



# Filtration Devices

## Table of Contents

Filtration Device Portfolio Introduction	66
Minisart® Standard Selection Guide	67
Minisart® PP Standard Syringe Filter	68
Minisart® NML Standard Syringe Filters	74
Medical Device CE-Minisart® Syringe Filters	80
Claristep® Syringeless Filtration	83
Sartolab® P20 and Sartolab® P20 Plus	87
Sartolab® RF   BT	91
<b>NEW!</b> Sartolab® RF 50	94
<b>NEW!</b> Sartolab® Multistation	96
Sartoclear Dynamics® Lab P15	98
<b>NEW!</b> Sartoclear Dynamics® Lab V	100
Chemical Compatibility	104

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

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



4 mm packages are color-coded



Male Spike Outlet



Male Luer Slip Outlet



Minisart® RC 15 mm



Minisart® NY 15 mm



Minisart® SRP 15 mm



Minisart® RC 25 mm

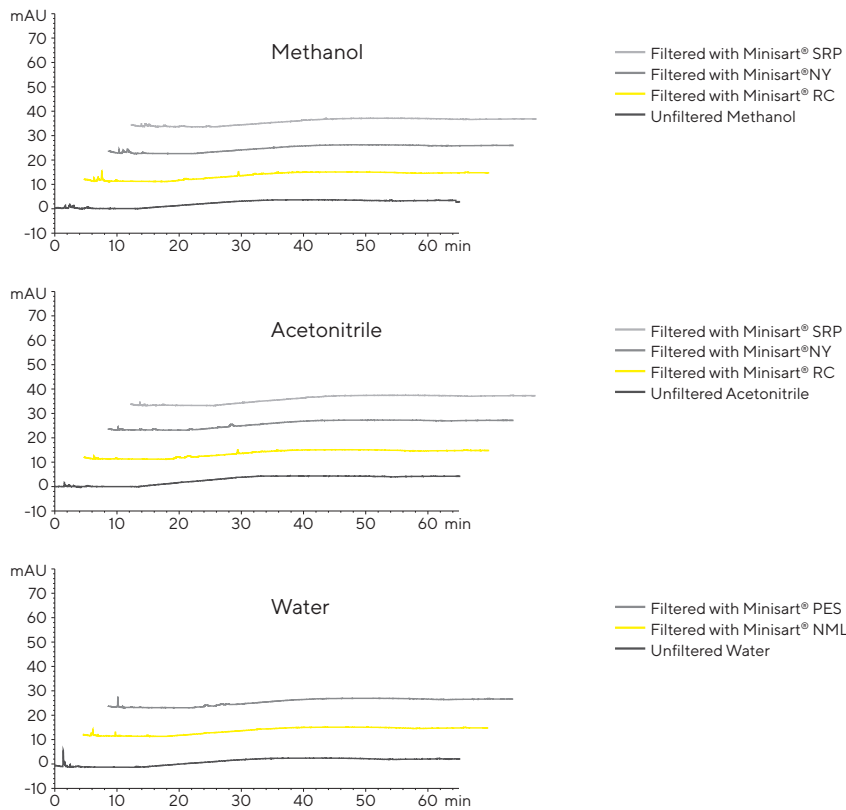


Minisart® NY 25 mm



Minisart® SRP 25 mm

## HPLC Certification



## HPLC Procedure

**Column** C18: 250 × 4.6 mm, Flow Rate: 1 mL/min, Wavelength: 220 nm

**HPLC** Injection Volume: 20 µL, Analysis Time: 65 min, Temperature: 40 °C,  
Mobile Phases: A) Acetonitrile | B) Water, Gradient: Hold 60 % A for 10 min,  
60 % to 95 % A in 20 min, 95 % to 100 % A in 35 min

## Minisart® with Polypropylene Housing

## Specifications

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

Minisart® Membrane Types	RC 0.2 µm	RC 0.2 µm	RC 0.45 µm	SRP 0.2 µm	SRP 0.45 µm
Non-sterile packs: 50 (K), 200 (S), 500 (Q), 1000 (R)   sterile packs: individually packaged, 50 (ACK)	K   S   Q   R	ACK	K   S   Q   R	K   S   Q   ACK	K   S   Q
Bubble point (≥)	With water 3.0 bar   44 psi	With water 4.6 bar   67 psi	With water 2.0 bar   29 psi	With ethanol 1.1 bar   16 psi	With ethanol 0.9 bar   13 psi

## Flow rate ((≥) mL/min), 4 mm Ø = 0.07 cm² filter area | Hold-up 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
Bubble point (≥)	With water 3.0 bar   44 psi	With water 2.0 bar   29 psi	With water 3.0 bar   44 psi	With water 2.0 bar   29 psi	With water 3.2 bar   46 psi	With ethanol 0.95 bar   14 psi

**Flow rate (≥) mL/min, 4 mm Ø = 0.07 cm<sup>2</sup> filter area | Hold-up volume<sup>1</sup>: ≤10 µL**

■ For water at 1 bar	-	-	-	-	1.5	-
■ For methanol at 1 bar	-	-	-	-	- <sup>4</sup>	-
■ For air at 0.1 bar	-	-	-	-	- <sup>2</sup>	-

**Flow rate (≥) mL/min, 15 mm Ø = 1.7 cm<sup>2</sup> filter area | Hold-up volume<sup>1</sup>: ≤100 µL**

■ 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>	-

**Flow rate (≥) mL/min, 25 mm Ø = 4.8 cm<sup>2</sup> filter area | Hold-up volume<sup>1</sup>: ≤200 µL**

■ 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

Water penetration point <sup>3</sup> (≥)	-	-	-	-	-	2.0 bar   29 psi
Sterile filtration capability <sup>5</sup> acc. to the bacteria challenge test	Yes	No	Yes	No	Yes	Yes

**Non-pyrogenic according to the USP**

<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   EFA <sup>1</sup>	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

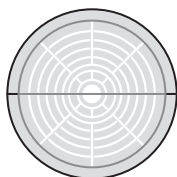
### Filtration is the Optimal Method for Clarification and Sterilization of Liquids and Gases

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.

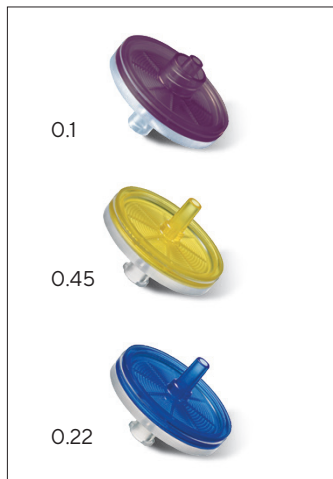
Both Minisart® types – NML and High Flow – are available pre-sterilized by ethylene oxide (EO) or gamma irradiation. Hydrophobic PTFE filters like Minisart® SRP are suitable for venting purposes and are additionally available in special formats with activated carbon.

### 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





Minisart® Membrane Types	GF+SFCA 0.2 µm	GF+SFCA 0.45 µm	GF+CA 1.2 µm	GF 0.7 µm	PTFE 0.2 µm	PTFE 1.0 µm	Acticosart	PTFE (Air) 0.2 µm
Non-sterile packages: 500 (Q, HYQ), 1000 (R), sterile packs: individually packaged, 50 (K, GUK, HYK, HNK)	K   Q	K   Q	Q	K   Q	K   Q	HYQ	Q	Q   HNK
<b>Bubble point (≥)</b>	With water 3.2 bar   46 psi	With water 2.0 bar   29 psi	With water 0.7 bar   10 psi	With water 0.5 bar   7 psi	With ethanol 1.4 bar   20 psi	With ethanol 0.5 bar   7 psi	With ethanol 0.9 bar   13 psi	With ethanol 1.0 bar   14 psi
<b>Flow rate for <sup>213</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   58 psi	1.5 bar   22 psi	N.a.	3.2 bar   44 psi
<b>Sterile filtration capability<sup>4</sup> according to the bacteria challenge test</b>	Yes	No	No	No	Yes	No	N.a.	Yes
<b>Non-pyrogenic according 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  $1 \times 10^7$  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.





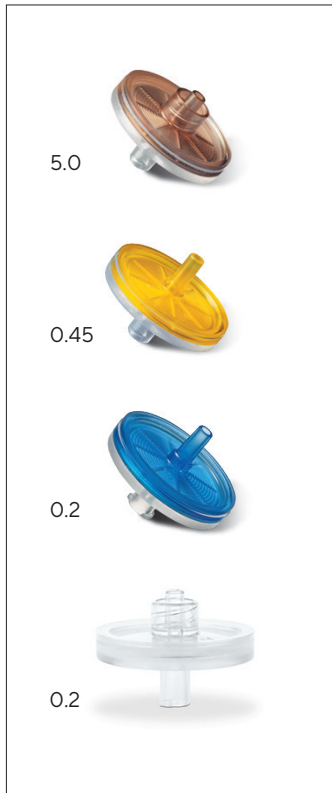
## CE-Minisart® Syringe Filters

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

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

Flow Rate for<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   58 psi	4.0 bar   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 &amp; 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.