polyethersulfone	Qty./Pkg.	Prod. No.
3,000 MWCO	12	VS15T91
3,000 MWCO	48	VS15T92
5,000 MWCO	12	VS15T11
5,000 MWCO	48	VS15T12
10,000 MWCO	12	VS15T01
10,000 MWCO	48	VS15T02
10,000 MWCO	12	VS15T01IVD***
10,000 MWCO	48	VS15T02IVD***
30,000 MWCO	12	VS15T21
30,000 MWCO	48	VS15T22
50,000 MWCO	12	VS15T31
50,000 MWCO	48	VS15T32
100,000 MWCO	12	VS15T41
100,000 MWCO	48	VS15T42

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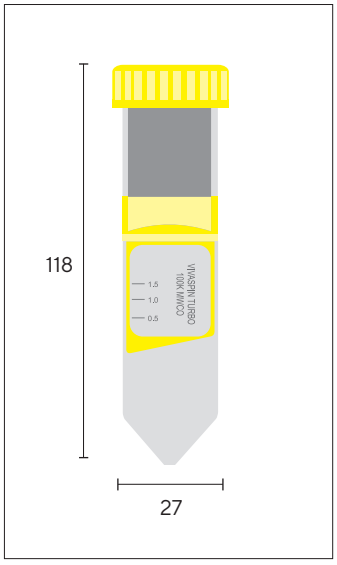
Vivaspin® Turbo 15 RC



4 to 15 mL Samples
Vivaspin® Turbo 15 RC allows fastest sample concentration with highest recoveries. This device can handle up to 11 or 15 mL sample volumes in fixed angle or swing bucket rotors accepting 50 mL centrifuge tubes.

The Vivaspin® Turbo 15 RC optimized design and sleek internal profile ensure maximum process speeds right the way down to the last few micro litres leading to more than 100-fold concentration. The hydrophillic regenerated cellulose (RC) is suitable for general samples, with ultra-low protein absorbtion and high chemical compatability. The membrane is especially well suited to oligonucleotides and peptides and has been developed uniquely for lab ultrafiltration applications.

The solvent free heat weld technology allows for a smooth transition between the membrane and plastic housing, providing complete sample recovery from the unique pipette friendly dead stop pocket. Combined with the PES counterpart the Vivaspin® Turbo range offers the best membrane, whatever the sample.

Specifications

Vivaspin® Turbo 15 PES		
Concentrator capacity	Swing bucket rotor	15 mL
	Fixed angle rotor (25°)	9 mL
Dimensions	Total length (concentrator insert)	77 mm
	Total length (in tube with cap)	118 mm
	Diameter (concentrator insert)	27 mm
	Active membrane area	8.1 cm²
	Hold-up volume of membrane	<10 µL
	Dead-stop volume for swing-bucket rotor	100 µL
	Dead-stop volume for fixed-angle rotor	60 µL
Materials of construction	Body	Styrene butadiene copolymer
	Filtrate vessel	Polypropylene
	Concentrator cap	Polypropylene
	Membrane	Regenerated Cellulose (RC)

Typical Performance Characteristics				
	Time to concentrate up to 20× [min.] at 20 °C and solute recovery [%]			
Rotor	Swing bucket		Fixed angle [25°]	
Centrifuge speed	4,000 g***		6,000 g	
Start volume	15 mL		11 mL	
	Min.	Rec.	Min.	Rec.
Cytochrome c* (12,400 MW) 5 MWCO RC	23	94 %	37	92 %
Lysozyme* (14,300 MW) 5 MWCO RC	23	94 %	37	89 %
α-Chymotrypsin** (25,000 MW) 10 MWCO RC	7	93 %	9	92 %
BSA** (66,000 MW) 10 MWCO RC** 30 MWCO RC*	 8 4	 94 % 96 %	 10 4	 98 % 93 %
Gamma Globulin (160,000 MW) 50 MWCO RC** 100 MWCO RC**	 17 18	 95 % 89 %	 11 12	 96 % 89 %

* 0.25 mg/mL ** 1 mg/mL *** 3,000 g for 100K MWCO devices

Ordering Information

Vivaspin® Turbo 15 Regenerated Cellulose	Qty./Pkg.	Prod. No.
5,000 MWCO	12	VS15TR11
5,000 MWCO	48	VS15TR12
10,000 MWCO	12	VS15TR01
10,000 MWCO	48	VS15TR02
30,000 MWCO	12	VS15TR21
30,000 MWCO	48	VS15TR22
50,000 MWCO	12	VS15TR31
50,000 MWCO	48	VS15TR32
100,000 MWCO	12	VS15TR41
100,000 MWCO	48	VS15TR42

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Vivaspin® 20

5 to 20 mL Samples

Vivaspin® 20 centrifugal concentrators have been developed to offer increased volume flexibility and performance.

Vivaspin® 20 handles up to 140 or 20 mL in fixed angle or swing bucket rotors that accept 50 mL conical bottom centrifuge tubes. Featuring twin vertical membranes for unparalleled filtration speeds, the Vivaspin® 20 can achieve more than 100-fold concentrations. The remaining volume is easy to read off the printedgraduations on the side of the concentrator and the modified dead-stop pocket further simplifies direct pipette recovery of the final concentrate.

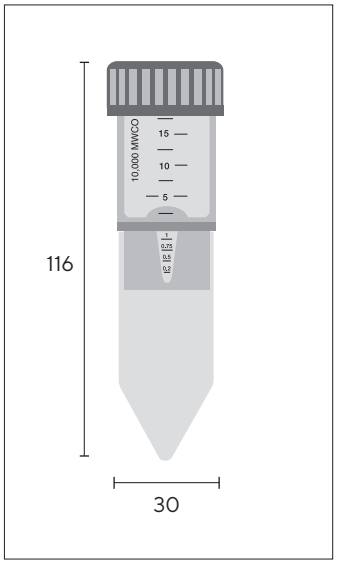
Air pressure controller, VCA002

More Process Flexibility

Vivaspin® 20 is available with unique accessories and operating methods that are designed to provide more process flexibility and further time savings.

Gas Pressure Filtration

When an appropriate centrifuge is unavailable or for single sample processing, Vivaspin® 20 can be filled with up to 15 mL and then pressurized for bench-top concentration. For even faster processing, gas pressure can be combined with centrifugal force. “Pressure-fugation” is particularly suitable for difficult or viscous samples, such as serum, or for use of a low process temperature, which reduces filtration speed, and generally when minimum process time is essential.



Specifications

Vivaspin® 20		
Concentrator capacity	Swing bucket rotor	20 mL
	Fixed angle rotor	14 mL
	With pressure head	15 mL
Dimensions	Total length	116 mm 125 mm with pressure head
	Width	30 mm
	Active membrane area	6.0 cm²
	Hold-up volume of membrane	<20 µL
	Dead-stop volume	50 µL
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polycarbonate
	Concentrator cap	Polypropylene
	Pressure head	Acetal | Aluminum
	Membrane	Polyethersulfone

Typical Performance Characteristics				
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]			
Mode	Centrifuge	Centrifuge	Bench top	Press-fuge
Rotor	Swing bucket	Fixed angle [25°]	Pressure	Swing bucket
Centrifugal speed | pressure	4,000 g*	6,000 g	4 bar	3,000 g* + 4 bar
Start volume	20 mL	14 mL	10 mL	10 mL

* 3,000 g for 100K devices in swing bucket centrifuge, 2,000 g for pressure-fuge devices in swing bucket

Typical Performance Characteristics								
	Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%]							
	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.
Cytochrome c 0.25 mg/mL (12,400 MW) 3,000 MWCO PES	110	97%	180	96%	60	96%	–	–
BSA 1.0 mg/mL (66,000 MW)								
5,000 MWCO PES	23	99%	29	99%	50	98%	14	98%
10,000 MWCO PES	16	98%	17	98%	32	97%	8	97%
30,000 MWCO PES	13	98%	15	98%	32	97%	8	97%
IgG 0.25 mg/mL (160,000 MW)								
30,000 MWCO PES	27	97%	20	95%	46	94%	13	97%
50,000 MWCO PES	27	96%	22	95%	46	93%	13	96%
100,000 MWCO PES	25	91%	20	90%	42	88%	12	94%
Latex beads 0.004% in DMEM + 10% FCS (0.055 µm) 300,000 MWCO PES	20	99%	35	99%	10	99%	–	–
Latex beads 0.004% in DMEM + 10% FCS (0.24 µm) 1,000,000 MWCO PES	4	99%	12	99%	4	99%	–	–
Yeast 1.0 mg/mL (S. Cerevisiae) 0.2 µm PES	15	95%	5	95%	20	95%	2	95%

Ordering Information

Vivaspin® 20 Polyethersulfone	Qty./Pkg.	Prod. No.
3,000 MWCO	12	VS2091
3,000 MWCO	48	VS2092
5,000 MWCO	12	VS2011
5,000 MWCO	48	VS2012
10,000 MWCO	12	VS2001
10,000 MWCO	48	VS2002
10,000 MWCO	12	VS2001IVD*
10,000 MWCO	48	VS2001IVD*
30,000 MWCO	12	VS2021
30,000 MWCO	48	VS2022
50,000 MWCO	12	VS2031
50,000 MWCO	48	VS2032
100,000 MWCO	12	VS2041
100,000 MWCO	48	VS2042
300,000 MWCO	12	VS2051
300,000 MWCO	48	VS2052
1,000,000 MWCO	12	VS2061
1,000,000 MWCO	48	VS2062
0.2 µm	12	VS2071
0.2 µm	48	VS2072

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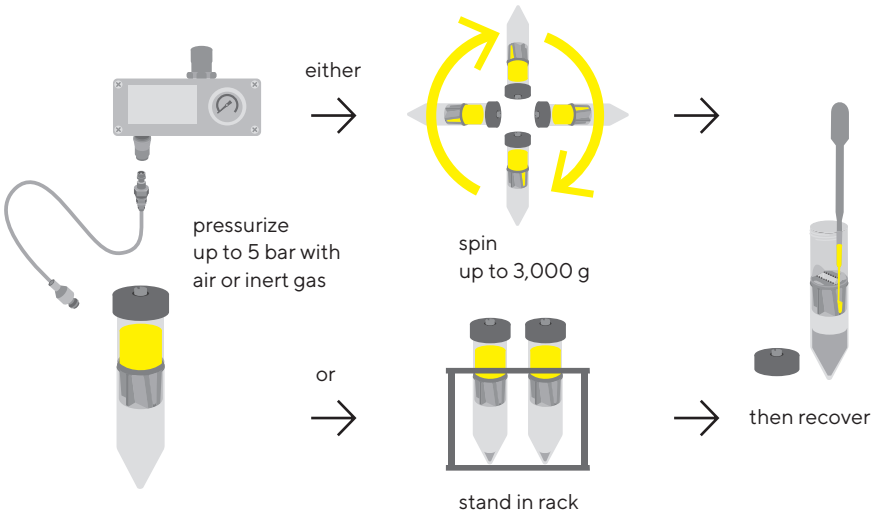
Vivaspin® 20 Accessories	Qty./Pkg.	Prod. No.
Air pressure controller (APC)	1	VCA002
Charge valve for pressure head	1	VCA005
Diafiltration cups	12	VSA005
Female coupling	1	VCA010
Male coupling	1	VCA011
Replacement extension line (4 mm pneumatic tubing, 3 m)	1	VCA012
Vivaspin® 20 pressure head	1	VCA200



Using the Vivaspin® 20 pressure head

Vivaclear Centrifugal Filters

Vivaclear centrifugal filters are disposable microfiltration devices for the fast and reliable clarification | filtration of biological samples in the range 100 to 500 µL. They can be used in fixed angle rotors accepting 2.2 mL centrifuge tubes.

Product Features

- High-flux polyethersulfone membrane
- 0.8 µm pore size
- Low hold-up volume (< 5 µL)
- Fast and reproducible performance

Applications

- Clarification of samples before loading in Vivapure® protein purification spin columns
- Removal of particles and precipitates
- Filtration of plasma and serum
- Filtration of cells or cell debris

Specifications

Vivaclear Centrifugal Filters		
Rotor	40 – 45° fixed angle rotor	
Pore size	0.8 µm	
Dimensions	Total length	43 mm
	Filtrate collection tube Ø	11 mm
	Active membrane area	0.34 cm²
	Hold-up volume, membrane plus support	< 5 µL
	Maximum RCF	2,000 g
Materials of construction	Body	Polypropylene
	Membrane	Polyethersulfone
	Filtrate collection tube	Polypropylene

Ordering Information

	Qty./Pkg.	Prod. No.
Vivaclear Mini 0.8 µm PES	100	VK01P042

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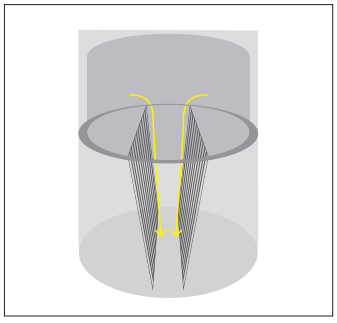
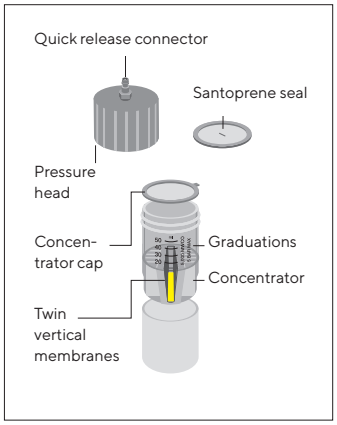
Vivacell 100

Air pressure controller, VCA002



Patented vertical membrane design



Filtrate container fits standard 250 mL rotors

20 to 100 mL Samples
Vivacell 100 is a unique and innovative concentrator for volumes from 20 to 100 mL, and utilizes pressure, centrifuge or pressure-shake to rapidly concentrate even samples with very high particle loads.

Vivacell 100 is designed for centrifugal concentration of samples up to 100 mL, which makes it the largest centrifugal device available. At the same time, its design allows for a maximum centrifugal force of 2,000 g to be used for even faster concentration. The patented vertical membrane design ensures the highest performance and unmatched flexibility.

Vivacell 100 Utilizes:
- Pressure
- Centrifuge
- Pressure-shake

Vivacell 100, when used as a centrifugal device, fits swng bucket rotors that accept 250 mL bottles.

Vivacell 100 units can also be used for single or extremely sensitive samples in the pressurized mode only and left on a bench or placed on an orbitallaboratory shaker for faster concentration. It can also be kept in a pressurized mode in the refrigerator. Pressurized handling is facilitated by the use of quick connectors. In whichever mode Vivacell 100 is used, the vertical membrane design inhibits membrane fouling, while the built in dead-stop impedes concentration to dryness and loss of sample.

Specifications

Vivacell 100		
Concentrator capacity	Swing bucket rotor With pressure head	90 mL 98 mL
Dimensions	Total length Width Active membrane area Hold-up volume of membrane Dead-stop volume	123 mm centrifugal 197 mm with pressure head 62 mm 23.5 cm² <250 µL 350 µL
Operating requirements	Rotor type Rotor cavity Maximum speed Maximum pressure	Swing-bucket To fit 250 mL (62 mm) centrifuge bottles (maximum cavity depth 105 mm) 2,000 g 5 bar (75 psi)
Materials of construction	Body Filtrate vessel Concentrator cap Pressure head seal Pressure head Membrane	Polycarbonate Polycarbonate Polypropylene TPE-V Acetal Polyethersulfone

Typical Performance Characteristics				
	Time to concentrate up to 30× [min.] at 20 °C			
90 mL Start volume	Centrifuge (swing bucket, 2,000 g)	Pressure (4 bar)		Solute recovery
		No agitation	Orbital shake	%
BSA 1.0 mg/mL (66,000 MW)				
5,000 MWCO PES	22	75	25	96 %
10,000 MWCO PES	16	60	20	96 %
30,000 MWCO PES	16	60	20	94 %
IgG 0.25 mg/mL (160,000 MW)				
50,000 MWCO PES	20	70	30	94 %
100,000 MWCO PES	20	85	30	90 %
Latex beads 0.004 % in DMEM + 10 % FCS (0.055 µm)				
300,000 MWCO PES	35	–	120	99 %
Latex beads 0.004 % in DMEM + 10 % FCS (0.24 µm)				
1,000,000 MWCO* PES	4	5	4	99 %

* 2,000 g in centrifuge, 2 bar (29 psi) pressure

Ordering Information

Vivacell 100 Polyethersulfone with Polypropylene Concentrator Cap	Qty./Pkg.	Prod. No.
5,000 MWCO	2	VC1011
5,000 MWCO	10	VC1012
10,000 MWCO	2	VC1001
10,000 MWCO	10	VC1002
30,000 MWCO	2	VC1021
30,000 MWCO	10	VC1022
50,000 MWCO	2	VC1031
50,000 MWCO	10	VC1032
100,000 MWCO	2	VC1041
100,000 MWCO	10	VC1042
300,000 MWCO	2	VC1051
300,000 MWCO	10	VC1052
1,000,000 MWCO	2	VC1061
1,000,000 MWCO	10	VC1062
0.2 µm	2	VC1071
0.2 µm	10	VC1072

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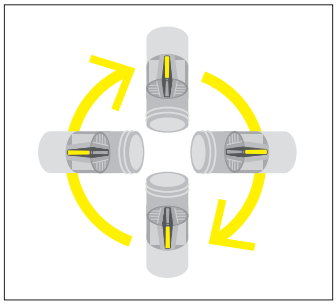
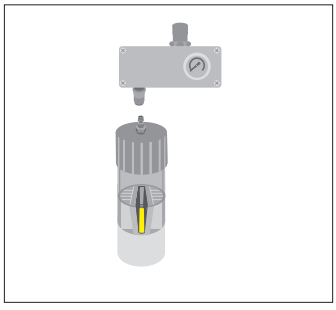
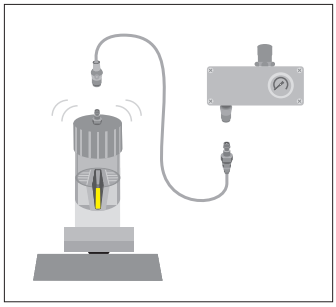
Vivacell 100 Accessories	Qty./Pkg.	Prod. No.
Air pressure controller (APC), complete with pressure gauge, regulator, over-pressure safety valve, female connector, 1 m extension line (4 mm pressure tubing) with male and female connectors and 1 m of 6 mm inlet tubing	1	VCA002
Female coupling	1	VCA010
Male coupling	1	VCA011
4 mm pressure tubing (3 m)	1	VCA012
Replacement extension line (4 mm pneumatic tubing, 3 m)	10	VCA014
Vivacell 100 pressure head with seals (5x)	1	VCA800



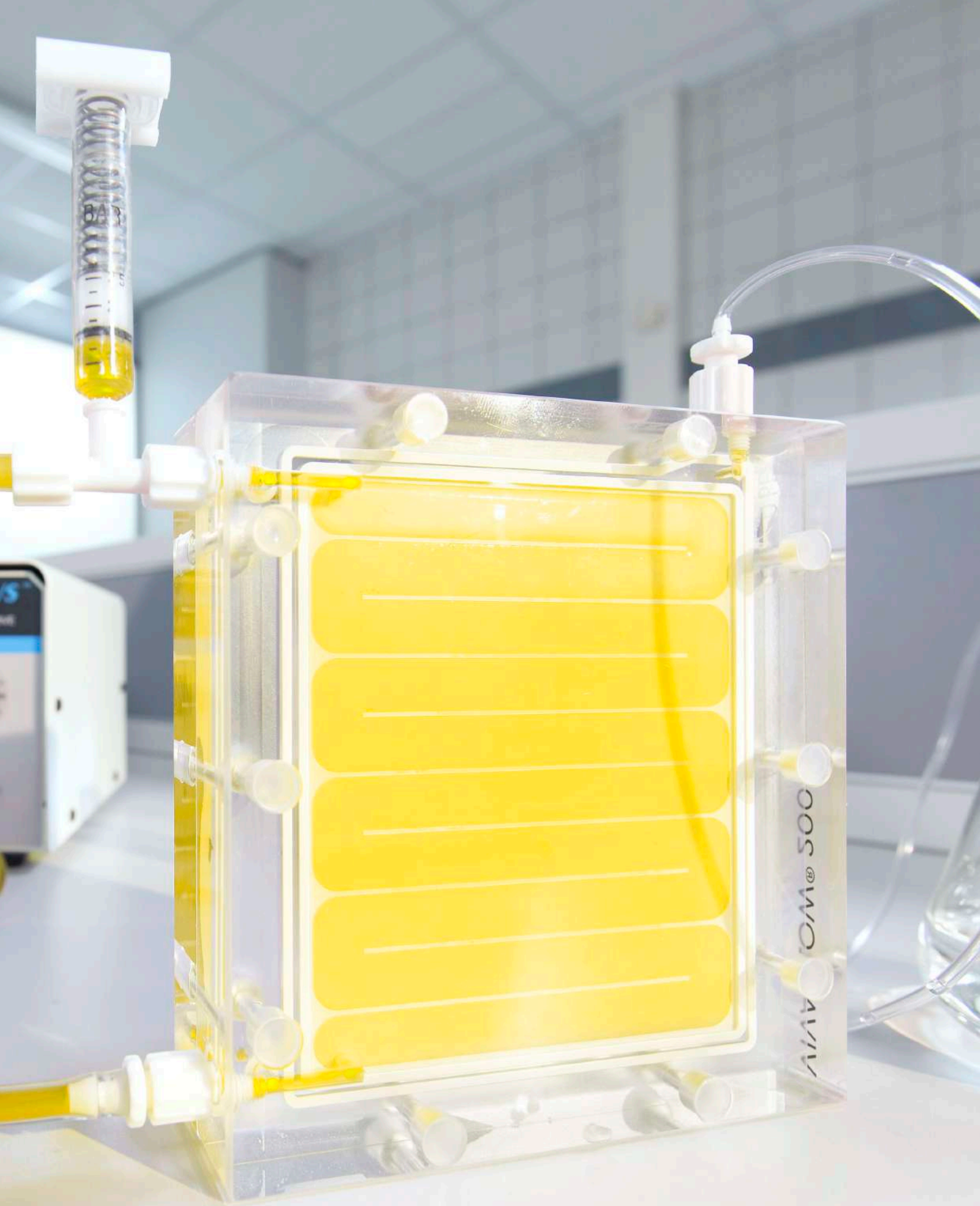
Centrifuge
use with polypropylene concentrator cap in swing out rotor
- Process convenience
- Low shear, non-foaming
- Less visual control



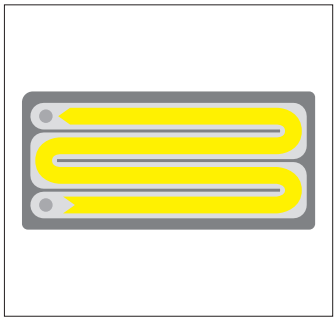
Pressure
use with pressure head VCA800
- Simplicity and the highest process control
- Ideal for refrigerated use
- Slower concentrations



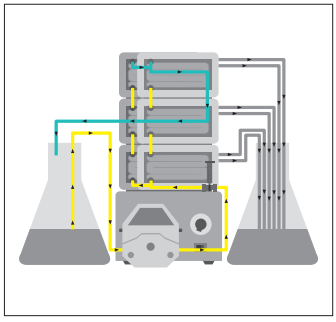
Pressure-Shake
use with pressure head VCA800
- Speed and process control
- Ideal for single samples



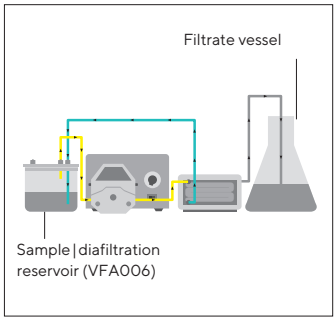
Vivaflow® 50



Flip-flow recirculation path



Multiple cassettes



Single cassette

0.1 to 3 L Samples

The unique, patented Vivaflow®* 50 system provides ease of use, performance, flexibility and economy that are unrivaled by any laboratory or pilot-scale filtration system on the market.

Unique Features

- The thin-channel, flip-flow recirculation path provides high crossflow velocities with minimum pump requirements
- No need for pressure holders
- Crystal clear for simple checking of the concentrate and membrane
- Unique interlocking modules with series connectors for easy scale up
- Disposable

Unique Performance

- A single 50 cm² module will typically reduce 500 mL to less than 15 mL in under 50 minutes
- Less than 10 mL minimum system recirculation for the highest concentration factors
- Less than 500 µL non-recoverable hold-up volume
- Near total recoveries achievable with a single 10 mL rinse

Unique "flip-flow" thin channel flow path results in high turbulence and linear velocity for exceptional flux, even at high concentrations.

Specifications

Vivaflow® 50		
Dimensions	Overall L | W | H	25 | 107 | 84 mm
	Channel W | H	15 | 0.3 mm
	Active membrane area	50 cm²
	Hold-up volume (module)	1.5 mL
	Minimum recirculation volume	<10 mL
	Non-recoverable hold-up	<0.5 mL
Operating conditions	Pump flow	200 to 400 mL/min
	Maximum pressure	3 bar (45 psi)
	Maximum temperature	60 °C
Materials of construction	Main housing	Polycarbonate
	Flow channel	TPX (PMP)
	Membrane support	TPX (PMP)
	Seals and O-rings	Silicone
	Pressure indicator	Polypropylene, SS spring
	Flow restrictor	Polypropylene
	Fittings	Nylon
	Tubing	PVC (medical grade)

* Vivaflow® is a registered trademark in the U.S., Japan and the European Union.

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Performance Characteristics				
	Time to concentrate up to 20× [min.] at 3 bar inlet pressure, 20 °C			
	Single device 250 mL start volume	Three devices 1 L start volume	Solute recovery % Direct	After 10 mL rinse
BSA 1.0 mg/mL (66,000 MW)				
5,000 MWCO PES	34	49	96 %	> 99 %
10,000 MWCO PES	22	32	94 %	> 99 %
10,000 MWCO RC	38	55	96 %	> 99 %
30,000 MWCO PES	22	32	92 %	99 %
50,000 MWCO PES	20	29	92 %	98 %
γ Globulins 1.0 mg/mL (160,000 MW)				
100,000 MWCO PES	43	62	92 %	98 %
100,000 MWCO RC	40	58	92 %	98 %
Yeast 1.0 mg/mL (S. Cerevisiae)				
0.2 µm PES	33	47	92 %	98 %

Ordering Information

Vivaflow® 50*	Qty./Pkg.	Prod. No.
3,000 MWCO PES	2	VF05P9
5,000 MWCO PES	2	VF05P1
10,000 MWCO PES	2	VF05P0
30,000 MWCO PES	2	VF05P2
50,000 MWCO PES	2	VF05P3
100,000 MWCO PES	2	VF05P4
1,000,000 MWCO PES	2	VF05P6
0.2 µm PES	2	VF05P7
100,000 MWCO RC	2	VF05C4

* Vivaflow® 50 cassettes are supplied with feed, retentate and filtrate tubing, 0.6 mm flow restrictor and luer fittings.

Vivaflow® 50 Complete Set of Accessories		
Pump (230 V), Easy Load pump head (size 16), tubing, 500 mL sample | diafiltration reservoir, cassette stand, pressure indicator, T-connectors, series interconnectors	1	VFS502
Pump (115 V), Easy Load pump head (size 16), tubing, 500 mL sample | diafiltration reservoir, cassette stand, pressure indicator, T-connectors, series interconnectors	1	VFS504

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Accessories	Qty./Pkg.	Prod. No.
Masterflex economy drive variable speed peristaltic pump (230 V)	1	VFA004
Masterflex economy drive variable speed peristaltic pump (115 V)	1	VFA009
500 mL sample and	or diafiltration reservoir	1	VFA006
Masterflex Easy-Load pump head (size 16)	1	VFA031
Vivaflow® 50 stand	1	VFA032
Pressure indicator (1 - 3 bar)	1	VFA034

PVC Tubing and Fittings	Qty./Pkg.	
Size 16 PVC pump tubing and Luer fittings (3 m, 3.2 × 1.6 mm)	1	VFA004
Flow restrictor set, 2 each of 0.4, 0.6 and 0.8 mm	6	VFA009
T-connectors for running 2 stacks	2	VFA030
Series interconnectors	6	VFA031
Female luer fittings	10	VFA032
VF50 tubing kit (2 × 1 m size 16 PVC tubing with luer fittings, 2 × 50 cm size 16 PVC tubing with 0.6 mm flow restrictors, 1 x series interconnector)	1	VFA034
Flow restrictor, 0.6 mm	6	VFA035

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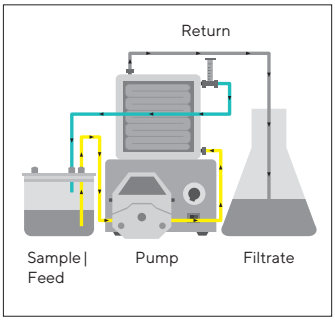
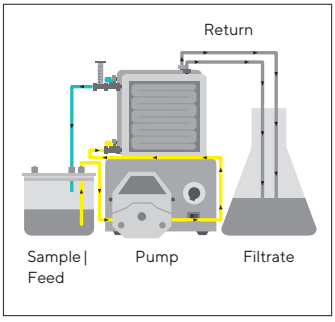
Vivaflow® 50R



Vivaflow® 50R – Single cassette



Vivaflow® 50R – Two cassettes

0.1 to 1 L Samples
Concentrate 100 mL to under 20 mL in just a few minutes or concentrate one liter 50-fold in less than 60 minutes. Alternatively, speed up your process by using two Vivaflow® 50R units in parallel and concentrate 1 L in under 30 min.

Vivaflow® 50R is a plug-and-play laboratory crossflow cassette for concentrating up to 1 L aqueous samples. The active membrane area per device is 50 cm².

One unit comes with all the necessary accessories for running the device with a laboratory pump and a size 16 pump head. For speeding up concentration, two cassettes can be run simultaneously.

- Fast and easy protein sample concentration
- Reusable
- Concentrates volumes from 0.1 L to 1 L
- Optimal for concentration of culture supernatants and viruses
- The most compact crossflow cassette with a premium Hydrosart® membrane

Specifications

Vivaflow® 50R		
Dimensions	Overall L | W | H	24 | 100 | 100 mm
	Channel W | H	7.5 | 0.4 mm
	Active membrane area	50 cm²
	Hold-up volume (module)	1.7 mL
	Min. recirculation volume	10 mL
	Non-recoverable hold-up	< 0.5 mL
Operating conditions	Pump flow	200 to 400 mL/min
	Maximum pressure	4 bar (60 psi)
	Maximum temperature	60 °C
Materials of construction	Main housing	Acrylic
	Flow channel	Acrylic
	Membrane support	Polypropylene
	Seals and O-rings	Silicone
	Pressure indicator	Polypropylene, SS spring
	Flow restrictor	Polypropylene
	Fittings	Nylon
	Tubing	PVC (medical grade)

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Performance Characteristics				
	Time to concentrate up to 20× [min.] at 3.0 bar inlet | 2.5 bar outlet pressure, 20 °C			
	Start volume 250 mL	Average flux [mL/min]	Direct recovery [%]	Recovery after 25 mL rinse [%]
Lysozyme 0.25 mg/mL (14,000 MW)				
5,000 MWCO Hydrosart®	70	3.4	96 %	98 %
10,000 MWCO Hydrosart®	23	10.3	94 %	96 %
BSA 1.0 mg/mL (66,000 MW)				
10,000 MWCO Hydrosart®	24	9.9	98 %	> 99 %
30,000 MWCO Hydrosart®	15	15.8	97 %	> 99 %
γ Globulins 1.0 mg/mL (150,000 MW)				
100,000 MWCO Hydrosart®	46	5.2	97 %	> 99 %

Performance Characteristics				
	Time to concentrate up to 20× [min.] at 3.0 bar inlet | 2.5 bar outlet pressure, 20 °C			
	Start volume 250 mL	Average flux mL/min	Recovery % Direct	25 mL rinse
Start volume 1 L (one Vivaflow® 50R at 3 bar) 10,000 MWCO Hydrosart® BSA 1.0 mg/mL	95	10.0	98 %	> 99 %
Start volume 1 L (two Vivaflow® 50R in parallel at 3 bar) 10,000 MWCO Hydrosart® BSA 1.0 mg/mL	48	19.8	98 %	> 99 %

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Ordering Information

Vivaflow® 50R*	Qty./Pkg.	Prod. No.
5,000 MWCO Hydrosart®	1	VF05H1
10,000 MWCO Hydrosart®	1	VF05H0
30,000 MWCO Hydrosart®	1	VF05H2
100,000 MWCO Hydrosart®	1	VF05H4

* Vivaflow® 50R and filtrate tubing, 0.6 mm flow restrictor, luer fittings and a pressure indicator.

Vivaflow® 50R Complete Set of Accessories		
Pump (230 V), Easy-Load pump head (size 16), tubing, 500 mL sample	diafiltration reservoir	1	VFS202
Pump (115 V), Easy-Load pump head (size 16), tubing, 500 mL sample	diafiltration reservoir	1	VFS204

Accessories		
Masterflex economy drive variable speed peristaltic pump (230 V)	1	VFP001
Masterflex economy drive variable speed peristaltic pump (115 V)	1	VFP002
500 mL sample and	or diafiltration reservoir	1	VFA006
Masterflex Easy-Load pump head (size 16)	1	VFA012

Tubing and Fittings		
Size 16 tubing and Luer fittings (3 m, 3.2 × 1.6 mm)	1	VFA004
T-connectors for running 2 cassettes	2	VFA030
Flow restrictor set, 2 each of 0.4, 0.6 and 0.8 mm	6	VFA009
Female luer fittings, size 16	10	VFA032
Flow restrictors, 0.6 mm	6	VFA035

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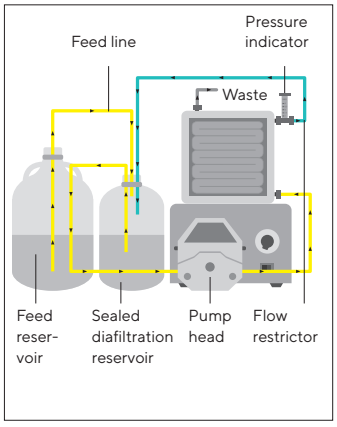
Vivaflow® 200



Vivaflow® 200 setup for diafiltration

0.5 to 5 L Samples
Concentrate 250 mL to under 20 mL in just a few minutes or concentrate one liter 50-fold in less than 30 minutes. Alternatively, use two Vivaflow® 200 units in parallel and concentrate 5 L in under 75 minutes.

Nearly total sample recoveries can be expected with most solutions.

Each cassette is supplied complete with tubing, pressure indicator, flow restrictor and high-pressure pump tubing. All you need is a peristaltic pump capable of handling 6.4 mm OD (size 16) tubing. Should your pump head require larger tubing, just use the interconnecter provided to attach your own peristaltic tubing to this standard product.

To operate two cassettes in parallel, the only additional accessories needed are a Y-connector and size 15 pump head.

Specifications

Vivaflow® 200		
Dimensions	Overall L | W | H	38 | 126 | 138 mm
	Channel W | H	10 | 0.4 mm
	Active membrane area	200 cm²
	Hold-up volume (module)	5.3 mL
	Min. recirculation volume	<20 mL
	Non-recoverable hold-up	<2 mL
Materials of construction	Main housing	Acrylic
	Flow channel	Acrylic
	Membrane support	Polypropylene
	Seals and O-rings	Silicone
	Pressure indicator	Polypropylene, SS spring
	Flow restrictor	Polypropylene
	Fittings	Nylon
	Tubing	PVC (medical grade)
Operating conditions	Pump flow	200 to 400 mL/min
	Maximum pressure	4 bar (60 psi)
	Maximum temperature	60 °C

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Performance Characteristics

	Time to concentrate up to 20× [min.] at 3 bar inlet pressure, 20 °C			
	Start volume 1 L	Average flux [mL/min]	Direct recovery [%]	Recovery after 25 mL rinse [%]
Lysozyme 0.25 mg/mL (14,000 MW)				
2,000 MWCO Hydrosart®	160	6	97 %	> 99 %
3,000 MWCO PES	180	5	97 %	> 99 %
BSA 1.0 mg/mL (66,000 MW)				> 99 %
5,000 MWCO PES	29	33	98 %	> 99 %
5,000 MWCO Hydrosart®	70	14	98 %	> 99 %
10,000 MWCO PES	23	41	96 %	> 99 %
10,000 MWCO Hydrosart®	35	27	98 %	
30,000 MWCO PES	25	38	96 %	99 %
30,000 MWCO Hydrosart®	20	48	96 %	> 99 %
50,000 MWCO PES	22	43	96 %	98 %
γ Globulins 1.0 mg/mL (average 160,000 MW)				
100,000 MWCO PES	54	18	96 %	99 %
Yeast 1.0 mg/mL (S. Cerevisiae)				
0.2 µm PES	11	86	92 %	98 %
Dilute solute concentration, start volume 1 L at 3 bar, 10,000 MWCO PES				
BSA 0.001 mg/mL	18	52	90 %	98 %
BSA 0.01 mg/mL	20	47	92 %	98 %
BSA 0.1 mg/mL	21	45	94 %	99 %
Start volume 5 L (two Vivaflow® 200 in parallel at 3 bar) 10,000 MWCO PES				
BSA 1.0 mg/mL (66,000 MW)	67	70	97 %	> 99 %

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Ordering Information

Vivaflow® 200*	Qty./Pkg.	Prod. No.
3,000 MWCO PES	1	VF20P9
5,000 MWCO PES	1	VF20P1
10,000 MWCO PES	1	VF20P0
30,000 MWCO PES	1	VF20P2
50,000 MWCO PES	1	VF20P3
100,000 MWCO PES	1	VF20P4
0.2 µm PES	1	VF20P7
2,000 MWCO Hydrosart®	1	VF20H9
5,000 MWCO Hydrosart®	1	VF20H1
10,000 MWCO Hydrosart®	1	VF20H0
30,000 MWCO Hydrosart®	1	VF20H2
100,000 MWCO Hydrosart®	1	VF20H4

* Vivaflow® 200 cassettes are supplied with feed, retentate and filtrate tubing, 0.6 mm flow restrictor, luer fittings and a pressure indicator.

Vivaflow® 200 Complete Set of Accessories**		
Pump (230 V), Easy-Load pump head (size 16), tubing, 500 mL sample	diafiltration reservoir	1	VFS202
Pump (115 V), Easy-Load pump head (size 16), tubing, 500 mL sample	diafiltration reservoir	1	VFS204

* * VFS202 and VFS204 are suitable only for operation of a single Vivaflow® 200 cassette. To operate 2 cassettes in parallel, an Easy-Load size 15 pump head is required.

Accessories	Qty./Pkg.	Prod. No.
Masterflex economy drive variable speed peristaltic pump (240 V)	1	VFP001
Masterflex economy drive variable speed peristaltic pump (115 V)	1	VFP002
500 mL sample and	or diafiltration reservoir	1	VFA006
Masterflex Easy-Load pump head (size 16)	1	VFA012
Masterflex Easy-Load pump head (size 15)	1	VFA013

Tubing and Fittings	Qty./Pkg.	Prod. No.
Size 15 tubing and Luer fittings (3 m, 4.8 mm × 2.6 mm)	1	VFA003
Size 16 tubing and Luer fittings (3 m, 3.2 mm × 1.6 mm)	1	VFA004
Y-connector (size 15 to 2 × size 16 for running 2 cassettes in parallel)	1	VFA005
Flow restrictor set, 2 each of 0.4, 0.6 and 0.8 mm	6	VFA009
Female luer fittings, size 16	10	VFA032
Flow restrictors, 0.6 mm	6	VFA035
Female luer fittings, size 15	10	VFA036

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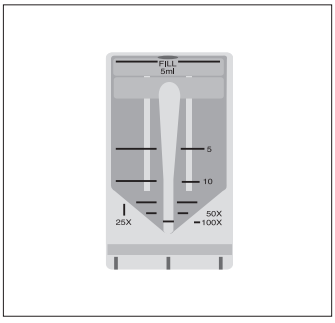
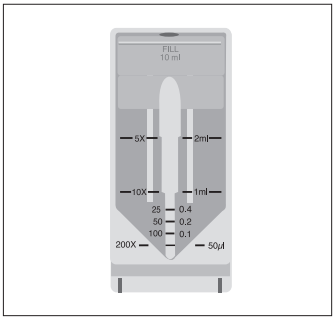
Vivapore® Solvent Absorption Concentrators



Vivapore® 5



Vivapore® 10 | 20

3 to 20 mL Samples
With no need for additional equipment, pressure or vacuum, solvent absorption is the most economic and user-friendly concentration technique available to the clinician and research scientist.

Just fill the unit with the solution to be concentrated, wait for the desired concentration level to be achieved and then pipette the concentrated sample from the bottom of the device.

Vivapore® is ideal for general-purpose laboratory concentration and purification prior to further analysis. It is particularly suited for labile solutions that can denature with alternative shear- or pressure-inducing methods or that require processing in a cold room environment.

Vivapore® concentrators extend the solvent absorption technique to a totally new level of performance, application potential and ease of use.

Vivapore® solvent absorption concentrators are IVD registered devices. Article codes are only available in IVD registered countries, according to country specific regulations. Please contact Sartorius for more information on registered countries and availability.

Specifications

	Vivapore® 5	Vivapore® 10	20
Membrane material	PES	PES	
Membrane MWCO	7,500	7,500	
Membrane surface area	20 cm^2	28 cm^2	
Reservoir material	SAN	SAN	
Volume range	1 to 5 mL	2 to 10 mL	20 mL*
Minimum concentrate volume	50 µL	50 µL	
Vivapore® overall dimensions			
Width (mm)	42	46	
Height (mm)	82	100	

* to concentrate 20 mL please use the 10 mL expansion reservoir (VPA006)

Typical Performance Characteristics						
	Time to concentrate up to 10× [min.]			Concentrate recovery [%]		
Product	VP5	VP10 | 20	VP10 | 20*	VP5	VP10 | 20	VP10 | 20*
Start volume	5 mL	10 mL	20 mL	5 mL	10 mL	20 mL
Cytochrome c (12,600 MW)	0.25 mg/mL	0.25 mg/mL	0.1 mg/mL	0.25 mg/mL	0.25 mg/mL	0.1 mg/mL
7,500 MWCO PES	35	75	150	90 %	90 %	92 %
BSA (66,000 MW) 7,500 MWCO PES	30	55	115	92 %	92 %	92 %
IgG (160,000 MW) 7,500 MWCO PES	40	70	160	75 %	77 %	78 %

* with additional reservoir

Performance Characteristics						
	Time to concentrate up to 50× [min.]			Concentrate recovery [%]		
Product	VP5	VP10 | 20	VP10 | 20*	VP5	VP10 | 20	VP10 | 20*
Start volume	5 mL	10 mL	20 mL	5 mL	10 mL	20 mL
Cytochrome c (12,600 MW) 7,500 MWCO PES	65	70	160	91 %	88 %	90 %
BSA (66,000 MW) 7,500 MWCO PES	45	50	105	90 %	90 %	92 %
IgG (160,000 MW) 7,500 MWCO PES	50	65	140	53 %	65 %	74 %

* with additional reservoir

Ordering Information

Vivapore® 5*	Qty./Pkg.	Prod. No.
7,500 MWCO PES	4	VP0503**
7,500 MWCO PES	30	VP0501**
Requires Stand		
7,500 MWCO PES	100	VP0502**
Vivapore® 10 | 20*		
7,500 MWCO PES	4	VP2003**
7,500 MWCO PES	30	VP2001**
Requires Stand		
7,500 MWCO PES	100	VP2002**
Requires Stand		
Disposable stands for 4 units	6	VPA002**
Plastic recovery pipettes (Vivapore® 10 | 20)	100	VPA005**
10 mL expansion reservoir (Vivapore® 10 | 20)	10	VPA006**
Plastic recovery pipettes (Vivapore® 5)	100	VPA007**

* includes stand and recovery pipettes
** For *In Vitro* Diagnostic (IVD) applications only, available in registered countries only.

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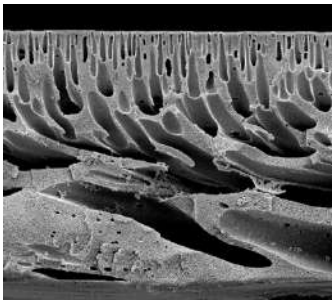
Ultrafiltration Membrane Filters

PES 146, CTA 145 and Hydrosart® 144



Polyethersulfone (PES)

This is a general purpose membrane that provides excellent performance with most solutions when retentate recovery is of primary importance. PES membranes exhibit no hydrophobic or hydrophilic interactions and are usually preferred for their low fouling characteristics, exceptional flux and broad pH compatibility.

Cellulose Triacetate (CTA)

High hydrophilicity and exceptionally low non-specific binding characterize this membrane. Cast without any membrane support that could trap or bind passing microsolutes, these membranes are ideal for sample cleaning and protein removal, and when high recovery from the filtrate solution is of primary importance.

Hydrosart®

These membranes are also highly hydrophilic and are often preferred for their high protein recovery when processing very dilute solutions. Resistance to autoclaving, ease of cleaning and extended chemical resistance also characterize this type of membrane.

Specifications

Specifications for Polyethersulfone, Type 146		
Thickness	120 µm	
pH range	1–14	
Water flux	MWCO 10,000	0.2 mL/min/cm²
Protein retention	Cytochrome C	95 %

Specifications for Cellulose Triacetate, Type 145		
Thickness	120 µm	
pH range	4–8	
Water flux	MWCO 10,000	0.11 mL/min/cm^2
Protein retention	Cytochrome C	90 %

Specifications for Cellulose Triacetate, Type 145		
Thickness	180 µm	
pH range	1–13	
Water flux	MWCO 10,000	0.08 mL/min/cm^2
Protein retention	Cytochrome C	99 %

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Ordering Information

Polyethersulfone Membrane Filters, Type 146			
Ø in mm	MWCO	Qty./Pkg.	Prod. No.
47	1,000	10	14609--47------D
63	1,000	10	14609--63------D
76	1,000	10	14609--76------D
25	5,000	10	14629--25------D
47	5,000	10	14629--47------D
63	5,000	10	14629--63------D
76	5,000	10	14629--76------D
25	10,000	10	14639--25------D
63	10,000	10	14639--63------D
76	10,000	10	14639--76------D
150	10,000	10	14639-150------D
25	30,000	10	14659--25------D
63	30,000	10	14659--63------D
76	30,000	10	14659--76------D
25	50,000	10	14650--25------D
47	50,000	10	14650--47------D
76	50,000	10	14650--76------D
25	300,000	10	14679--25------D
47	300,000	10	14679--47------D
76	300,000	10	14679--76------D

Cellulose Triacetate Membrane Filters, Type 145			
Ø in mm	MWCO	Qty./Pkg.	Prod. No.
25	5,000	10	14529--25------D
47	5,000	10	14529--47------D
25	10,000	10	14539--25------D
47	10,000	10	14539--47------D
50	10,000	10	14539--50------D
25	20,000	10	14549--25------D
43	20,000	10	14549--43------D
47	20,000	10	14549--47------D
47	20,000	100	14549--47------N
63	20,000	10	14549--63------D

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Hydrosart® Membrane Filters, Type 144			
Ø in mm	MWCO	Qty./Pkg.	Prod. No.
25	5,000	10	14429--25------D
44	5,000	10	14429--44------D
63	5,000	10	14429--63------D
76	5,000	10	14429--76------D
25	10,000	10	14439--25------D
47	10,000	10	14439--47------D
63	10,000	10	14439--63------D
76	10,000	10	14439--76------D
25	30,000	10	14459--25------D
47	30,000	10	14459--47------D
63	30,000	10	14459--63------D
76	30,000	10	14459--76------D

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Vivacon® 500

For DNA Sample Desalting and Concentration

Reproducible DNA and Protein Sample Desalting and Concentration

Vivacon® 500 centrifugal concentrators offer the optimal solution for DNA and protein concentration and buffer exchange applications. For optimal performance with highly dilute samples, e.g. forensic samples, Vivacon® 500 incorporates the patented regenerated cellulose membrane, Hydrosart®. High recoveries and excellent reproducibilities are combined with convenience offered by the molecular weight cutoff printed on the individual Vivacon® 500 units.

As Vivacon® 500 can be reverse spun after sample processing, this ensures complete concentrate recovery, which is especially important when working with low sample concentrations.

Vivacon® 500-PCR Grade

To use DNA amplification technologies, any traces of DNA originating from the equipment need to be eliminated.

Vivacon® 500-PCR Grade units are treated with ethylene oxide (EtO) in a validated process to denature all traces of DNA that might interfere with subsequent amplification procedures.

Reference: K. Shaw et al., Int. J. Legal Med. (2008) 122: 29 – 33

Specifications

Vivacon® 500		
Concentrator capacity	Fixed angle rotor	0.5 mL
Dimensions	Total length (concentration) Total length (backspin) Width Active membrane area Hold-up volume of membrane and support Dead-stop volume (40° rotor)	45 mm 47.5 mm 12.4 mm 0.32 cm² <5 µL 5 µL
Materials of construction	Body Filtrate vessel Membrane	Polycarbonate Polypropylene Hydrosart®, Cellulose Acetate

Conversion Table for Hydrosart® MWCO to Nucleotide Cutoff		
Membrane	**MWCO**	**Double-Stranded Nucleotide Cutoff (bp)**
Hydrosart®	2,000	>10
Hydrosart®	10,000	>30
Hydrosart®	30,000	>50
Hydrosart®	50,000	>300
Hydrosart®	100,000	>600
Cellulose Acetate	125,000	>650

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Performance Characteristics for DNA
Start volume 0.5 mL, sample concentration 50 mg/mL.

	Molecule size (bp)	Time to concentrate up to 30× [min.] at 20 °C	Concentrate recovery [%]	RCF (g)
2,000 MWCO	10	60 min.	93 %	7,500
10,000 MWCO	30	25 min.	94 %	7,500
30,000 MWCO	50	18 min.	88 %	5,000
50,000 MWCO	300	18 min.	91 %	5,000
100,000 MWCO	600	10 min.	87 %	3,000
125,000 MWCO	650	12 min.	85 %	2,000
125,000 MWCO	900	9 min.	94 %	3,000

Performance Characteristics for Proteins
Start volume 0.5 mL, sample and concentration of proteins as specified in table.

	Test molecule	Time to concentrate up to 30× [min.] at 20 °C	Concentrate recovery [%]	RCF (g)
2,000 MWCO	0.25 mg/mL cytochrome c	30 min.	95 %	14,000
10,000 MWCO	0.25 mg/mL cytochrome c	15 min.	92 %	14,000
30,000 MWCO	1.0 mg/mL BSA	10 min.	95 %	14,000
50,000 MWCO	1.0 mg/mL BSA	10 min.	92 %	14,000
100,000 MWCO	1.0 mg/mL bovine IgG	11 min.	90 %	8,000
125,000 MWCO	1.0 mg/mL bovine IgG	10 min.	81 %	8,000

Ordering Information

Vivacon® 500	Qty./Pkg.	Prod. No.
2,000 MWCO	25	VN01H91
2,000 MWCO	100	VN01H92
10,000 MWCO	25	VN01H01
10,000 MWCO	100	VN01H02
30,000 MWCO	25	VN01H21
30,000 MWCO	100	VN01H22
50,000 MWCO	25	VN01H31
50,000 MWCO	100	VN01H32
100,000 MWCO	25	VN01H41
100,000 MWCO	100	VN01H42
125,000 MWCO	25	VN01H81
125,000 MWCO	100	VN01H82

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Vivacon® 500-PCR Grade	Qty./Pkg.	Prod. No.
30,000 MWCO	100	VN01H22ETO
30,000 MWCO	500	VN01H23ETO
50,000 MWCO	100	VN01H32ETO
100,000 MWCO	100	VN01H42ETO
100,000 MWCO	500	VN01H43ETO
125,000 MWCO	100	VN01H82ETO
125,000 MWCO	500	VN01H83ETO
125,000 MWCO	100	VN01H82ETO

Accessories	Qty./Pkg.	Prod. No.
Collection tube	100	VNCT01

Vivacon® 2

For DNA Sample Desalting and Concentration

Reproducible DNA Sample Desalting and Concentration

Vivacon® 2 centrifugal concentrators offer the optimal solution for DNA and protein concentration and buffer exchange applications. For optimal performance with highly dilute samples, e.g. forensic samples, Vivacon® 2 incorporates the patented regenerated cellulose membrane Hydrosart®. High recoveries and excellent reproducibilities are combined with the convenience provided by the volume graduation and molecular weight cutoff printed on the individual Vivacon® 2 units.

As Vivacon® 2 can be reverse spun after sample processing, this ensures complete concentrate recovery, which is especially important when working with low sample concentrations.

Vivacon® 2-PCR Grade

Vivacon® 2-PCR Grade units are treated with ethylene oxide (EtO) in a validated process to denature all traces of DNA that might interfere with subsequent amplification procedures.

Specifications

Vivacon® 2		
Concentrator capacity	Fixed-angle rotor	2 mL
Dimensions	Total length (concentration) Total length (backspin) Width Active membrane area Hold-up volume membrane and support Dead-stop volume (25° rotor)	125 mm 115 mm 16 mm 0.95 cm² 10 µL 55 µL
Materials of construction	Body Filtrate vessel Backspin vial Concentrator cap Membrane	Polycarbonate Polypropylene Polypropylene Polypropylene Hydrosart®, Cellulose Acetate

Conversion Table for Hydrosart® MWCO to Nucleotide Cutoff		
Membrane	**MWCO**	**Double-Stranded Nucleotide Cutoff (bp)**
Hydrosart®	2,000	>10
Hydrosart®	10,000	>30
Hydrosart®	30,000	>50
Hydrosart®	50,000	>300
Hydrosart®	100,000	>600
Cellulose Acetate	125,000	>650

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Performance Characteristics for DNA
Start volume 2 mL, sample concentration 50 mg/mL.

	Molecule size (bp)	Time to concentrate up to 30× [min.] at 20 °C	Concentrate recovery [%]	RCF (g)
2,000 MWCO	10	120 min.	92 %	7,500
10,000 MWCO	30	60 min.	94 %	5,000
30,000 MWCO	50	60 min.	95 %	2,500
50,000 MWCO	300	45 min.	96 %	2,500
100,000 MWCO	600	30 min.	93 %	2,500
125,000 MWCO	650	30 min.	88 %	2,500
125,000 MWCO	900	30 min.	89 %	2,500

Performance Characteristics for Proteins
Start volume 2 mL, sample and concentration of proteins as specified in table.

	Test molecule	Time to concentrate up to 30× [min.] at 20 °C	Concentrate recovery [%]	RCF (g)
2,000 MWCO	0.25 mg/mL cytochrome c	120 min.	95 %	7,500
10,000 MWCO	0.25 mg/mL cytochrome c	90 min.	96 %	5,000
30,000 MWCO	1.0 mg/mL BSA	40 min.	96 %	5,000
50,000 MWCO	1.0 mg/mL BSA	30 min.	94 %	5,000
100,000 MWCO	1.0 mg/mL bovine IgG	30 min.	92 %	5,000
125,000 MWCO	1.0 mg/mL bovine IgG	27 min.	81 %	5,000

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Ordering Information

Vivacon® 2	Qty./Pkg.	Prod. No.
2,000 MWCO	25	VN02H91
2,000 MWCO	100	VN02H92
10,000 MWCO	25	VN02H01
10,000 MWCO	100	VN02H02
30,000 MWCO	25	VN02H21
30,000 MWCO	100	VN02H22
50,000 MWCO	25	VN02H31
50,000 MWCO	100	VN02H32
100,000 MWCO	25	VN02H41
100,000 MWCO	100	VN02H42
125,000 MWCO	25	VN02H81
125,000 MWCO	100	VN02H82

Vivacon® 2-PCR Grade	Qty./Pkg.	Prod. No.
30,000 MWCO	100	VN02H22ETO
30,000 MWCO	500	VN02H23ETO
50,000 MWCO	100	VN02H32ETO
50,000 MWCO	500	VN02H33ETO
100,000 MWCO	100	VN02H42ETO
100,000 MWCO	500	VN02H43ETO
125,000 MWCO	100	VN02H82ETO
125,000 MWCO	500	VN02H83ETO

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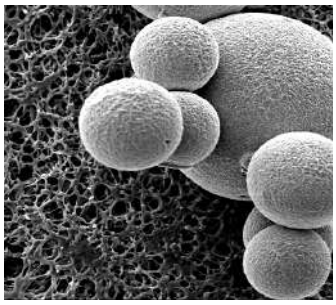
Vivapure®

Ion Exchange Protein Purification Products



Chromatography gel beads (right) are shown on top of a membrane adsorber in this SEM. The membrane adsorber pores are more than 50 times larger than bead pores.

Fast and Easy-to-Use Spin Columns

Vivapure® Ion Exchange (IEX) spin columns are centrifugal devices that incorporate Sartobind® membrane adsorber technology as their chromatography matrix. Vivapure® IEX spin columns make protein purification as easy as filtration. The devices are ready to use and eliminate the risk of running dry. For many protein purification applications, they replace time-consuming and tedious column chromatography.

The rapid Vivapure® IEX bind-wash-elute protocol especially lends itself to screening applications, where many different samples are processed in parallel.

The Sartobind® Membrane Adsorber Matrix

Sartobind® IEX membrane adsorbers are based on stabilized regenerated cellulose and exhibit a microporous structure with a pore size of > 3 µm, which is orders of magnitude larger than conventional chromatographic gel materials. This allows molecules to be transported to the ligands immobilized on the membrane adsorber by convective flow, resulting in exceptionally high flow rates.

By contrast, gel chromatography is slowed down due to diffusion limitations, as the molecules need to enter the small bead pores in order to be bound by the ligands. The porous membrane adsorber enables fast, reproducible and scalable protein purification.

Fast and Simple-to-Use Spin Columns

- Devices are ready to use
- They make protein purification as simple as filtration

Reproducible Results

- No column packing necessary as the devices are ready to use
- Membrane adsorber spin columns cannot crack or run dry

Centrifugal Devices

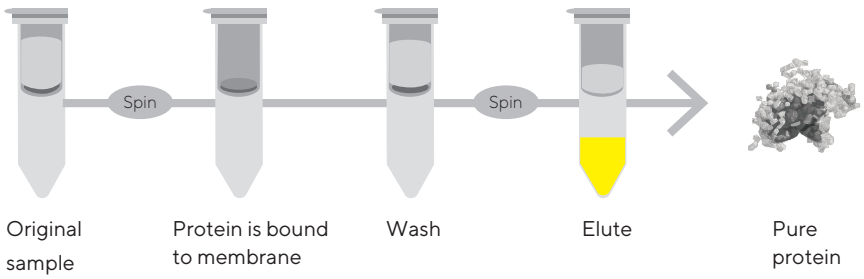
- Offer the possibility of working in parallel

Low Bed Volume

- Allow working with lower buffer volumes, resulting in concentrated elate fractions

Scalable Product Range

- Process-scale modules are available with the same Sartobind® IEX membrane adsorber matrices



Fast and easy protein purification with Vivapure® spin columns

Vivapure® Mini: 400 µL
Binding capacities: 1 to 4 mg

Vivapure® Maxi-19
Binding capacities: 15 to 80 mg

Specifications

Available Formats	
Vivapure® IEX Products	**Application**
Vivapure® Mini spin columns	▪ Sample fractionation ▪ Purification condition scouting ▪ Small-scale purification
Vivapure® Maxi spin columns	▪ Large-scale sample fractionation ▪ One-step protein purification	concentration ▪ Polishing of His-tagged protein

Membrane Availability		
Functional Groups	**Ion Exchanger Type**	
Sulfonic acid (S)	Strong acidic cation exchanger:	$R\text{-}CH_2\text{-}SO_3^-Na^+$
Quaternary ammonium (Q)	Strong basic anion exchanger:	$R\text{-}CH_2\text{-}N^+\text{-}(CH_3)_3Cl^-$
Diethylamine (D)	Weak basic anion exchanger:	$R\text{-}CH_2\text{-}NH^+\text{-}(CH_2H_5)_2$

Performance Characteristics			
Vivapure® Spin Columns	**Protein Binding Capacity* (mg)**	**Max. Volume per Centrifuge Run Using a Swing-Out Rotor (mL)**	**Max. Volume per Centrifuge Using a Fixed-Angle Rotor Run (mL)**
Vivapure® Mini H	4	0.4	
Vivapure® Maxi H	60 to 80	19	10.5

* Actual yields depend on specific protein sample and selected pH and salt conditions.
Yields established using 1 mg/mL BSA in 25 mM Tris/HCL pH 8.0 with Vivapure® Q & D spin columns and 1 mg/mL cytochrome c in 25 mM sodium acetate buffer pH 5.5 with Vivapure® S spin columns.

Ordering Information

Vivapure® Mini Ion Exchange Spin Columns (up to 0.5 mL)			
Description	**Spin Columns**	**Centrifuge Tubes**	**Prod. No.**
Vivapure® Mini S&Q H starter kit	16	32	VS-IX01SQ16
Vivapure® D Mini H	24	48	VS-IX01DH24
Vivapure® Q Mini H	24	48	VS-IX01QH24
Vivapure® S Mini H	24	48	VS-IX01SH24

Vivapure® Maxi Ion Exchange Spin Columns (up to 20 mL)			
Vivapure® D Maxi H	8	16	VS-IX20DH08
Vivapure® Q Maxi H	8	16	VS-IX20QH08
Vivapure® S Maxi H	8	16	VS-IX20SH08

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Vivapure® Virus Purification and Concentration Kits

Recombinant virus vectors are the preferred method for a wide range of gene delivery applications. Especially adenovirus type 5 and VSV-G pseudotyped lentivirus are two frequently utilized viral vectors for in vitro and in vivo applications.

Recombinant Adenovirus Vectors
Recombinant adenovirus vectors are versatile tools in research and therapeutic applications for gene transfer and protein expression in cell lines that have low transfection efficiency with liposomes. After entering cells, the virus remains epichromosomal – i.e., does not integrate into the host chromosome, leaving the host genome unaffected. The delivery of RNAi into cells is becoming a major application for adenovirus vectors.

Lentivirus Vectors
Lentivirus vectors are frequently used in gene transfer studies, due to their ability of gene transfer and integration into dividing and non-dividing cells. The pseudotyped envelope with vesicular stomatitis virus envelope G (VSV-G) protein broadens their target cell range. Lentiviral vectors have been shown to deliver genes into cell types (e.g. neurons, lymphocytes and macrophages) which other retrovirus vectors could not be used for. The lentivirus vector is increasingly used to integrate siRNA efficiently in a wide variety of cell lines and primary cells, both in vitro and in vivo.

Rapid Virus Purification by Membrane Chromatography
The Sartobind® ion exchange membrane adsorber technology used in AdenoPACK and LentiSELECT is unique in its capability to efficiently and rapidly capture and recover large virus particles. Compared with chromatography media, membrane adsorbers provide large 3,000 nm pores, allowing unrestricted access and recovery of virus from the charged adsorber surface. Convective flow through the syringe filter devices provides high-speed separations not possible with traditional chromatography, cesium chloride density gradients and ultracentrifugation methods.

Sartorius membrane adsorbers with porous matrices, high capacities, low differential pressures, high flow rates and low unspecific adsorption show excellent performance in small-scale virus purification. In addition, these syringe filter devices are scalable and comply with cGMP requirements for large-volume, high-performance separation, reducing final process time ten-fold.

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Adenovirus Purification with Vivapure® AdenoPACK Kits

AdenoPACK 20 | 100 | 500
The AdenoPACK adenovirus purification and concentration kits offer researchers who need to recover up to 3×10^{13} purified recombinant adenovirus particles for in vitro transfection a fast, safe and easy-to-use solution. The kits include all reagents and devices necessary for clarification, purification and concentration of adenovirus type 5 from HEK293 cell cultures – all within just two hours. These straightforward kits replace time-consuming and labor-intensive 48-hour CsCl density gradients.

AdenoPACK kits are offered as AdenoPACK 20, AdenoPACK 100 and AdenoPACK 500 for the purification and concentration of adenovirus type 5 from 20 to 500 mL cell cultures, resulting in 1×10^{11} to 3×10^{13} purified viral particles. For each sample volume, the most convenient handling method is provided for ultimate convenience.

To this end, preparations using AdenoPACK 20 are supplied in a spin column format for centrifuges. AdenoPACK 100 is a manually operated kit in a syringe filter format* and AdenoPACK 500 is a pump-driven kit.

AdenoPACK Advantages

Fast and Easy Virus Purification
- Purification completed in just 2 hours
- Convenient, over 10 × faster alternative to CsCl density gradient

Quantitative Yields
- In contrast to CsCl density gradient, the complete cell culture is used for virus purification and not only the viral pellet

Flexible Product Range
- Applicable from initial construct screening to large-scale virus production

Complete Kit
- Including filtration devices, AdenoPACK units for virus purification, Vivaspin® and all buffers

Low Endotoxin Levels
- High cell viability and infection rates due to endotoxin levels of < 0.025 EU/mL

* Vivapure® AdenoPACK 100 can be alternatively be operated with a laboratory pump or an infusion pump, for which protocols are provided on our web page at www.sartorius-stedim.com. Additionally, the tubes and adaptors needed for these operating modes can be ordered.

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Specifications

Adenovirus Purification Kit Specifications			
Product	**AdenoPACK 20**	**AdenoPACK 100**	**AdenoPACK 500**
Sample size	20 mL cell culture	20 to 200 mL of cell culture	500 mL of cell culture
Number of purifications	6 × 20 mL	2 × 20 to 60 mL 1 × 200 mL	1 × 500 mL
Virus particles (VP) per mL	Typically up to 1×10^{11}–10^{12}	Typically up to 1×10^{13}	Typically up to 3×10^{13}
VP/IU	50 to 100	20 to 50	20 to 50
Processing time	Typically one hour	Typically two hours	
Endotoxin level	< 0.025 EU/mL	< 0.025 EU/mL	< 0.025 EU/mL

Ordering Information

Vivapure® AdenoPACK 20	
Vivapure® AdenoPACK 20	VS-AVPQ020
Vivapure® AdenoPACK 20 RT*	VS-AVPQ022

* AdenoPACK 20 RT does not contain Benzonase®**

Vivapure® AdenoPACK 100	
Vivapure® AdenoPACK 100	VS-AVPQ101
Vivapure® AdenoPACK 100 RT*	VS-AVPQ102

AdenoPACK 100 Accessories	
Pump tubing set for Vivapure® AdenoPACK 100	VS-AVPA001

* AdenoPACK 100 RT does not contain Benzonase®**

Vivapure® AdenoPACK 500	
Vivapure® AdenoPACK 500	VS-AVPQ501
Vivapure® AdenoPACK 500 RT*	VS-AVPQ502

* AdenoPACK RT-kits do not contain Benzonase®**
** Benzonase® is a registered trademark of Merck

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Lentivirus Purification with the Vivapure® LentiSELECT Kit

LentiSELECT 40 | 500 | 1000
The LentiSELECT kits for lentivirus purification and concentration offer researchers who need to recover up to 5×10^9 infective lentivirus particles per mL for in vitro transfection or animal studies a fast and easy-to-use solution.

These straightforward kits replace time-consuming ultracentrifugation protocols, which typically take approximately one day for large sample volumes. Vivapure® LentiSELECT thus reduces purification time to just a few hours.

LentiSELECT kits are offered as LentiSELECT 40, LentiSELECT 500 and LentiSELECT 1000 for the purification and concentration of VSV-G pseudotyped lentivirus from 40 to 1,000 mL cell cultures, resulting in 8×10^8 to 1×10^{10} purified infective particles. The most convenient handling method is provided for each sample volume. To this end, 40 mL sample volumes are processed manually with LentiSELECT 40, while LentiSELECT 500 and 1000 are pump-driven kits.

LentiSELECT Advantages

Fast and Easy Virus Purification
- Purification completed in less than one to six hours, depending on sample volume
- Kit is as easy to use as filtration

No Need for Expensive Instruments
- Lentivirus purification with LentiSELECT is independent of equipment, such as ultracentrifuges

High Virus Purity
- Achieve pure virus based on a chromatographic method for your experiments instead of a crude and variable cell culture supernatant pellet

Optimal for Multiple Virus Construct Screening
- With LentiSELECT 40, four purification runs can be conducted in parallel with one kit

Complete Kits
- Including LentiSELECT units for virus purification, Vivaspin® units for concentration | buffer exchange and all buffers and syringes necessary

Low Endotoxin Levels
- High cell viability and infection rates due to endotoxin levels of < 0.025 EU/mL

* Vivapure® AdenoPACK 100 can be alternatively be operated with a laboratory pump or an infusion pump, for which protocols are provided on our web page at www.sartorius-stedim.com. Additionally, the tubes and adaptors needed for these operating modes can be ordered.

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Specifications

Product	LentiSELECT 40	LentiSELECT 500	LentiSELECT 1000
Sample size	40 mL cell culture	500 mL of cell culture	1,000 mL of cell culture
Number of purifications	4 × 40 mL	1 × 500 mL	1 × 1,000 mL
Virus particles (VP) per mL	Typically up to 3×10^9	Typically up to $2 - 5 \times 10^9$	Typically up to $4 - 6 \times 10^{13}$
VP/IU	5 to 15	5 to 15	20 to 50
Processing time	Typically up to 45 min	Typically up to 3 hours	Typically up to 6 hours
Endotoxin level	< 0.025 EU/mL	< 0.025 EU/mL	< 0.025 EU/mL

Ordering Information

Vivapure® LentiSELECT 40	
Vivapure® LentiSELECT 40	VS-LVPQ040

Vivapure® LentiSELECT 500	
Vivapure® LentiSELECT 500	VS-LVPQ500

Vivapure® LentiSELECT 1000	
Vivapure® LentiSELECT 1000	VS-LVPQ1000

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Filtration Devices

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Introduction

Syringe filters are used for many routine preparation steps in laboratories all over the world. They are convenient, ready-to-use disposables for sterile filtration of liquids and removal of particles from solutions and gases. Depending on the reagents filtered, syringe filters have to fulfill certain requirements to best serve customer's application. Sartorius offers Minisart® syringe filters and filters optimized for a wide range of relatively large volumes. The filters are reliably remove particles with no leakage. If you need to rely on the quality of your filtrate – whether it needs to be sterile prior to use or particulate-free before analysis – field-proven, high-quality Sartorius filter syringes are the No. 1 choice for reliable, convenient preparation steps.

Our Product Range

For clarification and sterilization of liquids, filtration is the optimal method. It removes microorganisms and particles reliably, without any effects on the ingredients due to adsorption or decomposition. For optimal results, Minisart® NML Standard syringe filters with an MBS housing provide a choice of membranes with pore sizes ranging from 0.1 µm to 5 µm for high flow rates and the low adsorption characteristics. The effective filtration area of 6.2 cm^2 for the fast filtration is the largest among premium syringe filters available, and the MBS housing is color- coded for easy pore size identification. For a list of the types offered, please see page 74.

Elimination of particles from your samples prior to HPLC or other chromatographic analysis is essential in order to maintain the integrity of your chromatography column and to maximize its operating lifetime. Minisart® PP Standard syringe filters optimized for sample preparation consist of a polypropylene housing and membrane components featuring maximum chemical compatibility and minimum extractables to ensure excellent results. Due to the typical range of volumes from less than 1 mL to 100 mL, these filters are available in three different diameters with an effective filtration area of 0.07 cm^2, 1.7 cm^2 and 4.8 cm^2. For a selection guide, please see page 67..

The Sartorius medical device CE-Minisart® syringe filter with a hydrophilic (surfactant-free) cellulose acetate and hydrophobic polytetrafluoroethylene (PTFE) are the perfect choice for pharmacy admixture applications like sterile filtration and | or clarification of low volume solutions in a laboratory environment before use for patient care. The CE-Minisart® syringe filters are manufactured by Sartorius in a facility whose Quality Management System is certified for compliance with EN ISO 13485 (see page 80).

Minisart® Standard Syringe Filters are not for medical use.

Sartorius has developed a new, easy-to-use and straightforward filtration setup. The manually operated Claristep® Filtration System consisting of a station and filter units offers a novel way for clarifying your samples prior to analysis.

Claristep® Filter units are processed without syringe and are made of the purest materials. Another major benefit is that the contact time of the samples with the filters and the caps is extremely short, ensuring optimal, contamination-free results. The Claristep® Station consists of a base, a lid and an exchangeable tray for easy and accurate positioning of sample vials and Claristep® Filter units.

Claristep® syringeless filter units with RC membranes are optimized for solvents and aqueous solutions. They provide maximum chemical compatibility and exceptionally low non-specific binding of analytes.

Sartolab® vacuum filtration devices with 0.1 µm and 0.22 µm PES membranes for convenient filtration of 150 mL up to 1 L are ready to use and sterile. Sartolab® RF is a complete system that includes a receiver flask. Sartolab® BT Sterile is a bottle top filter without a receiver flasks. This enables customers to use a receiver bottle of their choice and to even expand filtration capacity, depending on the particle load of the filtered liquid by filling more than one receiver flask. Sartolab® 150V is a disposable vacuum filter with a pleated 0.22 µm PES membrane, which is suitable for up to 15 L of liquid.

Sartolab® P20 pressure filtration devices with a 0.2 µm and 0.45 µm PES membrane are available with or without a glass fiber prefilter, depending on your needs. Sartolab P20 is designed for up to 3 L volumes and can also be used in-line. The polycarbonate housing and membrane components are ideal for filtering liquids. The glass fiber prefilter types are ideal for filtering environmental samples that have a high particle load prior to analyzing such samples.

Typical Applications for Filtration Devices

- Sterile filtration of liquids and gases with virtually no effect on the ingredients
- Particle removal from liquids and gases prior to downstream processes
- Venting of vials, bottles, containers, bags and bioreactors and fermenters
- Removal of precipitates and coagulates from solutions prior to use

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Minisart® Standard Selection Guide

Please refer to Minisart® RC, NY or SRP for the highest chemical compatibility on page 71.
Please refer to Minisart® NML or Minisart® High Flow on page 74.

Sample Composition

Aqueous		Aqueous | Solvents		
All Aqueous Solutions Buffers, Protein Analysis	**All Aqueous Solutions** Tissue Culture Media	Aqueous | Solvent Mixtures | Solvents	Solvent Mixtures | Solvents	Solvents | Gases | Acids | Bases
CA Cellulose Acetate	**PES** Polyethersulfone	**RC** Regenerated Cellulose	**NY** Polyamide, Nylon	**PTFE** Polytetrafluoro-ethylene
Hydrophilic				Hydrophobic

Pore Sizes

Sterilization		Sample Preparation | Clarification | Particle Removal					Prefiltration
Small Bacteria Mycoplasma Colloids >0.1	UHPLC, etc. (Columns <3 µm Particles) Bacteria	HPLC, etc. (Columns >3 µm Particles) Particles	Particles Yeast Cells	Particles Yeast Cells	Particles Yeast Cells Platelets	Large Particles Cells	Glass Prefilter Glass+Membrane Highly Particle-laden Samples
0.1 µm	**0.2 µm**	**0.45 µm**	**0.65 µm**	**0.8 µm**	**1.2 µm**	**5 µm**	**GF (Glass Fiber)**

Sample Volumes

1 mL to 200 mL	1 mL to 100 mL	0.5 mL to 15 mL	0.05 mL to 1 mL
28 mm for up to 200 mL	**25 mm for up to 100 mL**	**15 mm for up to 15 mL**	**4 mm for up to 1 mL**

Minisart® PP Standard Syringe Filter Sample Preparation for Analytics

4 mm packages are color-coded

Male Spike Outlet

Male Luer Slip Outlet

Minisart® RC 15 mm

Minisart® NY 15 mm

Minisart® SRP 15 mm

Minisart® RC 25 mm

Minisart® NY 25 mm

Minisart® SRP 25 mm

Reliable Removal of Particles from Liquids and Gases

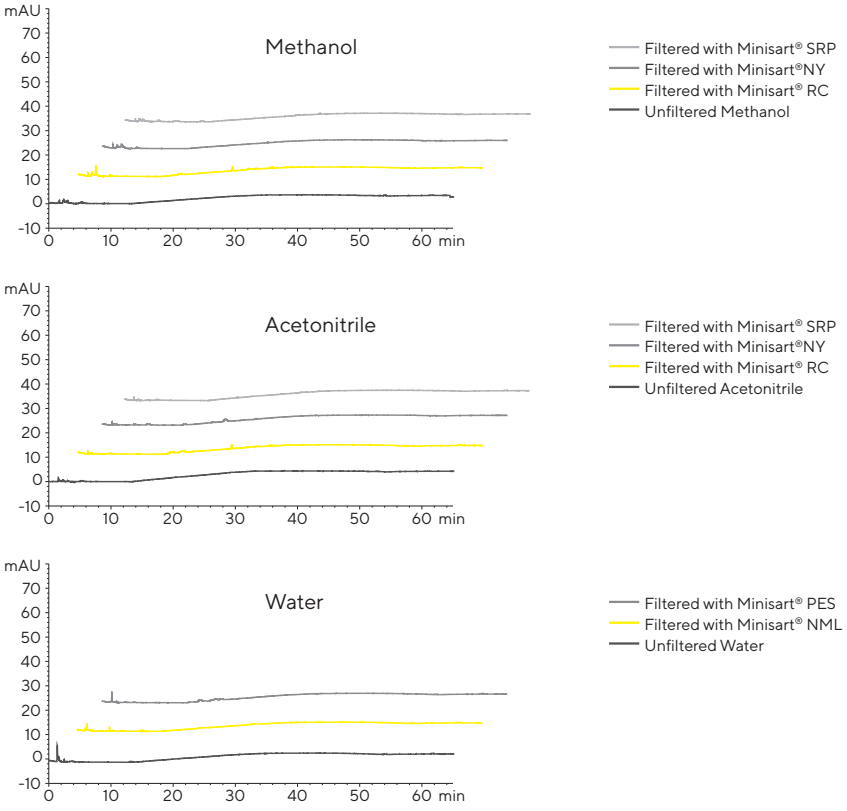
Particle removal by filtration before analysis substantially increases the lifetime of your columns. Minisart® RC is optimized for aqueous liquids and solvents and is compatible with DMSO, other amides, ketones, esters and ethers. Minisart® NY is exceptionally pure compared with other common polyamide (=nylon) filters and competitor products. For this product raw materials are used which do not interfere with standard analytical methods.

Our coating-free hydrophobic PTFE membrane used in Minisart® SRP is suitable for venting applications.

Minisart® Features

- Low adsorption of analytes
- Maximum chemical compatibility
- Minimum extractables

HPLC Certification



HPLC Procedure

Column C18: 250 × 4.6 mm, Flow Rate: 1 mL/min, Wavelength: 220 nm
HPLC Injection Volume: 20 µL, Analysis Time: 65 min, Temperature: 40 °C, Mobile Phases: A) Acetonitrile | B) Water, Gradient: Hold 60 % A for 10 min, 60 % to 95 % A in 20 min, 95 % to 100 % A in 35 min

Minisart® with Polypropylene Housing

Specifications

Minisart® RC	SRP	NY	PES with 4	15	25 mm Ø Membrane Filtration Area	
Housing material	Polypropylene (PP)
Membranes	RC = Regenerated Cellulose	NY = Polyamide	 SRP = Hydrophobic PTFE = Polytetrafluoroethylene	PES = Polyethersulfone	 PES - = hydrophobic PES
Glass fiber prefilter	NY Plus: Ultrapure quartz, 0.7 µm particle retention
Max. operating pressure	4.5 bar	65 psi Minisart® PES - : 2.0 bar	29 psi (IN - OUT) or 0.5 bar	7 psi (OUT - IN)
Housing burst pressure	≥ 7 bar	102 psi
Max. temperature	60 °C
Sterilization	Non-sterile Minisart® can be autoclaved or sterilized by ethylene oxide (EO)

Minisart® Membrane Types	RC 0.2 µm	RC 0.2 µm	RC 0.45 µm	SRP 0.2 µm	SRP 0.45 µm
Non-sterile packs: 50 (K), 200 (S), 500 (Q), 1000 (R)	sterile packs: individually packaged, 50 (ACK)	K | S | Q | R	ACK	K | S | Q | R	K | S | Q | ACK	K | S | Q
Bubble point (≥)	With water 3.0 bar | 44 psi	With water 4.6 bar | 67 psi	With water 2.0 bar | 29 psi	With ethanol 1.1 bar | 16 psi	With ethanol 0.9 bar | 13 psi
Flow rate ((≥) mL/min), 4 mm Ø = 0.07 cm² filter area | Hold-up volume[1]: ≤ 10 µL					
▪ For water at 1 bar	0.5	–	1.5	–[3]	–[3]
▪ For methanol at 1 bar	1.5	–	3.0	2.0	4.5
▪ For air at 0.1 bar	–[2]	–	–[2]	30	60
Flow rate ((≥) mL/min), 15 mm Ø = 1.7 cm² filter area | Hold-up volume[1]: ≤ 100 µL					
▪ For water at 1 bar	20	10	40	–[3]	–[3]
▪ For methanol at 1 bar	55	25	105	55	150
▪ For air at 0.1 bar	–[2]	–[2]	–[2]	800	1,600
Flow rate ((≥) mL/min), 25 mm Ø = 4.8 cm² filter area | Hold-up volume[1]: ≤ 200 µL					
▪ For water at 1 bar	80	50	160	–[3]	–[3]
▪ For methanol at 1 bar	160	90	325	60	260
▪ For air at 0.1 bar	–[2]	–[2]	–[2]	1,800	3,000
Water penetration point[3] (≥)	–	–	–	4.0 bar | 58 psi	3.0 bar | 44 psi
Sterile filtration capability[5] acc. to the bacteria challenge test	No	Yes	No	Yes	No
Non-pyrogenic according to the USP					

Minisart® Membrane Types	NY 0.2 µm	NY 0.45 µm	NY Plus 0.2 µm	NY Plus 0.45 µm	PES 0.2 µm	PES -0.2 µm
Non-sterile packs: 50 (K), 200 (S), 500 (Q), 1000 (R) | sterile packs: individual packaged, 50 (ACK)	K | Q | R | ACK	K | Q | R | ACK	K | Q	K | Q	K | Q | ACK	K | Q
Bubble point (≥)	With water 3.0 bar | 44 psi	With water 2.0 bar | 29 psi	With water 3.0 bar | 44 psi	With water 2.0 bar | 29 psi	With water 3.2 bar | 46 psi	With ethanol 0.95 bar | 14 psi
Flow rate ((≥) mL/min), 4 mm Ø = 0.07 cm² filter area | Hold-up volume[1]: ≤ 10 µL						
▪ For water at 1 bar	–	–	–	–	1.5	–
▪ For methanol at 1 bar	–	–	–	–	–[4]	–
▪ For air at 0.1 bar	–	–	–	–	–[2]	–
Flow rate ((≥) mL/min), 15 mm Ø = 1.7 cm² filter area | Hold-up volume[1]: ≤ 100 µL						
▪ For water at 1 bar	20	40	–	–	40	–
▪ For methanol at 1 bar	40	110	–	–	–[4]	–
▪ For air at 0.1 bar	–[2]	–[2]	–	–	–[2]	–
Flow rate ((≥) mL/min), 25 mm Ø = 4.8 cm² filter area | Hold-up volume[1]: ≤ 200 µL						
▪ For water at 1 bar	50	100	50	100	100	–
▪ For methanol at 1 bar	70	200	70	200	–[4]	–[4]
▪ For air at 0.1 bar	–[2]	–[2]	–[2]	–[2]	–[2]	1,200
Water penetration point[3] (≥)	–	–	–	–	–	2.0 bar | 29 psi
Sterile filtration capability[5] acc. to the bacteria challenge text	Yes	No	Yes	No	Yes	Yes
Non-pyrogenic according to the USP						

[1] Hold-up volume after air purge
[2] Hydrophilic membranes can filter dry air or gas but become impermeable to air or gas when wetted!
[3] Hydrophobic membranes cannot be wetted with aqueous solutions unless you overcome their water penetration point or pre-wet them using an organic solvent (e.g. ethanol).
[4] PES is suitable for solutions only containing up to 30 % MeOH.
[5] According to the bacterial challenge test (BCT) with ≥ 1×10^7 cfu/cm² Brevundimonas diminuta. Non-sterile RC Minisart® types are optimized for sample preparation and are not suitable for sterile filtration according to the bacteria challenge test. All other non-sterile Minisart® types with 0.2 µm pore size can be sterilized by autoclaving or EO before use for sterile filtration.
[6] For sterile packs ACK.

Minisart® Standard Syringe Filters are not for medical use.

Sample Preparation for Chromatography

Ordering Information

Minisart® RC (Regenerated Cellulose)								
Ø in mm | EFA[1]	Membrane	Housing	Pore Size	Connector Outlet	Color | Printing	Sterile*	Qty./Pkg.	Order No.
25 mm	RC	PP	0.2 µm	Male Luer Slip	White, Printed	Yes	50	17764--------ACK
25 mm	RC	PP	0.2 µm	Male Luer Slip	White, Printed	No	50	17764----------K
25 mm	RC	PP	0.2 µm	Male Luer Slip	White, Printed	No	200	17764----------S
25 mm	RC	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	17764----------Q
25 mm	RC	PP	0.45 µm	Male Luer Slip	White, Printed	No	50	17765----------K
25 mm	RC	PP	0.45 µm	Male Luer Slip	White, Printed	No	200	17765----------S
25 mm	RC	PP	0.45 µm	Male Luer Slip	White, Printed	No	500	17765----------Q
15 mm	RC	PP	0.2 µm	Male Luer Slip	White, Printed	Yes	50	17761--------ACK
15 mm	RC	PP	0.2 µm	Male Luer Slip	White, Printed	No	50	17761----------K
15 mm	RC	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	17761----------Q
15 mm	RC	PP	0.45 µm	Male Luer Slip	White, Printed	No	50	17762----------K
15 mm	RC	PP	0.45 µm	Male Luer Slip	White, Printed	No	500	17762----------Q
4 mm	RC	PP	0.2 µm	Male Luer Slip	Blue Tray	No	50	17821----------K
4 mm	RC	PP	0.2 µm	Male Luer Slip	Blue Tray	No	500	17821----------Q
4 mm	RC	PP	0.45 µm	Male Luer Slip	Yellow Tray	No	50	17822----------K
4 mm	RC	PP	0.45 µm	Male Luer Slip	Yellow Tray	No	500	17822----------Q
Minisart® SRP (Hydrophobic PTFE)								
25 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	Yes	50	S7575------FXOSK
25 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	No	50	17575----------K
25 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	No	200	17575----------S
25 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	17575----------Q
25 mm	PTFE	PP	0.2 µm	Hose Barb	White, Printed	No	500	1757A----------Q
25 mm	PTFE	PP	0.45 µm	Male Luer Slip	White, Printed	No	50	17576----------K
25 mm	PTFE	PP	0.45 µm	Male Luer Slip	White, Printed	No	200	17576----------S
25 mm	PTFE	PP	0.45 µm	Male Luer Slip	White, Printed	No	500	17576----------Q
15 mm	PTFE	PP	0.2 µm	Male Spike	White, Printed	No	50	17558----------K
15 mm	PTFE	PP	0.2 µm	Male Spike	White, Printed	No	500	17558----------Q
15 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	Yes	50	17573--------ACK
15 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	No	50	17573----------K
15 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	17573----------Q
15 mm	PTFE	PP	0.45 µm	Male Spike	White, Printed	No	50	17559----------K
15 mm	PTFE	PP	0.45 µm	Male Spike	White, Printed	No	500	17559----------Q
15 mm	PTFE	PP	0.45 µm	Male Luer Slip	White, Printed	No	50	17574----------K
15 mm	PTFE	PP	0.45 µm	Male Luer Slip	White, Printed	No	500	17574----------Q
4 mm	PTFE	PP	0.2 µm	Male Luer Slip	Blue Tray	No	500	17844----------Q
4 mm	PTFE	PP	0.45 µm	Male Luer Slip	Yellow Tray	No	50	17820----------K
4 mm	PTFE	PP	0.45 µm	Male Luer Slip	Yellow Tray	No	500	17820----------Q

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Minisart® NY (Nylon) and NY25 Plus (Glass Fiber 0.7 µm² + Nylon)								
Ø in mm | EFA[1]	Membrane	Housing	Pore Size	Connector Outlet	Color | Printing	Sterile*	Qty./Pkg.	Order No.
25 mm	Nylon	PP	0.2 µm	Male Luer Slip	White, Printed	Yes	50	17845--------ACK
25 mm	Nylon	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	17845----------Q
25 mm	Nylon	PP	0.45 µm	Male Luer Slip	White, Printed	Yes	50	17846--------ACK
25 mm	Nylon	PP	0.45 µm	Male Luer Slip	White, Printed	No	500	17846----------Q
15 mm	Nylon	PP	0.2 µm	Male Luer Slip	White, Printed	No	50	1776B----------K
15 mm	Nylon	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	1776B----------Q
15 mm	Nylon	PP	0.45 µm	Male Luer Slip	White, Printed	No	50	1776C----------K
15 mm	Nylon	PP	0.45 µm	Male Luer Slip	White, Printed	No	500	1776C----------Q
25 mm	GF+Nylon	PP	0.2 µm	Male Luer Slip	White, Printed	No	50	1784B----------K
25 mm	GF+Nylon	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	1784B----------Q
25 mm	GF+Nylon	PP	0.45 µm	Male Luer Slip	White, Printed	No	50	1784C----------K
25 mm	GF+Nylon	PP	0.45 µm	Male Luer Slip	White, Printed	No	500	1784C----------Q
Minisart® PES (Polyethersulfone) Aqueous Filtration								
15 mm	PES	PP	0.22 µm	Male Luer Slip	White	Yes	50	1776D--------ACK
15 mm	PES	PP	0.22 µm	Male Luer Slip	White	No	500	1776D----------Q
Minisart® PES- (Hydrophobic PES) Venting & Gas Filtration, Gamma Stable								
25 mm	PES	PP	0.2 µm	Male Luer Slip	White, Printed	No	50	1757H----------K
25 mm	PES	PP	0.2 µm	Male Luer Slip	White, Printed	No	500	1757H----------Q
25 mm	PES	PP	0.2 µm	Hose Barbs[3]	White, Printed	No	50	1757G----------K
25 mm	PES	PP	0.2 µm	Hose Barbs[3]	White, Printed	No	500	1757G----------Q

* Sterile Minisart® syringe filters are individually packaged. If not stated otherwise, Minisart® units have been sterilized by ethylene oxide. Non-presterilized Minisart® units: RC, PTFE and nylon can be sterilized by autoclaving at 121 °C for 30 min. or by using ethylene oxide (EO).

[1] Diameter of EFA – Effective Filtration Area

[2] 0.7 µm = GF particle retention ≠ pore size!

[3] Hose barbs, inlet and outlet, stepped 4.4–6 mm diameter

Minisart® Standard Syringe Filters are not for medical use.

For technical product specifications, please see page 70.

Minisart® High Flow with PES

Minisart® NML with (SF)CA

Minisart® HY with PTFE

Minisart® NML Standard Syringe Filter Clarification and Sterilization by Filtration

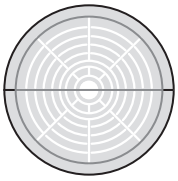
Filtration is the Optimal Method for Clarification and Sterilization of Liquids and Gases

Sterilization by filtration is the fastest method for removal of bacterial cells from liquids, while minimizing the effects on ingredients. Minisart® NML with (surfactant-free) cellulose acetate (SF)CA is the best choice for all aqueous solutions with a pH of 4 to 8. It combines fast flow rates and is available in many different pore sizes – also for the removal of larger particles. Minisart® High Flow with polyethersulfone (PES) is optimal for delivering the highest flow rates and for a broad pH compatibility range from 1 to 13. Due to the asymmetric membrane structure, the PES surface almost behaves like a prefilter.

Both Minisart® types – NML and High Flow – are available pre-sterilized by ethylene oxide (EO) or gamma irradiation. Hydrophobic PTFE filters like Minisart® SRP are suitable for venting purposes and are additionally available in special formats with activated carbon.

Minisart® Features

- Largest effective filtration area (EFA) of 6.2 cm²
- Low adsorption
- High flow rate
- High total throughput
- Low hold-up volume
- Gamma-irradiated or EO-sterilized



28 mm EFA
33 mm housing diameter
(for NML and High Flow)

Minisart® Standard Syringe Filters with MBS Housing

Specifications

Minisart® High Flow | NML | NML Plus with 28 mm accessible membrane filtration area diameter, ≤150 µL hold-up volume[1]
Minisart® HY | Acticosart with 26 mm accessible membrane filtration area diameter, ≤150 µL hold-up volume[1]
Minisart® Air with 15 mm accessible membrane filtration area diameter, ≤100 µm hold-up volume[1]

Housing material	Methacrylate butadiene styrene (MBS)
Membranes	High Flow: PES = Polyethersulfone NML: (SF) CA = (Surfactant-free) Cellulose Acetate NML Plus: (SF) CA = (Surfactant-free) Cellulose Acetate HY	Acticosart	Air: Hydrophobic PTFE = Polytetrafluoroethylene
Glass fiber prefilter	NML Plus: Binder-free GF, 0.7 µm particle retention
Max. operating pressure	High Flow: 6.0 bar	87 psi NML, NML Plus, HY, Air: 4.5 bar	65 psi Acticosart: 1 bar	14.5 psi
Housing burst pressure	≥7 bar	102 psi (not determined for Acticosart)
Max. temperature	60 °C
Sterilization	Non-sterile Minisart® High Flow, NML and NML Plus can be or sterilized by ethylene oxide (EO) or by gamma irradiation. Non-sterile Minisart® HY, Acticosart, Air* can be sterilized by ethylene oxide (EO).

Minisart® Membrane Types	**PES 0.1 µm**	**PES 0.2 µm**	**PES 0.45 µm**	**SFCA 0.2 µm**	**SFCA 0.45 µm**	**CA 0.65 µm**	**CA 0.8 µm**	**CA 1.2 µm**	**CA 5.0 µm**
Non-sterile packages: 500 (Q, HYQ), 1000 (R), sterile packs: individually packaged: 50 (K, GUK, HYK, HNK)	K	K | GUK | Q	K | GUK | Q	K | GUK | Q	K | GUK | Q	K	K | GUK | Q	K | Q	K | Q
Bubble point (≥)	With water 5.0 bar | 73 psi	With water 3.2 bar | 46 psi	With water 2.0 bar | 29 psi	With water 3.2 bar | 46 psi	With water 2.0 bar | 29 psi	With water 1.3 bar | 19 psi	With water 0.8 bar | 12 psi	With water 0.7 bar | 10 psi	With water 0.4 bar | 6 psi
Flow Rate for[2 | 3] (≥ mL/min)									
28 mm Ø for water at 1 bar	40	140	220	60	160	250	400	500	600
15 mm Ø for air at 0.1 bar	–	–	–	–	–	–	–	–	–
26 mm Ø for air at 0.1 bar	–	–	–	–	–	–	–	–	–
Water penetration point[3] (≥)	–	–	–	–	–	–	–	–	–
Sterile filtration capability[4] acc. to the bacteria challenge test	Yes	Yes	No	Yes	No	No	No	No	No
Non-pyrogenic according to the USP	Yes[5]	Yes[5]	Yes[5]	Yes[5]	Yes[5]	Yes[5]	Yes[5]	Yes[5]	Yes[5]

Minisart® Membrane Types	GF+SFCA 0.2 µm	GF+SFCA 0.45 µm	GF+CA 1.2 µm	GF 0.7 µm	PTFE 0.2 µm	PTFE 1.0 µm	Acticosart	PTFE (Air) 0.2 µm
Non-sterile packages: 500 (Q, HYQ), 1000 (R), sterile packs: individually packaged, 50 (K, GUK, HYK, HNK)	K | Q	K | Q	Q	K | Q	K | Q	HYQ	Q	Q | HNK
Bubble point (≥)	With water 3.2 bar | 46 psi	With water 2.0 bar | 29 psi	With water 0.7 bar | 10 psi	With water 0.5 bar | 7 psi	With ethanol 1.4 bar | 20 psi	With ethanol 0.5 bar | 7 psi	With ethanol 0.9 bar | 13 psi	With ethanol 1.0 bar | 14 psi
Flow rate for [2] | [3] (≥ mL/min)								
28 mm Ø for water at 1 bar	60	160	350	450	–	–	–	–
15 mm Ø for air at 0.1 bar	–	–	–	–	–	–	–	800
26 mm Ø for air at 0.1 bar	–	–	–	–	2,000	4,000	2,300	–
Water penetration point[3] (≥)	–	–	–	–	4.0 bar | 58 psi	1.5 bar | 22 psi	N.a.	3.2 bar | 44 psi
Sterile filtration capability[4] according to the bacteria challenge test	Yes	No	No	No	Yes	No	N.a.	Yes
Non-pyrogenic according to the USP					Yes[5]			

[1] Hold-up volume after air purge
[2] Hydrophilic membranes can filter dry air or gas but become impermeable to air or gas when wetted!
[3] Hydrophobic membranes cannot be wetted with aqueous solutions unless you overcome their water penetration point.
[4] According to bacterial challenge test (BCT) with 1×10^7 cfu/cm² Brevundimonas diminuta. All non-sterile Minisart® types listed above can be sterilized according to the method recommended in this table.
[5] For sterile packs K | GUK
*Minisart® Air can be sterilized by Gamma irradiation according to the following parameters: Range 25 – 40 kGy (validated with 50 kGy).

Standard Minisart® Syringe Filters are not for medical use.

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Preparation of Aqueous Liquids

Ordering Information

Ø in mm | EFA[1]	Membrane	Housing	Pore Size	Connector Outlet	Color | Printing	Sterile*	Qty./Pkg.	Order No.
Minisart® High Flow (PES – Polyethersulfone)								
28 mm	PES	MBS	0.1 µm	Male Luer Lock	Dark Red	Yes	50	16553----------K
28 mm	PES	MBS	0.22 µm	Male Luer Lock	Royal Blue	Yes#	50	16532--------GUK
28 mm	PES	MBS	0.22 µm	Male Luer Lock	Royal Blue	Yes	50	16532----------K
28 mm	PES	MBS	0.22 µm	Male Luer Slip	Royal Blue	Yes	50	16541----------K
28 mm	PES	MBS	0.22 µm	Male Luer Lock	Royal Blue	No	500	16532----------Q
28 mm	PES	MBS	0.22 µm	Male Luer Slip	Royal Blue	No	500	16541----------Q
28 mm	PES	MBS	0.45 µm	Male Luer Lock	Amber	Yes	50	16537----------K
28 mm	PES	MBS	0.45 µm	Male Luer Lock	Amber	No	500	16537----------Q
28 mm	PES	MBS	0.45 µm	Male Luer Slip	Amber	Yes#	50	16533--------GUK
28 mm	PES	MBS	0.45 µm	Male Luer Slip	Amber	Yes	50	16533----------K
28 mm	PES	MBS	0.45 µm	Male Luer Slip	Amber	No	500	16533----------Q
Minisart® NML ((SF)CA – (Surfactant-free) Cellulose Acetate)								
28 mm	SFCA	MBS	0.2 µm	Male Luer Lock	Blue	Yes	50	S6534------FMOSK
28 mm	SFCA	MBS	0.2 µm	Male Luer Lock	Blue	Yes#	50	S6534------FMGUK
28 mm	SFCA	MBS	0.2 µm	Male Luer Lock	Blue	No	500	S6534------FM--Q
28 mm	SFCA	MBS	0.2 µm	Male Luer Slip	Blue	Yes	50	S7597------FXOSK
28 mm	SFCA	MBS	0.2 µm	Male Luer Slip	Blue	No	500	S7597------FX--Q
28 mm	SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	Yes	50	S6555------FMOSK
28 mm	SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	Yes#	50	S6555------FMGUK
28 mm	SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	No	500	S6555------FM--Q
28 mm	SFCA	MBS	0.45 µm	Male Luer Slip	Yellow	Yes	50	S7598------FXOSK
28 mm	SFCA	MBS	0.45 µm	Male Luer Slip	Yellow	No	500	S7598------FX--Q
28 mm	CA	MBS	0.65 µm	Male Luer Slip	Pink	Yes	50	16569----------K
28 mm	CA	MBS	0.8 µm	Male Luer Lock	Green	Yes	50	16592----------K
28 mm	CA	MBS	0.8 µm	Male Luer Lock	Green	Yes#	50	16592--------GUK
28 mm	CA	MBS	0.8 µm	Male Luer Lock	Green	No	500	16592----------Q
28 mm	CA	MBS	1.2 µm	Male Luer Lock	Red	Yes	50	17593----------K
28 mm	CA	MBS	1.2 µm	Male Luer Lock	Red	No	500	17593----------Q
28 mm	CA	MBS	5 µm	Male Luer Lock	Brown	Yes	50	S7594------FMOSK
28 mm	CA	MBS	5 µm	Male Luer Lock	Brown	No	500	17594----------Q

Minisart® NML Plus (Glass Fiber 0.7 µm² + SFCA)								
Ø in mm | EFA[1]	Membrane	Housing	Pore Size	Connector Outlet	Color | Printing	Sterile*	Qty./Pkg.	Order No.
28 mm	GF+SFCA	MBS	0.2 µm	Male Luer Lock	Blue	Yes	50	17823----------K
28 mm	GF+SFCA	MBS	0.2 µm	Male Luer Lock	Blue	No	500	17823----------Q
28 mm	GF+SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	Yes	50	17829----------K
28 mm	GF+SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	No	500	17829----------Q
28 mm	GF+CA	MBS	1.2 µm	Male Luer Lock	Red	No	500	17825----------Q
28 mm	GF	MBS	0.7 µm[2]	Male Luer Lock	White	No	50	17824----------K
28 mm	GF	MBS	0.7 µm[2]	Male Luer Lock	White	No	500	17824----------Q
Minisart® HY (hydrophobic PTFE), for Venting and Gas Filtration								
26 mm	PTFE	MBS	0.2 µm	Male Luer Lock	Clear	Yes	50	S6596------FMOSK
26 mm	PTFE	MBS	1 µm	Male Luer Lock	Clear	No	500	1659A--------HYQ
26 mm	PTFE	MBS	0.2 µm	Male Luer Lock	Clear	No	500	S6596------FM--Q
Minisart® High Flow (PES – Polyethersulfone) Aqueous Filtration								
28 mm	PES	MBS	0.1 µm	Male Luer Lock	Dark Red	Yes	50	16553----------K
Minisart® Air (Hydrophobic PTFE) Venting								
15 mm	PTFE	MBS	0.2 µm	Male Luer Slip	Yellow	No	500	1751A----------Q
15 mm	PTFE	MBS	0.2 µm	Male Luer Slip + Needle	Yellow	No	500	1751A----------Q
Minisart® Acticosart with Dome Reservoir + Hydrophobic PTFE Venting & Ultracleaning of Gases								
26 mm	Active carbon	MBS	0.45 µm	Male Luer Slip	Blue	No	500	17840----------Q

* Sterilized Minisart® units are individually packaged. If not stated otherwise, Minisart® are sterilized by ethylene oxide.
#-mark indicates sterilization by gamma irradiation.
Non-presterilized Minisart® units: High Flow, NML, NML Plus and HY can be sterilized by ethylene oxide; High Flow, NML and NML Plus can also be sterilized by gamma irradiation
[1] Diameter of EFA – Effective Filtration Area
[2] 0.7 µm = GF particle retention ≠ pore size!

Minisart® Standard Syringe Filters are not for medical use.

For technical product specifications, please see page 76.

CE-Minisart® Syringe Filters

For medical use – Sterile Filtration and Sterile Venting
The medical device CE-Minisart® NML and Ophthalsart with (surfactant-free) cellulose acetate ((SF)CA), and CE-Minisart® HY and SRP with hydrophobic PTFE are frequently used for sterile filtration and | or clarification of aqueous and oily liquids and other medical applications. CE-Minisart® NML with a 5 µm cellulose acetate (CA) membrane removes particulates or coagulates offering high total throughput under sterile conditions. Hydrophobic PTFE filters are suitable for venting purposes. All CE-Minisart® filters are intended to be used in a laboratory environment before use for patient care.

Minisart® Features
- Low adsorption
- Gamma-irradiated or EO-sterilized
- Biocompatible acc. to ISO 10993-1

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CE-Minisart® Syringe Filters

Specifications

CE-Minisart® NML / Ophthalsart with 28 mm accessible membrane filtration diameter, ≤ 150 µL hold-up volume[1]
CE-Minisart® HY with 26 mm accessible membrane filtration diameter, ≤ 200 µL hold-up volume[1]
CE-Minisart® SRP with 25 mm accessible membrane filtration diameter, ≤ 200 µL hold-up volume[1]

Housing material	NML/Ophthalsart/HY: Methacrylate butadiene styrene (MBS) SRP: Polypropylene (PP)
Membranes	NML /Ophthalsart: (SF)CA = (Surfactant-free) Cellulose Acetate NML (5 µm): CA = Cellulose Acetate HY: Hydrophobic PTFE = Polytetrafluoroethylene SRP: Hydrophobic PTFE = Polytetrafluoroethylene
Max. operating pressure	4.5 bar | 65 psi
Housing burst pressure	≥ 7 bar | 102 psi
Max. temperature	60 °C
Sterilization	Non-sterile Minisart® NML can be sterilized by ethylene oxide (EO) or gamma irradiation. Non-sterile Minisart® HY can be sterilized by ethylene oxide (EO)

Minisart® type with regards to membrane	**SFCA 0.2 µm**	**SFCA 0.45 µm**	**CA 5.0 µm**	**PTFE 0.2 µm**	**PTFE 0.2 µm**
Non-sterile packages: 500 (Q, HYQ), sterile packs: individually packaged: 50 (K, GUK, HYK, ACK)	K | GUK | Q	K | GUK | Q	K	HYK | HYQ	ACK
Bubble point (≥)	With water 3.2 bar | 46 psi	With water 2.0 bar | 29 psi	With water 0.4 bar | 6 psi	With ethanol 1.4 bar | 20 psi	With ethanol 1.1 bar | 16 psi

Flow Rate for[2] (≥ mL/min)					
28 mm Ø for water at 1 bar	60	160	600	–	–
25 mm Ø with ethanol at 1 bar	–	–	–	–	60
25 mm Ø for air at 0.1 bar	–	–	–	–	1,800
26 mm Ø for air at 0.1 bar	–	–	–	2,000	–

Water penetration point[2] (≥)	–	–	–	4.0 bar | 58 psi	4.0 bar | 58 psi
Sterile filtration capability[3] acc. to the bacteria challenge test	Yes	No	No	Yes	Yes
Non-pyrogenic	Yes	Yes	Yes	Yes	Yes
Biocompatible	acc. to ISO 10993-1				

[1] Hold-up volume after air purge
[2] Hydrophobic membranes cannot be wetted with aqueous solutions unless you overcome their water penetration point.
[3] According to the bacterial challenge test (BCT) with ≥ 1×10^7 cfu/cm² Brevundimonas diminuta. All non-sterile Minisart® types listed above can be sterilized according to the sterilization recommendation in this table.

CE-Minisart® Syringe Filters for Medical Use

Ordering Information

Ø in mm | EFA[1]	Membrane	Housing	Pore Size	Connector Outlet	Color | Printing	Sterile*	Qty./Pkg.	Order No.
Minisart® NML ((SF)CA – (Surfactant-free) Cellulose Acetate) Aqueous Filtration								
28 mm	SFCA	MBS	0.2 µm	Male Luer Lock	Blue	Yes	50	16534----------K*
28 mm	SFCA	MBS	0.2 µm	Male Luer Lock	Blue	Yes#	50	16534--------GUK*
28 mm	SFCA	MBS	0.2 µm	Male Luer Lock	Blue	No	500	16534----------Q*
28 mm	SFCA	MBS	0.2 µm	Male Luer Slip	Blue	Yes	50	17597----------K *
28 mm	SFCA	MBS	0.2 µm	Male Luer Slip	Blue	No	500	17597----------Q*
28 mm	SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	Yes	50	16555----------K*
28 mm	SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	Yes#	50	16555--------GUK*
28 mm	SFCA	MBS	0.45 µm	Male Luer Lock	Yellow	No	500	16555----------Q*
28 mm	SFCA	MBS	0.45 µm	Male Luer Slip	Yellow	Yes	50	17598----------K*
28 mm	SFCA	MBS	0.45 µm	Male Luer Slip	Yellow	No	500	17598----------Q*
28 mm	CA	MBS	5 µm	Male Luer Lock	Brown	Yes	50	17594----------K*
Minisart® Ophthalsart (SFCA – Cellulose Acetate) Aqueous Filtration								
28 mm	SCFA	MBS	0.2 µm	Male Luer Slip	Pink	Yes	50	17528----------K*
Minisart® HY (Hydrophobic PTFE), for Venting and Gas Filtration								
26 mm	PTFE	MBS	0.2 µm	Male Luer Lock	Clear	Yes	50	16596--------HYK*
26 mm	PTFE	MBS	0.2 µm	Male Luer Lock	Clear	No	500	16596--------HYQ*
26 mm	PTFE	MBS	0.2 µm	Male Luer Lock[a]	Clear	No	500	16599--------HYQ*
Minisart® SRP (Hydrophobic PTFE) Venting & Gas Filtration								
25 mm	PTFE	PP	0.2 µm	Male Luer Slip	White, Printed	Yes	50	17575--------ACK*

* Article numbers are only available in: EU/EEA and in registered countries.
** Sterilized Minisart® units are individually packaged. If not stated otherwise, Minisarts are sterilized by ethylene oxide.
#-mark indicates sterilization by gamma irradiation
Non-presterilized Minisart® units: (SF)CA can be sterilized by ethylene oxide or gamma irradiation. PTFE can be sterilized by ethylene oxide.
[a] Connector inlet: Male Luer Slip (all other Minisart® have Female Luer Lock inlet(s)).
[1] Diameter of EFA – Effective Filtration Area

For technical product specifications, please see page 81.

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Claristep® Filtration System

The Claristep® Station consists of a base, a lid and an exchangeable tray for easy and accurate positioning of sample vials and Claristep® Filter units.

The patent-pending design features unique grooves in the station's lid and matching guide ridges on Claristep® Filter units to enable intuitively correct alignment and convenient handling of the system.

The Power of Simplicity

Preparing samples by clarification is an essential step prior to nearly all analytical techniques, such as high pressure liquid chromatography (HPLC). This filtration step to eliminate particles is crucial for maintaining the integrity of chromatography columns and for maximizing their operating life time.

In addition, as the sensitivity of automated analytical instruments continues to improve, they increasingly require less volume to operate in order to maximize throughput. Therefore, fast clarification of small volumes that does not add leachables or extractables to the original sample is indispensable for achieving the best analytical results.

To meet these requirements, Sartorius has developed a new, easy-to-use and straightforward filtration setup. The manually operated Claristep® Filtration System consisting of a station and filter units offers a novel way for clarifying your samples prior to analysis.

- Up to 8 samples are processed simultaneously
- No syringe required
- No need for a vacuum source or a power supply
- For low sample volumes ranging from 60 µL to 600 µL
- Hold-up volume < 30 µL

The grooves automatically guide the filter unit caps into the correct positions for simultaneous and accurate cap closure.

Claristep® Filter units are made of the purest materials. Another major benefit is that the contact time of the samples with the filters and the caps is extremely short, ensuring optimal, contamination-free results. Filtered liquids are collected in any 12 × 32 mm outer diameter vials of your choice based on the analytical method to be performed.

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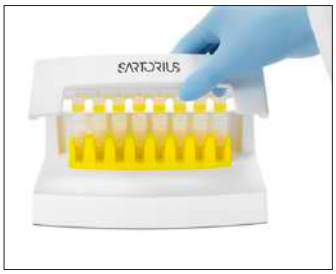
Sample Preparation for Analytics

Use the Most Ergonomic Clarification Solution

Filter 8 samples simultaneously – without needing any power supply or a vacuum | pressure source.
Simply place the filters on your vials, gently close the station and press on the station lid to filter – that's it!



1. Close the station lid. The grooves align the caps automatically, securely sealing every single Claristep® Filter unit for the most convenient processing.

2. Apply slight uniform pressure with your hand to start sample clarification. You will feel a certain resistance while liquid is pressed through each membrane.

3. Press down on the station lid so that the left and right corners touch the base plate. Hold the lid in place for 3 seconds to ensure all sample liquid is filtered through.

Claristep® Filter units press liquid through each membrane by an air pocket that forms over each filter unit when the station lid is closed. This air pocket is released when you stop holding down the lid – you will feel it in your fingertips!

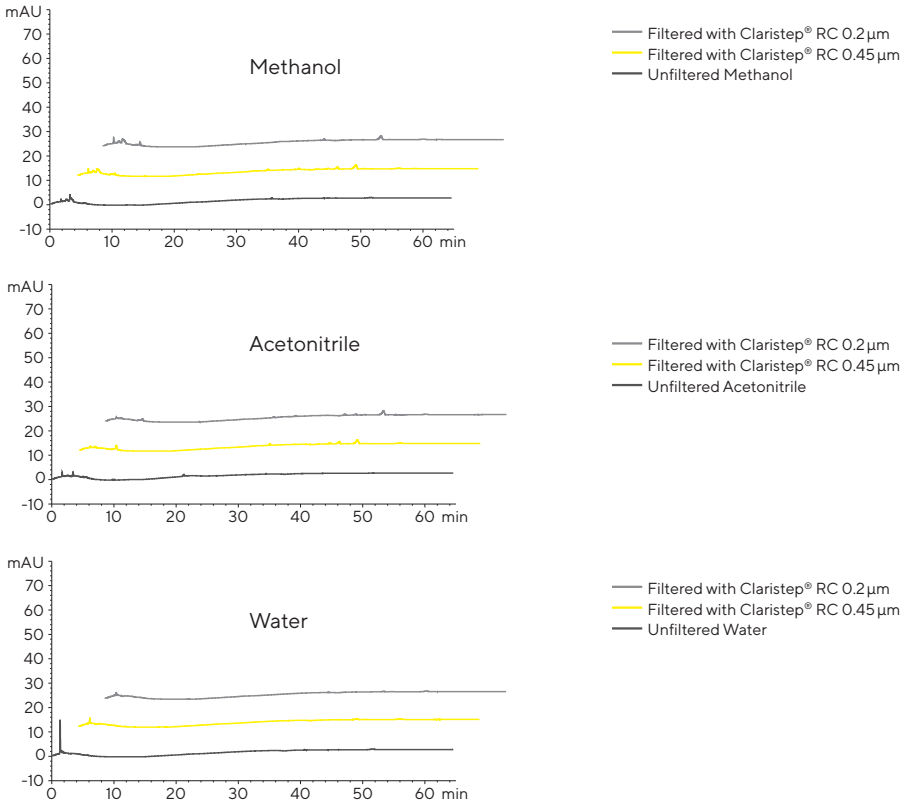
Before clarification, the samples are pipetted in the filter reservoire.

After clarification, the filtrates are collected in sample vials.

Reliable Removal of Particles

Filter Samples Without Adding Extractables and Leachables
Claristep® Filter units with RC membranes are optimized for solvents and aqueous solutions. They provide maximum chemical compatibility and exceptionally low non-specific binding of analytes.

HPLC Certification



HPLC Procedure
Column: C18: 5 µm × 250 mm × 4.0 mm, Flow Rate: 1 mL/min, Wavelength: 220 nm
Injection Volume: 20 µL, Analysis Time: 65 min, Temperature: 40 °C,
Mobile Phases: A) Acetonitrile | B) Water, Gradient: Hold 60 % A for 10 min, 60 % to 100 % A in 20 min, 100 % A for 30 min

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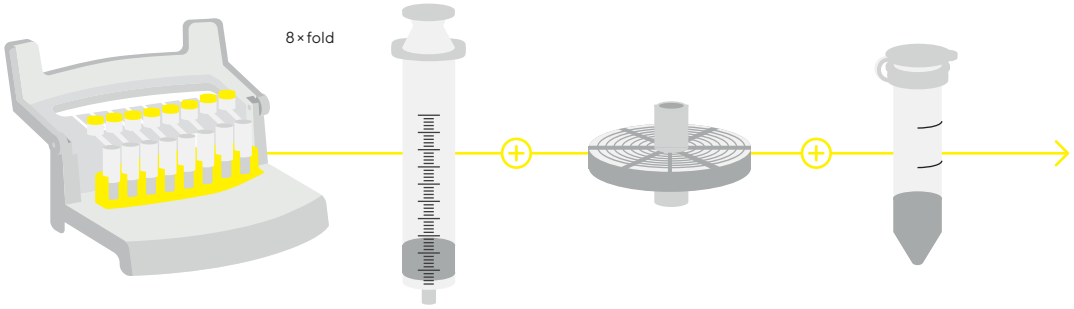
Sample Preparation Techniques

Choose the Best Solution for Your Needs
Do you process dozens of samples each day? A syringeless solution will help you reduce time, effort and waste – and minimize hand stress. If you need to analyze only a few samples a day, you will benefit from our proven combination of a syringe and syringe filter. The choice is all yours!

Claristep®
Filtration System

or

Syringe Filters
for processing one sample at a time



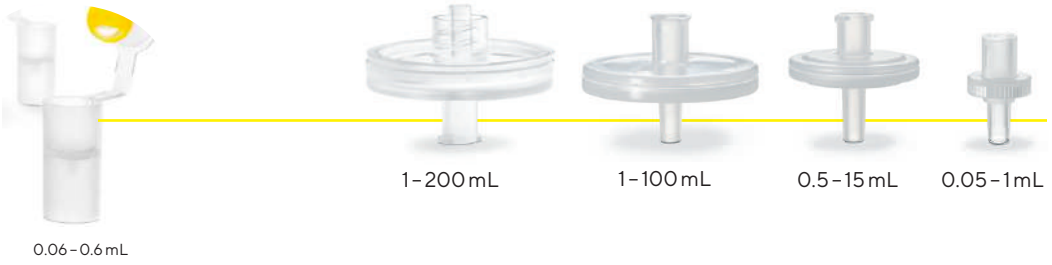
Analytical Sample Volumes Run Small

Get the Particle-free Volume You Really Need
If you need to fill only 12 × 32 mm vials, a syringeless solution will help you save time and reduce sample loss!

Syringeless Solution

or

Different Diameters
for different sample volumes



Ordering Information

Claristep® Filters are availabe in a choice of two pore sizes

Claristep® Filters						
Ø mm | EFD1	Membrane	Housing	Pore Size	Sterile	Qty | Pk	Order No.
9.7 mm	RC	PP	0.2 µm	No	96	17C07FT–96
9.7 mm	RC	PP	0.2 µm	No	480	17C07FT-480
9.7 mm	RC	PP	0.45 µm	No	96	17C06FT–96
9.7 mm	RC	PP	0.45 µm	No	480	17C06FT-480

[1] Effective Filtration Diameter
RC = Regenerated Cellulose

Claristep® System		
Name	Qty./Pkg.	Prod. No.
Claristep® Station complete	1	17C-M8
Claristep® Single Tray	1	17C-S1

The Tray can be removed and exchanged

12 × 32 mm sample vials

Additional Components Needed

The free choice of 12 × 32 mm sample vials and lids is enabeling you to chose the right vial for your particular sample and application, e.g. for light sensitive substances you can use brown glass. For small sample volumes you can use vessels with inlays. You can use glass or plastic, screw caps and | or slid lids – whatever you prefer.

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SARTORIUS

Sartolab® P20 Pressure Filter Units

Compact Design for the Filtration of Large Volumes

Sartolab® P20 devices are ready-to-use pressure filter units for the clarification and sterile filtration of media and aqueous solutions in batches from 100 mL to 10 L. Sartolab® P20 Plus with an incorporated prefilter is recommended for difficult-to-filter solutions like, for example, media that contains serum.

Membrane of Choice

Polyethersulfone (PES) is the membrane of choice for the Sartolab® P20 pressure filter units, as it combines very low protein binding properties with the highest flow rates. The Sartolab® P20 pressure filter unit is available either with 0.2 µm or 0.45 µm PES membranes, with or without a prefilter made of high purity quartz microfibers. An additional version containing quartz microfiber only is also available for clarification purposes.

Compact Design

Sartolab® P20 pressure filter units have been designed to filter batches from 100 mL to 10 L, either using a syringe or in-line with a peristaltic pump, or a pressure vessel.Sartolab® P20 pressure filter units are available in different configurations, with or without PTFE automatic venting, with or without a filling bell (including cover) on the outlet and with a combination of different inlet and outlet connectors to meet the needs of most applications.

Benefits

- Highest flow rates with a large surface of filtration (20 cm^2)
- No loss of protein with a low binding membrane
- Low dead volume due to an optimized membrane support
- Versions available with a prefilter for high particle load solutions

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Specifications

Different Filter Materials	0.2 µm polyethersulfone 0.45 µm polyethersulfone High purity binder-free quartz microfibers
Housing Material	Transparent polycarbonate
Filter Diameter	61 mm
Filtration Area	20 cm^2
Holdup Volume	Sartolab® P20: 1 mL Sartolab® P20 Plus: 1.2 mL Sartolab® P20 Prefilter: 1 mL
Filtration Range	Sartolab® P20: 100 mL to 5 L Sartolab® P20 Plus: 100 mL to 10 L Sartolab® P20 Prefilter: 100 mL to 10 L
Recommended Max. Inlet Pressure	4 bar
pH Range	1 – 10
Housing Burst Pressure	> 5 bar
Autoclavable	121°C

Ordering Information

Sartolab® P20

Order Number	Filter Material	Inlet	Outlet	PTFE Venting	Filling Bell	Sterilization (EO)	Qty./Pack
18064----------D	0.2 µm PES	Female Luer-Lock	Male Luer-Lock	yes	no	yes	10
18075----------D	0.2 µm PES	Female Luer-Lock	Hose barb	no	no	yes	10
18075--------UPN	0.2 µm PES	Female Luer-Lock	Hose barb	no	no	no	100
18089----------D	0.2 µm PES	Hose barb	Hose barb	yes	yes	yes	10
18090----------D	0.2 µm PES	Female Luer-Lock	Male Luer-Lock	no	no	yes	10

Sartolab® P20 Plus

Order Number	Filter Material	Inlet	Outlet	PTFE Venting	Filling Bell	Sterilization (EO)	Qty./Pack
18068----------D	Quartz microfibers & 0.2 µm PES	Female Luer-Lock	Hose barb	yes	yes	yes	10
18076----------N	Quartz microfibers & 0.45 µm PES	Hose barb	Hose barb	no	no	no	100
18091----------D	Quartz microfibers & 0.2 µm PES	Hose barb	Hose barb	yes	yes	yes	10
18092----------D	Quartz microfibers & 0.2 µm PES	Female Luer-Lock	Male Luer-Lock	no	no	yes	10

Sartolab® P20 Prefilter

Order Number	Filter Material	Inlet	Outlet	PTFE Venting	Filling Bell	Sterilization (EO)	Qty./Pack
18072----------D	Quartz microfibers	Female Luer-Lock	Hose barb	no	no	no	10

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Sartolab® RF 50

Vacuum filtration unit for volumes of up to 50 mL

Sartolab® RF 50 vacuum filtration units are single-use units, designed for the filtration of sample volumes of up to 50 mL. They are available either with a 0.22 or a 0.45 µm polyethersulfone membrane which have been developed and manufactured by Sartorius at its own facilities. Both membranes provide fastest flow rates due to their asymmetric structure and ensure lowest protein binding as well as low extractables. The 0.22 µm version is ideal for sterile filtration of cell cultures, buffers and aqueous solutions; the 0.45 µm for clarification. Sartolab® RF 50 are available either individually packed and sterile or in bulk non-sterile.

Sartolab® RF 50 vacuum filtration unit is composed of a funnel, with dust cover, a 50 mL conical tube with graduation and writing field as well as a tubing connector for vacuum connection (sterile versions only) and a screw cap to store your filtrate in the conical tube. The design of the yellow adapter connecting the funnel to the conical tube ensures a vacuum-tight seal and enables the filtration unit to be used on the Sartolab® MultiStation for filtration of up to 6 samples in parallel with one vacuum source.

Sartolab® RF 50 can also be used alone when connecting the tubing connector delivered with each unit to your vacuum source (sterile versions only). The tubing connector and the screw cap for the conical tube are individually wrapped to maintain sterility until needed.

User Benefits

- Highest flow rates with an asymmetric membrane and a large surface area
- No loss of protein with a very low protein binding membrane
- Low dead volume thanks to an optimized membrane support
- Minimized risks of contamination with a complete ready-to-use unit (no further transfer of liquid for storage necessary)
- Designed as standalone system or for a parallel filtration of up to 6 samples with Sartolab® MultiStation

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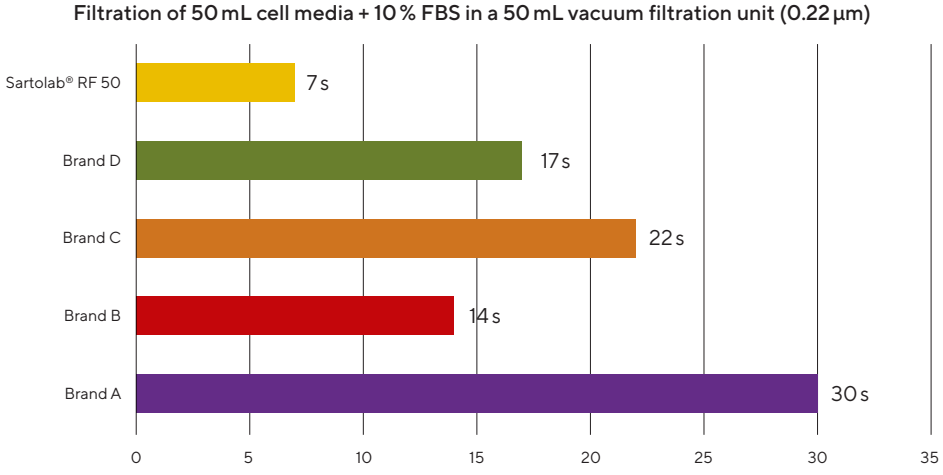

Materials

Funnel with dust cover	Polystyrene (PS)
Membrane filter	0.22 µm polyethersulfone (order no. 180E01) 0.45 µm polyethersulfone (order no. 180F01)
Funnel adapter	High Density Polyethylene (HDPE)
Tubing connector for vacuum connection	High Density Polyethylene (HDPE)
Conical tube	Polypropylene
Conical tube cap	High Density Polyethylene (HDPE)

Specifications

Membrane Ø	58.5 mm
Effective filtration area	21 cm²
Hold-up volume	1.2 mL
Filtration capacity	50 mL
Size of the 50 mL conical tube	Height: 115.5 mm, External/internal diameter: 29.5 mm/27.48 mm
Autoclavable	No
Sterilization method	E-Beam (beta) irradiation
Storage temperature of the conical tube	4 °C to 30 °C (short-term: –80 °C to max. 100 °C)
Packaging	Single-packaged, sterile
Operating pressure	–350 to –700 mbar

Ordering Information

Description	Quantity	Order No.
Sartolab® RF 50, 0.22 µm, PES	24 units	180E01--------2
Sartolab® RF 50, 0.45 µm, PES	24 units	180F01--------2
Sartolab® RF 50, 0.22 µm, PES, non-sterile	96 units	180E01--------E8
Sartolab® RF 50, 0.45 µm, PES, non-sterile	96 units	180F01--------E8

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Sartolab® RF | BT

Vacuum Filtration Units

Sartolab® RF | BT vacuum filtration units are convenient filtration units designed for research purposes and, therefore, for the filtration of small volumes from > 50 mL to 1 L. Sartolab® RF as a complete system includes a receiver flask to the filtration funnel. Sartolab® BT is a bottle top filter (filtration funnel) without a receiver flask, enabling customers to use their own receiver flasks and/or to expand the filtration capacity, depending on the particle load of the filtered liquid, by filling more than one receiver flask.

Membrane of Choice

Polyethersulfone is the membrane of choice for the Sartolab® RF | BT vacuum filtration units as it combines very low protein binding properties and highest flow rates. The 0.22 µm polyethersulfone membrane belongs to the best asymmetric membrane in the market.

The Sartolab® RF | BT vacuum filtration units are available in 3 different pore sizes to meet most of the applications:

- 0.1 µm for mycoplasma removal
- 0.22 µm for the sterile filtration of cell culture, media, buffers, and reagents
- 0.45 µm for the clarification of aqueous and viscous solutions

Ergonomic Design

Sartolab® RF | BT vacuum filtration units have been designed to maximally facilitate the user's daily work.

- Ergonomic design of the 150 mL to 1 L bottles for easy grip with one hand and designated writing field on the back for clear labeling of samples
- Engraved graduations on the funnels and the bottles ensure accuracy and highest readability
- The footprint of the bottles gives good stability for the unit during filtration
- No extra tightening of the funnel before filtration required (vacuum-tight sealed)
- The funnels and bottles are stackable to save space not only in the refrigerator but also in the bin
- The design of the yellow adapter connecting the funnel to the bottles enables the filtration unit to be used on the Sartolab® Multistation for filtration of up to 6 samples in parallel with one vacuum source
- The ergonomic soft blister packaging is not only easy to open but its design facilitates the transportation of several units with one hand

State-of-the-Art Production

- Sartolab® RF | BT vacuum filtration units are manufactured in an ISO 13485 certified plant and ISO
- Class 8 cleanroom to assure the highest level of purity
- All fluid path materials used in the production of the Sartolab® RF | BT vacuum filtration units are medical graded for highest quality, without any animal origin
- All products are sold sterilized and guaranteed endotoxin-free
- All fluid path component materials meet the requirements for United States Pharmacopeia (USP)
- Class VI Biological Test for Plastics, latest volume
- The fluid path component materials are determined to be non-cytotoxic in accordance to ISO 10993

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Best Engineering

- Optimized membrane support for lowest hold-up volumes and for the reducing of foam formation and thus a denaturation of proteins
- Delivered with a vacuum tube connector for stand-alone filtration
- For the Sartolab® RF versions, the screw caps of the bottles are delivered extra packed to maintain sterility up to the end of filtration
- The 45 mm neck thread of the Sartolab® units ensures a vacuum-tight seal to bottles with this standard thread
- The risk of contamination is minimized with the complete ready-to-use unit Sartolab® RF versions

Technical Specifications

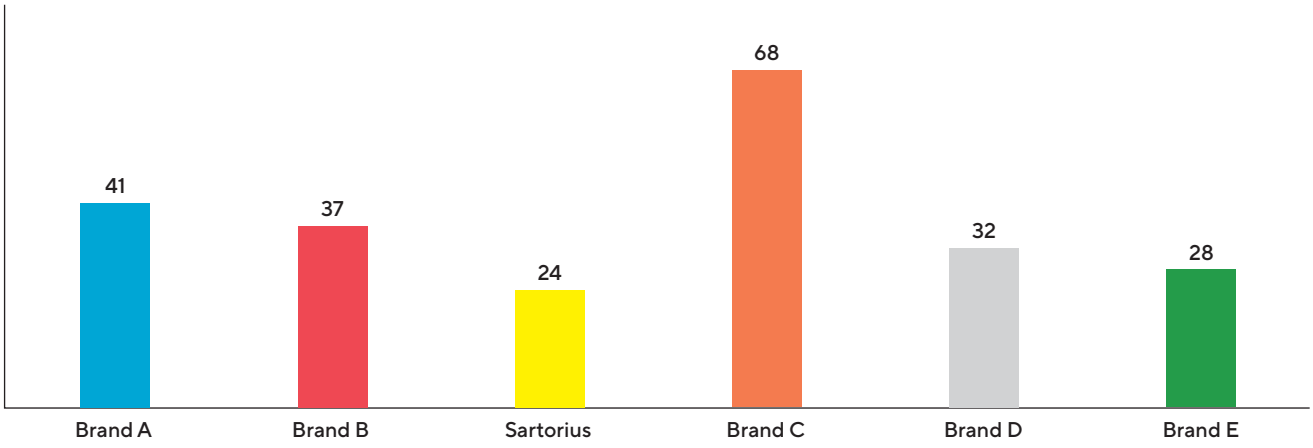
Material

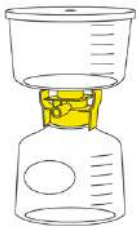
Membrane filter	0.1 µm polyethersulfone (Cat. No. 180D*) 0.22 µmpolyethersulfone (Cat. No. 180E*) 0.45 µm polyethersulfone (Cat. No. 180F*)
Funnel, lid, and bottle	Polystyrene (PS)
Tubing connector, funnel adapter, and screw cap	High Density Polyethylene (HDPE)
Packaging	PET|PE and PE|PA multilayer films

Specifications

Membrane diameter	80 mm for 150 mL and 250 mL volumes 100 mm for 500 mL and 1,000 mL volumes
Effective filtration area	43 cm^2 for 150 mL and 250 mL volumes 69 cm^2 for 500 mL and 1,000 mL volumes
Bottle neck size	45 mm
Autoclavable	No
Sterilization method	E-Beam (beta) irradiation (SAL 10^{-6})
Transportation and storage temperatures	-20° C to + 60° C
Operational temperatures	0° C to 70° C
Packaging	Single-packaged, soft blister, sterile
Operating pressure	-350 to -750 mbar
Hold up volumes (for water)	2.7 mL for 150 mL and 250 mL versions 4.1 mL for 500 mL and 1,000 mL versions

Comparison of Filtration Times [s] for 500 mL Cell Media + 10% FBS in Six 0.22 µm 500 mL Vacuum Filtration Units



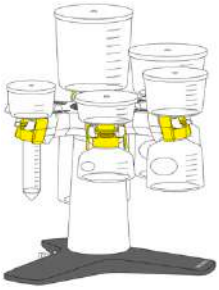


The Sartolab® RF vacuum filtration unit is comprised of:

- A graduated funnel with a polyethersulfone (PES) membrane, a vacuum adapter and a lid
- A bottle, with graduation and writing field
- A tube connector for vacuum connection (for stand-alone filtration)
- A screw cap for storage of the filtrate (individually wrapped to maintain sterility)

The Sartolab® BT bottle top filter is comprised of:

- A graduated funnel with a polyethersulfone (PES) membrane, a vacuum adapter, and a lid
- A tubing connector for vacuum connection (for use as stand-alone)



Ordering Information

Sartolab® RF

Order Number	Description	Membrane Type	Pore Size (µm)	Funnel Volume (mL)	Bottle Volume (mL)	Pkg. Unit
180E02----------E	Sartolab® RF 150	Asymmetric PES	0.22	150	150	12
180F02----------E	Sartolab® RF 150	PES	0.45	150	150	12
180D03----------E	Sartolab® RF 250	PES	0.1	250	250	12
180E03----------E	Sartolab® RF 250	Asymmetric PES	0.22	250	250	12
180F03----------E	Sartolab® RF 250	PES	0.45	250	250	12
180E04----------E	Sartolab® RF 500	Asymmetric PES	0.22	500	500	12
180F04----------E	Sartolab® RF 500	PES	0.45	500	500	12
180D05----------E	Sartolab® RF 1,000	PES	0.1	1,000	1,000	12
180E05----------E	Sartolab® RF 1,000	Asymmetric PES	0.22	1,000	1,000	12
180F05----------E	Sartolab® RF 1,000	PES	0.45	1,000	1,000	12

Sartolab® BT

Order Number	Description	Membrane Type	Pore Size (µm)	Funnel Volume (mL)	Pkg. Unit
180E12----------E	Sartolab® BT 150	Asymmetric PES	0.22	150	12
180E13----------E	Sartolab® BT 250	Asymmetric PES	0.22	250	12
180E14----------E	Sartolab® BT 500	Asymmetric PES	0.22	500	12
180E15----------E	Sartolab® BT 1,000	Asymmetric PES	0.22	1,000	12
180F15----------E	Sartolab® BT 1,000	PES	0.45	1,000	12

Accessories and Consumables

Multistation

For hands-free parallel filtration of up to six samples

Order Number	Description	Pkg. Unit
SDLC01	Sartolab® Multistation	1

Sartolab® Bottle

Delivered sterile, for filtration and storage

Order Number	Description	Volume (mL)	Pkg.Unit
180-22----------E	Sartolab® bottle 150 mL	150	12
180-23----------E	Sartolab® bottle 250 mL	250	12
180-24----------E	Sartolab® bottle 500 mL	500	12
180-25----------E	Sartolab® bottle 1,000 mL	1,000	12

Binder-Free Glass Microfiber Prefilters

High purity prefilters to prevent the clogging of the membrane when filtering viscous or particulate-loaded solutions

Order Number	Description	Filter Diameter (mm)	Pkg. Unit
FT-3-1101-080	Binder-free glass microfiber filter discs, grade MGA, for 150 and 250 mL funnels	80	100
FT-3-1101-100	Binder-free glass microfiber filter discs, grade MGA, for 500 and 1,000 mL funnels	100	100

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Sartolab® Multistation

For hands-free parallel filtration of up to 6 samples

Sartolab® MultiStation is a stand specially designed to hold 1 to 6 vacuum filtration units, allowing simultaneous filtration of up to 6 samples.

The MultiStation is permanently connected to your vacuum source. Easily install your vacuum filtration units in the MultiStation for quick and easy filtration of samples without the need for installation of extra connectors and time-consuming stabilization.

Sartolab® MultiStation works with all Sartolab® RF | BT vacuum filtration units; the funnel adapter of these units is designed to fit perfectly in the bracket of the MultiStation. With one click, connect the filtration unit to the device, assuring perfect filter stability. With a second click, engage the vacuum automatically and begin filtering.

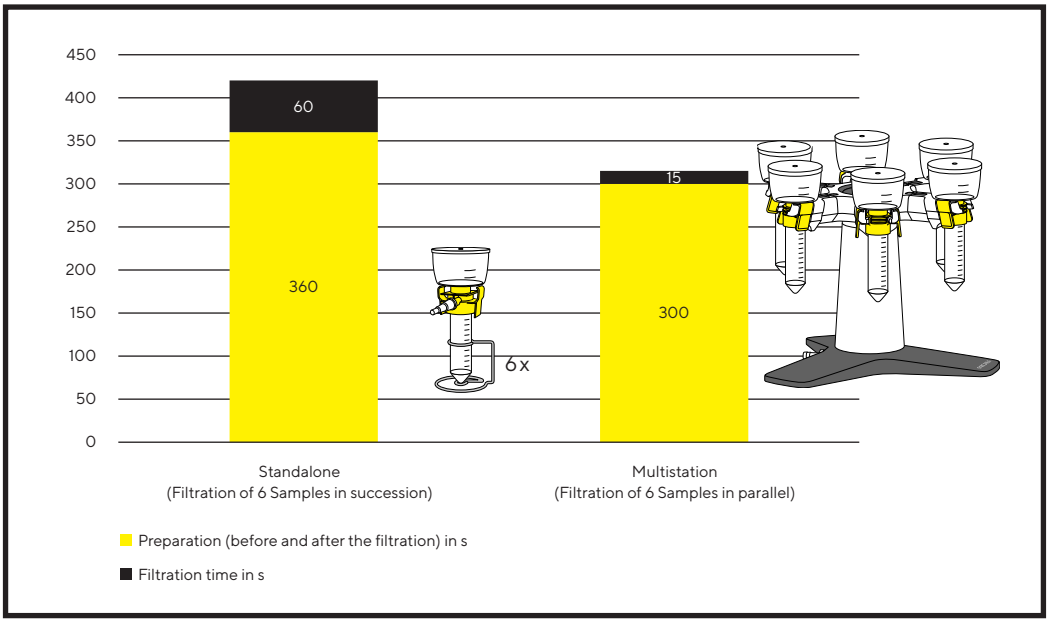
Easily manipulate your samples with the rotating, multi-directional head, and easily keep track of your samples during filtration with the numbered brackets

User Benefits

- Single vacuum source enables simultaneous filtration of up to 6 samples
- Time-saving (no installation time for each filter unit before use)
- Hands-free filtration

The MultiStation advantage: Using the Sartolab® MultiStation to filter 6 x 50 mL samples saves handling time compared to standalone filtration

Filtration of 50 mL cell media + 10 % FBS in a 50 mL vacuum filtration unit (0.22 µm)



Specifications

Material (visible parts)	ABS | Aluminum | Stainless steel
Dimensions (Length × Width × Height)	307 × 348 × 281 mm
Weight	4.6 kg
Tubing connector	Designed for tubing with an inner diameter between 4 and 10 mm and with a wall thickness of minimum 3 mm

Ordering Information

Description	Quantity	Order No.
Sartolab® MultiStation	1 unit	SDLC01

Sartoclear Dynamics® Lab P15

Clarification and Sterile Filtration of up to 15 mL Mammalian Cell Culture in One Step

Sartoclear Dynamics® Lab P15 is a kit for single step harvesting of 15 mL animal cell cultures with even high cell densities. With this kit, the clarification and sterile filtration of mammalian cell culture is performed in a single pressure filtration step. Inspired by the plasma industry, Sartoclear Dynamics® is based on the principles of body feed filtration.

This ready to use kit combines a 20 mL syringe pre-filled with a 0.5 g filter aid and an integrated filter* for sterile filtration. The filter aid facilitates filtration through the sterile filter while allowing complete protein recovery.

A convenient filling tube can be connected to the syringe, for the easy recovery of samples from 50 mL Falcon tubes or ambr 15 bioreactors.

As a result, this method replaces centrifugation and subsequent sterile filtration steps, leading to clarified and sterilized cell culture harvest in minutes. Your cell culture harvest will be available for following sample concentration by ultrafiltration and downstream analytics in no time.

Sartoclear® Dynamics Lab P15 Features:

- Single step mammalian cell culture harvest
- Designed for cell densities up to 20×10^6 cells and even more
- Fast and effortless filtration
- Optimized for cell culture harvest from ambr® 15 bioreactors

* The sterile filter included in the kit contains a 0.2 µm polyethersulfone membrane and a prefilter made of 100 % high-purity quartz: The choice of these materials, along with the larger surface area of the filter, enables higher flow rates.

Quick and Easy Filtration

1. Fill the syringe with cell culture broth.

2. Shake the syringe to mix the broth with the filter aid.

3. Connect the sterile filter to the syringe and filter.

Typical Results

Cell Type	Cell Density	Viability	Mab concentration before filtration	Mab concentration after filtration	Recovery Rate
CHO DG44	16×10^6 cells/mL	78 %	6.02 g/L	5.77 g/L	96 %
CHO DG44	38×10^5 cells/mL	48 %	0.43 g/L	0.43 g/L	100 %

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Specifications

DE Syringe	
Syringe material	Syringe barrel and plunger rod: polypropylene; stopper: latex-free elastomer
Syringe Cap	Polyamide
Filling tube material	Polypropylene
Filter aid	0.5 g highly pure diatomaceous earth (Celpure® C300 – pharmaceutical-grade*)

Sterile Filter	
Housing material	Polycarbonate
Prefilter material	100 % high-purity quartz, binder-free
Filter material	0.2 µm polyethersulfone
Filter Ø	61 mm
Filtration area	20 cm^2
Connector inlet	Female Luer-Lock
Connector outlet	Male Luer-Lock
Hold-up volume	Approx. 2.5 mL
Housing burst pressure	> 5 bar | 72.5 psi
Packaging	Individually packed
Sterilization	EO sterilization

Ordering Information

Product Name	Number of units per box	Order No.
Sartoclear Dynamics® Lab P15	▪ 6 × 20 mL syringes, pre-filled with 0.5 g DE, including caps and filling tubes ▪ 6 × 0.2 µm PES sterile filters	SDLP--0015-----C

* Celpure® is a trademark of Advanced Minerals

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Sartoclear Dynamics® Lab V

Clarification and Sterile Filtration of 50 mL up to 1 L Mammalian Cell Culture in One Step

Sartoclear Dynamics® Lab V kits enable clarification and sterile filtration to be performed in a single step. These kits simplify the cell harvesting process by fully eliminating the centrifugation step otherwise needed for clarification. As a result, they enable cell cultures to be efficiently clarified and sterilized in minutes – quickly and easily.

Sartoclear Dynamics® Lab kits have been designed and optimized for harvesting mammalian cell cultures, such as CHO, HEK, hybridomas and many others, with cell densities of up to 20 × 10⁶ cells/mL.

Each kit provides filter aid pouches for clarification and Sartolab® RF vacuum filtration units for sterile filtration. The filter aid used in Sartoclear Dynamics® Lab products is made of highly-pure diatomaceous earth (DE) that is insoluble and inert. It is packed in ready-to-use pouches in pre-wetted condition to prevent the release of dust particles. The DE pouches are gamma-irradiated to rule out any contamination.

Sartoclear® Dynamics Lab V Features:

- Single step mammalian cell culture harvest
- Designed for cell densities up to 20 × 10⁶ cells
- Fast and effortless filtration

Typical Results

Cell Type	Cell Density	Viability	Mab concentration before filtration	Mab concentration after filtration	Recovery Rate	Turbidity
CHO	14.46 ×10⁶ cells/mL	85.2 %	5.2 g/L	5.15 g/L	99 %	18 NTU
HEK	8 ×10⁶ cells/mL	70 %	0.035 g/L	0.034 g/L	97 %	8 NTU

Specifications

Clarification Pouches of Filter Aid	
Diatomaceous Earth (DE)	1 g, 5 g or 10 g highly pure diatomaceous earth, (Celpure® C300 – pharmaceutical grade)*, mixed with water in a ratio of 1 DE: 1.25 ultrapure water
Packaging | Sterilization	Dust-free, gamma irradiated pouches

Filtration Vacuum filtration units with receiver flasks (Sartolab® RF 150 – 1000)	
Funnel, dust cover, receiver bottles	Polystyrene (PS)
Filter adapter, tubing connector, cap	High Density Polyethylene (HDPE)
Filter material	0.22 µm polyethersulfone
Packaging | Sterilization	Single-packaged, sterile

Filtration Vacuum filtration units with conical tube (Sartolab® RF 50)	
Funnel, dust cover	Polystyrene (PS)
Filter adapter, tubing connector, cap	High Density Polyethylene (HDPE)
Conical tube	Polypropylene
Filter material	0.22 µm polyethersulfone (order no. 180E01) 0.45 µm polyethersulfone (order no. 180F01)
Packaging	Single-packaged, sterile

* Celpure® is a trademark of Advanced Minerals

Each Sartoclear Dynamics® Lab V kit is comprised of pouches of filter aid and Sartolab® RF vacuum filtration units that match your needs. Find the right kit in just two easy steps:

1. Determine the volume range of your sample to be filtered.
2. Then reference it to the cell density of your cell culture.

Volume	**Cell density***		
	< 5 million cells/mL	5 – 10 million cells/mL	10 – 20 million cells/mL
≤ 50	SDLV-0050-01E0-2	SDLV-0050-02E0-2	
> 50 – 150 mL	SDLV-0150-02E0-E	SDLV-0150-05E0-2	
150 – 250 mL	SDLV-0250-05E0-2	SDLV-0250-10E0-2	
250 – 500 mL	SDLV-0500-05E0-2	SDLV-0500-10E0-2	SDLV-0500-20E0-E
500 – 1,000 mL	SDLV-1000-10E0-2	SDLV-1000-20E0-E	SDLV-1000-40E0-E

* Tested with CHO cell lines with a cell viability of approx. 85 %

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Ordering Information

Description	Qty. of Units	Order No.
Sartoclear Dynamics® Lab V50 Kits – 0.22 µm PES		
Sartoclear Dynamics Lab V, 50 mL, 1 g		
Filtration of up to 50 mL with 1 g of DE per unit Contents: 1 × 180E01----------2 (24 × Sartolab® RF 50; 0.22 µm; PES) 1 × SDLKG-01.0------2 (24 × pouches of filter aid, 1 g)	24	SDLV-0050-01E0-2
Sartoclear Dynamics Lab V, 50 mL, 2 g		
Filtration of up to 50 mL with 2 g of DE per unit Contents: 1 × 180E01----------2 (24 × Sartolab® RF 50, 0.22 µm PES) 2 × SDLKG-01.0------2 (48 × pouches of filter aid, 1 g)	24	SDLV-0050-02E0-2
Sartoclear Dynamics® Lab V50 Kits – 0.45 µm PES		
Sartoclear Dynamics Lab V, 50 mL, 1 g		
Filtration of up to 50 mL with 1 g of DE per unit Contents: 1 × 180F01----------2 (24 × Sartolab® RF 50, 0.45 µm PES) 1 × SDLKG-01.0------2 (24 × pouches of filter aid, 1 g)	24	SDLV-0050-01F0-2
Sartoclear Dynamics Lab V, 50 mL, 2 g		
Filtration of up to 50 mL with 2 g of DE per unit Contents: 1 × 180F01----------E (24 × Sartolab® RF 50, 0.45 µm PES) 2 × SDLKG-01.0------2 (48 × pouches of filter aid, 1 g)	24	SDLV-0050-02F0-2
Sartoclear Dynamics® Lab V150 Kits		
Sartoclear Dynamics® Lab V, 150 mL, 2 g		
Filtration of up to 150 mL with 2 g of DE per unit Contents: 1 × 180E02---------E (12 × Sartolab® RF 150, 0.22 µm PES) 1 × SDLKG-01.0------2 (24 × pouches of filter aid, 1 g)	12	SDLV-0150-02E0-E
Sartoclear Dynamics® Lab V, 150 mL, 5 g		
Filtration of up to 150 mL with 5 g of DE per unit Contents: 2 × 180E02---------E (24 × Sartolab® RF 150, 0.22 µm PES) 1 × SDLKG-05.0------2 (24 × pouches of filter aid, 5 g)	24	SDLV-0150-05E0-2

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Description	Qty. of Units	Order No.
Sartoclear Dynamics® Lab V250 Kits		
Sartoclear Dynamics® Lab V, 250 mL, 5 g		
Filtration of up to 250 mL with 5 g of DE per unit Contents: 2 × 180E03---------E (24 × Sartolab® RF 250, 0.22 µm PES) 1 × SDLKG-05.0------2 (24 × pouches of filter aid, 5 g)	24	SDLV-0250-05E0-2
Sartoclear Dynamics® Lab V, 250 mL, 10 g		
Filtration of up to 250 mL with 10 g of DE per unit Contents: 2 × 180E03---------E (24 × Sartolab® RF 250, 0.22 µm PES) 1 × SDLKG-10.0------2 (24 × pouches of filter aid, 10 g)	24	SDLV-0250-10E0-2
Sartoclear Dynamics® Lab V500 Kits		
Sartoclear Dynamics® Lab V, 500 mL, 5 g		
Filtration of up to 500 mL with 5 g DE per unit Contents: 2 × 180E04---------E (24 × Sartolab® RF 500, 0.22 µm PES) 1 × SDLKG-05.0------2 (24 × pouches of filter aid, 5 g)	24	SDLV-0500-05E0-2
Sartoclear Dynamics® Lab V, 500 mL, 10 g		
Filtration of up to 500 mL with 10 g DE per unit Contents: 2 × 180E04---------E (24 × Sartolab® RF 500, 0.22 µm PES) 1 × SDLKG-010.0------2 (24 × pouches of filter aid, 10 g)	24	SDLV-0500-10E0-2
Sartoclear Dynamics® Lab V, 500 mL, 20 g		
Filtration of up to 500 mL with 20 g DE per unit Contents: 1 × 180E04---------E (12 × Sartolab® RF 500, 0.22 µm PES) 1 × SDLKG-010.0------2 (24 × pouches of filter aid, 10 g)	12	SDLV-0500-20E0-E
Sartoclear Dynamics® Lab V1000 Kits		
Sartoclear Dynamics® Lab V, 1,000 mL, 10 g		
Filtration of up to 1 L with 10 g of DE per unit Contents: 2 × 180E05---------E (24 × Sartolab® RF 1000, 0.22 µm PES) 1 × SDLKG-10.0------2 (24 × pouches of filter aid, 10 g)	24	SDLV-1000-10E0-2
Sartoclear Dynamics® Lab V, 1,000 mL, 20 g		
Filtration of up to 1 L with 20 g of DE per unit Contents: 1 × 180C3----------E (12 × Sartolab® RF 1000, 0.22 µm PES) 1 × SDLKG-10.0------2 (24 × pouches of filter aid, 10 g)	24	SDLV-1000-20E0-E
Sartoclear Dynamics® Lab V, 1,000 mL, 40 g		
Filtration of up to 1 L with 40 g of DE per unit Contents: 1 × 180E05---------E (12 × Sartolab® RF 1000, 0.22 µm PES) 2 × SDLKG-10.0------2 (48 × pouches of filter aid, 10 g)	12	SDLV-1000-40E0-E

Chemical Compatibility

	Material								Minisart® Types									
	PES membrane	SFCA membrane	PTFE membrane	RC membrane	Nylon membrane	GF depth filter	Housing MBS	Housing PP	Minisart® HighFlow	Minisart® NML Ophthalsart	Minisart® NML Plus	Minisart® NML GF	Minisart® HY Minisart® Air	Minisart® RC	Minisart® NY	Minisart® NY Plus	Minisart® SRP	Minisart® PES
Filter Membrane	PES	(SF)CA	PTFE	RC	PA				PES	(SF)CA	(SF)CA		PTFE	RC	PA	PA	PTFE	PES
Pre-Filter						GF			-	-	GF	GF	-	-	-	GF	-	-
Housing Material							MBS	PP	MBS	MBS	MBS	MBS	MBS	PP	PP	PP	PP	PP
Sterilization																		
Ethylene oxide	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Gamma irradiation	++	++	-[1]	++	-	++	++	-	++	++	++	++	-[1]	-	-	-	-	-
Autoclaving 121 °C, 30 min	++	++	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	++
Solvents																		
Acetone	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
Acetonitrile	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
Benzene	+	+	-	++	++	++	-	++	-	-	-	-	-	++	++	++	-	+
Benzyl alcohol	+	+	++	++	++	++	-	+	-	-	-	-	-	++	++	++	++	+
n-Butyl acetate	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
n-Butanol	++	++	++	++	++	++	+	++	+	+	+	+	+	++	++	++	++	++
Cellosolve	+	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	+
Chloroform	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
Cyclohexane	-	-	++	++	++	++	+	+	-	-	-	-	+	+	+	+	+	-
Cyclohexanone	-	-	++	++	++	++	-	+	-	-	-	-	-	+	+	+	+	-
Diethylacetamide	-	-	-	++	++	++	-	++	-	-	-	-	-	++	++	++	-	-
Diethyl ether	-	+	-	++	++	++	-	++	-	-	-	-	-	++	++	++	-	-
Dimethyl formamide	-	-	++	+	+	++	-	++	-	-	-	-	-	+	+	+	++	-
Dimethylsulfoxide	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
Dioxane	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
Ethanol, 98 %	++	++	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	++
Ethyl acetate	-	-	++	++	++	++	-	+	-	-	-	-	-	+	+	+	+	-
Ethylene glycol	++	+	++	++	++	++	+	++	+	+	+	+	+	++	++	++	++	++
Formamide	++	-	+	+	++	++	++	++	++	-	-	-	+	+	++	++	++	++
Glycerin	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
n-Heptane	+	+	+	++	++	++	++	+	+	+	+	+	+	+	+	+	+	+
n-Hexane	+	+	+	++	++	++	++	+	+	+	+	+	+	+	+	+	-	+
Isobutanol	++	+	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	++
Isopropanol	++	++	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	++
Isopropyl acetate	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
Methanol, 98 %	+	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	+
Methyl acetate	-	-	++	++	++	++	-	+	-	-	-	-	-	+	+	+	+	-
Methylene chloride	-	-	-	++	++	++	-	++	-	-	-	-	-	++	++	++	-	-
Methyl ethyl ketone	-	+	++	++	++	++	-	+	-	-	-	-	-	+	+	+	+	-
Methyl isobutyl ketone	-	-	++	++	++	++	-	+	-	-	-	-	-	+	+	+	+	-
Monochlorobenzene	+	+	-	++	++	++	-	+	-	-	-	-	-	+	+	+	-	+
Nitrobenzene	-	-	++	++	+	++	-	+	-	-	-	-	-	+	+	+	+	-
n-Pentane	++	++	-	++	++	++	+	+	+	+	+	+	+	+	+	+	-	+
Perchloroethylene	-	-	-	++	++	++	-	+	-	-	-	-	-	+	+	+	-	-
Petroleum ether	+	++	-	++	++	++	+	++	+	+	+	+	-	++	++	++	-	+

	Material								Minisart® Types									
	PES membrane	SFCA membrane	PTFE membrane	RC membrane	Nylon membrane	GF depth filter	Housing MBS	Housing PP	Minisart® HighFlow	Minisart® NML Ophthalsart	Minisart® NML Plus	Minisart® NML GF	Minisart® HY Minisart® Air	Minisart® RC	Minisart® NY	Minisart® NY Plus	Minisart® SRP	Minisart® PES
Filter Membrane	PES	(SF)CA	PTFE	RC	PA				PES	(SF)CA	(SF)CA		PTFE	RC	PA	PA	PTFE	PES
Prefilter						GF			-	-	GF	GF	-	-	-	GF	-	-
Housing Material							MBS	PP	MBS	MBS	MBS	MBS	MBS	PP	PP	PP	PP	PP
Solvents (continued)																		
Pyridine	-	-	++	++	++	++	-	++	-	-	-	-	-	++	++	++	++	-
Tetrahydrofuran	-	-	-	++	++	++	-	++	-	-	-	-	-	++	++	++	-	-
Toluene	-	+	-	++	++	++	-	+	-	-	-	-	-	+	+	+	-	-
Trichloroethylene	-	+	++	++	++	++	-	+	-	-	-	-	-	+	+	+	+	-
Xylene	-	+	-	++	++	++	-	+	-	-	-	-	-	+	+	+	-	-
Acids																		
Acetic acid, 25 %	+	+	++	++	-	++	+	++	+	+	+	+	+	++	-	-	++	+
Acetic acid, 80 %	-	-	++	+	-	++	-	+	-	-	-	-	-	+	-	-	+	-
Hydrofluoric acid, 50 %	+	-	++	+	-	++	-	+	-	-	-	-	-	+	-	-	+	+
Perchloric acid, 25 %	-	-	++	-	-	++	-	+	-	-	-	-	-	-	-	-	+	-
Phosphoric acid, up to 10 %	+	+	++	-	-	++	+	+	+	+	+	+	+	-	-	-	+	+
Phosphoric acid, 86 %	+	+	++	-	-	++	-	+	-	-	-	-	-	-	-	-	+	+
Nitric acid, 30 %	+	-	++	-	-	++	+	+	+	-	-	-	+	-	-	-	+	+
Nitric acid, conc.	-	-	++	-	-	++	-	-	-	-	-	-	-	-	-	-	-	-
Hydrochloric acid, 20 %	++	-	++	-	-	++	+	+	+	-	-	-	+	-	-	-	+	+
Sulfuric acid, 25 %	+	-	++	+	-	++	++	++	+	-	-	-	++	+	-	-	++	+
Sulfuric acid, 98 %	-	-	++	-	-	++	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroacetic acid, 25 %	-	-	++	++	-	++	-	+	-	-	-	-	-	+	-	-	+	-
Bases																		
Ammonia, 1N	++	+	++	+	++	++	+	++	+	+	+	+	+	+	++	++	++	++
Ammonium hydroxide, 25 %	+	+	++	+	++	+	-	+	-	-	-	-	-	+	+	+	+	+
Potassium hydroxide, 32 %	++	-	++	-	+	+	-	++	-	-	-	-	-	-	+	+	++	++
Sodium hydroxide, 1N	++	-	-	+	++	+	-	++	-	-	-	-	-	+	++	+	-	++
Sodium hydroxide, 32 %	++	-	-	-	+	-	-	+	-	-	-	-	-	-	+	-	-	+
Aqueous solutions																		
Formaldehyde, 30 %	+	++	++	+	++	++	+	+	+	+	+	+	+	+	+	+	+	+
Sodium hypochlorite, 5 %	++	-	++	-	-	++	+	+	+	-	-	-	+	-	-	-	+	+
Hydrogen peroxide, 35 %	++	-	++	-	-	++	+	++	+	-	-	+	+	-	-	-	++	++
pH range																		
pH 1 to 14	-	-	++	-	-	++	-	++										
pH 1 to 13	++	-	++	-	-	++	-	++										
pH 3 to 14	+	-	++	+	++	++	-	++										
pH 3 to 12	++	-	++	++	++	++	+	++										
pH 4 to 8	++	++	++	++	++	++	++	++										

The chemical compatibility guide could be confirmed either by a literature review or by laboratory tests. Please consider that compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you want to filter by performing a trial filtration run before you start your actual filtration.

Legend

++ High compatibility
\+ Limited compatibility
\- Not compatible
[1] Gamma irradiation feasible for Minisart® Air

Basic Filtration

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Introduction

Filters are indispensable for your routine work in laboratory and industrial applications. Sartorius supplies you with a broad range of filters for a myriad of filtration tasks and supports you with all your filtration challenges.

Our Product Range Covers:
- Filter papers
- Glass and quartz microfiber filters
- Membrane filters
- Blotting & chromatography papers & membranes
- Filtration equipment

Quality Assurance and Quality Control

Sartorius pays particular attention to continuous in-process quality control. Regular checks and exact analyses of the raw materials and each finished product assure constant high quality and product uniformity.

We meet the requirements set forth by the ISO 9001 quality management system and the ISO 14001 environmental management system.

How Do Filter Papers Work?

Filter papers are depth filters. Their efficiency is influenced by various parameters: the mechanical particulate retention, adsorption, pH, surface properties, thickness and strength of the filter paper as well as the shape, density and quantity of particles to be retained. The precipitates deposited on the filter form a "cake layer" which – depending on its density – increasingly affects the progress of an ongoing filtration and decisively affects the retention capability. Therefore, it is essential to select the perfect filter paper to ensure the best filtration results. This choice depends on the filtration method as well as on the amount and properties of the medium to be filtered, the size of the particulate solids to be removed and the required degree of clarification.

How Do Membrane Filters Work?

Membrane filters retain particles larger than their pore sizes. Smaller particles pass through the membrane or are captured in the membrane. Such filters are used for the filtration of smaller particles and for critical applications such as sterility testing. The choice of the right membrane type depends on the specifications of the solution to be filtered. The most important parameters for this are adsorption, chemical compatibility and the particle size to be retained.

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Ash-free Filter Papers

For Quantitative and Gravimetric Analyses

These filter papers are used for quantitative and gravimetric analyses as well as for pressure or vacuum filtration. They are made out of 100 % cotton linters with an α-cellulose content of > 98 % and are acid-washed to make the papers ashless and achieve high purity.

Typical Values

Grade	Weight (g/m²)	Thickness (mm)	Particle retention (µm)	Filtration (s)	Precipitates	Properties
■ 388	84	0.21	12 – 15	10	Coarse crystalline	Wide-pore, loose structure, fast filtering
□ 389	84	0.19	8 – 12	20	Medium-fine crystalline	Medium- to wide-pore, medium fast filtering
■ 392	84	0.17	5 – 8	50	Fine crystalline	Medium dense, medium fast filtering
■ 390	84	0.16	3 – 5	100	Fine crystalline	Narrow-pore, dense, slow filtering
■ 391	84	0.15	2 – 3	180	Very fine crystalline	Fine-pore, dense, very slow filtering
■ 393	100	0.18	1 – 2	300	Very fine crystalline	Very fine-pore, very dense, very slow filtering

Ordering Information

Filter Discs, 100 pieces

Ø in mm	Grade 388	Grade 389	Grade 390	Grade 391	Grade 392	Grade 393
55	FT-3-101-055	FT-3-102-055	FT-3-103-055	FT-3-104-055	FT-3-105-055	FT-3-127-055
70	FT-3-101-070	FT-3-102-070	FT-3-103-070	FT-3-104-070	FT-3-105-070	FT-3-127-070
90	FT-3-101-090	FT-3-102-090	FT-3-103-090	FT-3-104-090	FT-3-105-090	FT-3-127-090
110	FT-3-101-110	FT-3-102-110	FT-3-103-110	FT-3-104-110	FT-3-105-110	FT-3-127-110
125	FT-3-101-125	FT-3-102-125	FT-3-103-125	FT-3-104-125	FT-3-105-125	FT-3-127-125
150	FT-3-101-150	FT-3-102-150	FT-3-103-150	FT-3-104-150	FT-3-105-150	FT-3-127-150
185	FT-3-101-185	FT-3-102-185	FT-3-103-185	FT-3-104-185	FT-3-105-185	FT-3-127-185
240	FT-3-101-240	FT-3-102-240	FT-3-103-240	FT-3-104-240	FT-3-105-240	FT-3-127-240

Folded Filters, 100 pieces

Ø in mm	Grade 388	Grade 389	Grade 390	Grade 391	Grade 392
110	FT-4-101-110	FT-4-102-110	FT-4-103-110	FT-4-104-110	FT-4-105-110
125	FT-4-101-125	FT-4-102-125	FT-4-103-125	FT-4-104-125	FT-4-105-125
150	FT-4-101-150	FT-4-102-150	FT-4-103-150	FT-4-104-150	FT-4-105-150
185	FT-4-101-185	FT-4-102-185	FT-4-103-185	FT-4-104-185	FT-4-105-185
240	FT-4-101-240	FT-4-102-240		FT-4-104-240	

Sheets in 580 × 580 mm, 100 pieces

Grade 388	Grade 389	Grade 390	Grade 391	Grade 392	Grade 393
FT-2-101-580580	FT-2-102-580580	FT-2-103-580580	FT-2-104-580580	FT-2-105-580580	FT-2-127-580580

Other dimensions are available on request

Wet-strengthened Filter Papers

For Qualitative Analyses

These qualitative filter papers are essentially used for analytical purposes and routine analyses, whenever no gravimetric analyses are required. They are wet-strengthened and can be used for pressure and vacuum filtration. They are made of refined pulp and linters with an > 95 % α-cellulose content and are very pure with an ash content ≤ 0.1 %.

Typical Values

Grade	Weight (g/m²)	Thickness (mm)	Particle retention (µm)	Filtration (s)	Precipitates	Properties
1288	84	0.21	12 – 15	10	Coarse crystalline	Wide-pore, loose structure, fast filtering
1289	84	0.21	8 – 12	20	Medium-fine crystalline	Medium- to wide-pore, medium fast filtering
1292	84	0.17	5 – 8	20	Fine crystalline	Medium dense, medium fast filtering
1290	84	0.15	3 – 5	100	Fine crystalline	Narrow-pore, dense, slow filtering
1291	84	0.15	2 – 3	180	Very fine crystalline	Fine-pore, dense, very slow filtering
293	80	0.15	1 – 2	300	Very fine crystalline	Very fine-pore, very dense, very slow filtering

Ordering Information

Filter Discs, 100 pieces

Ø in mm	Grade 1288	Grade 1289	Grade 1290	Grade 1291	Grade 1292	Grade 293
55	FT-3-206-055	FT-3-207-055	FT-3-208-055	FT-3-209-055	FT-3-210-055	FT-3-211-055
70	FT-3-206-070	FT-3-207-070	FT-3-208-070	FT-3-209-070	FT-3-210-070	FT-3-211-070
90	FT-3-206-090	FT-3-207-090	FT-3-208-090	FT-3-209-090	FT-3-210-090	FT-3-211-090
110	FT-3-206-110	FT-3-207-110	FT-3-208-110	FT-3-209-110	FT-3-210-110	FT-3-211-110
125	FT-3-206-125	FT-3-207-125	FT-3-208-125	FT-3-209-125	FT-3-210-125	FT-3-211-125
150	FT-3-206-150	FT-3-207-150	FT-3-208-150	FT-3-209-150	FT-3-210-150	FT-3-211-150
185	FT-3-206-185	FT-3-207-185	FT-3-208-185	FT-3-209-185	FT-3-210-185	FT-3-211-185
240	FT-3-206-240	FT-3-207-240	FT-3-208-240	FT-3-209-240	FT-3-210-240	

Folded Filters, 100 pieces

Ø in mm	Grade 1288	Grade 1289	Grade 1290	Grade 1291	Grade 1292	Grade 293
110	FT-4-206-110	FT-4-207-110	FT-4-208-110	FT-4-209-110	FT-4-210-110	
125	FT-4-206-125	FT-4-207-125	FT-4-208-125	FT-4-209-125	FT-4-210-125	FT-4-211-125
150	FT-4-206-150	FT-4-207-150	FT-4-208-150	FT-4-209-150	FT-4-210-150	FT-4-211-150
185	FT-4-206-185	FT-4-207-185	FT-4-208-185	FT-4-209-185	FT-4-210-185	FT-4-211-185
240	FT-4-206-240	FT-4-207-240	FT-4-208-240	FT-4-209-240	FT-4-210-240	FT-4-211-240

Sheets in 580 × 580 mm, 100 pieces

Grade 1288	Grade 1289	Grade 1290	Grade 1291	Grade 1292	Grade 293
FT-2-206-580580	FT-2-207-580580	FT-2-208-580580	FT-2-209-580580	FT-2-210-580580	FT-2-211-580580

Other dimensions are available on request

High-Purity Filter Papers

For Qualitative Analyses

These paper grades are used for analytical purposes that require a low ash content. Grades 292 and 292a are especially suitable for soil analyses because they are low in nitrogen. For phosphate or sodium determination, we recommend grades 131 and 132.

Typical Values

Grade	Weight (g/m²)	Thickness (mm)	Particle retention (µm)	Filtration (s)	Material
292	87	0.18	5 – 8	45	Cotton linters, low-nitrogen and nitrates, ash content ≤ 0.06 % according to DIN 54370
292a	97	0.19	4 – 7	60	Cotton linters, low-nitrogen and nitrates, ash content ≤ 0.06 % according to DIN 54370
132	80	0.17	5 – 7	55	Cotton linters and refined pulp, low-phosphate and low-potassium, ash content < 0.02 % according to DIN 54370
131	80	0.16	3 – 5	100	Cotton linters and refined pulp, low-phosphate and low-potassium, ash content < 0.02 % according to DIN 54370

Ordering Information

Filter Discs, 100 pieces

Ø in mm	Grade 131	Grade 132	Grade 292	Grade 292a
55		FT-3-329-055	FT-3-205-055	FT-3-215-055
70		FT-3-329-070	FT-3-205-070	FT-3-215-070
90		FT-3-329-090	FT-3-205-090	FT-3-215-090
110		FT-3-329-110	FT-3-205-110	FT-3-215-110
125	FT-3-351-125	FT-3-329-125	FT-3-205-125	FT-3-215-125
150		FT-3-329-150	FT-3-205-150	FT-3-215-150
185		FT-3-329-185	FT-3-205-185	FT-3-215-185
240		FT-3-329-240	FT-3-205-240	FT-3-215-240

Folded Filters, 100 pieces

Ø in mm	Grade 131	Grade 132	Grade 292	Grade 292a
110	FT-4-351-110	FT-4-329-110	FT-4-205-110	FT-4-215-110
125	FT-4-351-125	FT-4-329-125	FT-4-205-125	FT-4-215-125
150	FT-4-351-150	FT-4-329-150	FT-4-205-150	FT-4-215-150
185	FT-4-351-185	FT-4-329-185	FT-4-205-185	FT-4-215-185
240		FT-4-329-240	FT-4-205-240	FT-4-215-240

Sheets in 580 × 580 mm, 100 pieces

Grade 292	Grade 292a
FT-2-205-580580	FT-2-215-580580

Other dimensions are available on request

Filter Papers

For Qualitative-Technical Analyses

These filter papers are used for routine analyses like clarification, determination of substances, but also as discs with a center hole for technical applications. Grades with a wet burst resistance > 30 kPa are referred to as wet-strengthened and are therefore suitable for pressure or vacuum filtration. They are made of refined pulp and linters with an > 95 % α-cellulose content, are very pure with an ash content between < 0.1 to 0.15 %. Below you will find an overview of the most commonly used grades.

Typical Values

Grade	Surface	Weight (g/m^2)	Thickness (mm)	Particle Retention (µm)	Filtration (s)	Wet Burst Resistance (kPa)	Properties
3 hw	Smooth	65	0.14	8 – 12	20	40	Medium fast filtering, filter paper for routine work in the lab
4 b	Smooth	75	0.15	8 – 12	22	> 15	Medium fast filtering, filtration of coarse precipitates, wick paper for seed testing
603/N	Crêped	75	0.25	> 15	8	≥ 50	Fast filtering, filtration of sugar solutions
6	Smooth	80	0.17	10 – 13	15	30	Fast filtering, degassing beer before analysis, clarification of spirits
100/N	Smooth	85	0.18	6 – 8	30	80	Medium fast filtering, ash content < 0.1 %, low potassium and sodium content, determination of the sugar content
5 H/N	Crêped	85	0.28	> 40	3	≥ 40	Very fast filtering, wide-pore, filtration of essential oils
3 S/h	Smooth	200	0.36	5 – 7	55	15	Medium fast to slow filtering, narrow-pore, re-wet test for diapers

Ordering Information

Filter Discs

Ø in mm	Grade 3 hw (100 Pieces)	Grade 4 b (100 Pieces)	Grade 603/N (100 Pieces)	Grade 6 (100 Pieces)	Grade 100/N (100 Pieces)	Grade 5 H/N (100 Pieces)	Grade 3 S/h (50 Pieces)
55	FT-3-303-055	FT-3-309-055		FT-3-312-055	FT-3-328-055		FT-3-307-055
70	FT-3-303-070	FT-3-309-070		FT-3-312-070	FT-3-328-070		
90	FT-3-303-090	FT-3-309-090	FT-3-335-090	FT-3-312-090	FT-3-328-090	FT-3-423-090	FT-3-307-090
110	FT-3-303-110	FT-3-309-110	FT-3-335-110	FT-3-312-110	FT-3-328-110		FT-3-307-110
125	FT-3-303-125	FT-3-309-125	FT-3-335-125	FT-3-312-125	FT-3-328-125	FT-3-423-125	FT-3-307-125
150	FT-3-303-150	FT-3-309-150	FT-3-335-150	FT-3-312-150	FT-3-328-150	FT-3-423-150	FT-3-307-150
185	FT-3-303-185	FT-3-309-185	FT-3-335-185	FT-3-312-185	FT-3-328-185	FT-3-423-185	FT-3-307-185
240	FT-3-303-240	FT-3-309-240	FT-3-335-240	FT-3-312-240	FT-3-328-240	FT-3-423-240	FT-3-307-240

Folded Filters, 100 pieces

Ø in mm	Grade 3 hw	Grade 4 b	Grade 603/N	Grade 6	Grade 100/N	Grade 5 H/N
125	FT-4-303-125	FT-4-309-125	FT-4-335-125	FT-4-312-125		FT-4-423-125
150	FT-4-303-150	FT-4-309-150	FT-4-335-150	FT-4-312-150	FT-4-328-150	FT-4-423-150
185	FT-4-303-185	FT-4-309-185	FT-4-335-185	FT-4-312-185		FT-4-423-185
240	FT-4-303-240	FT-4-309-240	FT-4-335-240	FT-4-312-240	FT-4-328-240	FT-4-423-240
270	FT-4-303-270	FT-4-309-270	FT-4-335-270	FT-4-312-270	FT-4-328-270	FT-4-423-270
320	FT-4-303-320	FT-4-309-320	FT-4-335-320	FT-4-312-320	FT-4-328-320	FT-4-423-320

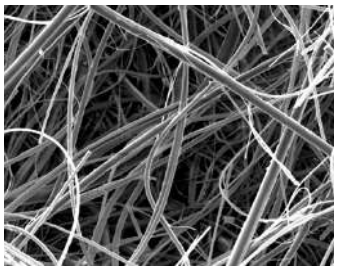
Sheets in 580 × 580 mm, 100 pieces

Grade 3 hw	Grade 4 b	Grade 603/N	Grade 6	Grade 100/N	Grade 5 H/N
FT-2-303-580580	FT-2-309-580580	FT-2-335-580580	FT-2-312-580580	FT-2-328-580580	FT-2-423-580580

Other dimensions are available on request

Glass Microfiber Filters

Without Binder



Binder-free glass microfiber filters are recommended for analytical and gravimetric analyses and also as prefilters. These filters combine fast flow rates with high load capacity and the retention of very fine particles; they are biologically inert, are resistant to most chemicals and withstand temperatures up to 500 °C (grade 550-HA up to 550 °C).

Typical Values

Grade	Weight (g/m²)	Thickness (mm)	Penetration 0.3 µm (%)*	Particle retention in liquids (µm)	Filtration speed (mL/min)	Fulfills the requirements in EN 872:2005 (weigh loss)
MGA	54	0.23	< 0.001	1.6	510	Yes
MGB	143	0.70	< 0.001	1.0	210	
MGC	54	0.24	< 0.001	1.2	335	Yes
MGD	120	0.47	< 0.1	2.7	920	
MGF	75	0.38	< 0.001	0.7	110	
MGG	65	0.27	≤ 0.001	1.5	600	
13440	88	0.44		0.7	120	Yes
MG 160	75	0.35	< 0.002	1.2	400	
MG 550-HA	65	0.27		1.5	500	

* Measurement according to EN 143 (0.3 µm, 5.3 cm/s, paraffin oil)

Ordering Information

Filter Discs

Ø in mm	MGA (100 pieces)	MG 160 (50 pieces)	MGB (50 pieces)	MGC (100 pieces)	MGD (50 pieces)
21			FT-3-1102-021		
25	FT-3-1101-025		FT-3-1102-025	FT-3-1103-025	FT-3-1104-025
37	FT-3-1101-037	FT-3-01110-037			
47	FT-3-1101-047	FT-3-01110-047	FT-3-1102-047	FT-3-1103-047	FT-3-1104-047
50	FT-3-1101-050	FT-3-01110-050	FT-3-1102-050	FT-3-1103-050	FT-3-1104-050
55	FT-3-1101-055		FT-3-1102-055	FT-3-1103-055	
70	FT-3-1101-070	FT-3-01110-070	FT-3-1102-070	FT-3-1103-070	FT-3-1104-070
80	FT-3-1101-080				
90	FT-3-1101-090	FT-3-01110-090	FT-3-1102-090	FT-3-1103-090	FT-3-1104-090
100	FT-3-1101-100	FT-3-01110-100	FT-3-1102-100	FT-3-1103-100	FT-3-1104-100
110	FT-3-1101-110	FT-3-01110-110	FT-3-1102-110	FT-3-1103-110	FT-3-1104-110
125	FT-3-1101-125		FT-3-1102-125	FT-3-1103-125	FT-3-1104-125
150	FT-3-1101-150		FT-3-1102-150	FT-3-1103-150	FT-3-1104-150
293					FT-3-1104-293

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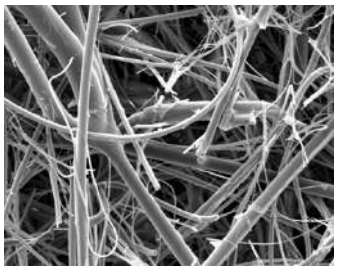
Ø in mm	MGF (100 pieces)	MGG (100 pieces)	MG 550-HA (100 pieces)	13440*
24			FT-3-01147-024	
25	FT-3-1105-025	FT-3-1106-025		
42				13440--42------Q
44				13440--44------Q
47	FT-3-1105-047	FT-3-1106-047	FT-3-01147-047	13440--47------Q
50	FT-3-1105-050	FT-3-1106-050	FT-3-01147-050	13440--50------Q
55	FT-3-1105-055	FT-3-1106-055	FT-3-01147-055	
70	FT-3-1105-070	FT-3-1106-070	FT-3-01147-070	
90	FT-3-1105-090	FT-3-1106-090	FT-3-01147-090	
100				13440-100------K
110	FT-3-1105-110	FT-3-1106-110	FT-3-01147-110	
125	FT-3-1105-125	FT-3-1106-125	FT-3-01147-125	
130				13440-130------K
150	FT-3-1105-150	FT-3-1106-150		13440-150------K
293	FT-3-1105-293			13440-293------K

* Q = 500 pieces | K = 50 pieces
Other dimensions are available on request

Glass Microfiber Filters

With Binder



These filters are mostly used either for monitoring air and gas or as a prefilter. They are manufactured with synthetic binding agents to ensure that the filter has a defined strength. They are mechanically and chemically stable, have a temperature resistance up to 180 °C and – depending on the binding agent used – are either hydrophobic or hydrophilic.

Typical Values

Grade	Weight (g/m^2)	Thickness (mm)	Penetration 0.3 µm (%)*	Pressure drop 5.3 cm/s (Pa)	Binding agent
MG 227/1/60	60	0.32	< 0.5	260	Hydrophobic
13430	220	1.25	0.02	360	Hydrophilic
13400	73	0.39	0.015	363	Hydrophilic
MG 400 XA	75	0.35	< 0.001	425	Hydrophobic
MG 1387/1	90	0.38	≤ 0.003	400	Hydrophilic

* Tested and classified according to the Standard EN 143

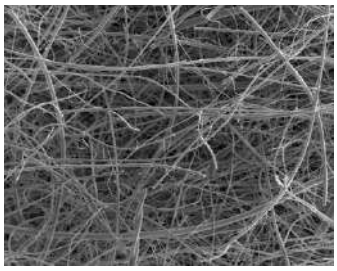
Ordering Information

Filter Discs

Ø in mm	MG 227/1/60 (100 pieces)	13430**	13400**	MG 1387/1 (50 pieces)
13			13400--13------S	
20			13400--20------S	
25			13400--25------Q	
42			13400--42------Q	
44			13400--44------Q	
45			13400--45------Q	FT-3-01125-045
47		13430--47------S	13400--47------Q	FT-3-01125-047
50			13400--50------Q	FT-3-01125-050
55				FT-3-01125-055
80			13400--80------N	
100		13430-100------K	13400-100------K	
110				FT-3-01125-110
120			13400-120------K	
124			13400-124------K	
125				FT-3-01125-125
127		13430-127------K	13400-127------K	
130		13430-130------K	13400-130------K	FT-3-01125-130
142		13430-142------K	13400-142------K	
150	FT-3-01124-150		13400-150------K	
293		13430-293------K	13400-293------K	

** K= 50 pieces, N= 100 pieces, Q = 500 pieces, S= 200 pieces
Other dimensions are available on request

Quartz Microfiber Filters



The quartz microfiber material of the Sartorius pre-heated filters, grade Q3400, is made of high-purity quartz microfibers without any addition of glass microfibers or binding agents. In addition, the Q3400 filter grade is tempered to remove all chemically combined water and to give the filters excellent weight and dimensional stability. Sartorius filters are especially suitable for emissions monitoring at temperatures of up to 900 °C and wherever filters of the highest purity are needed.

Typical Values

Grade	Material	Weight (g/m^2)	Thickness (mm)	Penetration, 0.3 µm 15 cm/s*	Temperature Resistance
Q3400	100 % Quartz microfiber silicium dioxide (SiO_2)	85	0.43	< 0.002	up to 900 °C

* Tested and classified according to the Standard EN 143

Ordering Information

Filter Discs

Ø in mm	Q3400
20	Q3400--20------G
25	Q3400--25------G
30	Q3400--30------G
37	Q3400--37------G
45	Q3400--45------G
47	Q3400--47------G
50	Q3400--50------G
82	Q3400--82------N
90	Q3400--90------N
142	Q3400-142------K
150	Q3400-150------K

* G = 25 pieces, K = 50 pieces, N = 100 pieces
Other dimensions as well as sheets are available on request

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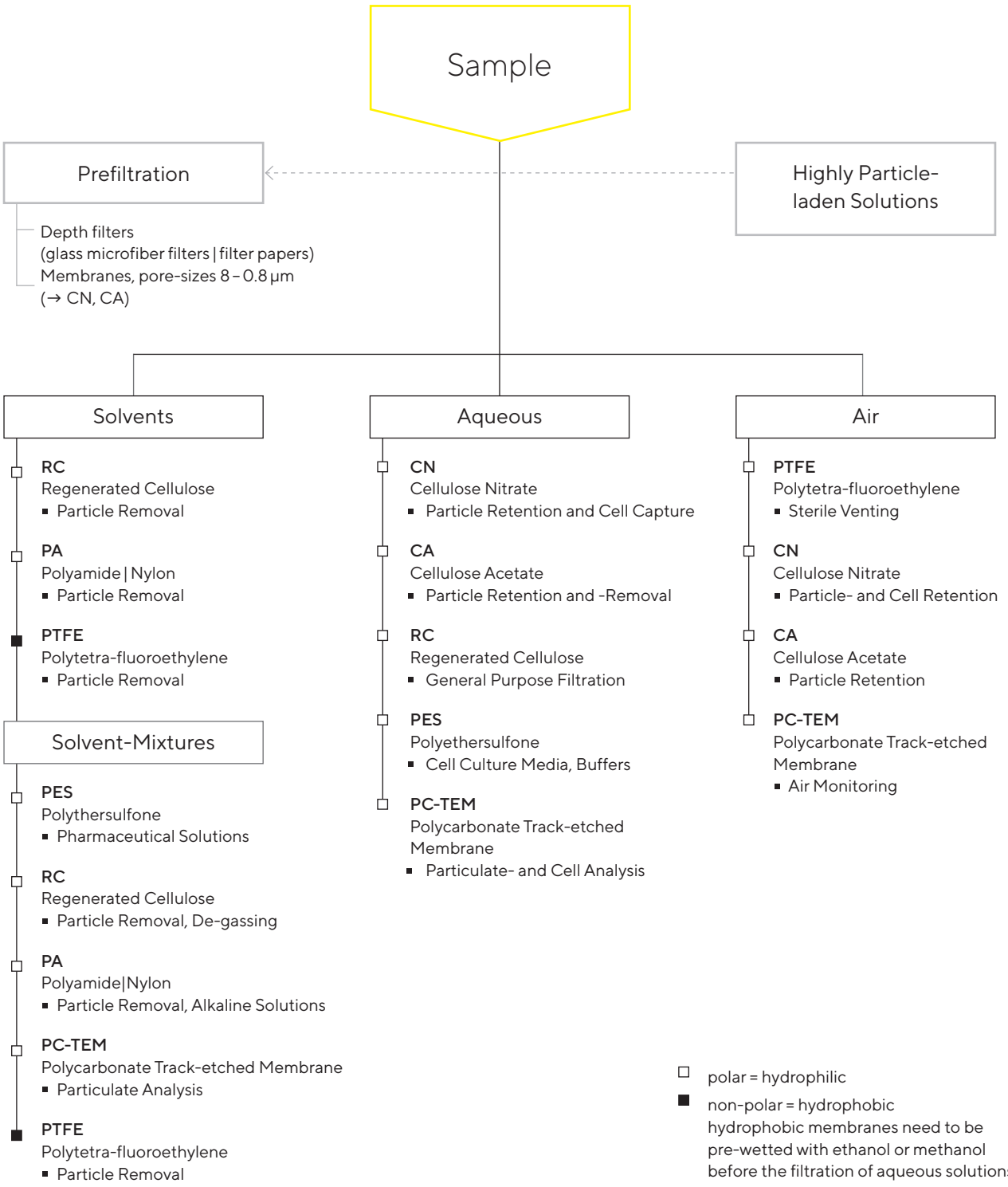
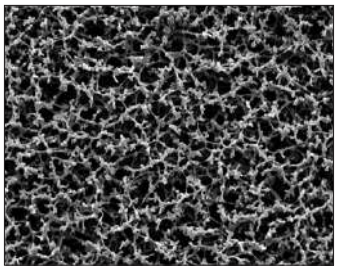
Membrane Filtration – Quick Selection Guide



Cellulose Nitrate (Mixed Cellulose Ester)



Cellulose nitrate membrane filters are indicated for many general laboratory applications where a membrane with a high non-specific adsorption is suitable. They are hydrophilic, have high flow rates thanks to their symmetric structure and are compatible with aqueous solutions (pH 4 to 8), hydrocarbons and several other organic solvents. The cellulose nitrate membranes are available in different pore sizes from 0.2 µm to 8 µm.

Typical Values

Type	Pore Size (µm)	Thickness (µm)	Bubble Point (bar)	Water Flow Rate (mL/min/cm²/bar)	Burst Pressure (bar)
11327	0.2	130	4.2	25	≥ 0.35
11306	0.45	130	2.4	70	≥ 0.3
11305	0.65	130	2	130	≥ 0.25
11304	0.8	130	1.4	200	≥ 0.2
11303	1.2	130	1	200	≥ 0.2
11302	3	130	0.5	430	≥ 0.2
11342	5	130	0.5	570	≥ 0.15
11301	8	130	0.3	750	≥ 0.1

** Measurement according to EN 143 (0.3 µm, 5.3 cm/s, paraffin oil)

Ordering Information

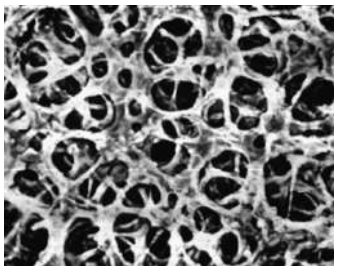
Filter Discs

Ø in mm	11301 (8 µm)*	11302 (3 µm)*	11303 (1.2 µm)*	11304 (0.8 µm)*
13	11301--13------N	11302--13------N	11303--13------N	11304--13------N
20				11304--20------N
25	11301--25------N	11302--25------N	11303--25------N	11304--25------N
37	11301--37------N			11304--37------N
47	11301--47------N	11302--47------N	11303--47------N	11304--47------N
50	11301--50------N	11302--50------N	11303--50------N	11304--50------N
70	11301--70------G			
90		11302--90------G	11303--90------G	11304--90------G
100	11301-100------N	11302-100------G	11303-100------G	11304-100------G

Ø in mm	11305 (0.65 µm)*	11306 (0.45 µm)*	11327 (0.2 µm)*	11342 (5 µm)*
13	11305--13------N	11306--13------N	11327--13------N	11342--13------N
20		11306--20------N		
25	11305--25------N	11306--25------N	11327--25------N	11342--25------N
37		11306--37------N		
47	11305--47------N	11306--47------N	11327--47------N	11342--47------N
50	11305--50------N	11306--50------N		11342--50------N
85		11306--85------N		
90		11306--90------N		11342--90------G
100	11305-100------N	11306-100------N		11342-100------G
110		11306-110------N		

* G = 25 pieces, N = 100 pieces
Other dimensions and packaging units are available on request

Cellulose Acetate



Cellulose acetate membranes combine high flow rates and thermal stability with very low adsorption characteristics, and are therefore excellently suited for use in pressure filtration devices. They are hydrophilic, have high flow rates thanks to their symmetric structure and are compatible with aqueous solutions (pH 4 – 8), oils, alcohols and other organic solvents. The 0.2 µm membrane is the filter of choice for sterile filtration of aqueous solutions, such as nutrient media, buffers and sera. The cellulose acetate membranes are available in different pore sizes from 0.2 to 5 µm.

Typical Values

Type	Pore Size (µm)	Thickness (µm)	Bubble Point (bar)	Water Flow Rate (mL/min/cm²/bar)	Burst Pressure (bar)
11107	0.2	120	2.9	24	0.8
11106	0.45	120	1.9	69	0.7
11105	0.65	120	1.5	115	0.7
11104	0.8	120	1	200	0.5
12303	1.2	140	0.8	320	0.4
12342	5	140	0.4	570	0.25

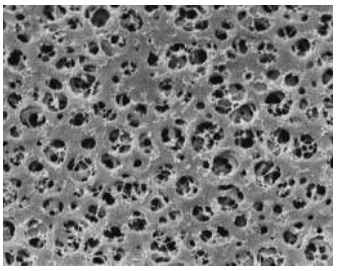
Ordering Information

Filter Discs

Ø in mm	11104 (0.8 µm)*	11105 (0.65 µm)*	11106 (0.45 µm)*	11107 (0.2 µm)*	12303 (1.2 µm)*	12342 (5 µm)*
13	11104--13------N		11106--13------N	11107--13------N		
25	11104--25------N	11105--25------N	11106--25------N	11107--25------N	12303--25------N	12342--25------N
30			11106--30------N	11107--30------N		
37	11104--37------N		11106--37------N			
45						
47	11104--47------N	11105--47------N	11106--47------N	11107--47------N	12303--47------N	12342--47------N
50	11104--50------N	11105--50------N	11106--50------N	11107--50------N	12303--50------N	
70						
85			11106--85------N			
90	11104--90------N	11105--90------G	11106--90------G	11107--90------G		
100			11106-100------N	11107-100------N	12303-100------G	
110			11106-110------N			

* G = 25 pieces, N = 100 pieces
Other dimensions and packaging units are available on request

Regenerated Cellulose



The very low adsorption membranes are hydrophilic, solvent-resistant (pH 3 – 12) and therefore suited for the particle removal from solvents. The membrane is reinforced with nonwoven cellulose. They are available in two pore sizes: 0.45 µm and 0.2 µm.

Typical Values

Type	Pore Size (µm)	Thickness (µm)	Bubble Point (bar)	Water Flow Rate (mL/min/cm²/bar)
18407	0.2	170	4.4	15
18406	0.45	170	2.9	30

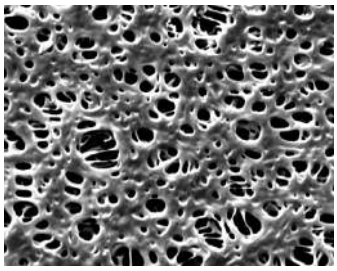
Ordering Information

Filter Discs

Ø in mm	18406 (0.45 µm)*	18407 (0.2 µm)*
13	18406--13------N	18407--13------N
25	18406--25------N	18407--25------N
47	18406--47------N	18407--47------N
50	18406--50------N	18407--50------N
90	18406--90------G	
100	18406-100------G	18407-100------G
142	18406-142------G	18407-142------G
293	18406-293------G	18407-293------G

* G = 25 pieces, N = 100 pieces
Other dimensions and packaging units are available on request

Polyethersulfone



Polyethersulfone (PES) membrane filters are hydrophilic, have high flow rates, a low non-specific protein adsorption and are chemically resistant over a pH range of 1 – 14. They are therefore recommended for the filtration of aqueous solutions as well for protein filtration. Furthermore, the low level of extractables makes them suitable for environmental analysis.

Typical Values

Type	Pore Size (µm)	Thickness (µm)	Bubble Point (bar)	Water Flow Rate (mL/min/cm²/bar)	Burst Pressure (bar)
15458	0.1	150	3.8	10	≥ 0.6
15407MI	0.2	150	3.5	25	≥ 0.5
15406	0.45	150	2.6	46	≥ 0.5

Ordering Information

Filter Discs

Ø in mm	**15406 (0.45 µm)***	**15407MI (0.2 µm)***	**15458 (0.1 µm)***
25	15406--25------N	15407--25----MIN	15458--25------N
47	15406--47------N	15407--47----MIN	15458--47------N
50	15406--50------N	15407--50----MIN	15458--50------N
90		15407--90----MIK	
142	15406-142------G	15407-142----MIG	15458-142------G
293		15407-293----MIG	15458-293------G

* G = 25 pieces, K = 50 pieces, N = 100 pieces
Other dimensions and packaging units are available on request

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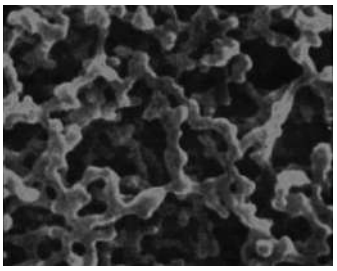
Polyamide



Polyamide membrane filters are hydrophilic and chemically resistant to alkaline solutions and organic solvents. They are therefore recommended for the particle removal from aqueous solutions and solvents for analytical determination such as HPLC, for the sterile filtration of these liquids as well as for applications where a membrane with a relatively high non-specific adsorption is suitable.

Typical Values

Type	Pore Size (µm)	Thickness (µm)	Bubble Point (bar)	Water Flow Rate (mL/min/cm²/bar)	Burst Pressure (bar)
25007	0.2	115	3.2	15	≥ 0.25
25006	0.45	115	2.3	35	≥ 0.23

Ordering Information

Filter Discs

Ø in mm	**25006 (0.45 µm)***	**25007 (0.2 µm)***
13	25006--13------N	25007--13------N
25	25006--25------N	25007--25------N
47	25006--47------N	25007--47------N
50	25006--50------N	25007--50------N
90	25006--90------G	25007--90------G
142	25006-142------N	25007-142------N
293	25006-293------N	25007-293------N

* G = 25 pieces, N = 100 pieces
Other dimensions and packaging units are available on request

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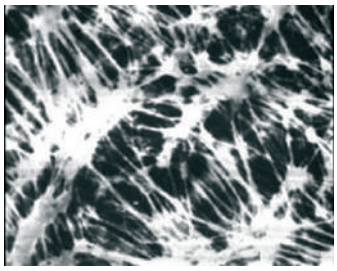
Hydrophobic PTFE



The main application of these membrane filters is the filtration of air, gases or chemicals. They are made of PTFE (polytetra-fluorethylene) only and are therefore permanently hydrophobic. Unlike other (hydrophilic) filter types, they are not wetted by air humidity, allowing unhindered passage of air at low differential pressures as well. PTFE membrane filters have an excellent chemical compatibility (pH 1 to 14), so that they are also used for the filtration of solvents and acids, to which other filter types are not resistant. Due to their hydrophobic characteristics, they must be pre-wetted with ethanol or methanol before the filtration of aqueous media.

Typical Values

Type	Pore Size (µm)	Thickness (µm)	Bubble Point (bar)	Isopropanol Flow Rate (mL/min/cm²/bar)
11807	0.2	65	1.4	11
11806	0.45	80	0.9	20
11803	1.2	100	0.45	80
11842	5	100	0.10	250

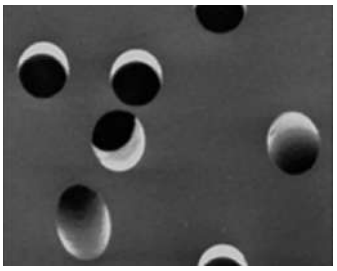
Ordering Information

Filter Discs

Ø in mm	11803 (1.2 µm)*	11806 (0.45 µm)*	11807 (0.2 µm)*	11842 (5 µm)*
13	11803--13------N	11806--13------N	11807--13------N	
25	11803--25------N	11806--25------N	11807--25------N	11842--25------N
37	11803--37------N	11806--37------N		
42				11842--42------N
47	11803--47------N	11806--47------N	11807--47------N	11842--47------N
50	11803--50------N	11806--50------N	11807--50------N	11842--50------N
90	11803--90------G	11806--90------G	11807--90------G	
100	11803-100------G	11806-100------G	11807-100------G	11842-100------G
142	11803-142------G	11806-142------G	11807-142------G	11842-142------G
293	11803-293------G	11806-293------G	11807-293------G	11842-293------G

* G = 25 pieces, K = 50 pieces, N = 100 pieces
Other dimensions and packaging units are available on request

Polycarbonate Track-Etched



Those white and hydrophilic polycarbonate track-etched filters are manufactured from high grade polycarbonate film using track-etch technology. Their capillary pore structure is uniform and precise, with a narrow pore size distribution to retain particles on their surface. Track-etched filters are an excellent choice for accurate fractionation of particulates because of their precise pore size. Track-etch technology offers the user distinct performance advantages when excellent surface capture and high sample visibility are required. Their main applications are particulate analysis, epifluorescence microscopy, fluid clarification, cytology, cell biology, bioassays, water microbiology and environmental analysis.

Typical Values

Type	Pore Size (µm)	Thickness (µm)	Bubble Point (bar)	Water Flow Rate (mL/min/cm²/0.7 bar)	Burst Pressure (bar)
23058	0.1	25	7.0	≥ 0.5	≥ 0.7
23007	0.2	25	3.5	≥ 10	≥ 0.7
23006	0.4	25	2.0	≥ 30	≥ 0.7
23004	0.8	25	0.6	≥ 40	≥ 0.7

Ordering Information

Filter Discs, 100 Pieces

Ø in mm	23004 (0.8 µm)	23006 (0.4 µm)	23007 (0.2 µm)	23058 (0.1 µm)
25	23004--25------N	23006--25------N	23007--25------N	23058--25------N
47		23006--47------N	23007--47------N	23058--47------N
50			23007--50------N	

Other dimensions and packaging units are available on request

Blotting | Chromatography Papers

These papers are made of cotton linters only with α-cellulose content of > 98 %. These highly pure papers are not only ideal for blotting and chromatography, but also for a wide range of absorption applications like those common in the life sciences and diagnostics. Below you will find an overview of the most commonly used grades.

Typical Values

Grade	Weight (g/m^2)	Thickness (mm)	Capillary Rise (mm/30 min)	Capillary Rise (mm/10 min)	Properties
FN 4	125	0.24	95		Chromatography paper, ash content < 0.04 %
FN 7	150	0.32	145		Chromatography paper, ash content < 0.04 %
FN 30	320	0.90	240		Chromatography paper, ash content < 0.04 %, paper for antibiotic test strips
FN 100	195	0.35	115	70	The most commonly used chromatography and blotting paper
BF 3	330	0.76	30	130	Blotting paper to increase and maintain the transport of liquids

Ordering Information

Sheets in 580 × 600 mm

Grade FN 4 (100 Sheets)	Grade FN 7 (50 Sheets)	Grade FN 30 (25 Sheets)	Grade FN 100 (50 Sheets)	Grade BF 3 (50 Sheets)
FT-2-504-580600N	FT-2-507-580600K	FT-2-526-580600G	FT-2-527-580600K	FT-2-520-580600K

Other dimensions and packaging units are available on request

Nitrocellulose Membrane for Blotting

Sartorius nitrocellulose membranes are available in two pore sizes, 0.22 µm and 0.45 µm. Both versions combine the advantages of high protein binding capacity with low background and high membrane stability, which ensures easy handling. Due to its large surface area, the 0.22 µm membrane version is recommended for small proteins. Sartorius blotting membranes are ideal for western blotting, DNA blotting as well as dot or slot blots. They have been optimized for all protein blotting systems, such as electrotransfer, semi-dry or simple capillary blotting.

Typical Values

	0.22 µm	**0.45 µm**
Material	Cellulose nitrate	Cellulose nitrate
Thickness	130 µm	130 µm
Water flow rate	27 mL/(min. cm² bar)	70 mL/(min. cm² bar)
Bubble point	4.4 bar	2.4 bar
Wettability in water	≤1 s	≤1 s
Extractable content in water	≤1%	≤1%
Burst pressure	0.8 bar	0.2 bar
Binding capacity for IgG	200 µg/cm²	200 µg/cm²

Ordering Information

	Roll Size	**Order No.**
NC 0.22 µm	30 cm × 3 m	11327------41BL
NC 0.45 µm	30 cm × 3 m	11306------41BL

All indicated data to be understood as typical average values

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Re-usable 13 mm Syringe Filter Holders

For the Ultracleaning of Small Volumes Up to About 10 mL

PTFE Holder for Solvents and Chemicals

Made completely of PTFE, this holder is unaffected by chemicals and contains no trace elements which could be released into the liquid being filtered. It is therefore extremely well suited for particle removal from samples and reagents for analytical methods, such as NMR samples. Other benefits of this application are the low hold-up volume, the easy cleaning and the drying at a temperature of 180 °C. The construction of the holder ensures leak proof sealing without a sealing ring, and avoids twisting of the membrane filter when the top is tightened onto the base.

Specifications

Connectors	Female Luer Lock inlet, luer slip outlet
Chemical compatibility	As for PTFE
Filtration area	0.5 cm^2
Materials	PTFE top and bottom parts
Max. operating pressure	5 bar | 500 kPa | 72.5 psi
Membrane filter Ø	13 mm
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C)
Hold-up volume	Less than 0.03 mL after overcoming the bubble point (0.3 mL before)

Ordering Information

Description	Order No.
13 mm PTFE Syringe Filter Holder	16574

Polycarbonate Holder for Aqueous Solutions

This inexpensive filter holder is made of clear, autoclavable polycarbonate. The silicone gasket enables a leak-free filtration at pressures of up to 7 bar by simply screwing it together manually. Filter supports in the top and bottom parts allow filtration in either direction.

Specifications

Connectors	Female Luer Lock inlet, luer slip outlet
Chemical compatibility	As for polycarbonate and silicone
Filtration area	0.5 cm^2
Materials	Polycarbonate top and bottom part,silicone gasket
Max. operating pressure	7 bar | 700 kPa | 101.5 psi
Membrane filter Ø	13 mm
Sterilization	By autoclaving at 121 °C
Hold-up volume	Less than 0.2 mL after overcoming the bubble point (0.3 mL before)

Ordering Information

Description	Order No.
13 mm PTFE Syringe Filter Holder	16574

Re-usable 25 mm Syringe Filter Holders

For the Ultracleaning and Sterilizing Filtration of Volumes of Up to About 100 mL

Stainless Steel Holder for Solvents and Chemicals

Made of stainless steel, this holder is heat-resistant, and the chemical compatibility depends only on the inserted filter type. The top part can easily be mounted on the bottom part using the enclosed tightening tool. Filter supports in the top and bottom parts allow filtration in either direction.

Specifications

Connectors	Female Luer Lock inlet, luer slip outlet
Chemical compatibility	As for stainless steel
Filtration area	3 cm²
Materials	Stainless steel (1.4305) top and bottom parts
Max. operating pressure	7 bar | 700 kPa | 101.5 psi
Membrane filter Ø	25 mm
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C)
Hold-up volume	Less than 0.1 mL after overcoming the bubble point (0.3 mL before)

Ordering Information

Description	Order No.
25 mm Stainless Steel Holder	16214
Tightening tool, Polyman 24/5	6980595

Polycarbonate Holder for Aqueous Solutions

This inexpensive filter holder is made of clear, autoclavable polycarbonate. The silicone gasket enables a leak-free filtration at pressures of up to 7 bar by simply screwing it together manually. Filter supports in the top and bottom parts allow filtration in either direction.

Specifications

Connectors	Female Luer Lock inlet, luer slip outlet
Chemical compatibility	As for polycarbonate and silicone
Filtration area	3 cm²
Materials	Polycarbonate top and bottom parts, silicone gasket
Max. operating pressure	7 bar | 700 kPa | 101.5 psi
Membrane filter Ø	25 mm
Sterilization	By autoclaving at 121 °C
Hold-up volume	Less than 0.3 mL after overcoming the bubble point (0.6 mL before)

Ordering Information

Description	Order No.
25 mm Polycarbonate Syringe Filter Holder, pack of 12	16517———-E
Silicone gasket, 20.5 × 26.5 × 0.5 mm, pack of 10	6980570

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25 mm Glass Vacuum Filter Holder

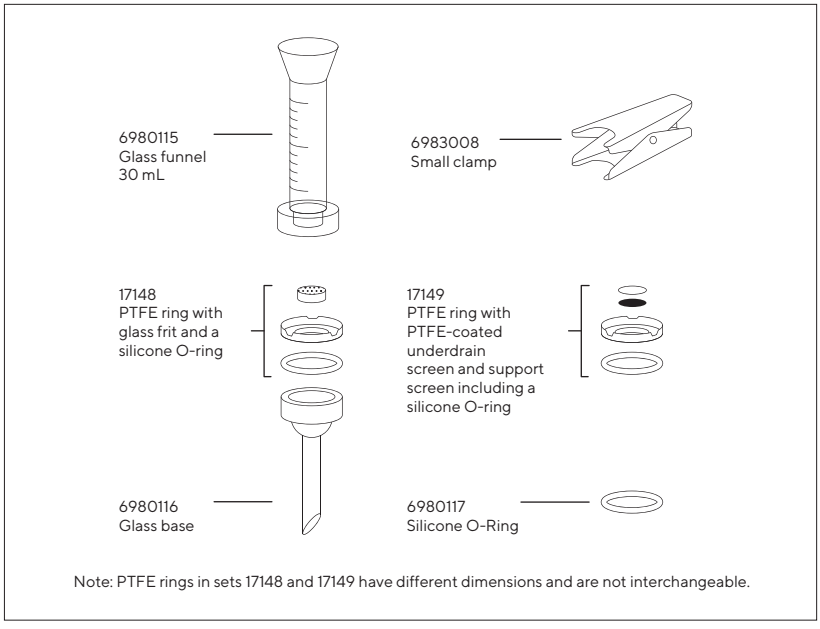
For Hybridization Tests, Particle Testing and Clarification

This filter holder is available in two versions differing from each other only in the type of the filter support. The filter with glass frit ensures uniform distribution of retained particles and is therefore recommended when the residue on the filter surface is of interest. Because it is easy to clean, the device with the PTFE-coated screen support is preferable when the filtrate is required, or when liquids difficult to remove from glass frits must be examined.

The PTFE ring, which holds the glass frit and the screen support, allows for the autoclaving of the devices with a filter in position and protects the edge of the glass frit from breakage and potential leakage. It has a rim around the upper edge to simplify the positioning of the membrane filter when inserted and a silicone O-ring in the underside for a leak-proof seal on the filtrate side. The funnel-shaped top part simplifies filling in the sample.

Specifications

Outlet spout	12 mm Ø
Parts and materials	Borosilicate glass funnel and base PTFE | glass filter support (type 16306) or PTFE | stainless steel filter support, coated with PTFE (type 16315) Silicone O-ring 25 × 3 mm Anodized Aluminium clamp
Chemical compatibility	As for glass, PTFE and silicone. The silicone O-ring can be replaced by a fluoroelastomer O-ring (order no. 00118)
Funnel capacity	30 mL
Filtration area	3 cm²
Max. operating pressure	Only for vacuum
Suitable membrane filter Ø	25 mm (or 24 mm)
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C)



Note: PTFE rings in sets 17148 and 17149 have different dimensions and are not interchangeable.

Ordering Information

Description	Order No.
Glass vacuum filtration holder for 25 mm (or 24 mm) membrane filter, with glass frit filter support	16306
Glass vacuum filtration holder for 25 mm (or 24 mm) membrane filter, with PTFE-coated screen filter support	16315

Replacement parts are shown in the diagram.

50 mm Glass Vacuum Filter Holder

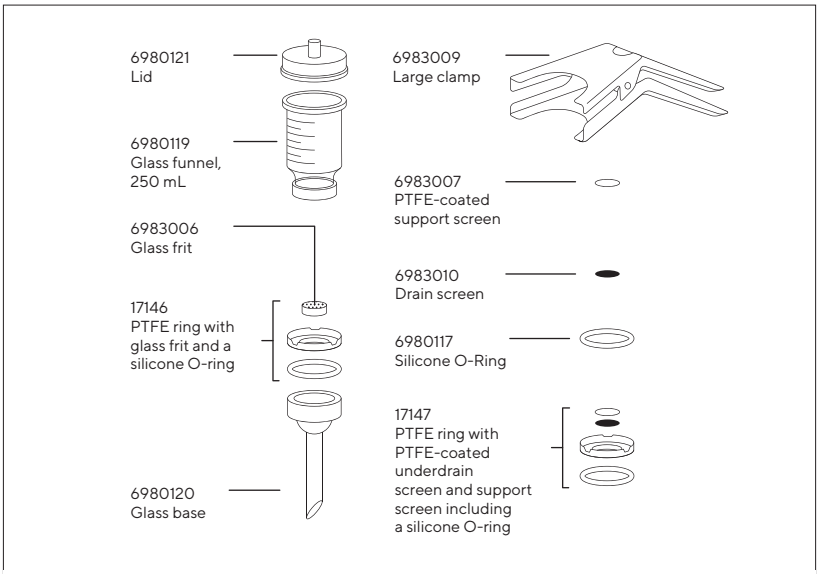
For Particle Testing or Clarification and Sterile Filtration

This filter holder is available in two versions differing from each other only in the type of the filter support. The device with glass frit ensures uniform distribution of retained particles and is therefore recommended, when the residue on the filter surface is of interest. Because it is easy to clean, the device with the PTFE-coated screen support is preferable when the filtrate is required, or when liquids difficult to remove from glass frits must be examined.

The PTFE ring, which holds the glass frit and the screen support, allows the autoclaving of the devices with a filter in position and protects the edge of the glass frit from breakage and potential leakage. It has a rim around the upper edge to simplify the positioning of the membrane filter when inserted and a silicone O-ring in the underside for a leak-proof seal on the filtrate side.

Specifications

Outlet spout	15 mm Ø
Parts and materials	Borosilicate glass funnel and base Silicone caoutchouc lid PTFE | glass filter support (type 16307) or PTFE | stainless steel filter support, coated with PTFE (type 16316) Silicone O-ring 45 × 3 mm Anodized Aluminium clamp
Chemical compatibility	As for glass, PTFE and silicone. The silicone O-ring can be replaced by a fluoroelastomer O-ring (order no. 00124).
Funnel capacity	250 mL
Filtration area	12.5 cm²
Max. operating pressure	Only for vacuum
Suitable membrane filter Ø	50 mm (or 47 mm)
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C)



Note: PTFE rings in sets 17146 and 17147 have different dimensions and are not interchangeable.

Ordering Information

Description	Order No.
Glass vacuum filtration holder for 50 mm (or 47 mm) membrane filter, with glass frit filter support	16307
Glass vacuum filtration holder for 50 mm (or 47 mm) membrane filter, with PTFE-coated screen filter support	16316

Replacement parts are shown in the diagram.

All-Glass Vacuum Filter Holder

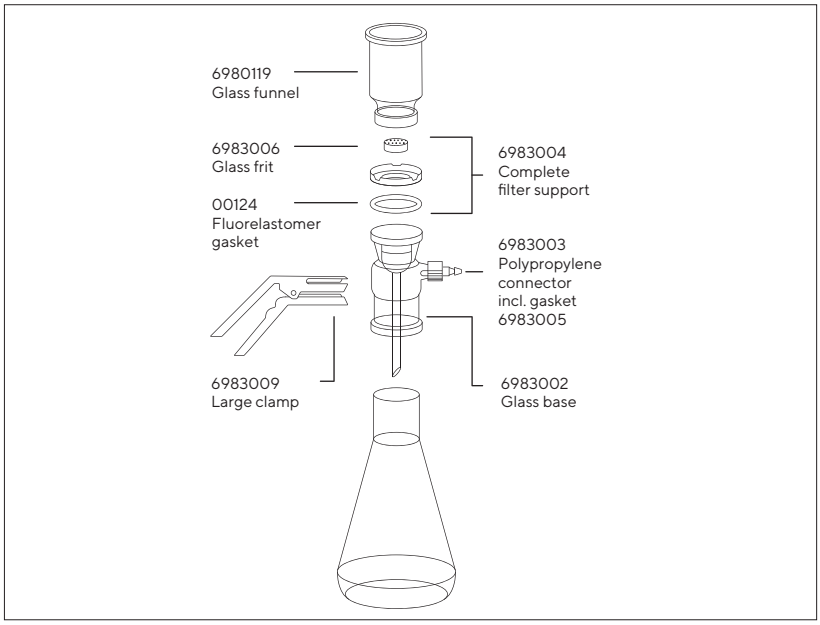
For Analytical Determinations, Particle Removal from Solvents

All areas, where liquid and device can come into direct contact, are made of glass or PTFE. The device, in combination with solvent-resistant, hydrophilic RC-membranes, is therefore ideal for ultracleaning and degassing solvents and solvent mixtures for HPLC, GC and AA.

Convenience of handling is ensured by several beneficial features. A 6 mm wide non-ground rim above the ground glass neck of the suction flask prevents the filtrate from contacting grease on the ground glass surface and so avoids its contamination while being poured out of the flask. The hose nipple connector is made of polypropylene for safe connection of the vacuum hose. The filtrate outlet spout ends well below the entrance to this hose nipple.

Specifications

Outlet spout	Borosilicate glass funnel, base and flask, sintered glass frit in a PTFE ring and fluoroelastomer O-ring (45 × 3 mm) underneath, anodized aluminium clamp
Parts and materials	As for glass and PTFE
Chemical compatibility	250 mL
Funnel capacity	1 liter
Filtration area	12.5 cm²
Max. operating pressure	Only for vacuum
Suitable membrane filter Ø	50 mm (or 47 mm), 40 or 42 mm prefilter
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C)



Ordering Information

Description	Order No.
All-glass vacuum filter holder for 50 mm (or 47 mm) membrane filter, with vacuum-resistant flask, capacity 1 liter	16309

Replacement parts are shown in the diagram.

Polycarbonate In-Line Filter Holder

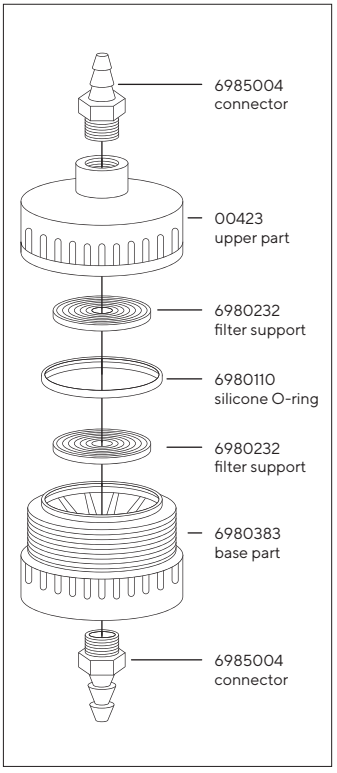
For the Filtration of Liter Volumes of Aqueous Solutions

This holder is made of stable, autoclavable polycarbonate. This practical holder is suitable for many simple laboratory filtrations. It can be connected to a peristaltic pump or a pressure container. The bell-shaped base protects the filtrate from repeated contamination while flowing in a receiver.

The holder is characterized by an excellent resistance to pressure and density setting by simple hand-tightening. The transparent top part allows the visual control of the correct fit of the O-ring. The hose nipples can be replaced by luer connectors to use it as a large area syringe filter holder.

Specifications

Chemical compatibility	As for polycarbonate, polypropylene and silicone
Filtration area	12.5 cm²
Weight	83 g
Threads for connectors	M 12 × 1 female thread
Materials	Polycarbonate top part, base part and hose nipple, polypropylene filter support, silicone O-ring (40 × 5 mm)
Max. operating pressure	7 bar | 700 kPa | 101.5 psi
Suitable membrane filter Ø	50 mm (40 or 42 mm prefilter)
Sterilization	By autoclaving at 121 °C The material withstands repeated cycles, provided aggressive cleaning agents are completely washed off and that the boiler water does not contain anti-corrosive or anti-scaling additives.



Ordering Information

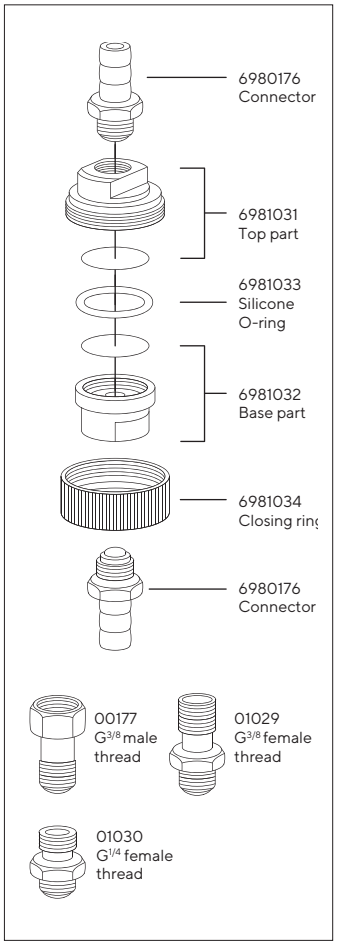
Description	Order No.
Polycarbonate in-line filter holder for 50 mm membrane filter, pack of 5.	16508----------B

Replacement parts are shown in the diagram.

25 mm Stainless Steel Filter Holder

For In-Line Filtration

The G¼ connection threads with density barrel, guarantee leak-proof sealing of the hose nipple and the holder without sealing rings. Other connectors, available as accessories, fit the holder onto reducing valves or pumps with G¼ female thread (order no. 01030) or G⅜ female thread order no. 01029) or onto pressure tanks with G⅜ male thread (order no. 00177).



Specifications

Connectors	Hose nipples DN10
Filtration area	3 cm²
Weight	ca. 170 g
Materials	Stainless steel, except silicone O-ring (21 × 2 mm) and aluminium closing ring
Max. operating pressure	5 bar | 500 kPa | 72.5 psi
Suitable membrane filter	25 mm (20 mm prefilter for the filtration of liquids only)
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C)

Ordering Information

Description	Order No.
Stainless steel pressure filter holder for 25 mm Ø membrane filter.	16251

Replacement parts are shown in the diagram.

47 mm Stainless Steel Filter Holder

For In-Line Filtration

The filter holder is suitable for a pressure of up to 20 bar. The inlet side valve is convenient for the intermittent run-off of waste water. Other connectors, available as accessories, fit the holder onto reducing valves or pumps with G⅜ female thread (order no. 17089) or onto pressure tanks with G⅜ male thread (order no. 17069) or on taps with G¾ male thread (order no. 17068).

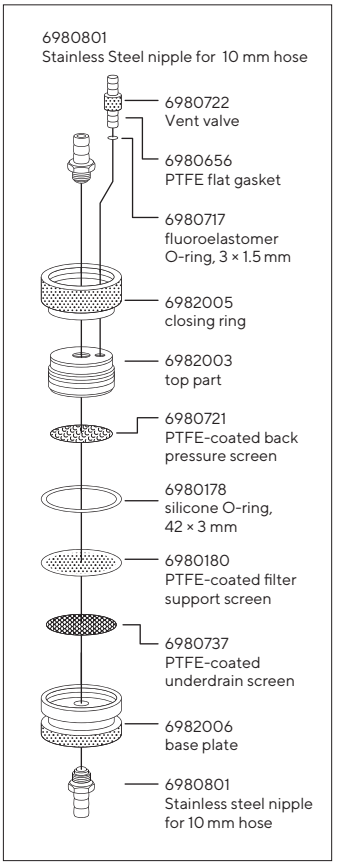


Diagram for 16254

Specifications

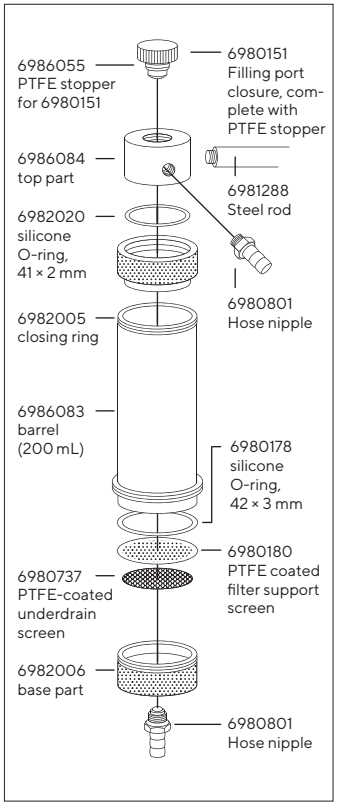
Connectors	Hose nipples DN10
Connection thread	M12 × 1
Filtration area	13 cm²
Weight	ca. 490 g
Materials	Stainless steel, except silicone O-ring (42 × 3 mm), PTFE and fluoroelastomer valve seals
Max. operating pressure	20 bar | 2,000 kPa | 290 psi
Suitable membrane filter	47 mm (40 or 42 mm prefilter)
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C)

Ordering Information

Description	Order No.
Stainless steel filter holder for 47 mm membrane filter (with adapter M12 × 1 male thread to hose barb DN10, Mat. 316, ref. 6980801) – Replacement parts are shown in the diagram	16254
Stainless steel filter holder for 47 mm membrane filter (with adapter M12 × 1 male thread to hose barb DN 4 to 5, Mat. 316, ref. 6981132)	16278
Stainless steel back pressure screen	6980721-----1
Stainless steel filter support screen	6980180-----1
Stainless steel underdrain screen	00181
Stainless steel connector M12 × 1 male thread to hose barb DN 4 – 5	6981132
Adapter Quick connect nipple length 60 mm male part to male thread M12 × 1, Mat 316	17090-----1

Stainless Steel Pressure Filter Holder

For the Filtration of Up to 5 L Volumes



A practical filter holder for many laboratory filtrations. It can be attached to a tripod with the help of a steel rod which can be screwed in. The hose nipple is screwed into the side of the top part, leaving room for a large filling opening. This makes pouring in the sample easier, and the sample can be refilled without removing the tube connection to the pressure source.

Leak-proof sealing is achieved by hand-tightening the closing ring. For the filtration of small volumes (up to about 200 mL of soil samples or viscous liquids, such as oils), the holder is connected directly to a pressure source. For the filtration of up to 5 L volumes of relatively easily filterable liquids (e.g. buffer solutions, solutions for cell counters and tissue culture solutions), it is used in combination with a pressure tank.

Specifications

Chemical compatibility	As for stainless steel, PTFE and silicone. If required, the silicone O-ring in the filter support can be replaced by a fluoroelastomer O-ring 00179 or a PTFE O-ring 17038 (by reducing the max. operating pressure to 4 bar | 58 psi); the silicone O-ring in the top part can be replaced by a fluoroelastomer O-ring 17145.
Filtration area	13 cm²
Weight	960 g
Threads for connectors	M 12 × 1 female thread
Materials	Top part, barrel, base part, corrugated iron, closing ring, closure cap, back pressure screen and stainless steel hose nipples 1.4401 (AISI 316), PTFE-coated stainless steel filter support, silicone O-rings, 41 × 2 mm (top part) and 42 × 3 mm (filter support), PTFE-sealing (cap).
Max. operating pressure	10 bar | 1,000 kPa | 145 psi
Suitable membrane filter Ø	47 mm (40 or 42 mm prefilter)
Sterilization	By autoclaving (max 134 °C) or by dry heat (180 °C)

Ordering Information

Description	Order No.
Stainless steel pressure filter holder	16249
Stainless steel pressure filter holder with double jacket	16249-----3

Replacement Parts

Description	Order No.
Fluoroelastomer O-ring, 42 × 3 mm	00179
PTFE O-ring, 42 × 3 mm	17038
Fluoroelastomer O-ring for upper part, 41 × 2 mm	17145

Other replacement parts are shown in the diagram or on page 138.

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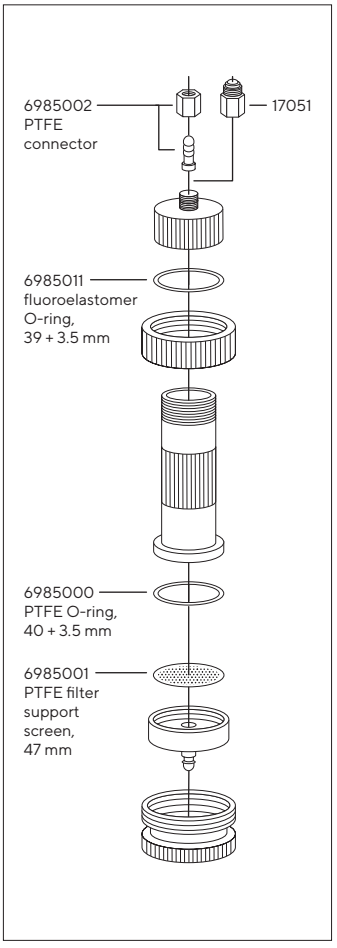
Chemical-resistant PTFE Filter Holder

For the Filtration of Aggressive Liquids

The holder hinders the release of trace elements into the filtrate and is resistant to almost all chemicals. The fluoroelastomer O-ring in the top part allows easy hand tightening, and can be replaced by a PTFE O-ring, order no. 17039. The 6 mm outlet nipple is an integral part of the base, the 10 mm inlet hose nipple can be replaced by a G⅜ connector, order no. 17051.



Specifications

Chemical compatibility	As for PTFE and fluoroelastomer
Filtration area	12.5 cm²
Thread for inlet connector	M 14 × 1.5 male thread
Materials	Top part, barrel, base part: corrugated iron, hose nipples and filter support with 40 × 3.5 mm O-ring: PTFE, locking rings: aluminium 39 × 3.5 mm fluoroelastomer O-ring (top part)
Max. operating pressure	5 bar | 500 kPa | 72.5 psi
Suitable membrane filter Ø	47 mm
Sterilization	By autoclaving (max 134 °C) or by dry heat (180 °C)

Ordering Information

Description	Order No.
PTFE pressure filter holder, 47 mm, with 200 mL capacity.	16579

Replacement Parts

Description	Order No.
PTFE O-ring, 39 × 3.5 mm	17039

Other replacement parts are shown in the diagram.

Combisart® Manifolds

1-, 3- and 6-Branch

Made of high-grade stainless steel (B.S. 304S3 | AISI 304); accommodates any type of vacuum funnel. Stainless steel three-way valves (taps) allow the vacuum for each filter holder to be individually controlled and each holder to be sterilely vented. The low height of the manifold ports is particularly advantageous for working on a clean bench.

Ordering Information

Combisart® Manifolds, without Base Support and Frit	Order No.
Combisart® 1-branch manifold	16844
Combisart® 3-branch manifold	16842
Combisart® 6-branch manifold	16843

Combisart® Sets, Stainless Steel Capacity	Order No.
1-branch 1 × 100 mL	16844-CS
1-branch 1 × 500 mL	16845-CS
3-branch 3 × 100 mL	16824-CS
3-branch 3 × 500 mL	16828-CS
6-branch 6 × 100 mL	16832-CS
6-branch 6 × 500 mL	16831-CS

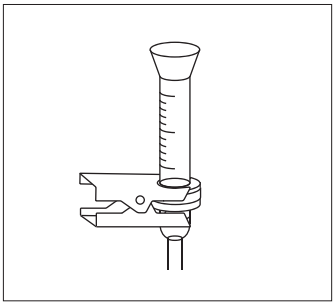
In each set stainless steel funnels with lids are preassembled.

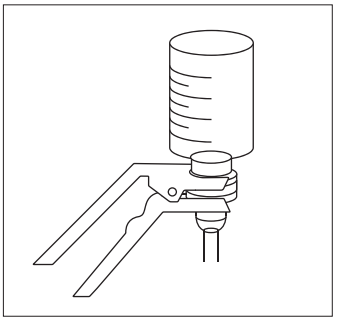
Accessories and Replacement Parts

Description	Pack Size	Order No.
Plug, conical, to close the venting hole beside the 3-way valve	10	6980225
Silicone O-ring for manifold female threads	3	6980235
Rubber tubing, 1 m	1	16623

Glass Filter Holders; 30, 250 mL

For Particle Counting



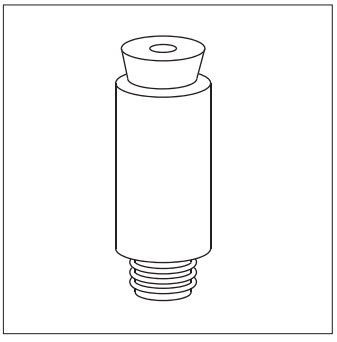


Glass Filter Holders

Two compact vacuum filter holders for easy particulate analysis. Both the top and bottom part of the filter holders are easily and securely fastened together using the metal clamp. The centering rim on the filter support ensures correct positioning of the membrane filter. The glass frit filter support guarantees uniform distribution of retained particles on the filter surface.

Ordering Information

Description		Order No.
Glass filter holder	30 mL	16306
Filter Ø	25 mm (or 24 mm) Prefilter, 20 mm	
Filtration area	3 cm²	
Capacity	30 mL	
Outlet	12 mm outer Ø	
Glass filter holder	250 mL	16307
Filter Ø	47 mm (or 50 mm) Prefilter, 40 mm	
Filtration area	12.5 cm²	
Capacity	250 mL	
Outlet	15 mm outer Ø	



Adapter, 16836 | Adapter, 16837

For use of a glass filter holder, 16306 or 16307, on a Combisart® stainless steel manifold.

Ordering Information

Description	Order No.
Adapter with 11 mm opening in stopper; for using filter holder 16306 on a Combisart® manifold	16836
Replacement stopper for 16836	00280
Adapter with 14 mm opening in stopper; for using filter holder 16307 on a Combisart® manifold	16837
Replacement stopper for 16837	00281

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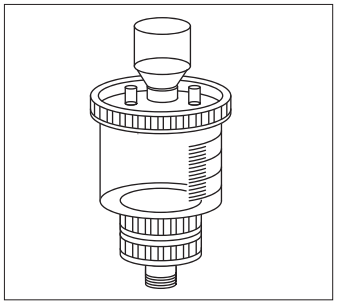
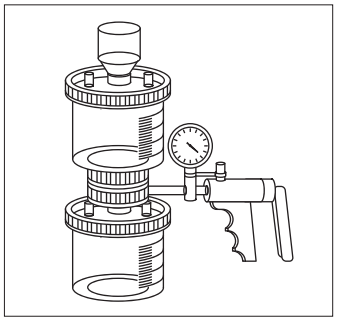
Polycarbonate Filter Holders

For Particle Counting





Polycarbonate Filter Holder, 250 mL

This reusable, practical filter holder made of autoclavable plastic is ideal for analytical testing outside the laboratory. For use with 47 mm membrane filters.

Outlet: TR 20 × 2 mm male thread

Ordering Information

Description	Order No.
Polycarbonate filter holder without receiver flask	16511
Polycarbonate filter holder with receiver flask	16510
Hand vacuum pump with gauge and 60 cm PVC tubing	16673

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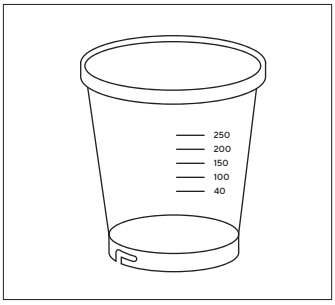
Ready-to-Use Biosart® 250 Funnels

For Particle Counting

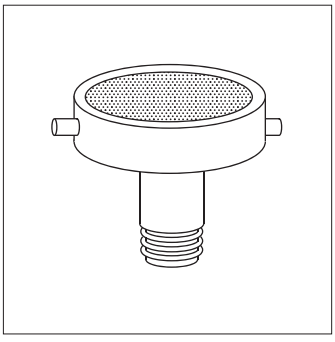


Biosart® 250 Funnel

The Biosart® 250 Funnel has been specially designed for analytical quality assurance. The sterile 250 mL plastic funnel guarantees fast filtration and high sample throughputs during routine testing. Its large inner diameter allows high flow rates, and the tapered inner walls permit thorough flushing of the funnel, after filtration.

Ordering Information

Description	Order No.
Biosart® 250 Funnel, 50 units, sterile-packaged	16407-25-ALK



Single Support, 16840

For adapting a Biosart® 250 Funnel for use on a Combisart® stainless steel manifold.

Ordering Information

Description	Order No.
Stainless steel filter support for stainless steel manifold.	16840

Replacement Parts

Description	Order No.
Stainless steel frit for 50 mm membrane filters	6980102
Stainless steel frit for 47 mm membrane filters	6980103
Silicone flat gasket underneath the frit	6980124
PTFE flat gasket underneath the frit	6980104
Silicone O-ring for 16840 male thread	6980274

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