



Laboratory  
Filtration  
Products

Simplifying Progress

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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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VIVAFLW® 50

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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.

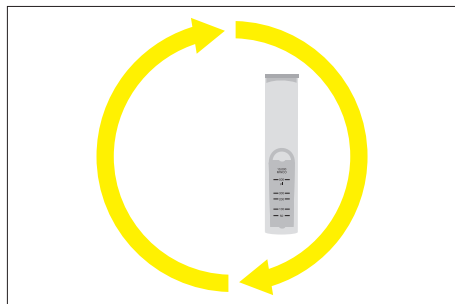


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## Membrane Selection Guide

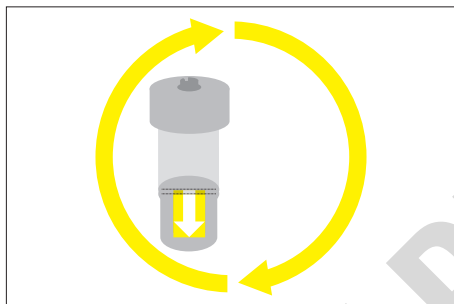
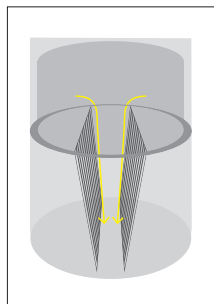
### Ultrafiltration Methods

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.



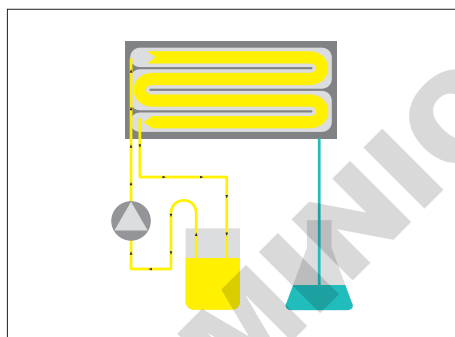
#### Centrifugal Concentration (0.1 to 100 mL Starting Volume)

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® 1 for protein concentration, as well as Vivacon® devices for DNA and peptide concentration | fractionation.



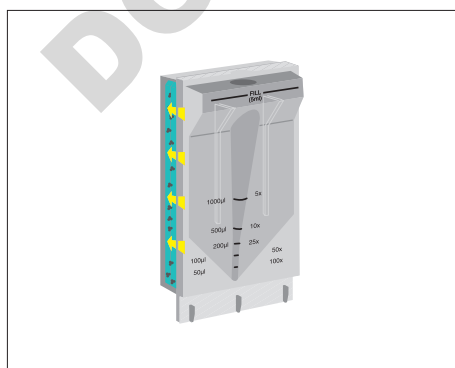
#### Pressure Ultrafiltration (5 to 100 mL Starting Volume)

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.



### 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 hydrophilic membrane suitable for general samples, with ultra-low protein adsorption and high chemical compatibility. 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.

### Specifications

#### Vivaspin® 500

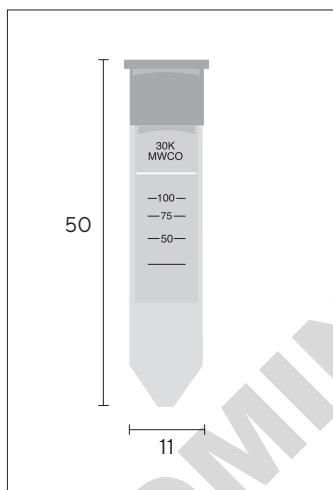
|                           |  |   |
|---------------------------|--|---|
| Concentrator capacity     | Swing bucket rotor<br>Fixed angle rotor  | do not use<br>500 µL  |
| Dimensions                | Total length<br>Width<br>Active membrane area<br>Hold-up volume,<br>membrane and support<br>Dead-stop volume | 50 mm<br>11 mm<br>0.5 cm <sup>2</sup><br>< 5 µL<br>5 µL             |
| Materials of construction | Body<br>Filtrate vessel<br>Concentrator cap<br>Membrane  | Polycarbonate<br>Polypropylene<br>Polycarbonate<br>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)<br>3,000 MWCO PES | 30  | 96 % |
| BSA 1.0 mg/mL (66,000 MW)<br>5,000 MWCO PES       | 15  | 96 % |
| 10,000 MWCO PES                                   | 5   | 96 % |
| 30,000 MWCO PES                                   | 5   | 96 % |
| IgG 0.25 mg/mL (160,000 MW)<br>30,000 MWCO PES    | 10  | 96 % |
| 50,000 MWCO PES                                   | 10  | 96 % |
| 100,000 MWCO PES                                  | 10  | 96 % |



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



## 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    |
| 0.2µm                          | 25        | VS0171    |
| 0.2µm                          | 100       | VS0172    |

Visit us at [www.sartorius.com/Vivaspin500](http://www.sartorius.com/Vivaspin500) to get additional info.  
Find instructions on how to use Vivaspin® 500 for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Concentration to a predefined volume
- Concentration of diluted samples with increased recovery

## 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.

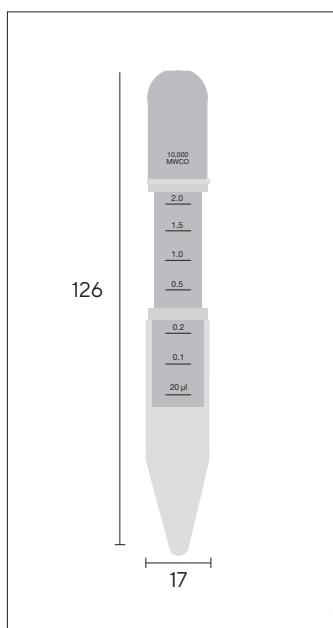
### Specifications

#### Vivaspin® 2

|                           |                            |                     |
|---------------------------|----------------------------|---------------------|
| Concentrator capacity     | Swing bucket rotor         | 3 mL                |
|                           | Fixed angle rotor          | 2 mL                |
| Dimensions                | Total length               | 126 mm              |
|                           | Width                      | 17 mm               |
|                           | Active membrane area       | 1.2 cm <sup>2</sup> |
|                           | Hold-up volume of membrane | <10 µL              |
|                           | Dead-stop volume           | 8 µL                |
| Materials of construction | Body                       | Polycarbonate       |
|                           | Filtrate vessel            | Polycarbonate       |
|                           | Concentrator cap           | Polycarbonate       |
|                           | Membrane                   | 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)<br>3,000 MWCO PES | 50   | 96%          |     |
| BSA 1.0 mg/mL (66,000 MW)                         | 5,000 MWCO PES   | 12           | 98% |
|   | 5,000 MWCO CTA   | 50           |     |
|   | 5,000 MWCO Hydrosart®  | 22           | 98% |
|   | 10,000 MWCO PES  | 8            | 98% |
|   | 10,000 MWCO CTA  | 10           | 96% |
|   | 10,000 MWCO Hydrosart®   | 12           | 98% |
|   | 20,000 MWCO CTA  | 5            | 97% |
|   | 30,000 MWCO PES  | 8            | 97% |
|   | 30,000 MWCO Hydrosart®   | 5            | 95% |



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**Typical Performance Characteristics**


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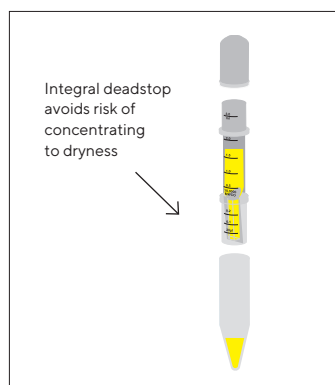
|                             | Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%] |      |
|-----------------------------|---|------|
| Rotor                       | Fixed angle   |      |
| Centrifugal force           | 5,000 g   |      |
| Start volume                | 2 mL  |      |
|                             | 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%  |

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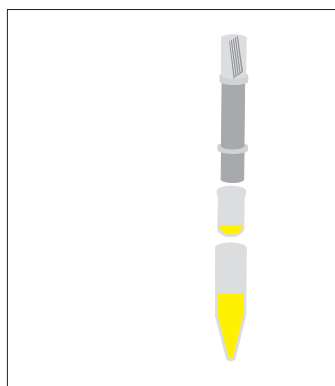
## Ordering Information

| 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    |
| 0.2µm                        | 25        | VS0271    |
| 0.2µm                        | 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.

Visit us at [www.sartorius.com/Vivaspin2](http://www.sartorius.com/Vivaspin2) to get additional info. Find instructions on how to use Vivaspin® 2 for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Concentration of diluted samples with increased recovery
- Sample preparation for radio immunoassay

## 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 floating 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         | 2.5 mL               |
|                           | Fixed angle rotor          | 2.5 mL               |
| Dimensions                | Total length               | 93 mm                |
|                           | Width                      | 14 mm                |
|                           | Active membrane area       | 0.79 cm <sup>2</sup> |
|                           | Hold-up volume of membrane | < 5 µL               |
|                           | Dead-stop volume           | 100 µL               |
| Materials of construction | Centrifuge tube            | Polystyrene          |
|                           | Floater tube               | Cellulose propionate |
|                           | Cap                        | Polyethylene         |
|                           | Membrane                   | CTA, PES             |

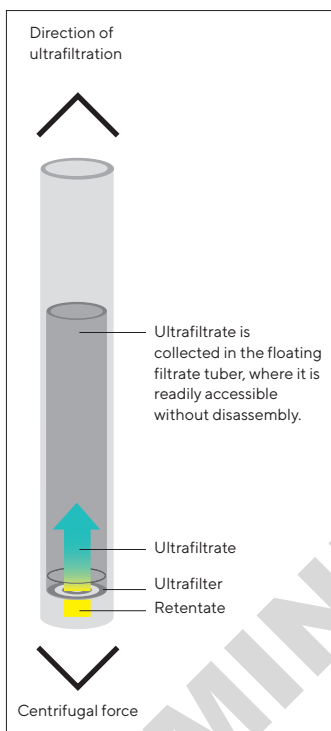
### Typical Performance Characteristics

|  | Time to filter<br>50% of sample<br>volume | Time to filter<br>90% of sample<br>volume | Passage of<br>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%                          |
| IBL Blue Dextran 0.1 mg/mL<br>(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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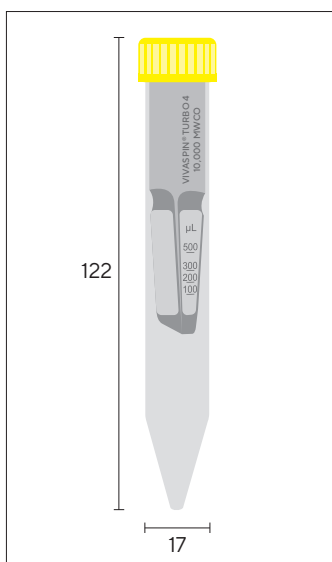
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**Visit us at** [www.sartorius.com/en/products/lab-filtration-purification/ultrafiltration-devices](http://www.sartorius.com/en/products/lab-filtration-purification/ultrafiltration-devices) to get additional info.

Find instructions on how to use Centrisart® I for the high recovery of cationised protein.



## 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                       | 4 mL                        |
|                           | Fixed angle rotor                        | 4 mL                        |
| Dimensions                | Total length                             | 122.5 mm                    |
|                           | Width                                    | 17 mm                       |
|                           | Active membrane area                     | 3.2 cm <sup>2</sup>         |
|                           | Hold-up volume of membrane               | <10 µL                      |
|                           | Dead-stop volume swing bucket rotor      | 40 µL                       |
|                           | Dead-stop volume fixed angle rotor (25°) | 30 µL                       |
| Materials of construction | Body                                     | Styrene butadiene copolymer |
|                           | Filtrate vessel                          | Polypropylene               |
|                           | Concentrator cap                         | Polypropylene               |
|                           | Membrane                                 | Polyethersulfone            |

#### Typical Performance Characteristics

|                            | Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%] |      |                   |      |
|----------------------------|---|------|-------------------|------|
|                            | 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.

## 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

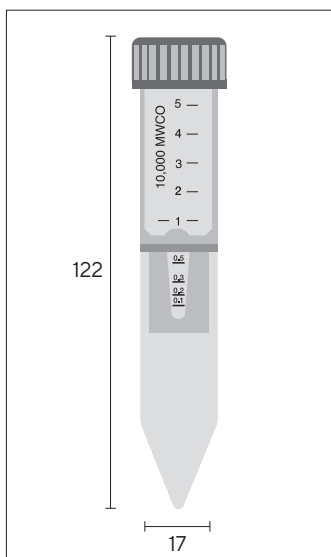
| Vivaspin® Turbo 4 Polyethersulfone | Qty./Pkg. | Prod. No.    |
|------------------------------------|-----------|--------------|
| 3,000 MWCO                         | 25        | VS04T91      |
| 3,000 MWCO                         | 100       | VS04T92      |
| 5,000 MWCO                         | 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

Visit us at [www.sartorius.com/VivaspinTurbo4](http://www.sartorius.com/VivaspinTurbo4) to get additional info. Find instructions on how to use Vivaspin® Turbo 4 PES for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Separation of proteins and metabolites for disease detection

## 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         | 6 mL                |
|                           | Fixed angle rotor          | 6 mL                |
| Dimensions                | Total length               | 122 mm              |
|                           | Width                      | 17 mm               |
|                           | Active membrane area       | 2.5 cm <sup>2</sup> |
|                           | Hold-up volume of membrane | <10 µL              |
|                           | Dead-stop volume           | 30 µL               |
| Materials of construction | Body                       | Polycarbonate       |
|                           | Filtrate vessel            | Polycarbonate       |
|                           | Concentrator cap           | Polypropylene       |
|                           | Membrane                   | Polyethersulfone    |

### Typical Performance Characteristics

|   | Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%] |      |                   |      |
|---|---|------|-------------------|------|
|   | 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%  |
|   | 13  | 98%  | 10                | 98%  |
|   | 12  | 98%  | 9                 | 97%  |
|   | 12  | 98%  | 9                 | 97%  |
| IgG 0.25 mg/mL (160,000 MW) 30,000 MWCO PES                       | 18  | 96%  | 15                | 95%  |
|   | 17  | 96%  | 14                | 95%  |
|   | 15  | 91%  | 12                | 91%  |
|   | 15  | 91%  | 12                | 91%  |
| Latex beads 0.004% in DMEM + 10% FCS (0.055 µm) 300,000 MWCO PES  | -   | -    | 25                | 99%  |
|   | -   | -    | 25                | 99%  |
| Latex beads 0.004% in DMEM + 10% FCS (0.24 µm) 1,000,000 MWCO PES | -   | -    | 4                 | 99%  |
|   | -   | -    | 4                 | 99%  |
| Yeast 1.0 mg/mL (S. Cerevisiae) 0.2 µm PES                        | 4   | 97%  | 3                 | 97%  |
|   | 4   | 97%  | 3                 | 97%  |

\* 6,000 g for 100K MWCO devices

## Ordering Information

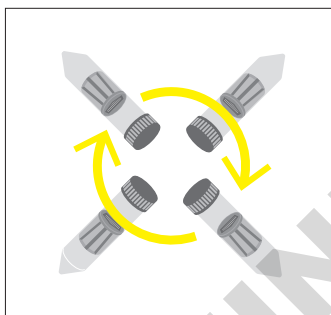
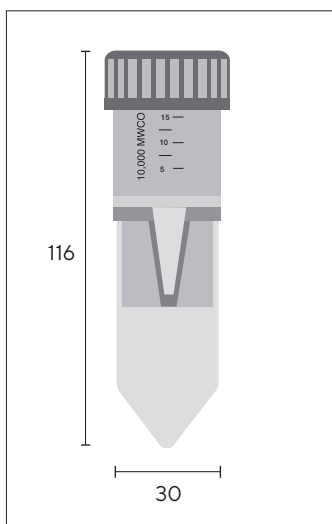
| Vivaspin® 6 Polyethersulfone | Qty./Pkg. | Prod. No.  |
|------------------------------|-----------|------------|
| 3,000 MWCO                   | 25        | VS0691     |
| 3,000 MWCO                   | 100       | VS0692     |
| 5,000 MWCO                   | 25        | VS0611     |
| 5,000 MWCO                   | 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     |

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

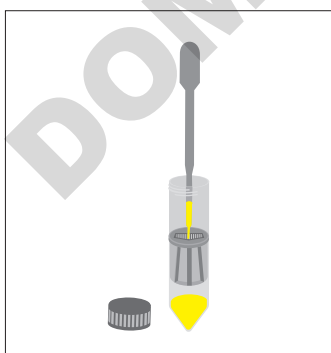
**Visit us at** [www.sartorius.com/Vivaspin6](http://www.sartorius.com/Vivaspin6) to get additional info.  
Find instructions on how to use Vivaspin® 6 for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Concentration of diluted samples with increased recovery

## 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 cm <sup>2</sup> |
|                           | 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 [%] |      |                   |      |
|---|---|------|-------------------|------|
|   | Min.  | Rec. | Min.              | Rec. |
| Rotor   | Swing bucket  |      | Fixed angle [25°] |      |
| Centrifuge speed  | 3,000 g   |      | 6,000 g           |      |
| Start volume  | 15 mL   |      | 12.5 mL           |      |
| Aprotinin 0.1 mg/mL* (6,500 MW)<br>5,000 MWCO           | 47  | 95%  | 45                | 95%  |
| Cytochrome c 0.25 mg/mL*<br>(12,400 MW)<br>5,000 MWCO   | 45  | 96%  | 45                | 96%  |
| 10,000 MWCO   | 25  | 94%  | 18                | 94%  |
| α-Chymotrypsin 0.25 mg/mL*<br>(25,000 MW)<br>5,000 MWCO | 50  | 98%  | 45                | 98%  |
| 10,000 MWCO   | 25  | 98%  | 18                | 98%  |
| Ovalbumin 1.0 mg/mL*<br>(45,000 MW)<br>10,000 MWCO      | 20  | 98%  | 14                | 98%  |
| 30,000 MWCO   | 15  | 94%  | 12                | 94%  |

| 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)<br>30,000 MWCO             | 18  | 98%  | 15   | 98%  |
| IgG 0.1 mg/mL* in DMEM<br>(160,000 MW)<br>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

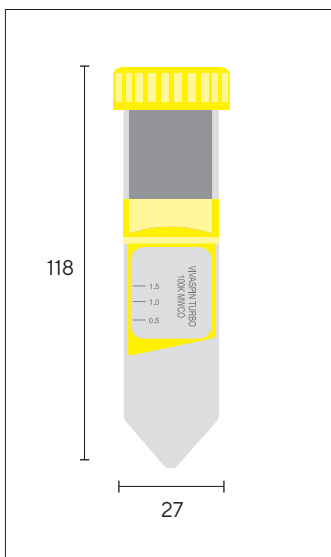
## Ordering Information

| 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  |

Visit us at [www.sartorius.com/Vivaspin15R](http://www.sartorius.com/Vivaspin15R) to get additional info.  
Find instructions on how to use Vivaspin® 15R for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Concentration of diluted samples with increased recovery

## 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 cm <sup>2</sup>         |
|                           | 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

| Rotor   | Time to concentrate up to 20× [min.] at 20 °C and solute recovery [%] |      |                   |      |
|---|---|------|-------------------|------|
|   | 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)<br>5,000 MWCO PES     | 30  | 98%  | 50                | 98%  |
| Lysozyme* (14,300 MW)<br>5,000 MWCO PES         | 33  | 96%  | 50                | 96%  |
| α-Chymotrypsin** (25,000 MW)<br>10,000 MWCO PES | 10  | 95%  | 10                | 95%  |
| BSA** (66,000 MW)<br>10,000 MWCO PES            | 10  | 99%  | 10                | 99%  |
| 30,000 MWCO PES                                 | 8   | 98%  | 10                | 98%  |

\*2,000 g for 100K MWCO devices

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**Typical Performance Characteristics**


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|                                       | Time to concentrate up to 20× [min.] at 20 °C and solute recovery [%] |      |      |      |
|---------------------------------------|---|------|------|------|
|                                       | Min.  | Rec. | Min. | Rec. |
| IgG** (160,000 MW)<br>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       |

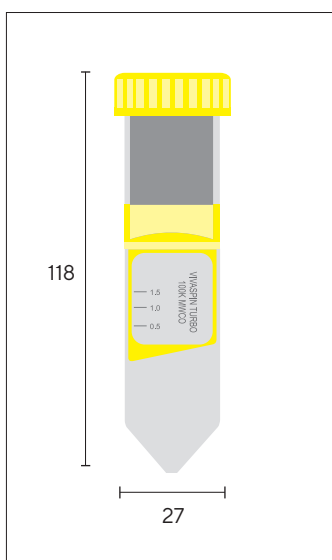
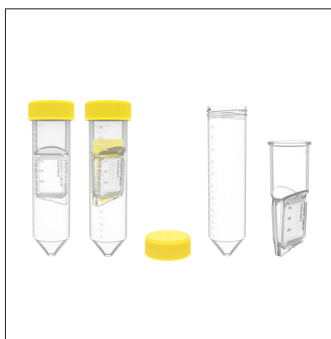
\*\*\* IVD device article codes available only in IVD registered countries, according to country specific regulations

**Visit us at** [www.sartorius.com/VivaspinTurbo15](http://www.sartorius.com/VivaspinTurbo15) to get additional info.  
Find instructions on how to use Vivaspin® Turbo 15 for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Concentration of diluted samples with increased recovery
- Concentration to a predefined volume
- Depyrogenation of the ultrafiltration devices
- Concentration of mammalian cell culture supernatants



## 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 hydrophilic regenerated cellulose (RC) is suitable for general samples, with ultra-low protein absorption and high chemical compatibility. 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 cm <sup>2</sup>         |
|  | 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 [%] |      |                   |      |
|---|---|------|-------------------|------|
|   | 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)<br>5 MWCO RC      | 23  | 94%  | 37                | 92%  |
| Lysozyme* (14,300 MW)<br>5 MWCO RC          | 23  | 94%  | 37                | 89%  |
| α-Chymotrypsin** (25,000 MW)<br>10 MWCO RC  | 7   | 93%  | 9                 | 92%  |
| BSA** (66,000 MW)<br>10 MWCO RC**           | 8   | 94%  | 10                | 98%  |
| 30 MWCO RC*                                 | 4   | 96%  | 4                 | 93%  |
| Gamma Globulin (160,000 MW)<br>50 MWCO RC** | 17  | 95%  | 11                | 96%  |
| 100 MWCO RC**                               | 18  | 89%  | 12                | 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  |

Visit us at [www.sartorius.com/VivaspinTurbo15](http://www.sartorius.com/VivaspinTurbo15) to get additional info. Find instructions on how to use Vivaspin® Turbo 15 for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Concentration of diluted samples with increased recovery
- Concentration to a predefined volume
- Depyrogenation of the ultrafiltration devices

## 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 printed graduations on the side of the concentrator and the modified dead-stop pocket further simplifies direct pipette recovery of the final concentrate.



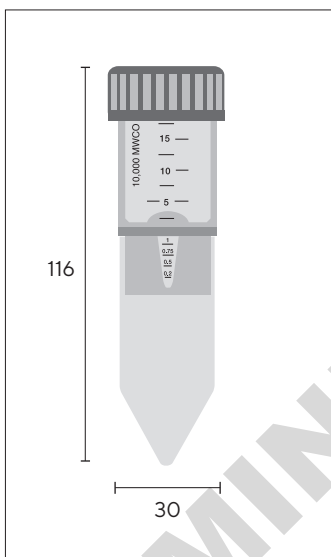
Air pressure controller, VCA002

### 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<br>Fixed angle rotor<br>With pressure head | 20 mL<br>14 mL<br>15 mL             |
| Dimensions                | Total length  | 116 mm<br>125 mm with pressure head |
|                           | Width   | 30 mm                               |
|                           | Active membrane area  | 6.0 cm <sup>2</sup>                 |
|                           | 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

| Mode                         | Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%] |                   |           |                  |
|------------------------------|---|-------------------|-----------|------------------|
|                              | 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**

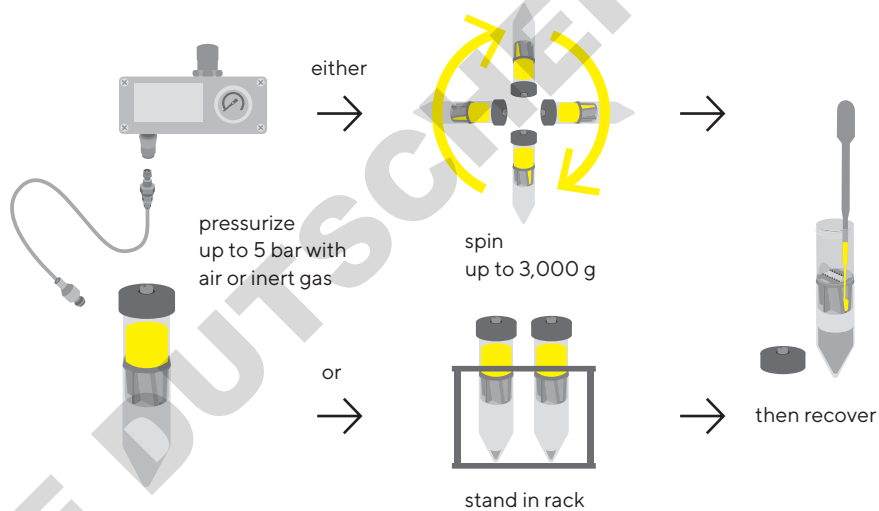
|   | Time to concentrate up to 30× [min.] at 20 °C and solute recovery [%] |      |      |      |      |      |      |      |
|---|---|------|------|------|------|------|------|------|
|   | Min.  | Rec. | Min. | Rec. | Min. | Rec. | Min. | Rec. |
| Cytochrome c 0.25 mg/mL (12,400 MW)             |   |      |      |      |      |      |      |      |
| 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 ( <i>S. Cerevisiae</i> )        |   |      |      |      |      |      |      |      |
| 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     |

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

| 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<br>(4 mm pneumatic tubing, 3 m) | 1         | VCA012    |
| Vivaspin® 20 pressure head                                 | 1         | VCA200    |



Using the Vivaspin® 20 pressure head

**Visit us at** [www.sartorius.com/Vivaspin20](http://www.sartorius.com/Vivaspin20) to get additional info.  
Find instructions on how to use Vivaspin® 20 for

- Desalting and buffer exchange
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Urine protein concentration
- Concentration of diluted samples with increased recovery
- The workflow in protein research laboratories

## 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  $\mu\text{L}$ . They can be used in fixed angle rotors accepting 2.2 mL centrifuge tubes.

### Product Features

- High-flux polyethersulfone membrane
- 0.8  $\mu\text{m}$  pore size
- Low hold-up volume (< 5  $\mu\text{L}$ )
- Fast and reproducible performance

### Applications

- Clarification of samples before loading in Vivapure<sup>®</sup> 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 $\mu\text{m}$                      |                    |
| Dimensions                | Total length                           | 43 mm              |
|                           | Filtrate collection tube $\varnothing$ | 11 mm              |
|                           | Active membrane area                   | 0.34 $\text{cm}^2$ |
|                           | Hold-up volume, membrane plus support  | < 5 $\mu\text{L}$  |
|                           | 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 $\mu\text{m}$ PES | 100       | VK01P042  |



## Vivacell 100



### 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:

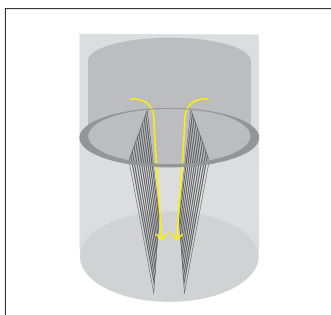
- Pressure
- Centrifuge
- Pressure-shake

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

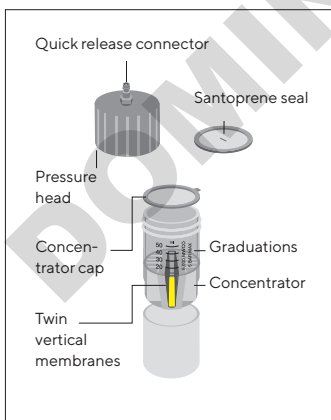
Vivacell 100 units can also be used for single or extremely sensitive samples in the pressurized mode only and left on a bench or placed on an orbital laboratory shaker for faster concentration. It can also be kept in a pressurized mode in the refrigerator. Pressurized handling is facilitated by the 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.



Air pressure controller, VCA002



Patented vertical membrane design



Filtrate container fits standard 250 mL rotors

## Specifications

### Vivacell 100

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

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**Typical Performance Characteristics**


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| 90 mL Start volume                              | Time to concentrate up to 30× [min.] at 20 °C |                  |               | Solute recovery % |
|---|---|------------------|---------------|-------------------|
|   | Centrifuge (swing bucket, 2,000 g)            | Pressure (4 bar) |               |                   |
|   |   | 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%               |

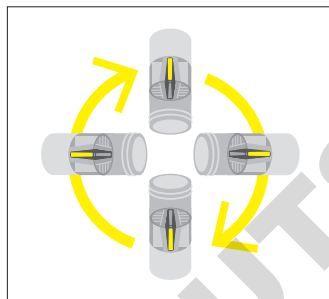
\* 2,000 g in centrifuge, 2 bar (29 psi) pressure

## 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    |



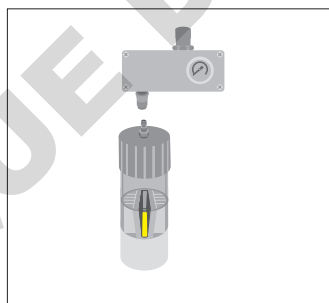
| Vivacell 100 Accessories   | Qty./Pkg. | Prod. No. |
|--|-----------|-----------|
| Air pressure controller (APC), complete with pressure gauge, regulator, over-pressure safety valve, female connector, 1 m extension line (4 mm pressure tubing) with male and female connectors and 1 m of 6 mm inlet tubing | 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

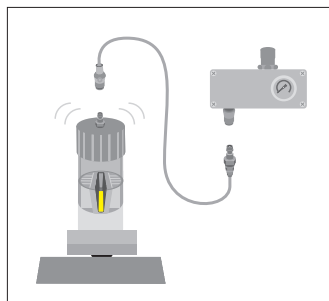
- Process convenience
- Low shear, non-foaming
- Less visual control



### 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



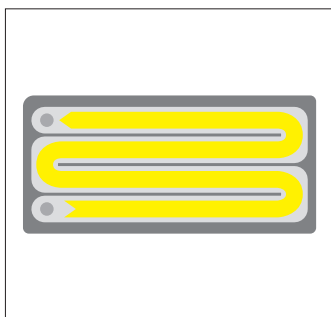
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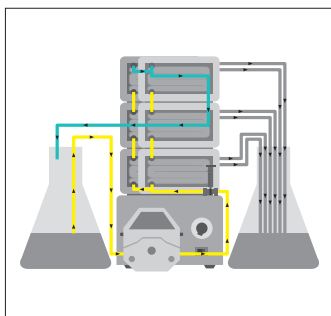
## Vivaflow® 50

### 0.1 to 3 L Samples

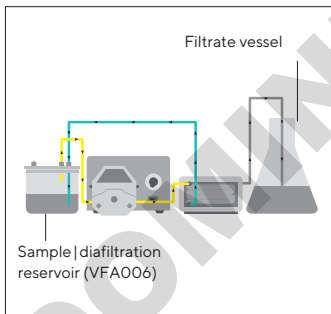
The unique, patented Vivaflow®\* 50 system provides ease of use, performance, flexibility and economy that are unrivaled by any laboratory or pilot-scale filtration system on the market.



Flip-flow recirculation path



Multiple cassettes



Single cassette

### 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 cm<sup>2</sup> 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 cm <sup>2</sup>       |
|                           | 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.

## Performance Characteristics

|                                       | Time to concentrate up to 20× [min.] at 3 bar inlet pressure, 20 °C |                                      |                   |                      |
|---------------------------------------|---|--------------------------------------|-------------------|----------------------|
|                                       | Single device<br>250 mL<br>start volume                             | Three devices<br>1 L<br>start volume | Solute recovery % |                      |
|                                       |   |                                      | Direct            | After 10 mL<br>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<br>(160,000 MW) |   |                                      |                   |                      |
| 100,000 MWCO PES                      | 43  | 62                                   | 92 %              | 98 %                 |
| 100,000 MWCO RC                       | 40  | 58                                   | 92 %              | 98 %                 |
| Yeast 1.0 mg/mL<br>(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 |

| 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×series interconnector) | 1         | VFA034 |
| Flow restrictor, 0.6 mm   | 6         | VFA035 |

Visit us at [www.sartorius.com/Vivaflow50](http://www.sartorius.com/Vivaflow50) to get additional info. Here you can find instructions on how to use Vivaflow® 50 for

- Measurement of soluble trace metals in seawater
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses

## Vivaflow® 50R

### 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 cm<sup>2</sup>.

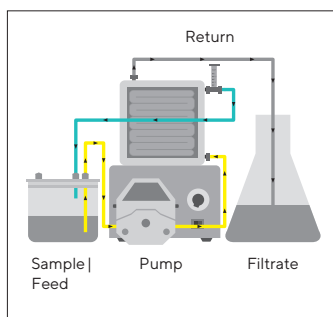
One unit comes with all the necessary accessories for running the device with a laboratory pump and a size 16 pump head. For speeding up concentration, two cassettes can be run simultaneously.

- 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

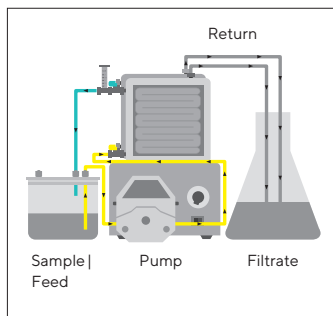
## Specifications

### Vivaflow® 50R

|                           |                           |                          |
|---------------------------|---------------------------|--------------------------|
| Dimensions                | Overall L   W   H         | 24   100   100 mm        |
|                           | Channel W   H             | 7.5   0.4 mm             |
|                           | Active membrane area      | 50 cm <sup>2</sup>       |
|                           | 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)      |



Vivaflow® 50R - Single cassette



Vivaflow® 50R - Two cassettes

## Performance Characteristics

|                                       | Time to concentrate up to 20× [min.] at 3.0 bar inlet   2.5 bar outlet pressure, 20 °C |                          |                        |                                   |
|---------------------------------------|--|--------------------------|------------------------|-----------------------------------|
|                                       | Start volume<br>250 mL   | Average flux<br>[mL/min] | Direct<br>recovery [%] | Recovery after<br>25 mL rinse [%] |
| Lysozyme 0.25 mg/mL<br>(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<br>(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<br>250 mL   | Average flux<br>mL/min | Recovery %<br>Direct | 25 mL rinse |
| Start volume 1 L<br>(one Vivaflow® 50R at 3 bar)                |  |                        |                      |             |
| 10,000 MWCO Hydrosart®  |  |                        |                      |             |
| BSA 1.0 mg/mL   | 95   | 10.0                   | 98%                  | >99%        |
| Start volume 1 L<br>(two Vivaflow® 50R<br>in parallel at 3 bar) |  |                        |                      |             |
| 10,000 MWCO Hydrosart®  |  |                        |                      |             |
| BSA 1.0 mg/mL   | 48   | 19.8                   | 98%                  | >99%        |

## 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

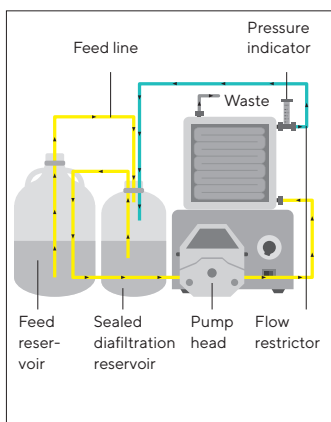
|  |    |        |
|--|----|--------|
| Size 16 tubing and Luer fittings (3 m, 3.2 × 1.6 mm) | 1  | VFA004 |
| T-connectors for running 2 cassettes                 | 2  | VFA030 |
| Flow restrictor set, 2 each of 0.4, 0.6 and 0.8 mm   | 6  | VFA009 |
| Female luer fittings, size 16                  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

Visit us at [www.sartorius.com/Vivaflow50R](http://www.sartorius.com/Vivaflow50R) to get additional info. Here you can find instructions on how to use Vivaflow® 50R for

- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses



## 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 interconnector 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 cm <sup>2</sup>         |
|                           | 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,<br>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                       |

| Performance Characteristics   |   |                          |                        |                                   |
|---|---|--------------------------|------------------------|-----------------------------------|
|   | Time to concentrate up to 20× [min.] at 3 bar inlet pressure, 20 °C |                          |                        |                                   |
|   | Start volume<br>1 L   | Average flux<br>[mL/min] | Direct<br>recovery [%] | Recovery after<br>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)   |   |                          |                        |                                   |
| 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%                    | >99%                              |
| 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%                              |

Visit us at [www.sartorius.com/Vivaflow200](http://www.sartorius.com/Vivaflow200) to get additional info. Find instructions on how to use Vivaflow® 200 for

- The measurement of soluble trace metals in seawater
- The workflow in protein research laboratories
- Preparation of biological nanoparticles and medical nanocarriers
- Concentration and purification of viruses
- Concentrating hybridoma supernatants prior to affinity chromatography

## 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    |
| 0.2µm 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    |

## Vivapore® Solvent Absorption Concentrators

### 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.

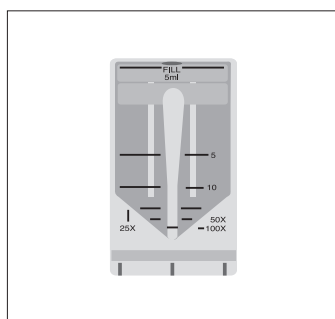
Vivapore® concentrators extend the solvent absorption technique to a totally new level of performance, application potential and ease of use.

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.

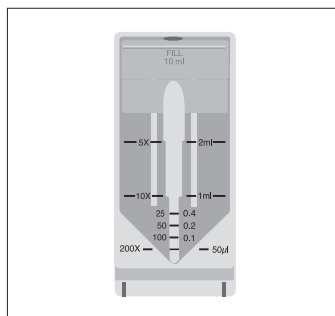
### Specifications

|                              | Vivapore® 5        | Vivapore® 10   20   |
|------------------------------|--------------------|---------------------|
| Membrane material            | PES                | PES                 |
| Membrane MWCO                | 7,500              | 7,500               |
| Membrane surface area        | 20 cm <sup>2</sup> | 28 cm <sup>2</sup>  |
| 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)



Vivapore® 5



Vivapore® 10 | 20

Visit us at [www.sartorius.com/en/products/lab-filtration-purification/diagnostic-sample-prep](http://www.sartorius.com/en/products/lab-filtration-purification/diagnostic-sample-prep) to get additional info.

Here you can find instructions on how to use Vivapore® Solvent Absorption Concentrators and Vivaspin® products for the concentration of urine samples.

## Typical Performance Characteristics

| Product                         | Time to concentrate up to 10× [min.] |            |           | Concentrate recovery [%] |            |           |
|---------------------------------|--------------------------------------|------------|-----------|--------------------------|------------|-----------|
|                                 | 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

| Product                                    | Time to concentrate up to 50× [min.] |         |          | Concentrate recovery [%] |         |          |
|--|--------------------------------------|---------|----------|--------------------------|---------|----------|
|  | 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)<br>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

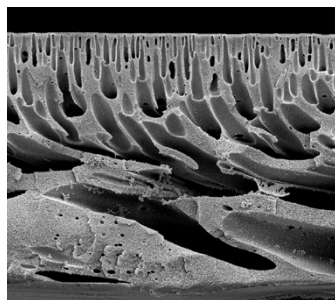
|   |                  |                  |
|---|------------------|------------------|
| <b>Vivapore® 5*</b>                         | <b>Qty./Pkg.</b> | <b>Prod. No.</b> |
| 7,500 MWCO PES                              | 4                | VP0503**         |
| 7,500 MWCO PES                              | 30               | VP0501**         |
| <b>Requires Stand</b>                       |                  |                  |
| 7,500 MWCO PES                              | 100              | VP0502**         |
| <b>Vivapore® 10 20*</b>                     |                  |                  |
| 7,500 MWCO PES                              | 4                | VP2003**         |
| 7,500 MWCO PES                              | 30               | VP2001**         |
| <b>Requires Stand</b>                       |                  |                  |
| 7,500 MWCO PES                              | 100              | VP2002**         |
| <b>Requires Stand</b>                       |                  |                  |
| 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.

## 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 microsolute, 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/cm <sup>2</sup> |
| 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 <sup>2</sup> |
| 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 <sup>2</sup> |
| Protein retention | Cytochrome C | 99%                         |

## Ordering Information

| <b>Polyethersulfone Membrane Filters, Type 146</b>     |             |                  |                  |
|--|-------------|------------------|------------------|
| <b>Ø in mm</b>   | <b>MWCO</b> | <b>Qty./Pkg.</b> | <b>Prod. No.</b> |
| 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  |
| <b>Cellulose Triacetate Membrane Filters, Type 145</b> |             |                  |                  |
| <b>Ø in mm</b>   | <b>MWCO</b> | <b>Qty./Pkg.</b> | <b>Prod. No.</b> |
| 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  |

## 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 |

DOMINIQUE DUTSCHER





## 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)           | 45 mm                            |
|                           | Total length (backspin)                | 47.5 mm                          |
|                           | Width                                  | 12.4 mm                          |
|                           | Active membrane area                   | 0.32 cm <sup>2</sup>             |
|                           | Hold-up volume of membrane and support | < 5 µL                           |
|                           | Dead-stop volume (40° rotor)           | 5 µL                             |
| Materials of construction | Body                                   | Polycarbonate                    |
|                           | Filtrate vessel                        | Polypropylene                    |
|                           | Membrane                               | Hydrosart®,<br>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                                   |



**Performance Characteristics for DNA**

Start volume 0.5 mL, sample concentration 50 mg/mL.

|              | Molecule size (bp) | Time to concentrate up to 30 <sup>x</sup> [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 <sup>x</sup> [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   |

| 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    |

**Visit us at** [www.sartorius.com/en/products/lab-filtration-purification/ultrafiltration-devices/centrifugal](http://www.sartorius.com/en/products/lab-filtration-purification/ultrafiltration-devices/centrifugal) to get additional info.

Find instructions on how to use Vivacon® 500 for

- Primer removal after a PCR reaction
- Filter aided sample preparation (FASP) for proteomic analysis by mass spectrometry

## 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)        | 125 mm                        |
|                           | Total length (backspin)             | 115 mm                        |
|                           | Width                               | 16 mm                         |
|                           | Active membrane area                | 0.95 cm <sup>2</sup>          |
|                           | Hold-up volume membrane and support | 10 µL                         |
|                           | Dead-stop volume (25° rotor)        | 55 µL                         |
| Materials of construction | Body                                | Polycarbonate                 |
|                           | Filtrate vessel                     | Polypropylene                 |
|                           | Backspin vial                       | Polypropylene                 |
|                           | Concentrator cap                    | Polypropylene                 |
|                           | Membrane                            | 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                                   |

**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   |

## 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 |

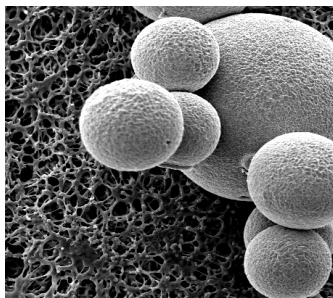
DOMINIQUE HUTSCHER SAS





## 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  $>3\mu\text{m}$ , 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

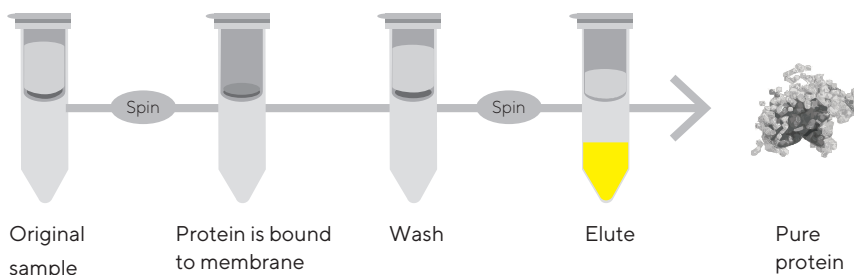
- Offer the possibility of working in parallel

### 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 | <ul style="list-style-type: none"> <li>Sample fractionation</li> <li>Purification condition scouting</li> <li>Small-scale purification</li> </ul>                                  |
| Vivapure® Maxi spin columns | <ul style="list-style-type: none"> <li>Large-scale sample fractionation</li> <li>One-step protein purification   concentration</li> <li>Polishing of His-tagged protein</li> </ul> |

### Membrane Availability

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

### 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)

| Description        | Spin Columns | Centrifuge Tubes | Prod. No.   |
|--------------------|--------------|------------------|-------------|
| Vivapure® D Maxi H | 8            | 16               | VS-IX20DH08 |
| Vivapure® Q Maxi H | 8            | 16               | VS-IX20QH08 |
| Vivapure® S Maxi H | 8            | 16               | VS-IX20SH08 |

## 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.

# 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  $3 \times 10^{13}$  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  $1 \times 10^{11}$  to  $3 \times 10^{13}$  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](http://www.sartorius-stedim.com). Additionally, the tubes and adaptors needed for these operating modes can be ordered.

## 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<br>1 × 200 mL      | 1 × 500 mL                         |
| Virus particles (VP) per mL | Typically up to $1 \times 10^{11}$ - $10^{12}$ | Typically up to $1 \times 10^{13}$ | Typically up to $3 \times 10^{13}$ |
| 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



## 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  $5 \times 10^9$  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  $8 \times 10^9$  to  $1 \times 10^{10}$  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](http://www.sartorius-stedim.com). Additionally, the tubes and adaptors needed for these operating modes can be ordered.

## 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 $3 \times 10^9$ | 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







# 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<sup>2</sup> 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<sup>2</sup>, 1.7 cm<sup>2</sup> and 4.8 cm<sup>2</sup>. 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

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

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

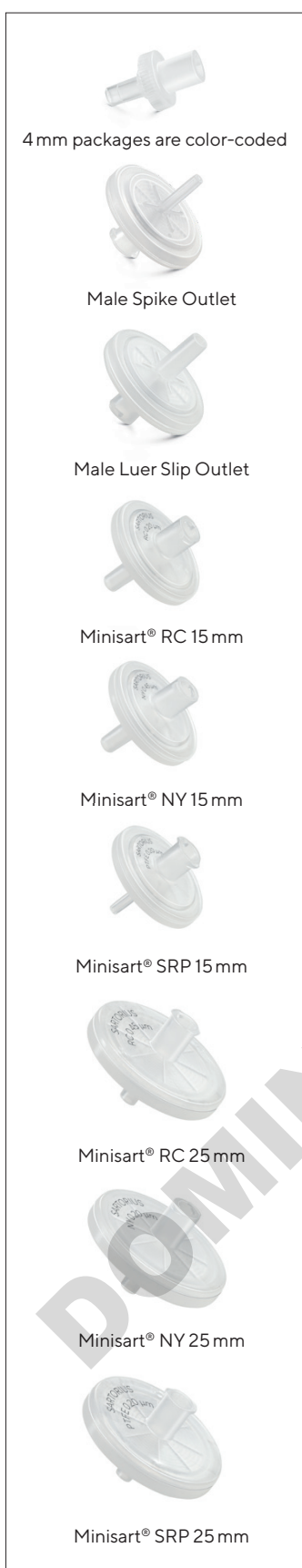
### Reliable Removal of Particles from Liquids and Gases

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.

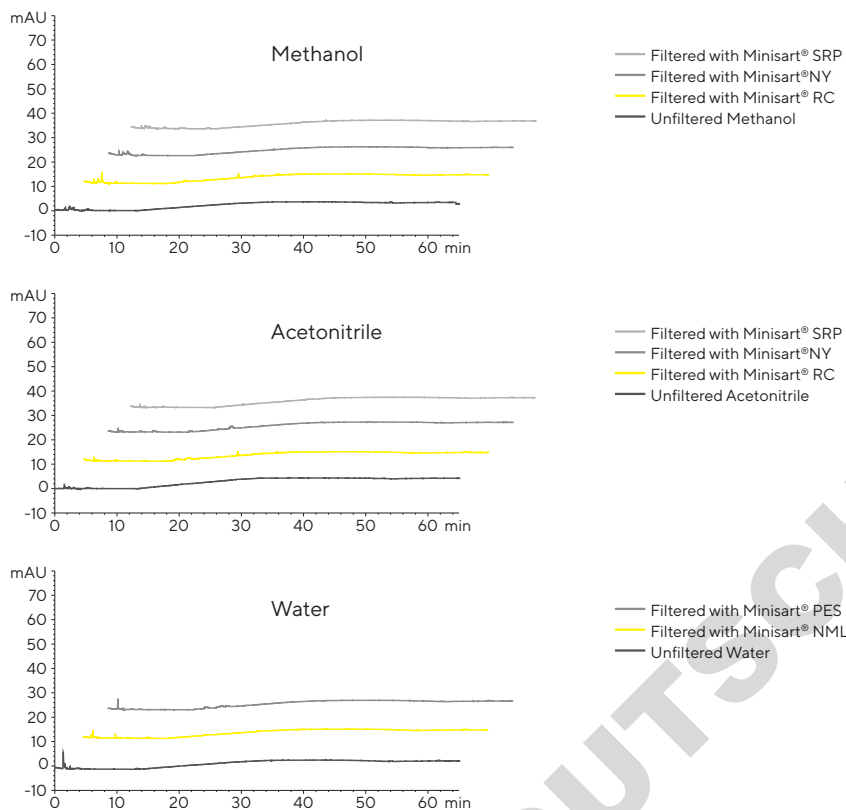
Our coating-free hydrophobic PTFE membrane used in Minisart® SRP is suitable for venting applications.

### 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  <br>SRP = Hydrophobic PTFE = Polytetrafluoroethylene   PES = Polyethersulfone  <br>PES - = hydrophobic PES |
| Glass fiber prefilter  | NY Plus: Ultrapure quartz, 0.7 µm particle retention  |
| Max. operating pressure  | 4.5 bar   65 psi<br>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<br>3.0 bar   44 psi | With water<br>4.6 bar   67 psi | With water<br>2.0 bar   29 psi | With ethanol<br>1.1 bar   16 psi | With ethanol<br>0.9 bar   13 psi |

## Flow rate (≥) mL/min, 4 mm Ø = 0.07 cm² filter area | Hold-up volume¹: ≤ 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 volume¹: ≤ 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 volume¹: ≤ 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 point³ (≥)                                       | -  | -   | -  | 4.0 bar   58 psi | 3.0 bar   44 psi |
| Sterile filtration capability⁵ 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                             |
| <b>Bubble point (≥)</b>   | With water<br>3.0 bar   44 psi | With water<br>2.0 bar   29 psi | With water<br>3.0 bar   44 psi | With water<br>2.0 bar   29 psi | With water<br>3.2 bar   46 psi | With ethanol<br>0.95 bar   14 psi |
| <b>Flow rate (≥) mL/min, 4 mm Ø = 0.07 cm<sup>2</sup> filter area   Hold-up volume<sup>1</sup>: ≤10 µL</b>  |                                |                                |                                |                                |                                |                                   |
| ■ For water at 1 bar  | -                              | -                              | -                              | -                              | 1.5                            | -                                 |
| ■ For methanol at 1 bar   | -                              | -                              | -                              | -                              | - <sup>4</sup>                 | -                                 |
| ■ For air at 0.1 bar  | -                              | -                              | -                              | -                              | - <sup>2</sup>                 | -                                 |
| <b>Flow rate (≥) mL/min, 15 mm Ø = 1.7 cm<sup>2</sup> filter area   Hold-up volume<sup>1</sup>: ≤100 µL</b> |                                |                                |                                |                                |                                |                                   |
| ■ For water at 1 bar  | 20                             | 40                             | -                              | -                              | 40                             | -                                 |
| ■ For methanol at 1 bar   | 40                             | 110                            | -                              | -                              | - <sup>4</sup>                 | -                                 |
| ■ For air at 0.1 bar  | - <sup>2</sup>                 | - <sup>2</sup>                 | -                              | -                              | - <sup>2</sup>                 | -                                 |
| <b>Flow rate (≥) mL/min, 25 mm Ø = 4.8 cm<sup>2</sup> filter area   Hold-up volume<sup>1</sup>: ≤200 µL</b> |                                |                                |                                |                                |                                |                                   |
| ■ For water at 1 bar  | 50                             | 100                            | 50                             | 100                            | 100                            | -                                 |
| ■ For methanol at 1 bar   | 70                             | 200                            | 70                             | 200                            | - <sup>4</sup>                 | - <sup>4</sup>                    |
| ■ For air at 0.1 bar  | - <sup>2</sup>                 | - <sup>2</sup>                 | - <sup>2</sup>                 | - <sup>2</sup>                 | - <sup>2</sup>                 | 1,200                             |
| <b>Water penetration point<sup>3</sup> (≥)</b>  | -                              | -                              | -                              | -                              | -                              | 2.0 bar   29 psi                  |
| <b>Sterile filtration capability<sup>5</sup> acc. to the bacteria challenge text</b>                        | Yes                            | No                             | Yes                            | No                             | Yes                            | Yes                               |
| <b>Non-pyrogenic according to the USP</b>   |                                |                                |                                |                                |                                |                                   |

<sup>1</sup> Hold-up volume after air purge<sup>2</sup> Hydrophilic membranes can filter dry air or gas but become impermeable to air or gas when wetted!<sup>3</sup> 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).<sup>4</sup> PES is suitable for solutions only containing up to 30% MeOH.<sup>5</sup> According to the bacterial challenge test (BCT) with  $\geq 1 \times 10^7$  cfu/cm<sup>2</sup> *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.<sup>6</sup> 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   EFA¹                       | 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     |



**Minisart® NY (Nylon) and NY25 Plus (Glass Fiber 0.7 µm<sup>2</sup> + Nylon)**

| Ø in mm   EFA <sup>1</sup> | 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 <sup>3</sup> | White, Printed | No | 50  | 1757G-----K |
| 25 mm | PES | PP | 0.2 µm | Hose Barbs <sup>3</sup> | 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-sterilized Minisart® units: RC, PTFE and nylon can be sterilized by autoclaving at 121°C for 30 min. or by using ethylene oxide (EO).

<sup>1</sup> Diameter of EFA - Effective Filtration Area

<sup>2</sup> 0.7 µm = GF particle retention ≠ pore size!

<sup>3</sup> 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® NML Standard Syringe Filter Clarification and Sterilization by Filtration

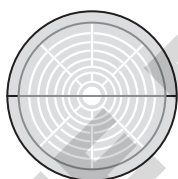
### Filtration is the Optimal Method for Clarification and Sterilization of Liquids and Gases

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.

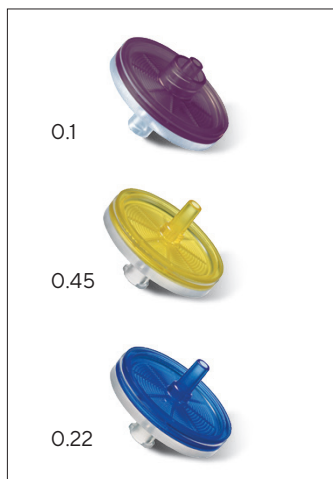
Both Minisart® types – NML and High Flow – are available pre-sterilized by ethylene oxide (EO) or gamma irradiation. Hydrophobic PTFE filters like Minisart® SRP are suitable for venting purposes and are additionally available in special formats with activated carbon.

### Minisart® Features

- Largest effective filtration area (EFA) of 6.2 cm<sup>2</sup>
- 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® High Flow with PES



Minisart® NML with (SF)CA



Minisart® HY with PTFE



DOMINIQUE DUTSCHER SAS



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

<sup>1</sup> Hold-up volume after air purge<sup>2</sup> Hydrophilic membranes can filter dry air or gas but become impermeable to air or gas when wetted!<sup>3</sup> Hydrophobic membranes cannot be wetted with aqueous solutions unless you overcome their water penetration point.<sup>4</sup> According to bacterial challenge test (BCT) with 1×10<sup>7</sup> cfu/cm<sup>2</sup> Brevundimonas diminuta. All non-sterile Minisart® types listed above can be sterilized according to the method recommended in this table.<sup>5</sup> 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.

## Preparation of Aqueous Liquids

## Ordering Information

## Minisart® High Flow (PES – Polyethersulfone)

| Ø in mm   EFA <sup>1</sup> | Membrane | Housing | Pore Size | Connector Outlet | Color   Printing | Sterile* | Qty./Pkg. | Order No.     |
|----------------------------|----------|---------|-----------|------------------|------------------|----------|-----------|---------------|
| 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 µm<sup>2</sup> + SFCA)**

| Ø in mm   EFA <sup>1</sup> | 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 <sup>2</sup> | Male Luer Lock   | White            | No       | 50        | 17824-----K |
| 28 mm                      | GF       | MBS     | 0.7 µm <sup>2</sup> | 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-sterilized 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

<sup>1</sup> Diameter of EFA – Effective Filtration Area

<sup>2</sup> 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.



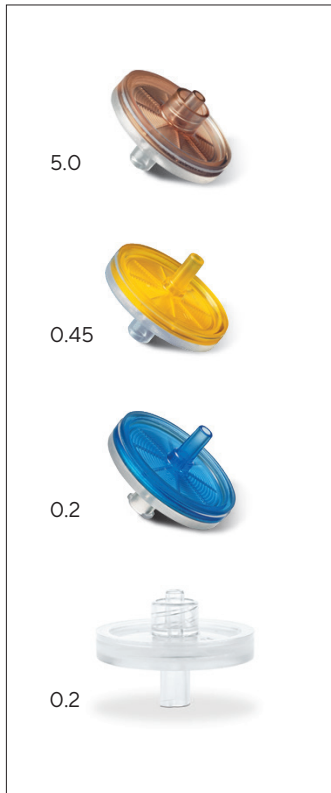
## CE-Minisart® Syringe Filters

### For medical use – Sterile Filtration and Sterile Venting

The medical device CE-Minisart® NML and Ophthalmisart 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





## CE-Minisart® Syringe Filters

## Specifications

CE-Minisart® NML / Ophthalmart with 28 mm accessible membrane filtration diameter, ≤ 150 µL hold-up volume<sup>1</sup>

CE-Minisart® HY with 26 mm accessible membrane filtration diameter, ≤ 200 µL hold-up volume<sup>1</sup>

CE-Minisart® SRP with 25 mm accessible membrane filtration diameter, ≤ 200 µL hold-up volume<sup>1</sup>

|                         |   |
|-------------------------|---|
| Housing material        | NML/Ophthalmart/HY: Methacrylate butadiene styrene (MBS)<br>SRP: Polypropylene (PP)   |
| Membranes               | NML /Ophthalmart: (SF)CA = (Surfactant-free) Cellulose Acetate<br>NML (5 µm): CA = Cellulose Acetate<br>HY: Hydrophobic PTFE = Polytetrafluoroethylene<br>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.<br>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),<br>sterile packs: individually packaged: 50 (K, GUK, HYK, ACK) | K  <br>GUK  <br>Q                 | K  <br>GUK  <br>Q                 | K                                | HYK  <br>HYQ                        | ACK                                 |
| Bubble point (≥)   | With water<br>3.2 bar  <br>46 psi | With water<br>2.0 bar  <br>29 psi | With water<br>0.4 bar  <br>6 psi | With ethanol<br>1.4 bar  <br>20 psi | With ethanol<br>1.1 bar  <br>16 psi |

| Flow Rate for <sup>2</sup> (≥ 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 <sup>2</sup> (≥)                                       |                     |     |     |                     |                     |
|  | -                   | -   | -   | 4.0 bar  <br>58 psi | 4.0 bar  <br>58 psi |
| Sterile filtration capability <sup>3</sup> acc. to the bacteria challenge test |                     |     |     |                     |                     |
|  | Yes                 | No  | No  | Yes                 | Yes                 |
| Non-pyrogenic  |                     |     |     |                     |                     |
|  | Yes                 | Yes | Yes | Yes                 | Yes                 |
| Biocompatible  |                     |     |     |                     |                     |
|  | acc. to ISO 10993-1 |     |     |                     |                     |

<sup>1</sup> Hold-up volume after air purge

<sup>2</sup> Hydrophobic membranes cannot be wetted with aqueous solutions unless you overcome their water penetration point.

<sup>3</sup> According to the bacterial challenge test (BCT) with ≥ 1 × 10<sup>7</sup> cfu/cm<sup>2</sup> 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

| Minisart® NML ((SF)CA - (Surfactant-free) Cellulose Acetate) Aqueous Filtration |          |         |           |                             |                  |          |           |                |
|---|----------|---------|-----------|-----------------------------|------------------|----------|-----------|----------------|
| Ø in mm   EFA <sup>1</sup>  | Membrane | Housing | Pore Size | Connector Outlet            | Color   Printing | Sterile* | Qty./Pkg. | Order No.      |
| 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 <sup>a</sup> | 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-sterilized Minisart® units: (SF)CA can be sterilized by ethylene oxide or gamma irradiation. PTFE can be sterilized by ethylene oxide.

<sup>a</sup> Connector inlet: Male Luer Slip (all other Minisart® have Female Luer Lock inlet(s)).

<sup>1</sup> Diameter of EFA - Effective Filtration Area

For technical product specifications, please see page 81.

## 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.



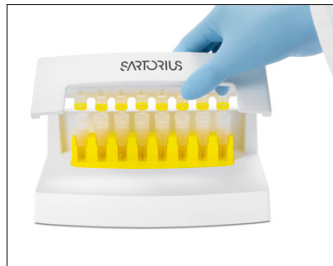
Claristep® Filter units are made of the purest materials. Another major benefit is that the contact time of the samples with the filters and the caps is extremely short, ensuring optimal, contamination-free results. Filtered liquids are collected in any 12 × 32 mm outer diameter vials of your choice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

## 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 reservoir.

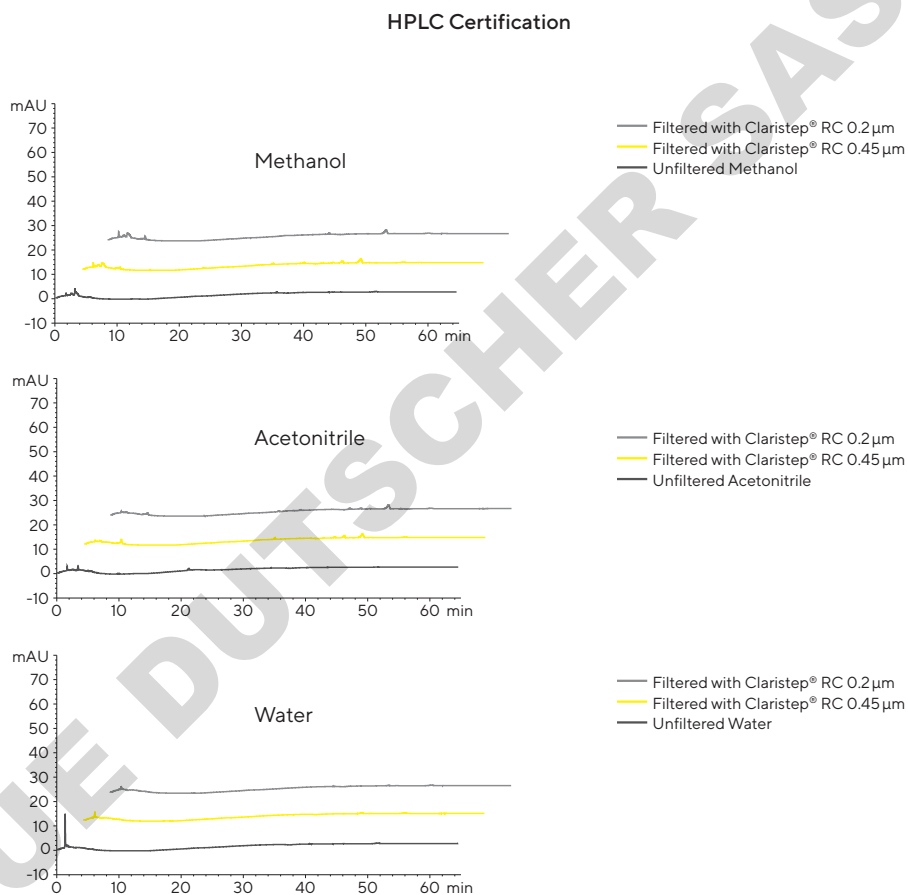


After clarification, the filtrates are collected in sample vials.

## 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 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

## Sample Preparation Techniques

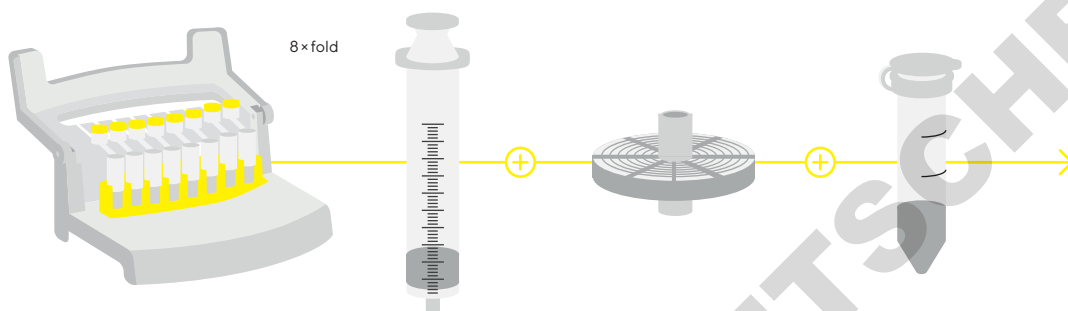
### Choose the Best Solution for Your Needs

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



**Syringe Filters**  
for processing one sample at a time



### Analytical Sample Volumes Run Small

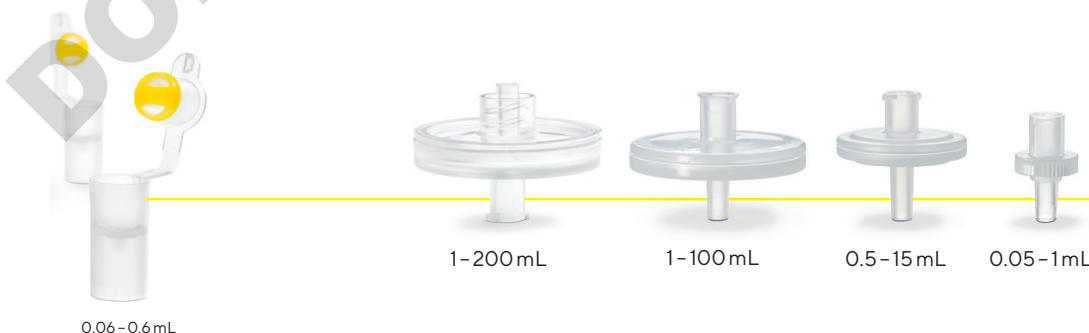
#### Get the Particle-free Volume You Really Need

If you need to fill only 12 x 32 mm vials, a syringeless solution will help you save time and reduce sample loss!

**Syringeless Solution**



**Different Diameters**  
for different sample volumes



## Ordering Information



Claristep® Filters are available 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 |

<sup>1</sup> 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 x 32 mm sample vials

### Additional Components Needed

The free choice of 12 x 32 mm sample vials and lids is enabling you to choose 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.





## 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<sup>2</sup>)
- 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

## Specifications

|                                 |   |
|---------------------------------|---|
| Different Filter Materials      | 0.2 µm polyethersulfone<br>0.45 µm polyethersulfone<br>High purity binder-free quartz microfibers             |
| Housing Material                | Transparent polycarbonate   |
| Filter Diameter                 | 61 mm   |
| Filtration Area                 | 20 cm <sup>2</sup>  |
| Holdup Volume                   | Sartolab® P20: 1 mL<br>Sartolab® P20 Plus: 1.2 mL<br>Sartolab® P20 Prefilter: 1 mL                            |
| Filtration Range                | Sartolab® P20: 100 mL to 5 L<br>Sartolab® P20 Plus: 100 mL to 10 L<br>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        |

## Sartolab® RF 50

Vacuum filtration unit for volumes of up to 50 mL



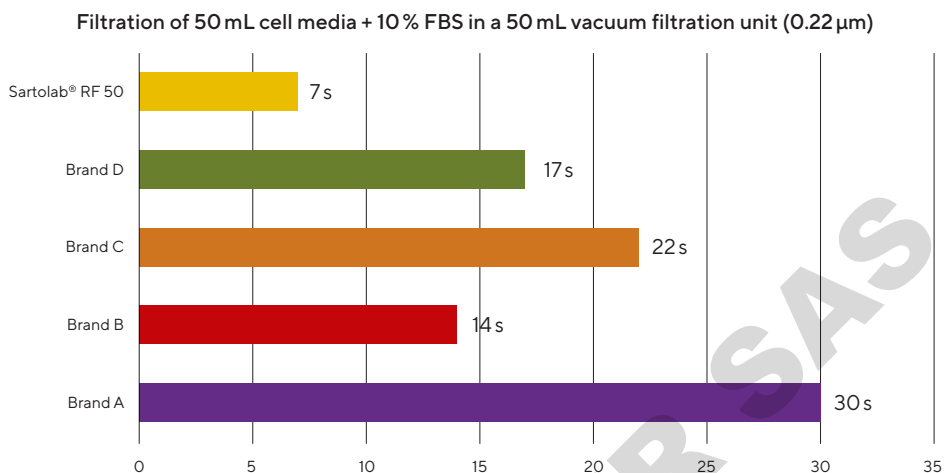
Sartolab® RF 50 vacuum filtration units are single-use units, designed for the filtration of sample volumes of up to 50 mL. They are available either with a 0.22 or a 0.45 µm polyethersulfone membrane which have been developed and manufactured by Sartorius at its own facilities. Both membranes provide 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



## Materials

|  |  |
|--|--|
| Funnel with dust cover                 | Polystyrene (PS)   |
| Membrane filter                        | 0.22 µm polyethersulfone (order no. 180E01)<br>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 cm <sup>2</sup>  |
| Hold-up volume                          | 1.2 mL  |
| Filtration capacity                     | 50 mL   |
| Size of the 50 mL conical tube          | Height: 115.5 mm, External/internal diameter:<br>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 |

## 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

### 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

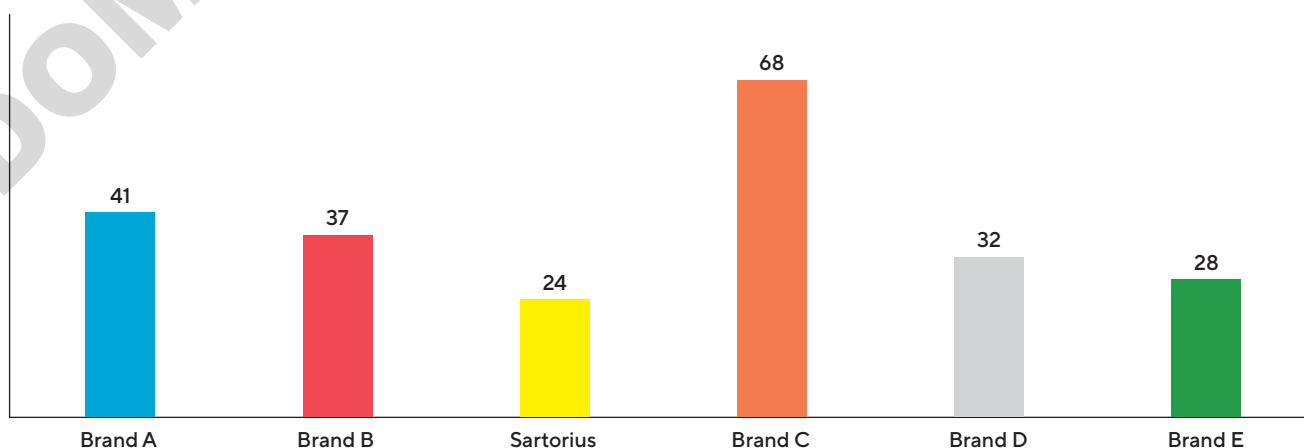
### Material

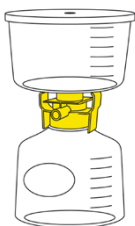
|   |  |
|---|--|
| Membrane filter                                 | 0.1 µm polyethersulfone (Cat. No. 180D*)<br>0.22 µm polyethersulfone (Cat. No. 180E*)<br>0.45 µm polyethersulfone (Cat. No. 180F*) |
| Funnel, lid, and bottle                         | Polystyrene (PS)   |
| Tubing connector, funnel 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<br>100 mm for 500 mL and 1,000 mL volumes                          |
| Effective filtration area               | 43 cm <sup>2</sup> for 150 mL and 250 mL volumes<br>69 cm <sup>2</sup> for 500 mL and 1,000 mL volumes |
| Bottle neck size                        | 45 mm  |
| Autoclavable                            | No   |
| Sterilization method                    | E-Beam (beta) irradiation (SAL 10 <sup>-6</sup> )  |
| 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<br>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





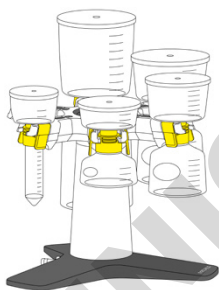
The Sartolab® RF vacuum filtration unit is comprised of:

- 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       |

## 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

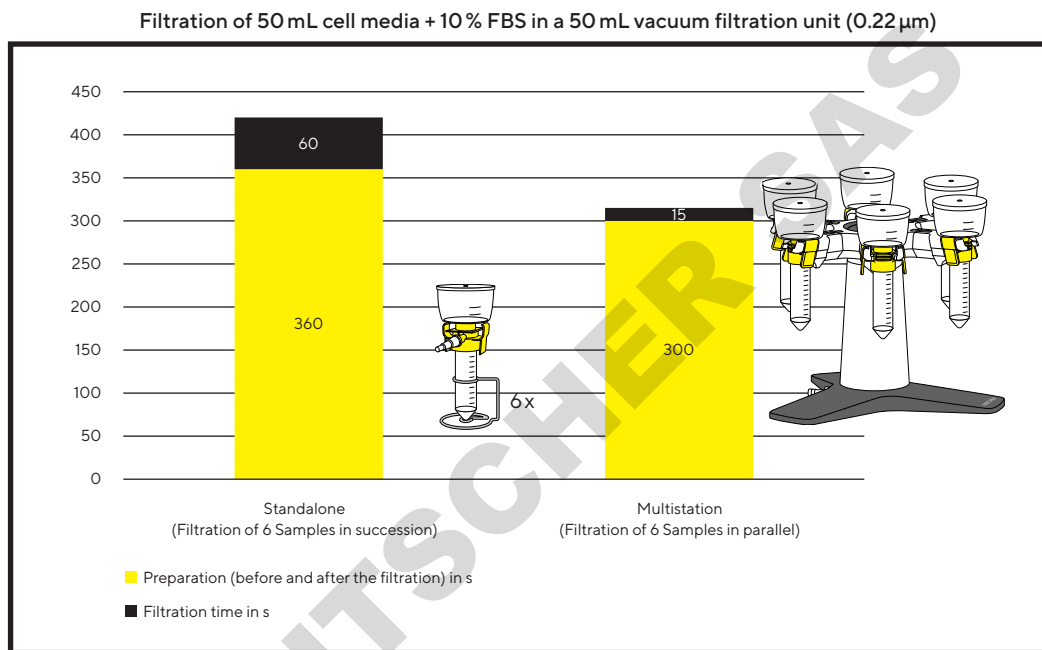
### User Benefits

- 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 6x50 mL samples saves handling time compared to standalone filtration



## 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  $20 \times 10^6$  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  $0.2 \mu\text{m}$  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  | $16 \times 10^6$ cells/mL | 78%       | 6.02 g/L                            | 5.77 g/L                           | 96%           |
| CHO DG44  | $38 \times 10^5$ cells/mL | 48%       | 0.43 g/L                            | 0.43 g/L                           | 100%          |

## Specifications

### DE Syringe

|                       |   |
|-----------------------|---|
| Syringe material      | Syringe barrel and plunger rod: polypropylene;<br>stopper: latex-free elastomer |
| Syringe Cap           | Polyamide   |
| Filling tube material | Polypropylene   |
| Filter aid            | 0.5 g highly pure diatomaceous earth<br>(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 <sup>2</sup>                   |
| 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®<br>Lab P15 | <ul style="list-style-type: none"> <li>■ 6 × 20 mL syringes, pre-filled with 0.5 g DE, including caps and filling tubes</li> <li>■ 6 × 0.2 µm PES sterile filters</li> </ul> | SDLP--0015----C |

\* Celpure® is a trademark of Advanced Minerals

## 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  $20 \times 10^6$  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  $20 \times 10^6$  cells
- Fast and effortless filtration

### Typical Results

| Cell Type | Cell Density                 | Viability | Mab concentration before filtration | Mab concentration after filtration | Recovery Rate | Turbidity |
|-----------|------------------------------|-----------|-------------------------------------|------------------------------------|---------------|-----------|
| CHO       | $14.46 \times 10^6$ cells/mL | 85.2%     | 5.2 g/L                             | 5.15 g/L                           | 99%           | 18 NTU    |
| HEK       | $8 \times 10^6$ cells/mL     | 70%       | 0.035 g/L                           | 0.034 g/L                          | 97%           | 8 NTU     |

## Specifications

### Clarification

#### Pouches of Filter Aid

|                           |  |
|---------------------------|--|
| Diatomaceous Earth (DE)   | 1g, 5g or 10g 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)<br>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%

## Ordering Information

**Sartoclear Dynamics® Lab V50 Kits – 0.22 µm PES****Sartoclear Dynamics Lab V, 50 mL, 1g**

| Description  | Qty. of Units | Order No.        |
|--|---------------|------------------|
| Filtration of up to 50 mL with 1g of DE per unit<br>Contents: 1 × 180E01-----2<br>(24 × Sartolab® RF 50; 0.22 µm; PES)<br>1 × SDLKG-01.0-----2<br>(24 × pouches of filter aid, 1g) | 24            | SDLV-0050-01E0-2 |

**Sartoclear Dynamics Lab V, 50 mL, 2g**

|   |    |                  |
|---|----|------------------|
| Filtration of up to 50 mL with 2g of DE per unit<br>Contents: 1 × 180E01-----2<br>(24 × Sartolab® RF 50, 0.22 µm PES)<br>2 × SDLKG-01.0-----2<br>(48 × pouches of filter aid, 1g) | 24 | SDLV-0050-02E0-2 |
|---|----|------------------|

**Sartoclear Dynamics® Lab V50 Kits – 0.45 µm PES****Sartoclear Dynamics Lab V, 50 mL, 1g**

|   |    |                  |
|---|----|------------------|
| Filtration of up to 50 mL with 1g of DE per unit<br>Contents: 1 × 180F01-----2<br>(24 × Sartolab® RF 50, 0.45 µm PES)<br>1 × SDLKG-01.0-----2<br>(24 × pouches of filter aid, 1g) | 24 | SDLV-0050-01F0-2 |
|---|----|------------------|

**Sartoclear Dynamics Lab V, 50 mL, 2g**

|   |    |                  |
|---|----|------------------|
| Filtration of up to 50 mL with 2g of DE per unit<br>Contents: 1 × 180F01-----E<br>(24 × Sartolab® RF 50, 0.45 µm PES)<br>2 × SDLKG-01.0-----2<br>(48 × pouches of filter aid, 1g) | 24 | SDLV-0050-02F0-2 |
|---|----|------------------|

**Sartoclear Dynamics® Lab V150 Kits****Sartoclear Dynamics® Lab V, 150 mL, 2g**

|   |    |                  |
|---|----|------------------|
| Filtration of up to 150 mL with 2g of DE per unit<br>Contents: 1 × 180E02-----E<br>(12 × Sartolab® RF 150, 0.22 µm PES)<br>1 × SDLKG-01.0-----2<br>(24 × pouches of filter aid, 1g) | 12 | SDLV-0150-02E0-E |
|---|----|------------------|

**Sartoclear Dynamics® Lab V, 150 mL, 5g**

|   |    |                  |
|---|----|------------------|
| Filtration of up to 150 mL with 5g of DE per unit<br>Contents: 2 × 180E02-----E<br>(24 × Sartolab® RF 150, 0.22 µm PES)<br>1 × SDLKG-05.0-----2<br>(24 × pouches of filter aid, 5g) | 24 | SDLV-0150-05E0-2 |
|---|----|------------------|

**Sartoclear Dynamics® Lab V250 Kits****Sartoclear Dynamics® Lab V, 250 mL, 5 g**

| Description   | Qty. of Units | Order No.        |
|---|---------------|------------------|
| Filtration of up to 250 mL with 5 g of DE per unit<br>Contents: 2 × 180E03-----E<br>(24 × Sartolab® RF 250, 0.22 µm PES)<br>1 × SDLKG-05.0-----2<br>(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<br>Contents: 2 × 180E03-----E<br>(24 × Sartolab® RF 250, 0.22 µm PES)<br>1 × SDLKG-10.0-----2<br>(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<br>Contents: 2 × 180E04-----E<br>(24 × Sartolab® RF 500, 0.22 µm PES)<br>1 × SDLKG-05.0-----2<br>(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<br>Contents: 2 × 180E04-----E<br>(24 × Sartolab® RF 500, 0.22 µm PES)<br>1 × SDLKG-010.0-----2<br>(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<br>Contents: 1 × 180E04-----E<br>(12 × Sartolab® RF 500, 0.22 µm PES)<br>1 × SDLKG-010.0-----2<br>(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<br>Contents: 2 × 180E05-----E<br>(24 × Sartolab® RF 1000, 0.22 µm PES)<br>1 × SDLKG-10.0-----2<br>(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<br>Contents: 1 × 180C3-----E<br>(12 × Sartolab® RF 1000, 0.22 µm PES)<br>1 × SDLKG-10.0-----2<br>(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<br>Contents: 1 × 180E05-----E<br>(12 × Sartolab® RF 1000, 0.22 µm PES)<br>2 × SDLKG-10.0-----2<br>(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 |
| <b>Filter Membrane</b>    | PES          | (SF)CA        | PTFE           | RC          | PA             |                 |             |            | PES                | (SF)CA                    | (SF)CA             |                  | PTFE                       | RC           | PA           | PA                | PTFE          | PES           |
| <b>Pre-Filter</b>         |              |               |                |             |                | GF              |             |            | -                  | -                         | GF                 | GF               | -                          | -            | -            | GF                | -             | -             |
| <b>Housing Material</b>   |              |               |                |             |                |                 | MBS         | PP         | MBS                | MBS                       | MBS                | MBS              | MBS                        | PP           | PP           | PP                | PP            | PP            |
| <b>Sterilization</b>      |              |               |                |             |                |                 |             |            |                    |                           |                    |                  |                            |              |              |                   |               |               |
| Ethylene oxide            | ++           | ++            | ++             | ++          | ++             | ++              | ++          | ++         | ++                 | ++                        | ++                 | ++               | ++                         | ++           | ++           | ++                | ++            | ++            |
| Gamma irradiation         | ++           | ++            | - <sup>1</sup> | ++          | -              | ++              | ++          | -          | ++                 | ++                        | ++                 | ++               | - <sup>1</sup>             | -            | -            | -                 | -             | -             |
| Autoclaving 121°C, 30 min | ++           | ++            | ++             | ++          | ++             | ++              | -           | ++         | -                  | -                         | -                  | -                | -                          | ++           | ++           | ++                | ++            | ++            |
| <b>Solvents</b>           |              |               |                |             |                |                 |             |            |                    |                           |                    |                  |                            |              |              |                   |               |               |
| 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           | +            | ++            | -              | ++          | ++             | ++              | +           | ++         | +                  | +                         | +                  | +                | -                          | ++           | ++           | ++                | -             | +             |

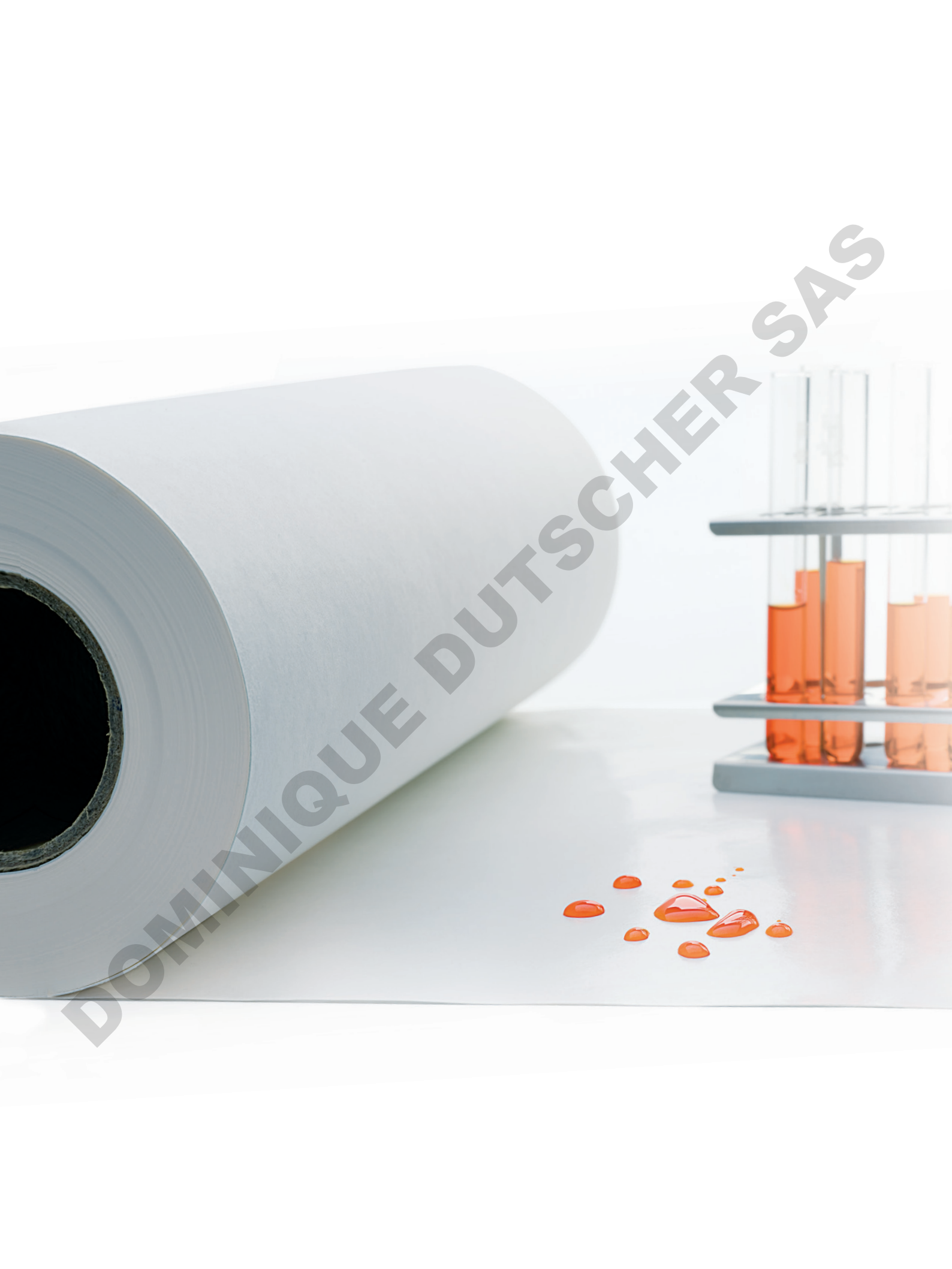


|                             | Material     |               |               |             |                |                 |             |            | Minisart® Types    |                           |                    |                  |              |               |              |              |                   |               |               |
|-----------------------------|--------------|---------------|---------------|-------------|----------------|-----------------|-------------|------------|--------------------|---------------------------|--------------------|------------------|--------------|---------------|--------------|--------------|-------------------|---------------|---------------|
|                             | 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 |
| <b>Filter Membrane</b>      | PES          | (SF)CA        | PTFE          | RC          | PA             |                 |             |            | PES                | (SF)CA                    | (SF)CA             |                  | PTFE         | RC            | PA           | PA           | PTFE              | PES           |               |
| <b>Prefilter</b>            |              |               |               |             |                | GF              |             |            | -                  | -                         | GF                 | GF               | -            | -             | -            | GF           | -                 | -             |               |
| <b>Housing Material</b>     |              |               |               |             |                |                 | MBS         | PP         | MBS                | MBS                       | MBS                | MBS              | MBS          | PP            | PP           | PP           | PP                | PP            | PP            |
| <b>Solvents (continued)</b> |              |               |               |             |                |                 |             |            |                    |                           |                    |                  |              |               |              |              |                   |               |               |
| Pyridine                    | -            | -             | ++            | ++          | ++             | ++              | -           | ++         | -                  | -                         | -                  | -                | -            | ++            | ++           | ++           | ++                | -             | -             |
| Tetrahydrofuran             | -            | -             | -             | ++          | ++             | ++              | -           | ++         | -                  | -                         | -                  | -                | -            | ++            | ++           | ++           | -                 | -             | -             |
| Toluene                     | -            | +             | -             | ++          | ++             | ++              | -           | +          | -                  | -                         | -                  | -                | -            | +             | +            | +            | -                 | -             | -             |
| Trichloroethylene           | -            | +             | ++            | ++          | ++             | ++              | -           | +          | -                  | -                         | -                  | -                | -            | +             | +            | +            | +                 | -             | -             |
| Xylene                      | -            | +             | -             | ++          | ++             | ++              | -           | +          | -                  | -                         | -                  | -                | -            | +             | +            | +            | -                 | -             | -             |
| <b>Acids</b>                |              |               |               |             |                |                 |             |            |                    |                           |                    |                  |              |               |              |              |                   |               |               |
| 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%   | -            | -             | ++            | ++          | -              | ++              | -           | +          | -                  | -                         | -                  | -                | -            | +             | -            | -            | +                 | -             | -             |
| <b>Bases</b>                |              |               |               |             |                |                 |             |            |                    |                           |                    |                  |              |               |              |              |                   |               |               |
| Ammonia, 1N                 | ++           | +             | ++            | +           | ++             | ++              | +           | ++         | +                  | +                         | +                  | +                | +            | +             | ++           | ++           | ++                | ++            | ++            |
| Ammonium hydroxide, 25%     | +            | +             | ++            | +           | ++             | +               | -           | +          | -                  | -                         | -                  | -                | +            | +             | +            | +            | +                 | +             | +             |
| Potassium hydroxide, 32%    | ++           | -             | ++            | -           | +              | +               | -           | ++         | -                  | -                         | -                  | -                | -            | +             | +            | ++           | ++                | ++            | ++            |
| Sodium hydroxide, 1N        | ++           | -             | -             | +           | ++             | +               | -           | ++         | -                  | -                         | -                  | -                | +            | ++            | +            | -            | -                 | ++            | ++            |
| Sodium hydroxide, 32%       | ++           | -             | -             | -           | +              | -               | -           | +          | -                  | -                         | -                  | -                | +            | -             | -            | -            | -                 | +             | +             |
| <b>Aqueous solutions</b>    |              |               |               |             |                |                 |             |            |                    |                           |                    |                  |              |               |              |              |                   |               |               |
| Formaldehyde, 30%           | +            | ++            | ++            | +           | ++             | ++              | +           | +          | +                  | +                         | +                  | +                | +            | +             | +            | +            | +                 | +             | +             |
| Sodium hypochlorite, 5%     | ++           | -             | ++            | -           | -              | ++              | +           | +          | +                  | -                         | -                  | +                | -            | -             | -            | -            | +                 | +             | +             |
| Hydrogen peroxide, 35%      | ++           | -             | ++            | -           | -              | ++              | +           | ++         | +                  | -                         | -                  | +                | +            | -             | -            | -            | ++                | ++            | ++            |
| <b>pH range</b>             |              |               |               |             |                |                 |             |            |                    |                           |                    |                  |              |               |              |              |                   |               |               |
| 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      - Not compatible  
+ Limited compatibility      1 Gamma irradiation feasible for Minisart® Air



DOMINIQUE DUTSCHER SAS

# Basic Filtration

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DOMINIQUE DUTSCHER SAS

## 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.

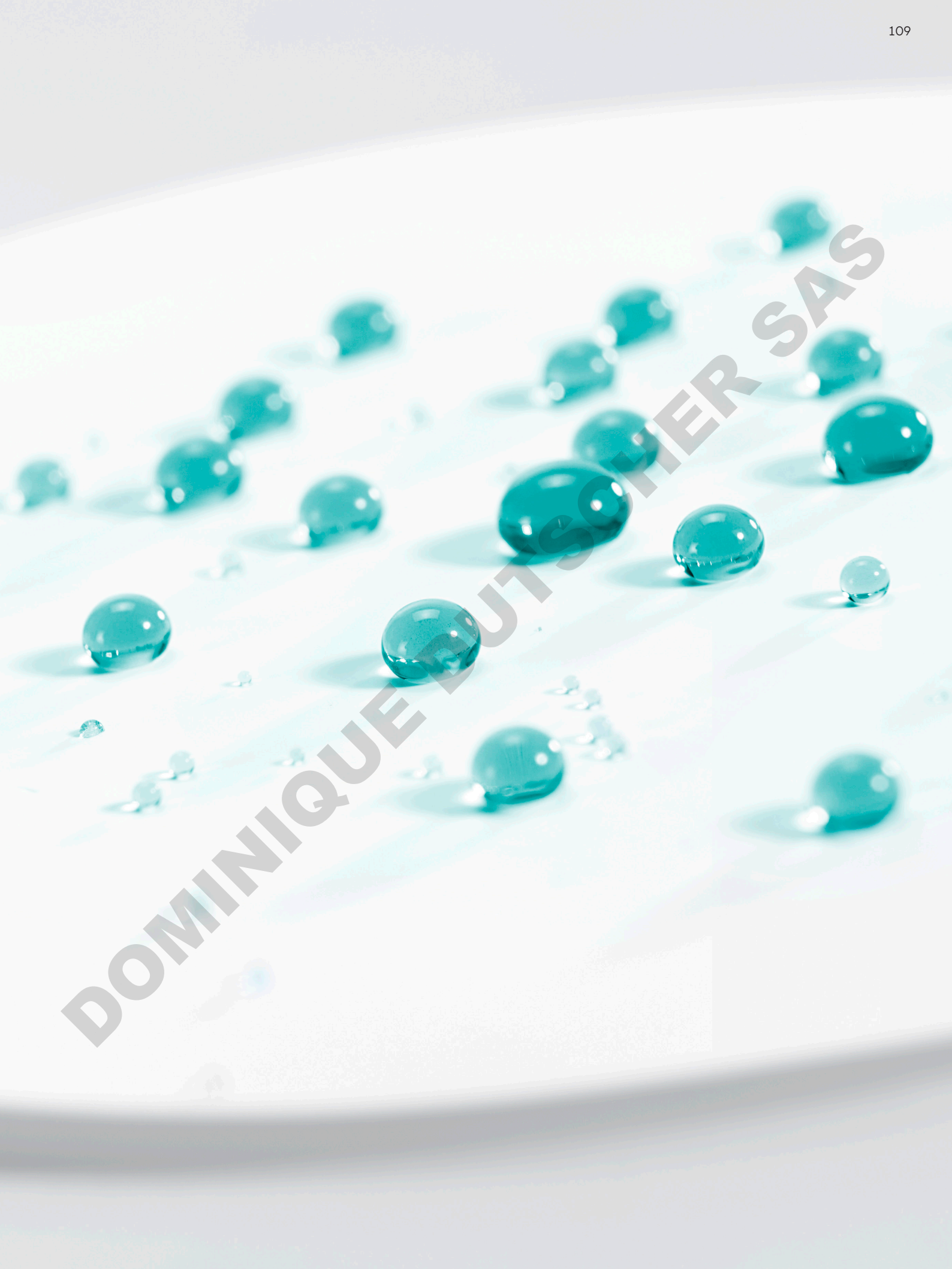
### How Do Filter Papers Work?

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.



DOMINIQUE PUTSCHER SAS

## 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  $\alpha$ -cellulose content of > 98 % and are acid-washed to make the papers ashless and achieve high purity.

### Typical Values

| Grade | Weight (g/m <sup>2</sup> ) | Thickness (mm) | Particle retention ( $\mu$ m) | 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 %  $\alpha$ -cellulose content and are very pure with an ash content  $\leq 0.1\%$ .

## Typical Values

| Grade | Weight (g/m <sup>2</sup> ) | Thickness (mm) | Particle retention ( $\mu\text{m}$ ) | 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/m <sup>2</sup> ) | 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%  $\alpha$ -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 <sup>2</sup> ) | Thickness (mm) | Particle Retention ( $\mu$ m) | 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<br>(100 Pieces) | Grade 4 b<br>(100 Pieces) | Grade 603/N<br>(100 Pieces) | Grade 6<br>(100 Pieces) | Grade 100/N<br>(100 Pieces) | Grade 5 H/N<br>(100 Pieces) | Grade 3 S/h<br>(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 |



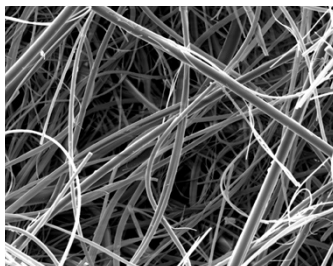
## Sheets in 580×580 mm, 100 pieces

| 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/m <sup>2</sup> ) | 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   |

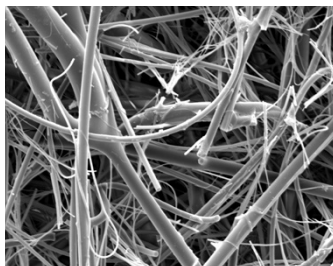
| Ø in mm | MGF (100 pieces) | MGG (100 pieces) | MG 550-HA (100 pieces) | 13440*          |
|---------|------------------|------------------|------------------------|-----------------|
| 24      |                  |                  | FT-3-01147-024         |                 |
| 25      | FT-3-1105-025    | 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 <sup>2</sup> ) | 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

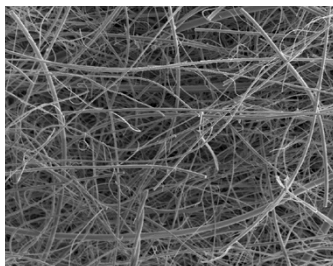


## Filter Discs

| Ø in mm | MG 227/1/60<br>(100 pieces) | 13430**         | 13400**         | MG 1387/1<br>(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 <sup>2</sup> ) | Thickness (mm) | Penetration, 0.3 µm 15 cm/s* | Temperature Resistance |
|-------|---|----------------------------|----------------|------------------------------|------------------------|
| Q3400 | 100% Quartz microfiber silicium dioxide (SiO <sub>2</sub> ) | 85                         | 0.43           | <0.002                       | up to 900 °C           |

\* Tested and classified according to the Standard EN 143

### Ordering Information



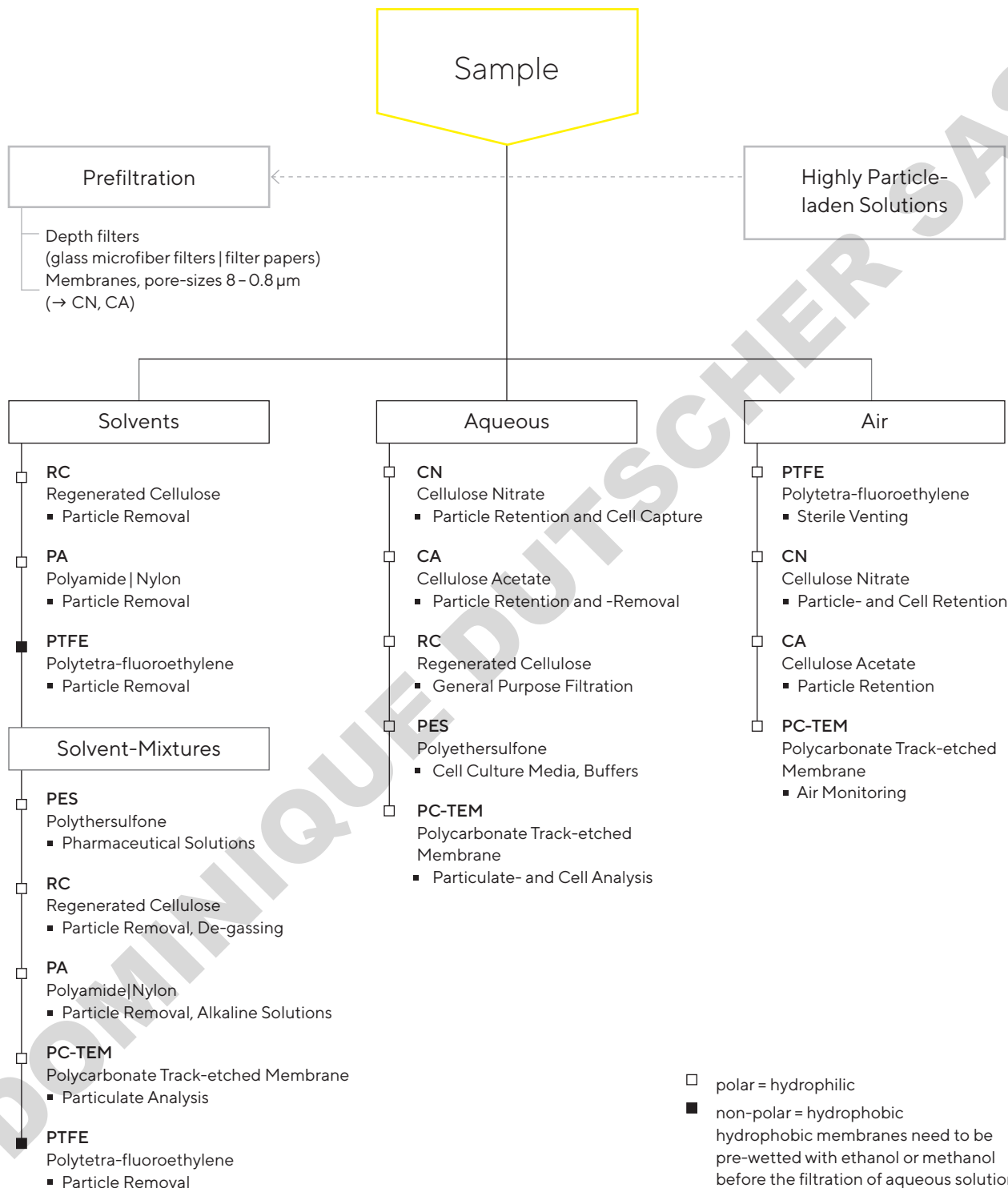
#### Filter Discs

| 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

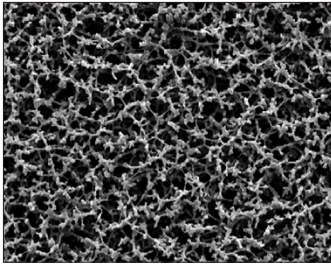


## Membrane Filtration – Quick Selection Guide





## 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  $\mu\text{m}$  to 8  $\mu\text{m}$ .

### Typical Values

| Type  | Pore Size ( $\mu\text{m}$ ) | Thickness ( $\mu\text{m}$ ) | Bubble Point (bar) | Water Flow Rate (mL/min/cm <sup>2</sup> /bar) | Burst Pressure (bar) |
|-------|-----------------------------|-----------------------------|--------------------|---|----------------------|
| 11327 | 0.2                         | 130                         | 4.2                | 25  | $\geq 0.35$          |
| 11306 | 0.45                        | 130                         | 2.4                | 70  | $\geq 0.3$           |
| 11305 | 0.65                        | 130                         | 2                  | 130   | $\geq 0.25$          |
| 11304 | 0.8                         | 130                         | 1.4                | 200   | $\geq 0.2$           |
| 11303 | 1.2                         | 130                         | 1                  | 200   | $\geq 0.2$           |
| 11302 | 3                           | 130                         | 0.5                | 430   | $\geq 0.2$           |
| 11342 | 5                           | 130                         | 0.5                | 570   | $\geq 0.15$          |
| 11301 | 8                           | 130                         | 0.3                | 750   | $\geq 0.1$           |

\*\* Measurement according to EN 143 (0.3  $\mu\text{m}$ , 5.3 cm/s, paraffin oil)

### Ordering Information



Filter Discs

| $\varnothing$ in mm | 11301 (8 $\mu\text{m}$ )* | 11302 (3 $\mu\text{m}$ )* | 11303 (1.2 $\mu\text{m}$ )* | 11304 (0.8 $\mu\text{m}$ )* |
|---------------------|---------------------------|---------------------------|-----------------------------|-----------------------------|
| 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             |

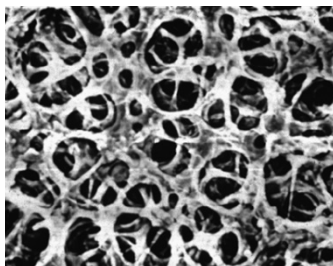
| Ø in mm | 11305 (0.65 µm)* | 11306 (0.45 µm)* | 11327 (0.2 µm)* | 11342 (5 µm)*   |
|---------|------------------|------------------|-----------------|-----------------|
| 13      | 11305--13-----N  | 11306--13-----N  | 11327--13-----N | 11342--13-----N |
| 20      |                  | 11306--20-----N  |                 |                 |
| 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

DOMINIQUE DUTSCHER SAS

## 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/cm <sup>2</sup> /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



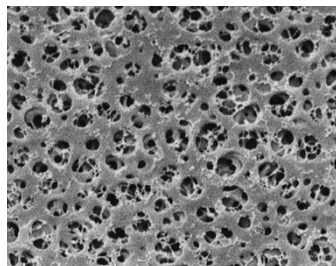
Filter Discs

| 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  $\mu\text{m}$  and 0.2  $\mu\text{m}$ .

### Typical Values

| Type  | Pore Size ( $\mu\text{m}$ ) | Thickness ( $\mu\text{m}$ ) | Bubble Point (bar) | Water Flow Rate (mL/min/cm <sup>2</sup> /bar) |
|-------|-----------------------------|-----------------------------|--------------------|---|
| 18407 | 0.2                         | 170                         | 4.4                | 15  |
| 18406 | 0.45                        | 170                         | 2.9                | 30  |

### Ordering Information



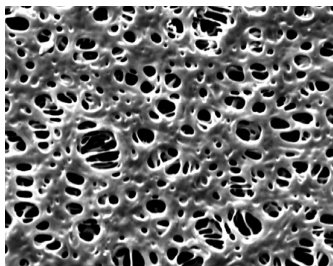
Filter Discs

| $\varnothing$ in mm | 18406 (0.45 $\mu\text{m}$ )* | 18407 (0.2 $\mu\text{m}$ )* |
|---------------------|------------------------------|-----------------------------|
| 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/cm <sup>2</sup> /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

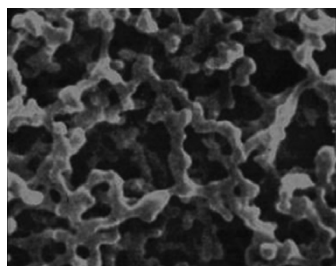


#### Filter Discs

| 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

## 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/cm <sup>2</sup> /bar) | Burst Pressure (bar) |
|-------|----------------|----------------|--------------------|---|----------------------|
| 25007 | 0.2            | 115            | 3.2                | 15  | ≥ 0.25               |
| 25006 | 0.45           | 115            | 2.3                | 35  | ≥ 0.23               |

### Ordering Information



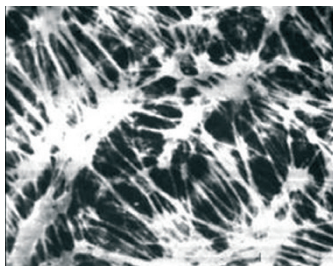
#### Filter Discs

| 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

## 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/cm <sup>2</sup> /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



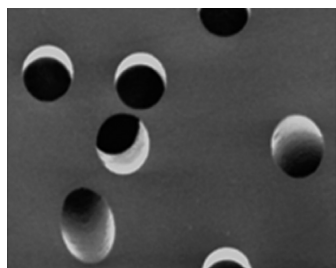
#### Filter Discs

| 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/cm <sup>2</sup> /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  $\alpha$ -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 <sup>2</sup> ) | 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<br>(100 Sheets) | Grade FN 7<br>(50 Sheets) | Grade FN 30<br>(25 Sheets) | Grade FN 100<br>(50 Sheets) | Grade BF 3<br>(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  $\mu\text{m}$  and 0.45  $\mu\text{m}$ . 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  $\mu\text{m}$  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 $\mu\text{m}$             | 0.45 $\mu\text{m}$             |
|------------------------------|--------------------------------|--------------------------------|
| Material                     | Cellulose nitrate              | Cellulose nitrate              |
| Thickness                    | 130 $\mu\text{m}$              | 130 $\mu\text{m}$              |
| Water flow rate              | 27 mL/(min. $\text{cm}^2$ bar) | 70 mL/(min. $\text{cm}^2$ bar) |
| Bubble point                 | 4.4 bar                        | 2.4 bar                        |
| Wettability in water         | $\leq 1\text{s}$               | $\leq 1\text{s}$               |
| Extractable content in water | $\leq 1\%$                     | $\leq 1\%$                     |
| Burst pressure               | 0.8 bar                        | 0.2 bar                        |
| Binding capacity for IgG     | 200 $\mu\text{g}/\text{cm}^2$  | 200 $\mu\text{g}/\text{cm}^2$  |

### Ordering Information

|                       | Roll Size          | Order No.      |
|-----------------------|--------------------|----------------|
| NC 0.22 $\mu\text{m}$ | 30 cm $\times$ 3 m | 11327-----41BL |
| NC 0.45 $\mu\text{m}$ | 30 cm $\times$ 3 m | 11306-----41BL |

All indicated data to be understood as typical average values

## 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 <sup>2</sup>   |
| 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 <sup>2</sup>  |
| 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 cm <sup>2</sup>  |
| 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 cm <sup>2</sup>  |
| 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    |

## 25 mm Glass Vacuum Filter Holder

For Hybridization Tests, Particle Testing and Clarification

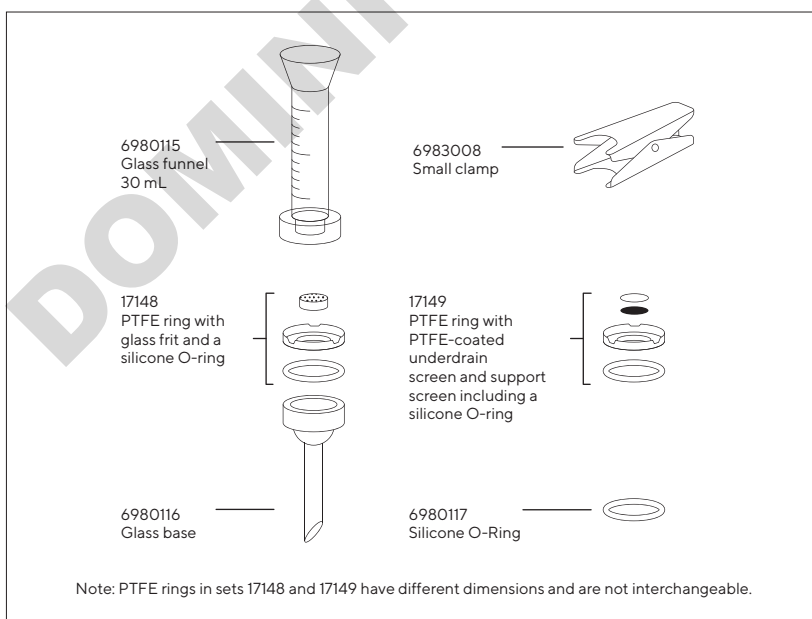


This filter holder is available in two versions differing from each other only in the type of the filter support. The filter with glass frit ensures uniform distribution of retained particles and is therefore recommended when the residue on the filter surface is of interest. Because it is easy to clean, 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<br>PTFE   glass filter support (type 16306) or<br>PTFE   stainless steel filter support, coated with<br>PTFE (type 16315)<br>Silicone O-ring 25 × 3 mm<br>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 cm <sup>2</sup>   |
| 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)   |



### 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

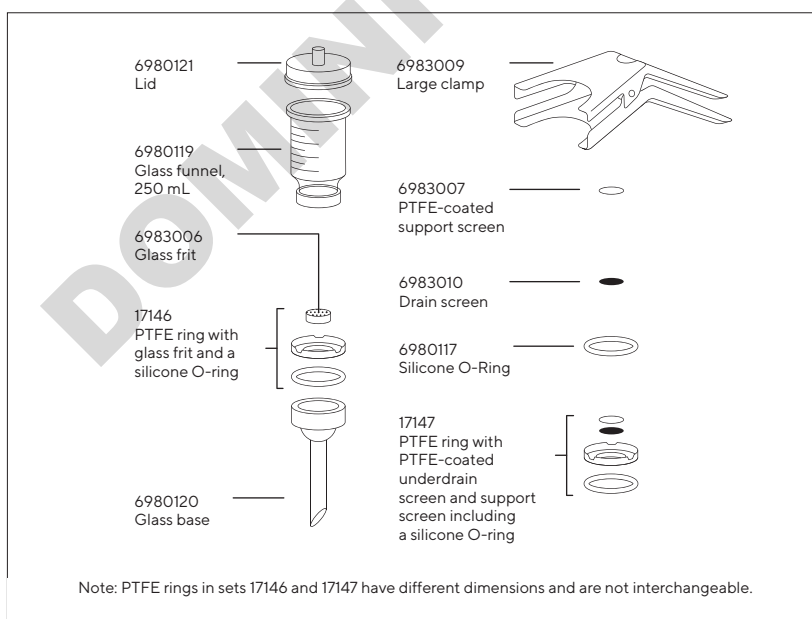
For Particle Testing or Clarification and Sterile Filtration

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<br>Silicone caoutchouc lid<br>PTFE   glass filter support (type 16307) or PTFE   stainless steel filter support, coated with PTFE (type 16316)<br>Silicone O-ring 45 × 3 mm<br>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 cm <sup>2</sup>   |
| 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)  |



### 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

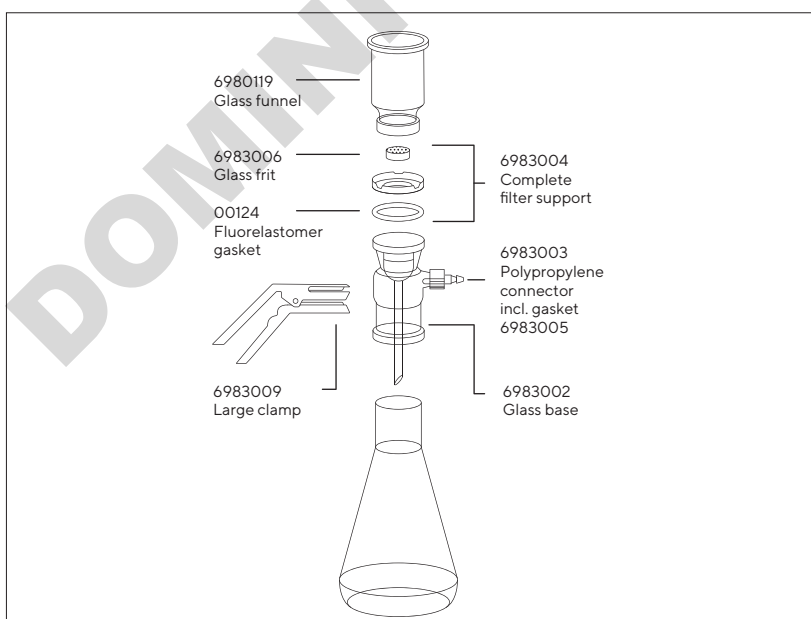


All areas, where liquid and device can come into direct contact, are made of glass or PTFE. The device, in combination with solvent-resistant, hydrophilic RC-membranes, is therefore ideal for ultracleaning and degassing solvents and solvent mixtures for HPLC, GC and AA.

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 cm <sup>2</sup>  |
| 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



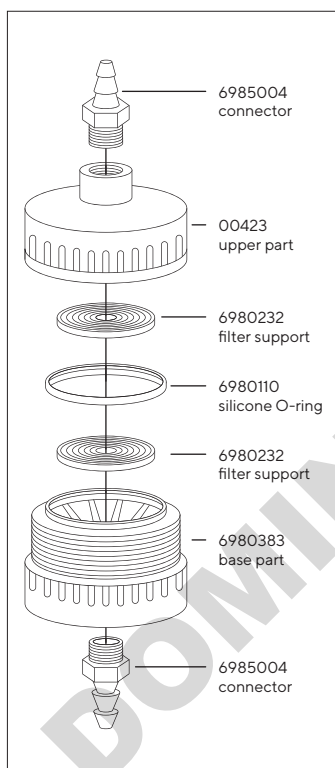
This holder is made of stable, autoclavable polycarbonate. This practical holder is suitable for many simple laboratory filtrations. It can be connected to a peristaltic pump or a pressure container. The bell-shaped base protects the filtrate from repeated contamination while flowing in a receiver.

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 cm <sup>2</sup>   |
| 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<br>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

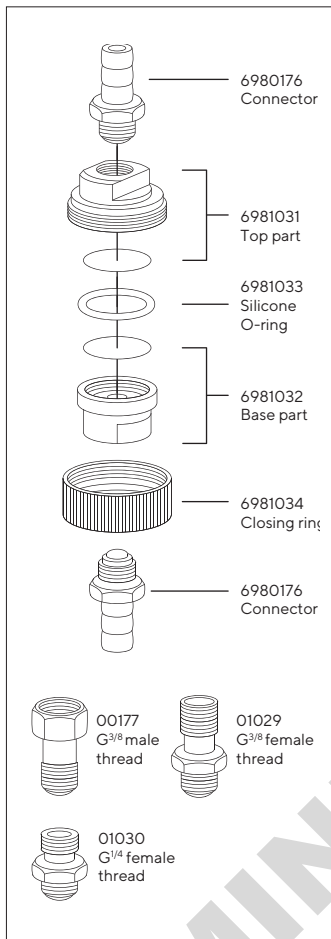
For In-Line Filtration



The G $\frac{1}{4}$  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 G $\frac{1}{4}$  female thread (order no. 01030) or G $\frac{3}{8}$  female thread order no. 01029) or onto pressure tanks with G $\frac{3}{8}$  male thread (order no. 00177).

### Specifications

|                          |  |
|--------------------------|--|
| Connectors               | Hose nipples DN10  |
| Filtration area          | 3 cm <sup>2</sup>  |
| 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 G $\frac{3}{8}$  female thread (order no. 17089) or onto pressure tanks with G $\frac{3}{8}$  male thread (order no. 17069) or on taps with G $\frac{3}{4}$  male thread (order no. 17068).

### Specifications

|                          |   |
|--------------------------|---|
| Connectors               | Hose nipples DN10   |
| Connection thread        | M12×1   |
| Filtration area          | 13 cm <sup>2</sup>  |
| 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)<br>– 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   |

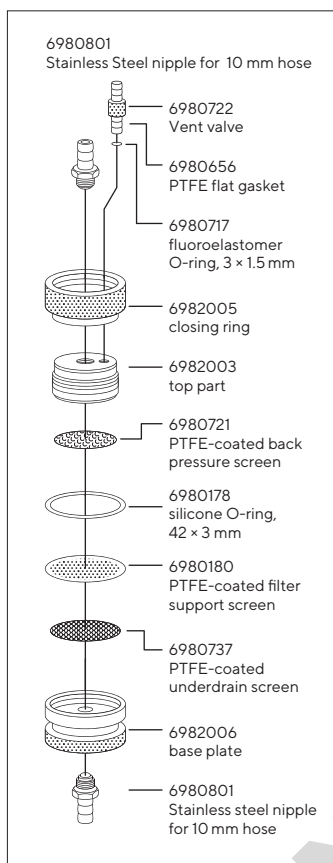
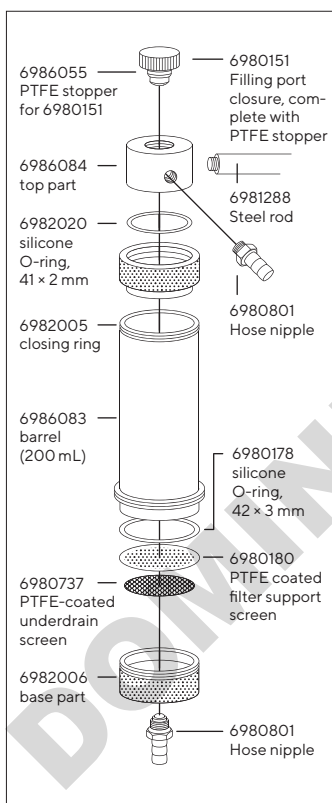


Diagram for 16254

## 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.<br>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 cm <sup>2</sup>  |
| Weight                     | 960 g   |
| Threads for connectors     | M 12 x 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 x 2 mm (top part) and 42 x 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 x 3 mm                | 00179     |
| PTFE O-ring, 42 x 3 mm                           | 17038     |
| Fluoroelastomer O-ring for upper part, 41 x 2 mm | 17145     |

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

## 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 G $\frac{3}{8}$  connector, order no. 17051.

### Specifications

|                            |   |
|----------------------------|---|
| Chemical compatibility     | As for PTFE and fluoroelastomer   |
| Filtration area            | 12.5 cm <sup>2</sup>  |
| 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)   |

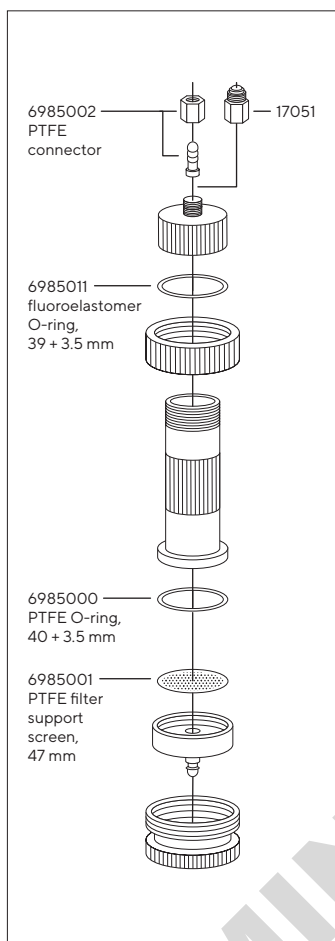
### Ordering Information

| 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, 1m   | 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

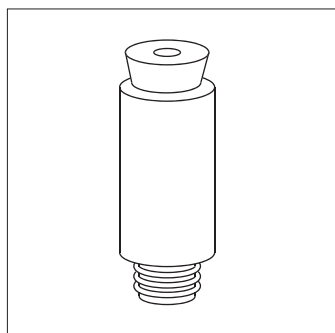
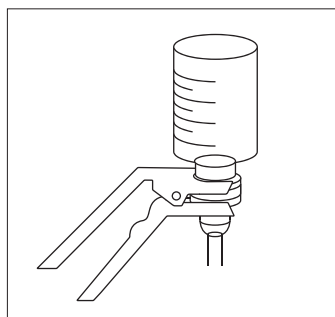
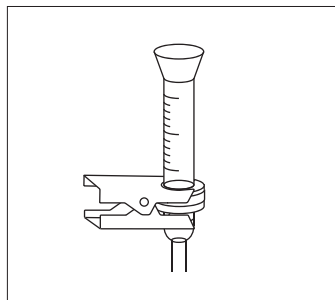
| Description         |                      | Order No. |
|---------------------|----------------------|-----------|
| Glass filter holder | 30 mL                | 16306     |
| Filter Ø            | 25 mm (or 24 mm)     |           |
|                     | Prefilter, 20 mm     |           |
| Filtration area     | 3 cm <sup>2</sup>    |           |
| 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 cm <sup>2</sup> |           |
| 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.

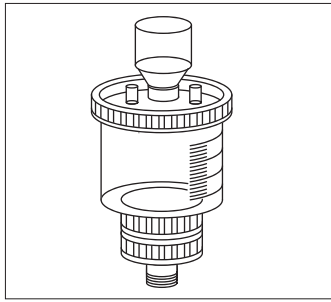
### Ordering Information

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



## Polycarbonate Filter Holders

### For Particle Counting



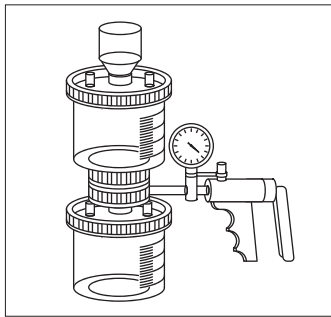
#### Polycarbonate Filter Holder, 250 mL

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

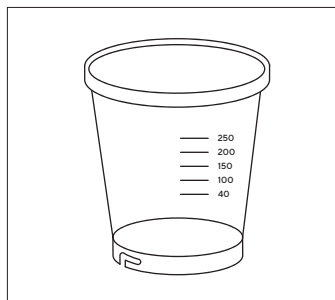
| Description  | Order No. |
|--|-----------|
| Polycarbonate filter holder without receiver flask | 16511     |
| Polycarbonate filter holder with receiver flask    | 16510     |
| Hand vacuum pump with gauge and 60 cm PVC tubing   | 16673     |



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## Ready-to-Use Biosart® 250 Funnels

For Particle Counting

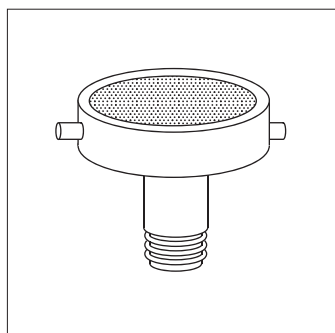


### Biosart® 250 Funnel

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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