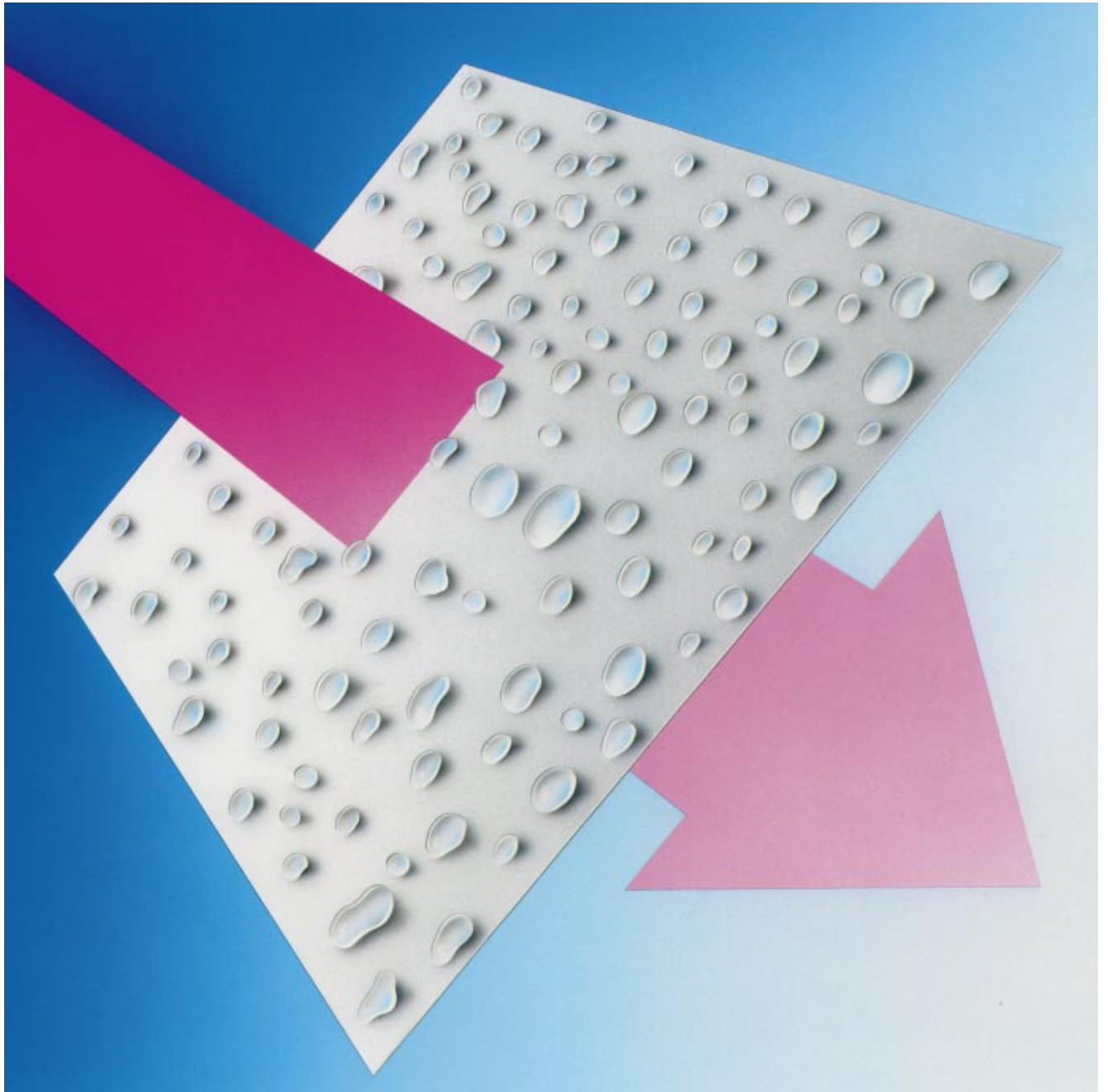


Membrane Separation Technology for Research and Quality Control



Sartorius AG, Separation Technology

sartorius

Major Applications and Product Descriptions

The right filter for every application

Sartorius offers a wide selection of filter types, filter holders and ready-to-use filtration units. There are certainly reasons for you to use these products if you are engaged in analysis, research, quality control or production. But which are the right ones for you?

The choice naturally depends on your particular application.

Are you interested in the particles, colloids, cells, microorganisms or proteins which are retained on the filter surface?

Do you need a visibly clear, particle-free, sterile or pyrogen-free filtrate?

Must cells be harvested, or proteins concentrated or purified?

Or do you need an adsorptive, porous support for blotting or diagnostic kits?

We have listed recommended products for a number of typical applications on the next two pages, and have given brief introductions to five major application areas (listed top right) on pages 4 to 8. Should you have questions on these, or require advice on other filtration or separation needs, please contact your nearest Sartorius representative. Addresses, telephone and telefax numbers are given on the back page.

We wish you every success,

Sartorius Separation Technology

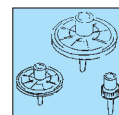
New!

- 8** Sterile, single use Funnels and Monitors for quicker and simpler vacuum filtration of samples for colony counts
- 55** Centrisart-C30 Micro-Concentrators for centrifugal filtration of volumes of up to 3 ml
- 60** Sartocon Slice crossflow filtration system for scaleable results from 1 to 100 liters
- 61** Sartocon 3 hydraulic crossflow system for larger volume concentration and purification
- 62** Ultrasart X. The spiral flow cell which avoids the drawbacks of stirred cells
- 63** Perisys 70 Benchtop System for optimum yields with Sartocon Micro crossflow units
- 79** Sartopore Capsules for faster pressure filtration and broader chemical compatibility
- 85** Membrane Adsorbers for the rapid purification and concentration of biomolecules

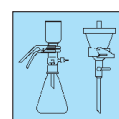
Major Applications

Concentration/Purification
Air/Gas filtration
Microbiological QC
Sample cleaning
Sterilizing filtration
(pages 4 to 8)

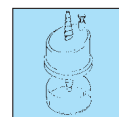
Product descriptions



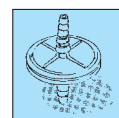
Syringe units
and filter holders
(pages 9 to 17)



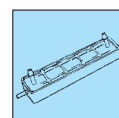
Vacuum units
and filter holders
(pages 18 to 29)



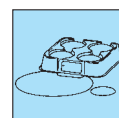
Pressure units
and filter holders
(pages 30 to 48)



Air filtration units
and filter holders
(pages 49 to 53)



Centrifugal and
crossflow units
(pages 54 to 64)



Membrane filters
and ultrafilters
(pages 65 to 81)

Membrane Adsorbers
Air sampling and
integrity testing instruments
(pages 85 to 99)

Chemical Compatibility Guides
(pages 82, 83, 84)

Accessories for EasyFlow and Sartocan[®] Micro

1. Recommended Accessories for complete filtration systems

1a. For Sartocan Micro Units

Each unit is supplied with a tubing set containing ethylene vinyl acetate tubing of 5 mm inner diameter, closing caps and a hose clip for regulation of the pressure. Additional requirements are a peristaltic pump and pump tubing (e.g. pump 16697 with tubing 16817), and an anodized aluminium, reusable clamp (17802), in which the Sartocan-Micro unit is slipped for a firm hold during use, as shown in the photo below.



The Perisys 70 Benchtop System is a complete, compact system for Sartocan Micro with optimized tubing lengths for increased yields.

1b. For EasyFlow Units

Liquid can be fed into these from a pressure tank for low pressure filtration, or they can be used with a peristaltic pump 16697 and tubing 16817 in a limited crossflow mode.

2. Descriptions of Accessories

Peristaltic Pump, 50 l/h
Order number: 16697



Watson-Marlow pump type 302/SA with pumphead 501 RI. Recommended for use with Sartocan Micro units and with EasyFlow units, together with Verderprene tubing of 4.8 mm inner diameter and 1.6 mm wall thickness (order number 16817 for a length of 1.5 m).

Specifications:

Length x height x width:

300 x 180 x 125 mm

Line voltage, 100-240 V, 50-60 Hz (no adjustment necessary)

Pump head, with 2 springloaded rollers

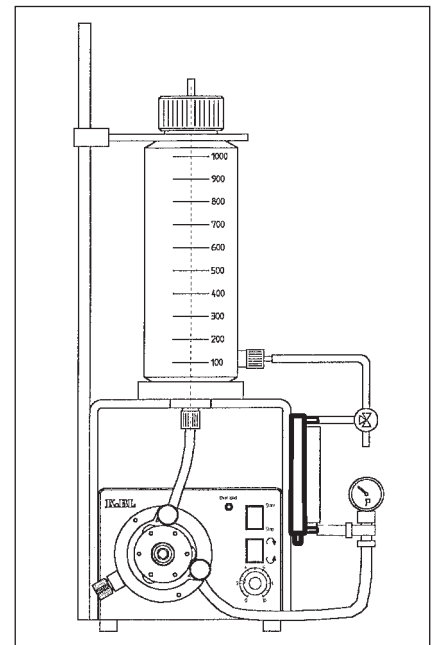
Pumping rate, up to 900 ml/min with 4.8 x 1.6 mm tubing, type 16817

Speed, max. 220 rpm (control range, 10 to 100%)

Tubing requirements, 0.5 to 8.0 inner diameter, 1.6 mm wall thickness.

Weight, 5.2 kg

Perisys 70 Benchtop System
for Sartocan Micro
Order number: 17205



To obtain maximum yields with an ultrafiltration system, the pump, container, ultrafiltration unit and tubing system must be designed to match each other exactly and to keep the fluid pathways as short as possible. This has been excellently achieved in Perisys 70, a complete system which requires little bench space (only 185 x 235 mm), is easy to assemble and use and ensures highest recoveries.

The dead volume of the tubing is less than 0.5 ml. The 1 liter glass container has 100 ml graduations and can be autoclaved together with the tubing for certain sterilization and avoidance of cross-contamination.

The peristaltic pump housing is made of stainless steel, the pumphead of POM. The pump supplies flow rates of 0.4 to 620 ml/min and accepts tubing of 3.2 to 6.4 mm internal diameter.

Further details on request.

Accessories for Collodion Bags and Ultrasart®-D20

Holders for Collodion Bags

Order numbers:

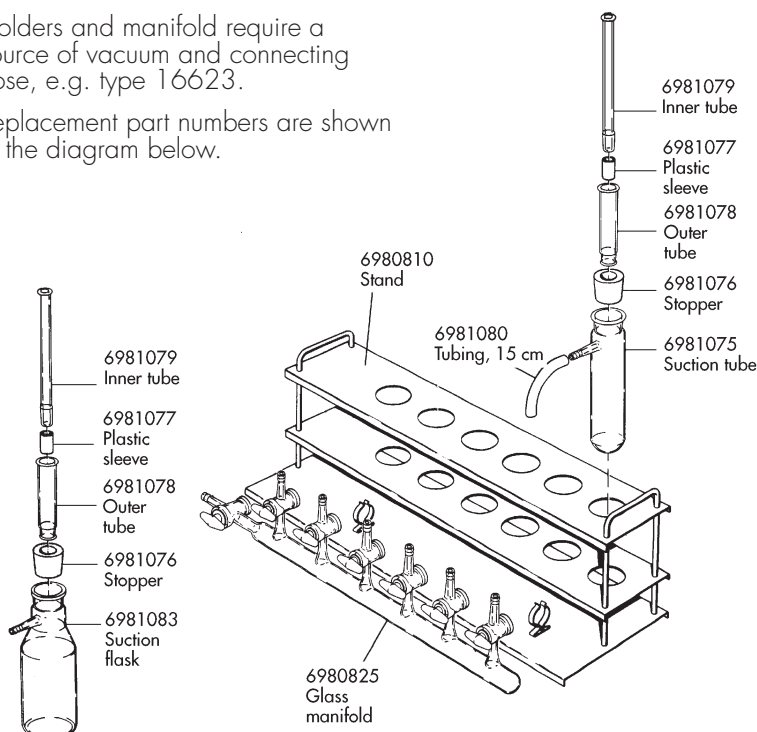
- 16304 Round-bottom glass holder
16305 Flat-bottom glass holder
26314 6-Place manifold



The round- and flat-bottom holders shown above each accept one single Collodion Bag. The 6-place manifold is supplied with 6 round-bottom holders in a stainless steel stand, connecting tubing, and a glass manifold having taps on each of the 6 hose nipple connectors to the holders for individual control of vacuum.

Holders and manifold require a source of vacuum and connecting hose, e.g. type 16623.

Replacement part numbers are shown in the diagram below.



3-Place Pressure Manifold for Micro Collodion Bags

Order number: 16538



Supplied with three polycarbonate supports of 1 ml capacity, each for a single Micro Collodion Bag. After insertion of a bag, a support is simply snapped into one of the three quick-connectors on the manifold. The connector is only open when a support is in position. Connection of the quick-connect nipple pressure inlet of the manifold to a pressure source requires a pressure hose with G1/4

threaded nut (order number 16929), or with G3/8 threaded nut (order number 16931), according to the male thread of the pressure source outlet. The maximum operating pressure is 10 bar (1000 kPa).

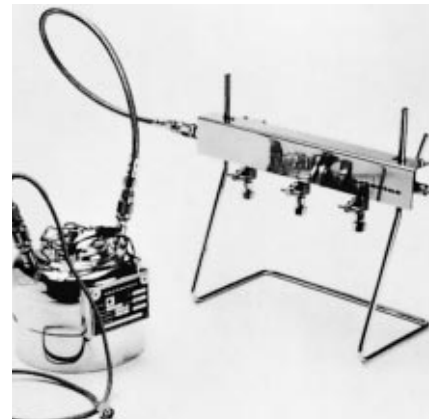
Additional polycarbonate supports of 1 ml capacity are available as a pack of 12 under the order number 16536E. When larger volumes are to be filtered, a polycarbonate support of 5 ml capacity can be used, order number 16597.

Replacement parts:

- 6980632 Pressure gauge
6980633 Gasket for gauge

3-Place Pressure Manifold for Ultrasart-D20 Units

Order number: 16506



Complete with 3 liter pressure tank and connecting hose with G3/8 threaded nut for connection to the pressure source. Ultrasart-D20 units can be screwed directly into the ports of the manifold, each of which has a tap for individual control of rinse liquid flow or pressure and of air venting. Two manifolds can be connected together using an adapter, order number 17152, plus a nipple, order number 17153.

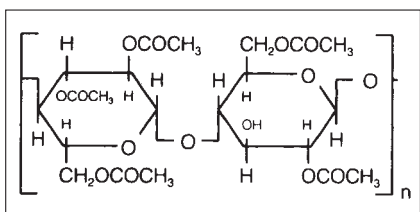
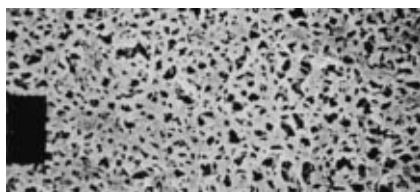
Maximum operating pressure is 5 bar (500 kPa). The manifold with connecting hose to the pressure tank and the pressure tank (with pressure gauge removed) can be depyrogenated by up to 200°C heat.

Membrane Filters, Mini Cartridges and Nutrient Pad Sets for use in analysis, research and quality control



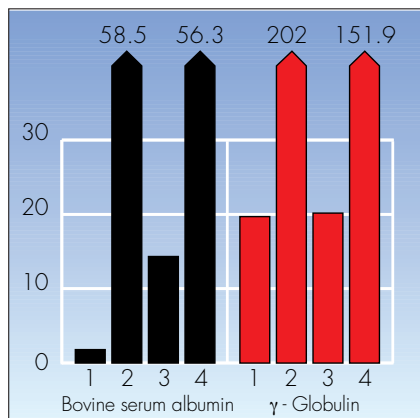
The photograph shows at the back, from left to right, Mini Cartridges with 500 cm², 1,000 cm² and 2,000 cm² filtration area. In front of these are white, plain disc membrane filters of 142 mm and 47 mm diameter, with 130 cm² and 13 cm² filtration area respectively. On their left, running downwards, membrane filter types 114 (white with black grid), 130 (gray with white grid), 131 (white with black grid and pink hydrophobic edge), 139 (white with green grid) and 138 (green with dark green grid). Nutrient Pad Sets and Ultrafilters are not shown here, they are described on pages 76 and 78 respectively.

Low adsorption Cellulose Acetate membranes, type 111, for the filtration of aqueous solutions



These membranes combine high flow rates and thermal stability with very low adsorption characteristics, making the 0.2 μm pore size excellently suited for use in disc filter holders to sterilize aqueous solutions, buffers, sera and media.

The results of publications on adsorption are difficult to correlate, as mostly different test substances, conditions and detection methods were used, and the membranes were tested without previously being sterilized.



The comparison shown above was carried out in our laboratories on 0.2 μm filters, after autoclaving them at 121°C to simulate normal usage conditions. Results are in $\mu\text{g}/\text{cm}^2$.

- 1 = Cellulose acetate
- 2 = Polysulfone
- 3 = PVDF
- 4 = Nylon

SPECIFICATIONS for Cellulose Acetate membranes

Bubble points	Minimum values, wetted with water, 3.5 bar (350 kPa) for 0.2 μm , 2.0 bar (200 kPa) for 0.45 μm , 1.3 bar (130 kPa) for 0.65 μm , 0.8 bar (80 kPa) for 0.8 μm
Compatibility	Are stable within the pH range 4-8, and resistant against most alcohols, hydrocarbons and oils (see page 82)
Extractables	With water, less than 1%
Flow rates	Average values for water per cm^2 at 1 bar differential pressure, 22 ml/min for 0.2 μm , 69 ml/min for 0.45 μm , 130 ml/min for 0.65 μm and 200 ml/min for 0.8 μm pore size
Limits	Max. temperature, 180°C
Material	Cellulose acetate
Sterilization	By autoclaving (at 121°C or 134°C), with γ -radiation or ethylene oxide
Thickness	Average value. 135 μm
Validation	The correlation of bubble point values of 0.2 μm pore size membranes to reliability of sterilizing filtration has been validated by standard Bacteria Challenge Tests

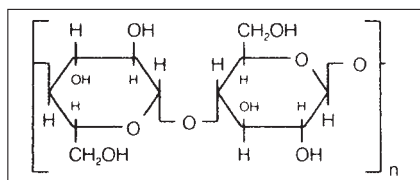
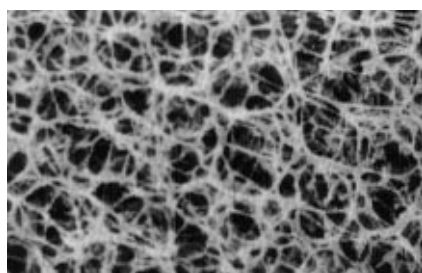
ORDER NUMBERS for Cellulose Acetate membranes

13 mm diameter discs:	85 mm diameter discs:
11104-013N 0.8 μm (pack of 100)	11106-085N 0.45 μm (pack of 100)
11106-013N 0.45 μm (pack of 100)	
11107-013N 0.2 μm (pack of 100)	90 mm diameter discs:
	11106-090G 0.45 μm (pack of 25)
	11107-090G 0.2 μm (pack of 25)
25 mm diameter discs:	100 mm diameter discs:
11104-025N 0.8 μm (pack of 100)	11106-100G 0.45 μm (pack of 25)
11105-025N 0.65 μm (pack of 100)	11106-100N 0.45 μm (pack of 100)
11106-025N 0.45 μm (pack of 100)	11107-100G 0.2 μm (pack of 25)
11107-025N 0.2 μm (pack of 100)	11107-100N 0.2 μm (pack of 100)
30 mm diameter discs:	142 mm diameter discs:
11106-030N 0.45 μm (pack of 100)	11104-142G 0.8 μm (pack of 25)
11107-030N 0.2 μm (pack of 100)	11104-142N 0.8 μm (pack of 100)
	11105-142G 0.65 μm (pack of 25)
47 mm diameter discs:	11106-142G 0.45 μm (pack of 25)
11104-047N 0.8 μm (pack of 100)	11106-142N 0.45 μm (pack of 100)
11105-047N 0.65 μm (pack of 100)	11107-142G 0.2 μm (pack of 25)
11106-047N 0.45 μm (pack of 100)	11107-142N 0.2 μm (pack of 100)
11107-047N 0.2 μm (pack of 100)	
50 mm diameter discs:	293 mm diameter discs:
11104-050N 0.8 μm (pack of 100)	11104-293G 0.8 μm (pack of 25)
11105-050N 0.65 μm (pack of 100)	11104-293N 0.8 μm (pack of 100)
11106-050N 0.45 μm (pack of 100)	11105-293G 0.65 μm (pack of 25)
11107-050N 0.2 μm (pack of 100)	11106-293G 0.45 μm (pack of 25)
	11106-293N 0.45 μm (pack of 100)
	11107-293G 0.2 μm (pack of 25)
	11107-293N 0.2 μm (pack of 100)

Larger pore size cellulose acetate membrane filters are also available for clarifying filtration and prefiltration. They contain up to 10% glycerine, which can be flushed out with water. Standard types and order numbers are as follows:

- a) 8 μm pore size: 12301-025N (25 mm, pack of 100), 12301-047N (47 mm, pack of 100), 12301-050N (50 mm, pack of 100), 12301-142G (142 mm, pack of 25), 12301-293G (293 mm, pack of 25).
- b) 5 μm pore size: 12342-025N (25 mm, pack of 100), 12342-142G (142 mm, pack of 25).
- c) 3 μm pore size: 12302-142G (142 mm, pack of 25), 12302-293G (293 mm, pack of 25).
- d) 1.2 μm pore size: 12303-025N (25 mm, pack of 100), 12303-047N (47 mm, pack of 100), 12303-050N (50 mm, pack of 100), 12303-100G (100 mm, pack of 25), 12303-142G (142 mm, pack of 25), 12303-293G (293 mm, pack of 25).

Chemical Resistant RC-Membranes, type 184, for the filtration of organic solvents



These solvent-resistant, hydrophilic membrane filters are excellently suited for their major application, particle removal from solvents. They are compatible with:

Acetic acid (96%)	Isobutanol
Acetone	Isopropanol
Acetonitrile	Methanol
n-Butanol	Methylene chloride
Cellosolve (ethyl)	Methyl ethyl ketone
Chloroform	Pentane
Diethyl acetamide	Tetrahydrofuran
Dimethylsulfoxide	Toluene
Dioxane	Trichloroacetic acid (25%)
Ethyl acetate	Trichloroethane
Ethanol	Water
Ethylene glycol	Xylene
Freon TF	
Gasoline	
Hexane	

The 50 mm diameter, 0.45 µm pore size filter, for example, is standardly used to ultraclean and de-gas solvents and mobile phases for HPLC, in combination with the All-Glass holder described on page 23.

Regenerated cellulose membranes also feature low non-specific adsorption.

SPECIFICATIONS for Regenerated Cellulose membranes

Adsorption	Aprox. 24 µg/cm ² for 0.2 µm pore size, 18 µg/cm ² for 0.2 µm pore size
Bubble point	Minimum values, water wetted, 4.7 bar (470 kPa) for 0.2 µm, 3.0 bar (300 kPa) for 0.45 µm and 1.2 bar (120 kPa) for 0.8 µm pore size
Compatibility	Chemically resistant to almost all solvents, see Table below left, and to aqueous solutions in the pH range 3-12. Further details on page 82
Extractables	With water, less than 1%
Flow rates	Average values per cm ² area for water at 1 bar (100 kPa) pressure, 20 ml/min for 0.2 µm, 47 ml/min for 0.45 µm pore size
Material	Regenerated cellulose, reinforced with non-woven cellulose
Sterilization	By autoclaving (at 121°C or 134°C), dry heat (180°C), γ-radiation (25 kGy) or with ethylene oxide
Thickness	Average value 160 µm
Validation	The correlation of bubble point values of 0.2 µm pore size membranes to reliability of sterilizing filtration has been validated by standard Bacteria Challenge Tests

ORDER NUMBERS for Regenerated Cellulose membranes

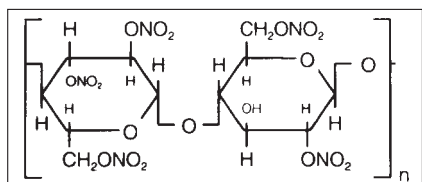
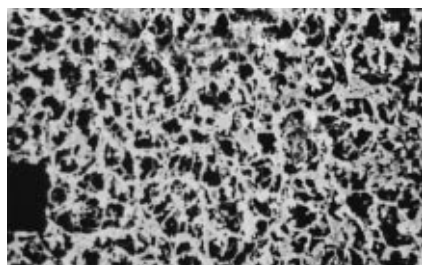
13 mm diameter discs:	
18406-013N	0.45 µm (pack of 100)
18407-013N	0.2 µm (pack of 100)

25 mm diameter discs:	
18406-025N	0.45 µm (pack of 100)
18407-025N	0.2 µm (pack of 100)

47 mm diameter discs:	
18406-047N	0.45 µm (pack of 100)
18407-047N	0.2 µm (pack of 100)

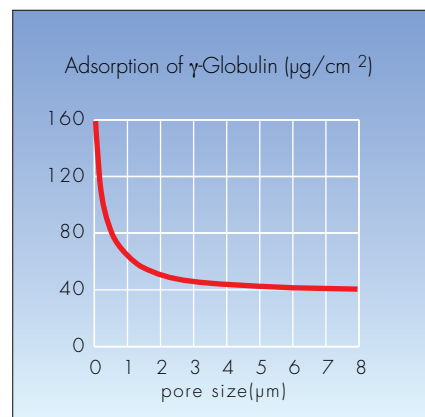
50 mm diameter discs:	
18406-050N	0.45 µm (pack of 100)
18407-050N	0.2 µm (pack of 100)
100 mm diameter discs:	
18406-100G	0.45 µm (pack of 25)
18407-100G	0.2 µm (pack of 25)
142 mm diameter discs:	
18406-142G	0.45 µm (pack of 25)
18407-142G	0.2 µm (pack of 25)
18407-142N	0.2 µm (pack of 100)
293 mm diameter discs:	
18406-293G	0.45 µm (pack of 25)
18407-293G	0.2 µm (pack of 25)
18407-293N	0.2 µm (pack of 100)

Cellulose Nitrate Membranes, type 113, for sample pretreatment, particle testing and removal



Cellulose nitrate was the material used for the original Sartorius membrane filters, and still maintains the advantage of providing very uniform pore structures over a wide range of pore sizes. The larger pore sizes (8 μm , 5 μm , 3 μm) find use for Chemotaxis and cell retention, the 0.45 μm pore size for particle collection and the finest pore size (0.1 μm) for the ultracleaning of solutions for light scattering measurements.

The high non-specific adsorption of this membrane type makes it indispensable for many blotting procedures (see page 72) and for diagnostic kits. It decreases with increasing pore size, as shown in the diagram below.



SPECIFICATIONS for cellulose nitrate membranes

Adsorption	See diagram (bottom left)
Bubble points	Minimum values, water wetted, 0.3 bar (30 kPa) for 8 μm pore size (11301) 0.5 bar (50 kPa) for 5 μm pore size (11342) 0.6 bar (60 kPa) for 3 μm pore size (11302) 1.0 bar (100 kPa) for 1.2 μm pore size (11303) 1.4 bar (140 kPa) for 0.8 μm pore size (11304) 2.0 bar (200 kPa) for 0.65 μm pore size (11305) 2.5 bar (250 kPa) for 0.45 μm pore size (11306) 3.8 bar (380 kPa) for 0.3 μm pore size (11347) 4.2 bar (420 kPa) for 0.2 μm pore size (11307) 8.0 bar (800 kPa) for 0.1 μm pore size (11358)
Compatibility	Chemically resistant to aqueous solutions in the pH range 4-8, to hydrocarbons and some other organic solvents (page 82)
Extractables	Less than 1% with water
Flow rates	Typical values per cm^2 area for water at $\Delta p = 1$ bar (100 kPa) 750 ml/min for 8 μm pore size (11301) 570 ml/min for 5 μm pore size (11342) 430 ml/min for 3 μm pore size (11302) 320 ml/min for 1.2 μm pore size (11303) 200 ml/min for 0.8 μm pore size (11304) 130 ml/min for 0.65 μm pore size (11305) 69 ml/min for 0.45 μm pore size (11306) 33 ml/min for 0.3 μm pore size (11347) 22 ml/min for 0.2 μm pore size (11307) 5 ml/min for 0.1 μm pore size (11358)
Heat stability	Do not expose to temperatures above 130°C
Material	Cellulose nitrate
Sterilization	By autoclaving (121°C), γ -radiation (25 kGy) or with ethylene oxide
Thickness	Varies with pore size between 90 μm (0.1 μm) and 140 μm (8 μm)
Validation	Standard Bacteria Challenge Tests with 0.2 μm pore size filters of various bubble points demonstrated the ability of filters with bubble point within the specification given above to filter sterile

ORDER NUMBERS for cellulose nitrate membranes

13 mm diameter discs:

11301-013N	8 μm (pack of 100)
11342-013N	5 μm (pack of 100)
11302-013N	3 μm (pack of 100)
11304-013N	0.8 μm (pack of 100)
11306-013N	0.45 μm (pack of 100)
11307-013N	0.2 μm (pack of 100)

20 mm diameter discs:

11304-020N	0.8 μm (pack of 100)
11306-020N	0.45 μm (pack of 100)

25 mm diameter discs:

11301-025N	8 μm (pack of 100)
11342-025N	5 μm (pack of 100)
11302-025N	3 μm (pack of 100)
11303-025N	1.2 μm (pack of 100)
11304-025N	0.8 μm (pack of 100)
11305-025N	0.65 μm (pack of 100)
11306-025N	0.45 μm (pack of 100)
11347-025N	0.3 μm (pack of 100)
11307-025N	0.2 μm (pack of 100)
11358-025N	0.1 μm (pack of 100)

(continued on page opposite)

30 mm diameter discs:

11304-030N	0.8 µm (pack of 100)
11306-030N	0.45 µm (pack of 100)

37 mm diameter discs:

11304-037N	0.8 µm (pack of 100)
11306-037N	0.45 µm (pack of 100)

40 mm diameter discs:

11307-040N	0.2 µm (pack of 100)
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47 mm diameter discs:

11301-047N	8 µm (pack of 100)
11342-047N	5 µm (pack of 100)
11302-047N	3 µm (pack of 100)
11303-047N	1.2 µm (pack of 100)
11304-047N	0.8 µm (pack of 100)
11305-047N	0.65 µm (pack of 100)
11306-047N	0.45 µm (pack of 100)
11306-047PFN	0.45 µm (pack of 100, for phosphate determination)
11347-047N	0.3 µm (pack of 100)
11307-047N	0.2 µm (pack of 100)
11358-047N	0.1 µm (pack of 100)

50 mm diameter discs:

11301-050N	8 µm (pack of 100)
11342-050N	5 µm (pack of 100)
11302-050N	3 µm (pack of 100)
11303-050N	1.2 µm (pack of 100)
11304-050N	0.8 µm (pack of 100)
11305-050N	0.65 µm (pack of 100)
11306-050N	0.45 µm (pack of 100)
11306-050PFN	0.45 µm (pack of 100, for phosphate determination)
11347-050N	0.3 µm (pack of 100)
11307-050N	0.2 µm (pack of 100)
11358-050N	0.1 µm (pack of 100)

80 mm diameter discs:

11301-080ALN	8 µm (pack of 100, sterile but not individually packed)
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85 mm diameter discs:

11306-085N	0.45 µm (pack of 100)
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90 mm diameter discs:

11342-090N	5 µm (pack of 100)
11303-090G	1.2 µm (pack of 25)
11304-090G	0.8 µm (pack of 25)
11306-090G	0.45 µm (pack of 25)
11306-090N	0.45 µm (pack of 100)
11307-090G	0.2 µm (pack of 25)

100 mm diameter discs:

11301-100G	8 µm (pack of 25)
11301-100N	8 µm (pack of 100)
11302-100G	3 µm (pack of 25)
11303-100G	1.2 µm (pack of 25)
11304-100G	0.8 µm (pack of 25)
11305-100G	0.65 µm (pack of 25)
11305-100N	0.65 µm (pack of 100)
11306-100G	0.45 µm (pack of 25)
11306-100N	0.45 µm (pack of 100)
11307-100G	0.2 µm (pack of 25)
11307-100N	0.2 µm (pack of 100)
11358-100G	0.1 µm (pack of 25)

120 mm diameter discs:

11302-120G	3 µm (pack of 25)
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142 mm diameter discs:

11301-142G	8 µm (pack of 25)
11342-142G	5 µm (pack of 25)
11342-142N	5 µm (pack of 100)
11302-142G	3 µm (pack of 25)
11303-142G	1.2 µm (pack of 25)
11304-142G	0.8 µm (pack of 25)
11304-142N	0.8 µm (pack of 100)
11305-142G	0.65 µm (pack of 25)
11306-142G	0.45 µm (pack of 25)
11306-142N	0.45 µm (pack of 100)
11347-142G	0.3 µm (pack of 25)
11307-142G	0.2 µm (pack of 25)
11307-142N	0.2 µm (pack of 100)
11358-142G	0.1 µm (pack of 25)

150 mm diameter discs:

11302-150G	3 µm (pack of 25)
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257 mm diameter discs:

11301-257D	8 µm (pack of 10)
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293 mm diameter discs:

11301-293G	8 µm (pack of 25)
11342-293G	5 µm (pack of 25)
11302-293G	3 µm (pack of 25)
11303-293G	1.2 µm (pack of 25)
11304-293G	0.8 µm (pack of 25)
11304-293N	0.8 µm (pack of 100)
11305-293G	0.65 µm (pack of 25)
11306-293G	0.45 µm (pack of 25)
11306-293N	0.45 µm (pack of 100)
11347-293G	0.3 µm (pack of 25)
11307-293G	0.2 µm (pack of 25)
11307-293N	0.2 µm (pack of 100)
11358-293G	0.1 µm (pack of 25)

47 mm and 50 mm diameters of several pore sizes are also available **sterile and individually packed**. Order numbers are as follows:

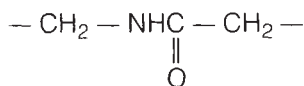
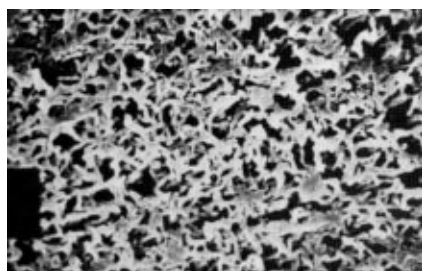
47 mm diameter discs, sterile and individually packed:

11301-047 ACN	8 µm (pack of 100)
11302-047 ACN	3 µm (pack of 100)
11303-047 ACN	1.2 µm (pack of 100)
11304-047 ACN	0.8 µm (pack of 100)
11305-047 ACN	0.65 µm (pack of 100)
11306-047 ACN	0.45 µm (pack of 100)
11307-047 ACN	0.2 µm (pack of 100)

50 mm diameter discs, sterile and individually packed:

11301-050 ACN	8 µm (pack of 100)
11302-050 ACN	3 µm (pack of 100)
11303-050 ACN	1.2 µm (pack of 100)
11304-050 ACN	0.8 µm (pack of 100)
11305-050 ACN	0.65 µm (pack of 100)
11306-050 ACN	0.45 µm (pack of 100)
11307-050 ACN	0.2 µm (pack of 100)

Polyamide Membranes, type 250, for the filtration of alkaline solutions and organic solvents



Polyamide filters are specified in a method for the isolation of legionella, and their high adsorption and good mechanical strength also make them very useful for blotting procedures, as described on page 72.

They are both hydrophilic and chemically resistant to most bases, including 1N NaOH, so that they are very good general purpose particle-removing or sterilizing filters for alkaline solutions. Their compatibility with many organic solvents, and their favourable price compared to PTFE membranes, makes them an economical choice for particle removal from mobile phases for HPLC.

They are not recommended for applications such as the sterilizing filtration of tissue culture solutions, as their relatively high adsorption could cause loss of important trace substances. For such applications, the low adsorption cellulose acetate membranes described on page 66 are preferred.

SPECIFICATIONS for polyamide membrane filters

Adsorption	100 µg/cm ² for bovine serum albumin for 0.2 µm pore size
Bubble points	Minimum values, water wetted, 3.4 bar (340 kPa) for 0.2 µm, 2.2 bar (220 kPa) for 0.45 µm
Compatibility	Are stable within the pH range 3-14, and resistant to many solvents (see page 82)
Extractables	With water, less than 0.2%
Flow rates	Average values per cm ² area for water at 1 bar (100 kPa) pressure, 23 ml/min for 0.2 µm pore size, 46 ml/min for 0.45 µm pore size
Material	Polyamide
Sterilization	By autoclaving (at 121°C or 134°C) or with ethylene oxide
Thickness	Average value 125 µm
Validation	The correlation of bubble point values of 0.2 µm pore size membranes to reliability of sterilizing filtration has been validated by standard Bacteria Challenge Tests

ORDER NUMBERS for polyamide membrane filters

13 mm diameter discs:	50 mm diameter discs:
25006-013N 0.45 µm (pack of 100)	25006-050N 0.45 µm (pack of 100)
25007-013N 0.2 µm (pack of 100)	90 mm diameter discs:
25 mm diameter discs:	25006-090G 0.45 µm (pack of 25)
25006-025N 0.45 µm (pack of 100)	25007-090G 0.2 µm (pack of 25)
25007-025N 0.2 µm (pack of 100)	142 mm diameter discs:
47 mm diameter discs:	25006-142G 0.45 µm (pack of 25)
25006-047N 0.45 µm (pack of 100)	25007-142G 0.2 µm (pack of 25)
25007-047N 0.2 µm (pack of 100)	25007-142N 0.2 µm (pack of 100)
	293 mm diameter discs:
	25006-293G 0.45 µm (pack of 25)
	25007-293G 0.2 µm (pack of 25)
	25007-293N 0.2 µm (pack of 100)

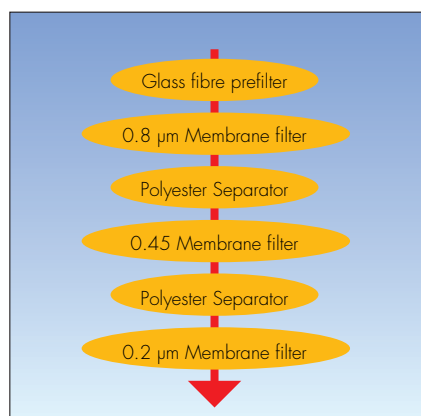
Glass fibre filters for increased throughputs. Polyester Separators for use in serial filtrations

The major use of all three glass fibre filters is as a depth prefilter, placed directly on top of a membrane filter, whereby the prefilter diameter specified for the holder must be chosen. Larger diameters would intrude under the sealing ring of the holder and cause leakage.



The standard type 13400 contains an acrylic latex binder. It has a high particle loading capacity, but for very "dirty" liquids the thicker type 13430 can be more effective. 13440 is a finer, binder-free type, and is recommended for the prefiltration of relative clean solutions such as tissue culture media.

Serial filtration may be necessary for difficult-to-filter liquids such as serum. As shown in the diagram, 2 or 3 membrane filters of different pore sizes are placed on each other, with a glass fibre prefilter on top and polyester separators 13420 between them (diameter as for prefilter) to assist liquid passage.



SPECIFICATIONS

Flow rates	For water per cm ² , at 1 bar (100 kPa) pressure, 320 ml/min for 13400 and 13430, 2.5 l/min for 13420
Limis	Max. temperature, 220°C for 13400 and 13430, 200°C for 13420
Materials	Glass fibres with acrylic latex binder (13400 and 13430). Glass fibres without binder (13440). Polyester (13420)
Sterilization	By autoclaving (at 121°C or 134°) or dry heat (180°C)
Thickness	Approx. 0.55 mm for 13400, 1.55 mm for 13430, 0.1 mm for 13420

ORDER NUMBERS

a) Type 13400.

Standard glass fibre filters

13400-013S	13 mm (pack of 200)
13400-020S	20 mm (pack of 200)
13400-025S	25 mm (pack of 200)
13400-037S	37 mm (pack of 200)
13400-040S	40 mm (pack of 200)
13400-042Q	42 mm (pack of 500)
13400-044Q	44 mm (pack of 500)
13400-047Q	47 mm (pack of 500)
13400-050Q	50 mm (pack of 500)
13400-088S	88 mm (pack of 200)
13400-090S	90 mm (pack of 200)
13400-100K	100 mm (pack of 50)
13400-120K	120 mm (pack of 50)
13400-124K	124 mm (pack of 50)
13400-127K	127 mm (pack of 50)
13400-130K	130 mm (pack of 50)
13400-142K	142 mm (pack of 50)
13400-150K	150 mm (pack of 50)
13400-257K	257 mm (pack of 50)
13400-260K	260 mm (pack of 50)
13400-279K	279 mm (pack of 50)
13400-293K	293 mm (pack of 50)

b) Type 13430.

Extra thick glass fibre filters

13430-013S	13 mm (pack of 200)
13430-025S	25 mm (pack of 200)
13430-040S	40 mm (pack of 200)
13430-044S	44 mm (pack of 200)
13430-047S	47 mm (pack of 200)
13430-050S	50 mm (pack of 200)
13430-127K	127 mm (pack of 50)
13430-130K	130 mm (pack of 50)
13430-142K	142 mm (pack of 50)
13430-257K	257 mm (pack of 50)
13430-279K	279 mm (pack of 50)
13430-293K	293 mm (pack of 50)

c) Type 13440.

Binder-free glass fibre filters

13440-013S	13 mm (pack of 200)
13440-020S	20 mm (pack of 200)
13440-025S	25 mm (pack of 200)
13440-037S	37 mm (pack of 200)
13440-040S	40 mm (pack of 200)
13440-042Q	42 mm (pack of 500)
13440-044Q	44 mm (pack of 500)
13440-047Q	47 mm (pack of 500)
13440-050Q	50 mm (pack of 500)
13440-088S	88 mm (pack of 200)
13440-090S	90 mm (pack of 200)
13440-100K	100 mm (pack of 50)
13440-120K	120 mm (pack of 50)
13440-124K	124 mm (pack of 50)
13440-127K	127 mm (pack of 50)
13440-130K	130 mm (pack of 50)

d) Type 13420.

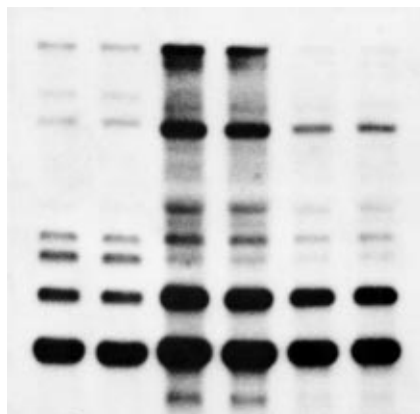
Polyester separators

13420-047N	47 mm (pack of 100)
13420-050N	50 mm (pack of 100)
13420-088K	88 mm (pack of 50)
13420-090S	90 mm (pack of 200)
13420-130G	130 mm (pack of 25)
13420-279D	279 mm (pack of 10)

Sensitive Blots and Multiple Reprobing with pure Nitrocellulose, NC-Extra und Polyamide

Nitrocellulose was the original material on which blotting was performed, and has maintained its popularity because of its ease of wetting and the extremely favourable combination of high protein binding and low background.

The most commonly used type for nucleic acid transfers and colony/plaque transfers is the 0.45 µm membrane. The 0.2 µm membrane is the standard material for protein blotting. It has an even higher binding capacity than the 0.45 µm pore size, which is particularly advantageous when electro-transferring proteins of low molecular weight.



The limited physical strength of the pure Nitrocellulose membrane makes it unsuitable for multiple reprobing of nucleic acid blots. For this application, supported Nitrocellulose (NC-Extra) is the membrane of choice. The polyester support within the membrane supplies the appropriate strength without affecting the favourable wetting and binding characteristics. NC-Extra also works particularly well for repeated colony transfers and for UV-crosslinking of DNA.

Sartolon® polyamide membranes are mainly used for transfer and immobilization of nucleic acids. They are naturally charged positively and are compatible with classical and non-radioactive detection procedures. Background is better controlled than with strongly charged membranes.

SPECIFICATIONS for Blotting Membranes

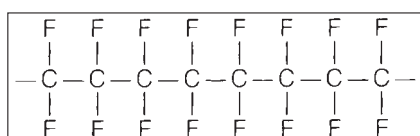
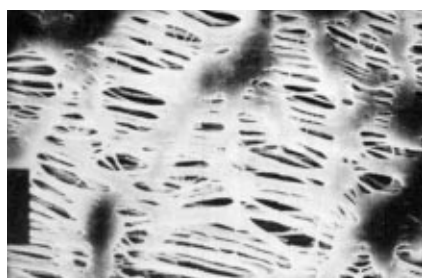
Thickness	130 µm (pure Nitrocellulose and Polyamide), 160 µm (NC-Extra)
Protein binding	As measured with gamma-globulin: a) for Nitrocellulose, 115 µg/cm ² (0.45 µm), 168 µg/cm ² (0.2 µm) b) for NC-Extra, 120 µg/cm ² (0.45 µm), 170 µg/cm ² (0.2 µm) c) for Polyamide, 105 µg/cm ² (0.45 µm), 145 µg/cm ² (0.2 µm)
Thermal stability	Max. temperature, 121°C for all membranes when wet, 80°C for NC-Extra and Polyamide when dry

ORDER NUMBERS for Blotting Membranes

a) 0.45 µm Nitrocellulose:	
11306-082 BLN	Discs, 82 mm diameter (pack of 100)
11306-132 BLG	Discs, 132 mm diameter (pack of 25)
11306-160x160 BLF	Sheets, 160 x 160 mm (pack of 15)
11306-200x200 BLF	Sheets, 200 x 200 mm (pack of 15)
11306-41 BL	Roll, 30 cm x 3 m (pack of 1)
11306-43 BL	Roll, 20 cm x 3 m (pack of 1)
b) 0.2 µm Nitrocellulose:	
11307-160x160 BLF	Sheets, 160 x 160 mm (pack of 15)
11307-200x200 BLF	Sheets, 200 x 200 mm (pack of 15)
11307-41 BL	Roll, 30 cm x 3 m (pack of 1)
11307-43 BL	Roll, 20 cm x 3 m (pack of 1)
c) 0.45 µm NC-Extra:	
12806-082 BLN	Discs, 82 mm diameter (pack of 100)
12806-132 BLG	Discs, 132 mm diameter (pack of 25)
12806-160x160 BLF	Sheets, 160 x 160 mm (pack of 15)
12806-200x200 BLF	Sheets, 200 x 200 mm (pack of 15)
12806-41 BL	Roll, 30 cm x 3 m (pack of 1)
12806-43 BL	Roll, 20 cm x 3 m (pack of 1)
d) 0.2 µm NC-Extra:	
12807-160x160 BLF	Sheets, 160 x 160 mm (pack of 15)
12807-200x200 BLF	Sheets, 200 x 200 mm (pack of 15)
12807-41 BL	Roll, 30 cm x 3 m (pack of 1)
12807-43 BL	Roll, 20 cm x 3 m (pack of 1)
e) 0.45 µm Polyamide (Sartolon):	
25006-082 BLN	Discs, 82 mm diameter (pack of 100)
25006-132 BLG	Discs, 132 mm diameter (pack of 25)
25006-160x160 BLF	Sheets, 160 x 160 mm (pack of 15)
25006-200x200 BLF	Sheets, 200 x 200 mm (pack of 15)
25006-41 BL	Roll, 30 cm x 3 m (pack of 1)
25006-43 BL	Roll, 20 cm x 3 m (pack of 1)
f) 0.2 µm Polyamide (Sartolon):	
25007-160x160 BLF	Sheets, 160 x 160 mm (pack of 15)
25007-200x200 BLF	Sheets, 200 x 200 mm (pack of 15)
25007-41 BL	Roll, 30 cm x 3 m (pack of 1)
25007-43 BL	Roll, 20 cm x 3 m (pack of 1)

The suffix BL denotes that these membranes are tested lot by lot for protein binding and Western blotting.

Hydrophobic PTFE Membranes, type 118, for the filtration of air, gases and chemicals



These membrane filters are made purely of PTFE, which is naturally and permanently hydrophobic. They allow unhindered passage of moist air or other gas even at low differential pressures, as, unlike the hydrophilic membranes, they are not wetted and blocked by the moisture.



The extreme chemical resistance of PTFE also makes these filters very useful for the filtration of those solvents or aggressive chemicals for which other membrane filter types are unsuitable. When they are to be used for the filtration of aqueous solutions, they must be pre-wetted with a solvent such as ethanol or isopropanol before water passage can occur.

SPECIFICATIONS for PTFE membrane filters

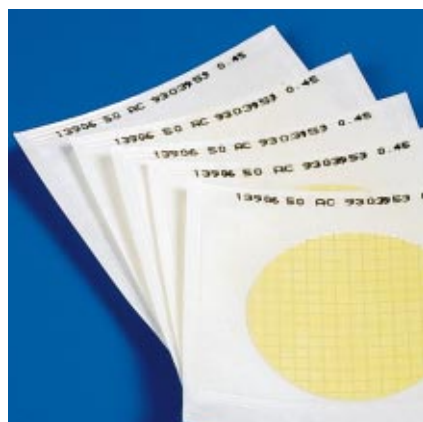
Adsorption	8 µg/cm ² for γ-globulin for 0.2 µm pore size
Bubble points	Wetted with iso-propanol. Minimum values for 0.2 µm = 1.2 bar (120 kPa), for 0.45 µm = 0.8 bar (80 kPa). Average values for 1.2 µm = 0.45 bar (45 kPa), for 5 µm = 0.1 bar (10 kPa)
Compatibility	Resistant to almost all solvents and chemicals, see page 82
Extractables	With water, none detectable
Flow rates	Average values per cm ² area for air, at p = 0.05 bar (5 kPa), 0.2 l/min for 0.2 µm, 0.3 l/min for 0.45 µm pore size, 1.6 l/min for 1.2 µm and 4 l/min for 5 µm
Material	Polytetrafluoroethylene
Sterilization	By autoclaving (at 121°C or 134°C) or with ethylene oxide
Thickness	Average value varies from 65 µm for 0.2 µm pore size to 100 µm for 5 µm pore size
Validation	The correlation of bubble point values of 0.2 µm pore size membranes to reliability of sterilizing filtration has been validated by standard Bacteria Challenge Tests

ORDER NUMBERS for PTFE membrane filters

13 mm diameter discs:	90 mm diameter discs
11803-013N 1.2 µm (pack of 100)	11806-090G 0.45 µm (pack of 25)
11806-013N 0.45 µm (pack of 100)	
11807-013N 0.2 µm (pack of 100)	
25 mm diameter discs:	100 mm diameter discs:
11842-025N 5 µm (pack of 100)	11842-100G 5 µm (pack of 25)
11803-025N 1.2 µm (pack of 100)	11803-100G 1.2 µm (pack of 25)
11806-025N 0.45 µm (pack of 100)	11806-100G 0.45 µm (pack of 25)
11807-025N 0.2 µm (pack of 100)	11807-100G 0.2 µm (pack of 25)
47 mm diameter discs:	142 mm diameter discs:
11842-047N 5 µm (pack of 100)	11842-142G 5 µm (pack of 25)
11803-047N 1.2 µm (pack of 100)	11803-142G 1.2 µm (pack of 25)
11806-047N 0.45 µm (pack of 100)	11806-142G 0.45 µm (pack of 25)
11807-047N 0.2 µm (pack of 100)	11807-142G 0.2 µm (pack of 25)
50 mm diameter discs:	293 mm diameter discs:
11842-050N 5 µm (pack of 100)	11806-293G 0.45 µm (pack of 25)
11803-050N 1.2 µm (pack of 100)	11807-293B 0.2 µm (pack of 5)
11806-050N 0.45 µm (pack of 100)	11807-293G 0.2 µm (pack of 25)
11807-050N 0.2 µm (pack of 100)	

Gridded Membranes, sterile and individually packed, for colony counts

Sterile, individually packed membrane filters have long become standard for routine microbiological quality control because of the user benefits they offer. They are ready-to-use and save preparatory time, they avoid the possibility of contamination of remaining filters in opened packs and are GLP conform, having filter identification and lot number printed on each individual envelope.



The ultra-modern packaging machine recently installed by Sartorius was designed specifically for this type of packaging. It complements the user-benefits with automatic, in-line quality assurance. Each membrane is checked to ensure it is not damaged in any way, is positioned correctly with no slippage under the edge seal, has perfect grid printing and is free from particles. Each envelope is checked for readable lettering.

The membrane filters

All of the gridded membranes are made of cellulose nitrate, a material which assures excellent retention and optimum colony growth. Their basic specifications are as for the appropriate pore size type 113 membranes described on page 68. The grid size is 3.1 x 3.1 mm. The various colours allow the one to be chosen which gives the best contrast to the colonies which are to be counted (see, for example, the membranes selected for the various Nutrient Pad Sets, page 76).

Hydrophobic edge membranes are used mainly in the sterility testing of solutions containing antibiotics.

ORDER NUMBERS

for sterile, individually packed membrane filters

1. Type 114, white with black grid, for colony counts



47 mm diameter discs:

- a) In packs of 100

11403-047ACN	1.2	µm
11404-047ACN	0.8	µm
11405-047ACN	0.65	µm
11406-047ACN	0.45	µm
11407-047ACN	0.2	µm

- b) In packs of 1000

11403-047ACR	1.2	µm
11404-047ACR	0.8	µm
11406-047ACR	0.45	µm

50 mm diameter discs:

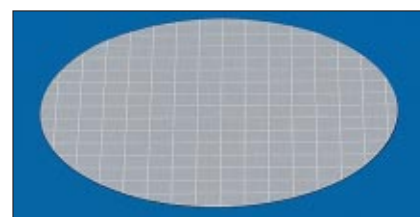
- a) In packs of 100

11404-050ACN	0.8	µm
11405-050ACN	0.65	µm
11406-050ACN	0.45	µm
11407-050ACN	0.2	µm

- b) In packs of 1000

11406-050ACR	0.45	µm
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2. Type 130, gray (black when wet) with white grid, for the detection of yeasts and moulds



47 mm diameter discs:

- a) In packs of 100

13004-047ACN	0.8	µm
13005-047ACN	0.65	µm
13006-047ACN	0.45	µm

- b) In packs of 1000

13004-047ACR	0.8	µm
13006-047ACR	0.45	µm

50 mm diameter discs:

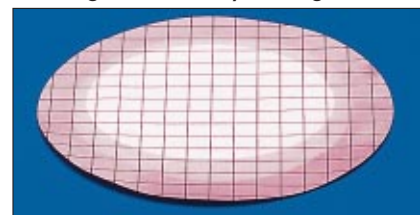
- a) In packs of 100

13004-050ACN	0.8	µm
13005-050ACN	0.65	µm
13006-050ACN	0.45	µm

- b) In packs of 1000

13005-050ACR	0.65	µm
13006-050ACR	0.45	µm

3. Type 131, white with black grid and pink-coloured hydrophobic edge, for sterility testing



3a. With 3 mm hydrophobic edge

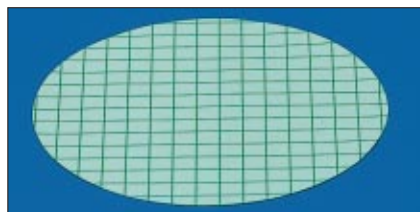
- 47 mm diameter discs,
in packs of 100:
- | | | |
|--------------|------|----|
| 13106-047ACN | 0.45 | µm |
| 13107-047ACN | 0.2 | µm |

- 50 mm diameter discs
in packs of 100:
- | | | |
|--------------|------|----|
| 13106-050ACN | 0.45 | µm |
| 13107-050ACN | 0.2 | µm |

3b. With 6 mm hydrophobic edge

- 47 mm diameter discs,
in packs of 100:
- | | | |
|--------------|------|----|
| 13106-047HCN | 0.45 | µm |
|--------------|------|----|

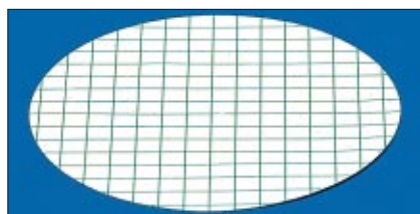
4. Type 138, green with dark green grid, for colony counts



47 mm diameter discs:
13806-047ACN 0.45 µm (pack of 100)
13806-047ACR 0.45 µm (pack of 1000)

50 mm diameter discs:
13806-050ACN 0.45 µm (pack of 100)
13806-050ACR 0.45 µm (pack of 1000)

5. Type 139, white with green grid, for E. coli and coliforms



47 mm diameter discs:
a) In packs of 100
13906-047ACN 0.45 µm
b) In packs of 1000
13906-047ACR 0.45 µm

50 mm diameter discs:
a) In packs of 100
13906-050ACN 0.45 µm
b) In packs of 1000
13906-050ACR 0.45 µm

Gridded membranes in standard packs, non-sterile, for particle counting and microscopy

1. Type 114, white membrane with black grid

25 mm diameter discs,
in packs of 100:

11403-025N	1.2 µm
11404-025N	0.8 µm
11406-025N	0.45 µm
11407-025N	0.2 µm

37 mm diameter discs,
in packs of 100:

11404-037N	0.8 µm
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47 mm diameter discs,
in packs of 100:

11403-047N	1.2 µm
11404-047N	0.8 µm
11405-047N	0.65 µm
11406-047N	0.45 µm
11407-047N	0.2 µm

50 mm diameter discs,
in packs of 100:

11403-050N	1.2 µm
11404-050N	0.8 µm
11406-050N	0.45 µm
11407-050N	0.2 µm

2. Type 130, gray membrane (black when wet) with white grid

25 mm diameter discs,
in packs of 100:

13006-025N	0.45 µm
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47 mm diameter discs,
in packs of 100:

13001-047N	8 µm
13004-047N	0.8 µm
13005-047N	0.65 µm
13006-047N	0.45 µm

50 mm diameter discs,
in packs of 100:

13001-050N	8 µm
13004-050N	0.8 µm
13005-050N	0.65 µm
13006-050N	0.45 µm

3. Type 131, white membrane with pink-coloured, 3 mm wide hydrophobic edge

3a. with black grid:

25 mm diameter discs,
in packs of 100:

13106-025N	0.45 µm
13107-025N	0.2 µm

47 mm diameter discs,
in packs of 100:

13101-047N	8 µm
13106-047N	0.45 µm
13107-047N	0.2 µm

50 mm diameter discs,
in packs of 100:

13101-050N	8 µm
13106-050N	0.45 µm
13107-050N	0.2 µm

3b. without grid:

50 mm diameter discs without grid,
in packs of 100:

13101-050AHN	8 µm
--------------	------

4. Type 138, green membrane with dark green grid

47 mm diameter discs:

a) In packs of 100
13806-047N 0.45 µm
b) In packs of 1000
13806-047R 0.45 µm

50 mm diameter discs:

a) In packs of 100
13806-050N 0.45 µm
b) In packs of 1000
13806-050R 0.45 µm

5. Type 139, white membrane with green grid

47 mm diameter discs:

a) In packs of 100
13906-047N 0.45 µm
b) In packs of 1000
13906-047R 0.45 µm

50 mm diameter discs:

a) In packs of 100
13906-050N 0.45 µm
b) In packs of 1000
13906-050R 0.45 µm

Gridded filters, sterile but not individually packed, for air sampling

a) White with black grid, 0.8 µm pore size, 80 mm diameter, pack of 100: 11404-080ALN

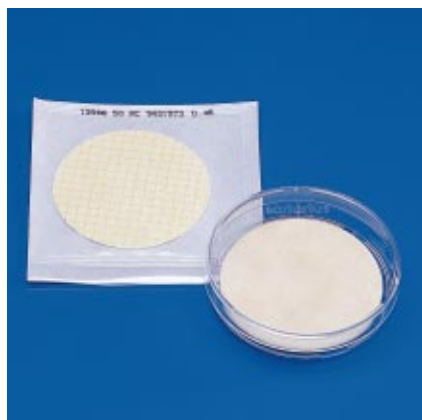
b) Gray with white grid, 0.8 µm pore size, 80 mm diameter, pack of 100: 13004-080ALN

Culture Media in Petri dishes, with matching membrane filters, for reliable, time-saving Quality Control

Sartorius Nutrient Pads are 50 mm diameter absorbent pads which have been uniformly impregnated with a standard culture medium, then dried and sterilized in Petri dishes. They eliminate time-consuming and labour-intensive preparation of culture media, are of consistent high quality and have shelf lives of from 9 to 24 months, according to type. A simple wetting with sterile demineralized water reactivates them for use.



They are available with 21 different media, and are supplied as Nutrient Pad Sets, which additionally contain sterile, individually packed membrane filters, of pore size and colour chosen according to the requirements of the individual medium, for optimum colony growth and convenience of colony counting. The various types, and the microorganisms they detect, are listed on the right.



ORDER NUMBERS for Nutrient Pad Sets

Nutrient Pad Set type:	For the detection of **:	Order number:
Azide	Enterococci (1)	14051-*
Bismuth sulfite	Salmonellae (1)	14057-*
Caso	Colony count (1)	14063-*
Cetrimide	Pseudomonas aeruginosa (2)	14075-*
Chapman	Staphylococci (2)	14074-*
ECD	E. coli (2)	14082-*
Endo	E. coli and coliforms (2)	14053-*
Endo for milk	E. coli and coliforms (5)	14054-*
Glucose-Tryptone	Thermophilic spore formers (2)	14066-*
lysine	Wild yeasts (3)	14061-*
McConkey	Enterobacteria (2)	14097-*
M-FC	E. coli and coliforms (2)	14068-*
Orange serum	Acid-tolerant microbes (1)	14062-*
Orange serum, pH 3.2	Acid-tolerant microbes (1)	14096-*
Sabouraud	Yeasts and moulds (4)	14069-*
Schaufus-Pottinger	Yeasts and moulds (5)	14070-*
Schaufus-Pottinger	Yeasts and moulds (6)	14072-*
Schaufus-Pottinger	Yeasts and moulds (7)	14080-*
Schaufus-Pottinger	Yeasts and moulds (8)	14060-*
Schaufus-Pottinger	Yeasts and moulds (4)	14083-*
Standard	Colony count (1)	14064-*
Standard TTC	Colony count (1)	14055-*
Teepol	E. coli and coliforms (2)	14067-*
Tergitol TTC	E. coli and coliforms (2)	14056-*
Tomato juice	Leuconostoc oenos (1)	14079-*
VLB-S7-S	Pediococci and Lactobacilli (2)	14059-*
Weman	Leuconostoc mesenteroides (1)	14065-*
Wort	Yeasts and moulds (4)	14058-*
Wort, pH 4.4	Yeasts and moulds (4)	14078-*

* Add your choice of the following to the basic order number for the nutrient pad set given above for the complete order number fitting your requirements:

- 047K for a pack of 50, with 47 mm diameter membranes
- 047N for a pack of 100, with 47 mm diameter membranes
- 050K for a pack of 50, with 50 mm diameter membranes
- 050N for a pack of 100, with 50 mm diameter membranes

(Some types are also available without Petri dishes, packed sterile in 25 polyethylene bags, each containing 2 nutrient pads and 2 membranes, to give a pack of 50. Basic order numbers are 14003 (Endo), 14005 (Standard-TTC), 14006 (Tergitol-TTC) and 14008 (Wort). Add -047K for 47 mm membranes or -050K for 50 mm membranes.)

** The number in brackets refers to the type of membrane filter supplied:

- (1) = green filter with dark green grid, 0.45 µm pore size
- (2) = white filter with green grid, 0.45 µm pore size
- (3) = green filter with dark green grid, 0.65 µm pore size
- (4) = gray filter (black when wet) with white grid, 0.65 µm pore size
- (5) = white filter with green grid, 0.65 µm pore size
- (6) = white filter with green grid, 1.2 µm pore size
- (7) = gray filter (black when wet) with white grid, 0.8 µm pore size
- (8) = gray filter (black when wet) with white grid, 0.45 µm pore size

This poster is available free on request (actual size is 70 cm x 50 cm). It shows typical colonies and lists applications for the various Nutrient Pad Sets types.

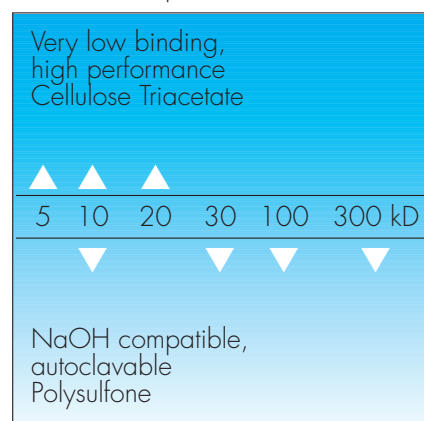
Sartorius Nutrient Pad Sets

1 China Blue <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	2 Ende <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	4 Standard TTC <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	5 Neutral TTC <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	6 Starch Sulfite <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	7 Wort <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>
8 VLB 57 <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	9 Lysine <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	10 Orange Serum <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	11 Case <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	12 Standard <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	13 Weizen <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>
14 Glucose-Tryptone <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	15 Tergitol <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	16 MFC <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	17 Sabouraud <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	18 Schaeffer-Hanging <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	19 Chapman <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>
20 Cennide <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	21 Tomato Juice Medium <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	22 ECD <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	23 MacConkey <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	24 ECD <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>	25 MacConkey <i>Streptococcus faecalis</i> <i>Streptococcus faecalis</i>

Product	Description of	Type of bacteria for which it is suitable	Number of pads in set
Fluoro-phenol and carbocyclic	Counting count	Most SM 140/54 (50% - 2), VLB 57 SM 140/54 (50% - 2), Ende SM 140/54 (50% - 2)	8
Water	Counting count	Most SM 140/54 (50% - 2), VLB 57 SM 140/54 (50% - 2), Ende SM 140/54 (50% - 2)	8
Wine	Counting count	Most SM 140/54 (50% - 2), VLB 57 SM 140/54 (50% - 2), Ende SM 140/54 (50% - 2)	8
Sugar	Counting count	Most SM 140/54 (50% - 2), VLB 57 SM 140/54 (50% - 2), Ende SM 140/54 (50% - 2)	8

Low adsorption Cellulose triacetate and NaOH compatible Polysulfone ultrafilters

Both types are asymmetric in structure. They differ in the cut-offs offered and in their adsorption characteristics and chemical compatibilities.



The exceptionally low protein adsorption of the cellulose triacetate ultrafilters is particularly beneficial when proteins should pass through the ultrafilter into the filtrate, as is shown by the results with test protein gamma-globulin and ultrafilters of various cut-offs which are given below.

1. Adsorption when used to concentrate (adsorbing area, only the ultrafilter surface):

5 $\mu\text{g}/\text{cm}^2$ for 10,000 Polysulfone
4 $\mu\text{g}/\text{cm}^2$ for 20,000 Triacetate
8 $\mu\text{g}/\text{cm}^2$ for 30,000 Polysulfone

2. Adsorption when used to ultrafilter (adsorbing area, complete internal structure):

55 $\mu\text{g}/\text{cm}^2$ for 10,000 Polysulfone
38 $\mu\text{g}/\text{cm}^2$ for 20,000 Triacetate
73 $\mu\text{g}/\text{cm}^2$ for 30,000 Polysulfone

SPECIFICATIONS for Ultrafilters

Cleaning Conditions	For re-use, polysulfone only, treat with 1 N NaOH Max. pressure for effective ultrafiltration, 4 bar (400 kPa). Max. temperature (dry heat), 50°C
Flow rates	Average values for water (ml/min/cm ² /bar) a) cellulose triacetate: 0.015 (5,000), 0.1 (10,000), >0.26 (20,000) b) polysulfone: 0.25 (10,000), 0.9 (30,000), 1.3 (100,000), >4.0 (300,000) average values for 0.1% Cytochrome c with polysulfone ultrafilters: 0.05 (10,000), >0.18 (30,000)
pH range	4 to 8 for triacetate, 2 to 14 for polysulfone
Pretreatment	Rinse with water to remove glycerol, if required
Pyrogen removal	Tests with 14639 showed a 1,000 x reduction
Retentions	See the Table on page 5
Sterilization	Chemically by 24 hours immersion in 3% formaldehyde or 0.1% peracetic acid, γ -radiation or ethylene oxide. Sterilization with steam (polysulfone only) by autoclaving at 121°C under water.
Thickness	Approx. 120 μm
Toxicity	No clinical-toxicological symptoms were shown when extracts were administered to mice (i.v.) or to rabbits (intracutaneous)

ORDER NUMBERS for Ultrafilters

a) CELLULOSE TRIACETATE ultrafilters

5,000 D MWCO

14529-025D	25 mm (pack of 10)
14529-043D	43 mm (pack of 10)
14529-047D	47 mm (pack of 10)
14529-050D	50 mm (pack of 10)
14529-063D	63 mm (pack of 10)
14529-076D	76 mm (pack of 10)
14529-090B	90 mm (pack of 5)

10,000 D MWCO

14539-025D	25 mm (pack of 10)
14539-043D	43 mm (pack of 10)
14539-047D	47 mm (pack of 10)
14539-050D	50 mm (pack of 10)
14539-063D	63 mm (pack of 10)
14539-076D	76 mm (pack of 10)
14539-090B	90 mm (pack of 5)

20,000 D MWCO

14549-025D	25 mm (pack of 10)
14549-043D	43 mm (pack of 10)
14549-047D	47 mm (pack of 10)
14549-050D	50 mm (pack of 10)
14549-063D	63 mm (pack of 10)
14549-076D	76 mm (pack of 10)
14549-090B	90 mm (pack of 5)

b) POLYSULFONE ultrafilters

10,000 D MWCO

14639-025D	25 mm (pack of 10)
14639-043D	43 mm (pack of 10)
14639-047D	47 mm (pack of 10)
14639-050D	50 mm (pack of 10)
14639-063D	63 mm (pack of 10)
14639-076D	76 mm (pack of 10)
14639-090B	90 mm (pack of 5)

30,000 D MWCO

14659-025D	25 mm (pack of 10)
14659-043D	43 mm (pack of 10)
14659-047D	47 mm (pack of 10)
14659-050D	50 mm (pack of 10)
14659-063D	63 mm (pack of 10)
14659-076D	76 mm (pack of 10)
14659-090B	90 mm (pack of 5)

100,000 D MWCO

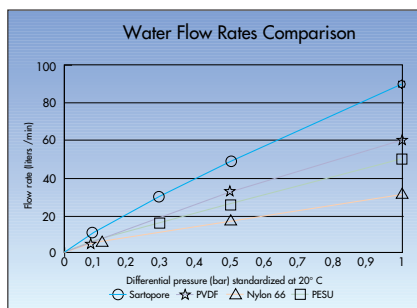
14669-025D	25 mm (pack of 10)
14669-043D	43 mm (pack of 10)
14669-047D	47 mm (pack of 10)
14669-050D	50 mm (pack of 10)
14669-063D	63 mm (pack of 10)
14669-076D	76 mm (pack of 10)
14669-090B	90 mm (pack of 5)

300,000 D MWCO

14679-025D	25 mm (pack of 10)
14679-043D	43 mm (pack of 10)
14679-047D	47 mm (pack of 10)
14679-050D	50 mm (pack of 10)
14679-063D	63 mm (pack of 10)
14679-076D	76 mm (pack of 10)
14679-090B	90 mm (pack of 5)

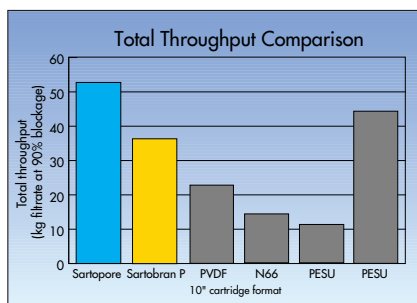
Sartopore® Capsules for faster flow and broader chemical compatibility

The new Sartopore Capsules ideally supplement the Sartobran-P Capsules described on page 33. Whereas Sartobran-P Capsules are excellent for the ultracleaning or sterilizing of up to 200 liters of aqueous solutions of pH between 4 and 8, the broader chemical compatibility of Sartopore Capsules allows them to be used to filter more aggressive liquids of lower or higher pH. The exceptionally high flow rates and total throughputs of their asymmetric, single-layer polyethersulfone membrane assure fast filtration.



Above, a flow rate comparison of Sartopore polyethersulfone, PVDF, PESU and Nylon 66 membranes in 10" cartridge format, showing water flow rates in liters per minute at differential pressures of up to 1 bar.

Below, a throughput comparison of Sartopore polyethersulfone, Sartobran cellulose acetate, PVDF, Nylon 66 and two different PESU membranes, also in 10" cartridge format, showing kg of filtrate at 90% blockage.

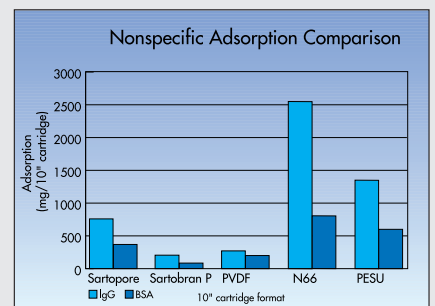


SPECIFICATIONS for Sartopore Capsules

Biological safety	All materials pass USP Plastics Test Class VI
Compatibility	Chemically compatible with aqueous solutions of pH 1-14
Connectors	See order numbers
Cytotoxicity	All materials are non-toxic, as determined with L929 cells and MRC-5 cells
Filtration area	0.05 m ² , 0.1 m ² , 0.2 m ² or 0.45 m ²
Integrity test data	All Sartopore Capsules are integrity testable. Details on minimum bubble points and maximum air diffusion values are given in the "Directions for use" supplied with each pack

Materials Asymmetric, single-layer polyethersulfone membrane filter, polypropylene housing parts and supporting/drainage layers

Nonspecific adsorption In the diagram on the right results are shown for both IgG and BSA adsorption on the membranes of various 10" cartridges - polyethersulfone (Sartopore), cellulose acetate (Sartobran-P), PVDF, Nylon 66 and PESU



Pressure limit Max. $\Delta p = 4$ bar at 20°C, 2 bar at 80°C

Sterilization By autoclaving at 121°C, 30 minutes

Sterilizing filtration Validated for compliance with HIMA bacteria challenge

ORDER NUMBERS for Sartopore Capsules*

1. Sartopore Capsules with 0.2 μ m membrane

- a) Type **OO** with hose nipple inlet and hose nipple outlet:
- | | |
|----------------|--------------------------------------|
| 5401307A7-OO-B | 0.05 m ² area (pack of 5) |
| 5401307A8-OO-B | 0.1 m ² area (pack of 5) |
| 5401307A9-OO-A | 0.2 m ² area (pack of 4) |
| 5401307A0-OO-V | 0.5 m ² area (pack of 2) |

b) Type **SS** with Sanitary flange inlet and Sanitary flange outlet:

- | | |
|----------------|--------------------------------------|
| 5401307A7-SS-B | 0.05 m ² area (pack of 5) |
| 5401307A8-SS-B | 0.1 m ² area (pack of 5) |
| 5401307A9-SS-A | 0.2 m ² area (pack of 4) |
| 5401307A0-SS-V | 0.5 m ² area (pack of 2) |

2. Sartopore Capsules with 0.45 μ m membrane

a) Type **OO** with hose nipple inlet and hose nipple outlet:

- | | |
|----------------|--------------------------------------|
| 5401306A7-OO-B | 0.05 m ² area (pack of 5) |
| 5401306A8-OO-B | 0.1 m ² area (pack of 5) |
| 5401306A9-OO-A | 0.2 m ² area (pack of 4) |
| 5401306A0-OO-V | 0.5 m ² area (pack of 2) |

b) Type **SS** with Sanitary flange inlet and Sanitary flange outlet:

- | | |
|----------------|--------------------------------------|
| 5401306A7-SS-B | 0.05 m ² area (pack of 5) |
| 5401306A8-SS-B | 0.1 m ² area (pack of 5) |
| 5401306A9-SS-A | 0.2 m ² area (pack of 4) |
| 5401306A0-SS-V | 0.5 m ² area (pack of 2) |

Capsules with other connector combinations may be available, according to requirements. Details on request.



Type OO
(hose nipple inlet and outlet)



Type SS
(Sanitary flange inlet and outlet)

*Also available in the same pore sizes and areas as Mini Cartridges. Order numbers for packs of 5:

Pore size:	0.05 m ²	0.1 m ²	0.2 m ²
0.2 μ m	5401507A7B	5401507A8B	5401507A9B
0.45 μ m	5401506A7B	5401506A8B	5401506A9B



Sartorius – Investing in the future



In order to do justice to the requirements of the future and to set strict standards for the environmentally protective production of membrane filters, cartridges and cassettes, Sartorius began in 1989 constructing new production facilities on an industrial complex covering 104,000 m².

The first building phase was completed in 1991, and the factory went into operation, equipped with new, innovative control technology and a manufacturing process which was developed by Sartorius and sponsored by the Federal Department of the Environment with the sum of 3 million marks. This process is environmentally friendly and low in emissions, incorporating a cost-efficient solvent recycling system which recovers 99.9% of the solvents used and recycles 99% of them in production.

We supply Quality

As was the case in the past, Sartorius sees its future in gearing Quality Assurance to meet specific customer requirements. For years our production methods and quality assurance have

conformed to GMP standards and have been audited by experts from multi-national customers. As manufacturer of "sterile medical devices and surgical products" Sartorius has been awarded the D. H. Certificate of Registration. The Sartorius Separation Technologies Division was certified according to DIN ISO 9001 by the DQS (German Society for the Certification of Quality

Management Systems) as of May 1994, thus completing coverage of DIN ISO 9001 certification of Sartorius AG in Göttingen.

We work with customers

Sartorius is not just a filter manufacturer but is able to provide its customers with complete system solutions, including support with the validation of their production processes.

We offer worldwide service



Order Number Index

Order number:	Page:	Order number:	Page:	Order number:	Page:
A100X	93	11406	74, 75	14062-....	76
A15X	93	11407	74, 75	14063-....	76
A5F	93	11803	73	14064-....	76
C100X	93	11806	73	14065-....	76
C120	94	11807	73	14066-....	76
C15X	93	11842	73	14067-....	76
C550	94	12301	66	14068-....	76
C5500X10	94	12301-050 ACN	28	14069-....	76
C5F	93	12302	66	14070-....	76
C600X5	94	12303	66	14072-....	76
D100X	93	12307 OS1V	58	14074-....	76
D120	94	12342	66	14075-....	76
D15X	93	12602-080 ALK	97	14078-....	76
D550	94	12806 BL	72	14079-....	76
D5500X10	94	12807 BL	72	14080-....	76
D5F	93	13001	75	14082-....	76
D600X5	94	13004	74, 75	14083-....	76
Q100X	93	13005	74, 75	14096-....	76
Q120	94	13006	74, 75	14097-....	76
Q15X	93	13101	75	14132 K	21
Q550	94	13106	74, 75	14529	78
Q5500X10	94	13107	74, 75	14529 OS1V	58
Q5F	93	13200 E	59	14539	78
Q600X5	94	13202 K	59	14549	78
S100X	93	13207 C30G	55	14549 OS1V	58
S120	94	13207 C4G	55	14639	78
S15X	93	13209 E	56	14639 OS1V	58
S550	94	13229 C4G	55	14659	78
S5500X10	94	13229 E	56	14669	78
S5F	93	13239 C30G	55	14669 OS1V	58
S600X5	94	13239 C4G	55	14679	78
00118	21	13239 E	56	14679 OS1V	58
00124	22, 23	13249 C30G	55	15629 001	57
00177	52	13249 C4G	55	15639 001	57
00179	38	13249 E	56	15650 001	57
01029	52	13269 C30G	55	15659 001	57
01030	52	13269 C4G	55	15669 001	57
01324	17	13269 E	56	15679 001	57
01325	17	13279 E	56	16201	24
11104	66	13400	71	16214	15
11105	66	13420	71	16219	24
11106	66	13430	71	16220	24
11107	66	13440	71	16249	38
11301	68-69	13806	74, 75	16251	52
11302	68-69	13906	74, 75	16254	52
11303	68-69	14003-....	76	16274	40
11304	68-69	14005-....	76	16275	39
11305	68-69	14006-....	76	16276	41
11306	68-69	14008-....	76	16276-3	94
11306BL	72	14051-....	76	16277	42
11307	68-69	14053-....	76	16277-7	94
11307BL	72	14054-....	76	16286	99
11342	68-69	14055-....	76	16296---05	98
11347	68-69	14056-....	76	16304	64
11358	68-69	14057-....	76	16305	64
11403	74, 75	14058-....	76	16306	21
11404	74, 75	14059-....	76	16307	22
11405	74, 75	14061-....	76	16309	23

Order Number Index

Order number:	Page:	Order number:	Page:	Order number:	Page:
16315	21	16803	44	17205	63
16316	22	16807	28	17521---001	60
16506	64	16817	63	17521---101	60
16508 B	36	16823	48	17521---102	60
16510	20	16824	25	17528-080 ACD	96
16511	20	16826	27	17528-080 BZD	96
16514 E	14	16828	25	17530	46
16517 E	15	16829	27	17531	46
16520 C	59	16831	25	17532	46
16522	29	16832	25	17533	46
16523	29	16836	26	17534	46
16534 K	12	16837	26	17535	46
16534 Q	12	16863	45, 47	17536	46
16536 E	64	16880	44	17546---001	61
16538	64	16881	44	17546---101	61
16540	37	16929	64	17546---102	61
16555 K	13	16931	48, 64	17558 K	11
16555 Q	13	16970	97	17558 Q	11
16574	14	16976	97	17559 K	11
16579	37	16999	48	17559 Q	11
16592 K	13	17004	27	17573 K	11
16592 Q	13	17005	27	17573 Q	11
16596 HYK	50	17006	27	17573 ZYQ	11
16596 HYQ	50	17016	44	17574 K	11
16597	64	17017	44, 45	17574 Q	11
16606	27	17019	44	17574 ZYQ	11
16610	27	17033	44, 48	17575 K	11
16611	27	17036	44	17575 Q	11
16612	28	17037	97	17576 K	11
16615	28	17038	38	17576 Q	11
16617	46	17039	37	17593 K	13
16618	17	17051	37	17593 Q	13
16619	17	17068	52	17594 K	13
16620	17	17069	52	17594 Q	13
16622	17	17070	47	17597 K	12
16623	29	17085	97	17597 Q	12
16625	17, 28, 48	17088	97	17598 K	13
16633	47	17089	44, 45, 52	17598 Q	13
16634	48	17090	45	17635	47
16639	17	17091	48	17636	47
16644 E	17	17098	44, 46	17649	29
16645 E	17	17099	44, 46	17655	97
16646 E	17	17105	37	17656	97
16647 E	17	17108 D	21	17657	97
16656	48	17109	21	17660	97
16660	44	17145	38	17661	97
16662	46	17146	22	17662	97
16668	62	17147	22	17712	97
16671	29	17148	21	17747	35
16672	27	17149	21	17748	35
16673	27	17150	44, 48	17749	35
16685	16	17152	64	17750	35
16692	28	17153	64	17761 K	10
16695	28	17168	97	17761 Q	10
16697	63	17170	45, 47	17761 ZYQ	10
16740	97	17173	26	17762 K	10
16743	96	17174	26	17762 Q	10
16744	96	17175	26	17762 ZYQ	10

Order Number Index

Order number:	Page:	Order number:	Page:	Order number:	Page:
17764 K	10	305186.....	60	6980120	22
17764 Q	10	331019P15TT112A	43	6980121	22
17765 K	10	332019P15TT112A	43	6980123	22
17765 Q	10	350019V15-K025A	53	6980151	38, 40
17766	35	360019P15II015A	53	6980176	52
17771	35	360019P15KG015A	53	6980178	38, 52
17773	35	5181306....	51	6980180	38, 52
17799	17	5181307...	51	6980225	20
17801	96	5181358....	51	6980226	20
17802	57, 63	5181506....	81	6980227	20
17804 E	50	5181507....	81	6980228	20
17804 G	50	5181558....	81	6980229	20
17804 M	28	5231306.....	33	6980230	20
17804 NPE	50	5231307.....	33	6980232	20, 29, 36
17804 NPG	50	except for:		6980233	20
17805 E	50	5231307H5NOV	32	6980234	20
17805 G	50	5231307H5OOB	32	6980235	20, 27
17805 UPN	50	5231307H5OOV	32	6980236	20
17805 NPE	50	5231307H8VNB	35	6980264	25
17805 NPG	50	5231307H8VOB	35	6980267	27
17820 K	11	5231307H8VUB	35	6980268	27
17820 Q	11	5231307H8VZB	35	6980270	25, 27
17821 K	10	5231307HNOB	32	6980271	25, 27
17821 Q	10	5401306...	79	6980272	25, 27
17822 K	10	5401307...	79	6980383	36
17822 Q	10	5521302...	34	6980389	47
17823 K	12	5521303...	34	6980390	47
17823 Q	12	5521307...	34	6980395	47
17824 K	13	5521320...	34	6980396	47
17824 Q	13	5521502...	80	6980407	48
17825 Q	13	5521503...	80	6980415	47
17829 K	13	5521507...	80	6980420	47
17829 Q	13	5521520...	80	6980569	14
18041 D	19	5531303...	34	6980570	15
18043 E	19	5531307...	34	6980573	29
18044 E	19	5531503...	80	6980574	29
18045 E	19	5531507...	80	6980586	29
18046 E	19	5601304...	34	6980588	29
18047 D	19	5601305...	34	6980589	29
18052 D	31	5601504...	80	6980590	29
18053 D	31	5601505...	80	6980591	29
18056 D	31	5621304...	34	6980595	15
18058 D	31	5621305...	34	6980632	64
18059	46	5621306...	34	6980633	64
18099	17, 31	5621307...	34	6980656	39, 40, 41, 42, 43, 52
18113	29	5621504...	80	6980657	43
18406	67	5621505...	80	6980700	37
18407	67	5621506...	80	6980701	37
24002	21	5621507...	80	6980702	39, 40
25006	70	6980101	24	6980703	37
25006 BL	72	6980102	24, 25	6980704	37
25007	70	6980103	24, 25	6980705	37
25007 BL	72	6980104	24, 25	6980706	37
26314	64	6980110	20, 36	6980707	39, 40, 41
302145.....	61	6980115	21	6980708	39, 40, 41
302146.....	61	6980116	21	6980711	39, 40, 41
302186.....	61	6980117	21	6980712	37, 39, 41
305146.....	60	6980119	22, 23		

Order Number Index

Order number:	Page:				
6980713	37	6982061	48	6986116	47
6980714	42	6982070	39, 40, 41	6986117	47
6980715	42	6982071	39, 40, 41	6986118	47
6980716	42	6982072	39, 40, 41	6986119	47
6980717	39, 40, 41, 42, 52	6982077	42	6986120	16
6980718	42	6982078	42	6986121	16
6980719	42	6982079	42	6986124	16
6980721	52	6982119	24, 25	6986125	16
6980722	39, 40, 41, 42, 43, 52	6983001	23	6986126	16
6980737	38, 52	6983002	23	6986127	16
6980740	41	6983003	23	6986129	47
6980767	43	6983004	23	6986130	47
6980801	38, 39, 40, 52	6983005	23	6986131	47
6980810	64	6983006	22	6986132	47
6980825	64	6983008	21	6986133	47
6981001	24, 25	6983009	22, 23	6986137	47
6981002	24, 25	6983010	22	6986138	47
6981003	24, 25	6985000	37	6986139	16
6981004	24	6985001	37	6988093	48
6981031	52	6985002	37	6988094	46
6981033	52	6985004	36		
6981032	52	6985010	37		
6981034	52	6985011	37		
6981063	24, 25	6985060	29		
6981064	24, 25	6985093	47		
6981065	24, 25	6985128	45, 48		
6981075	64	6985131	47		
6981076	64	6985149	81		
6981077	64	6985150	81		
6981078	64	6985151	81		
6981079	64	6985157	43		
6981080	64	6985183	39, 40, 41, 42, 43		
6981083	64	6985184	39, 40, 41, 42		
6981090	20	6985216	48		
6981139	28	6986006	46		
6981288	38	6986017	28		
6981314	48	6986055	38, 40		
6981320	17	6986070	17		
6981321	17	6986071	17		
6981322	17	6986073	17		
6981323	17	6986078	17		
6981540	29	6986079	17		
6982001	39, 40, 41	6986080	17		
6982002	40	6986081	17		
6982003	52	6986083	38		
6982005	38, 52	6986084	38		
6982006	38, 52	6986090	48		
6982012	39	6986091	48		
6982020	38	6986092	48		
6982022	42	6986105	28		
6982029	48	6986110	47		
6982036	40	6986111	47		
6982043	39, 40	6986112	47		
6982044	42	6986113	47		
6982060	48	6986114	47		
		6986115	47		

Product Name Index

Product name:	Page:	Product name:	Page:	Product name:	Page:
AC membranes	74-75	Manifolds	25, 27	Sartoclean-CA Capsules	34
Air sampler	96	MD 8 Air Sampler	96	Sartoclean-CA Mini Cartridges	80
All-Glass holder	23	Membrane Adsorbers	85-94	Sartoclean-GF Capsules	34
Anaerobic container	29	Membrane filters	66-70, 72-75	Sartoclean-GF Mini Cartridges	80
Biosart 250 Funnels	8	Micro collodion bags	59	Sartocon Micro	57
Biosart 100 Monitors	8	Midisart 2000	50	Sartocon Slice	60
Black membranes	74-75	Mini Cartridges	80, 81	Sartocon 3	61
Blotting membranes	72	Mini Cartridge housings	43, 53	Sartofluor Capsules	51
Calibration unit	97	Minicheck-BP	17	Sartofluor Mini Cartridges	81
Capsules	32-35, 51, 79	Minisart syringe units	10-13	Sartolab-P20	31
Cellulose acetate membranes	66	Minisart-GF	13	Sartolab-P20plus	31
Cellulose nitrate membranes	68-69, 72, 74-75	Minisart-HY	50	Sartolab-V units	19
Cellulose triacetate cassettes	61	Minisart-plus	12, 13	Sartopore Capsules	79
Cellulose triacetate ultrafilters	78	Minisart-RC	10	Sartopore Mini Cartridges	79
Centrifugal units	55, 56	Minisart, standard 0.2 µm	12	Sartopure-GF Capsules	34
Centrisart-C4	55	Minisart, standard, 0.45-5 µm	13	Sartopure-GF Mini Cartridges	80
Centrisart-C30	55	Minisart-SRP	11	Sartopure-PP Capsules	34
Centrisart-I	56	NC-Extra	72	Sartopure-PP Mini Cartridges	80
Collodion bags	59	Needles	17	School Kit	21
Colony counter	29	Nitrocellulose membranes	72	Spiral flow cell	62
Crossflow cassettes	60, 61	Nutrient Pad Sets	76-77	Stainless steel holders	15, 24, 25, 38-42, 52, 94
Crossflow systems	60, 61	Peristaltic pump	63	Sterile venting units	50, 51
Crossflow units	57	Perisys 70 Benchtop	63	Sterility test system	29
Dialysis bags	59	Polyamide membranes	70	Syringe filter holders	14, 15
Diaphragm pump	46	Polycarbonate holders	14, 15, 20, 36	Syringe filtration units	10-13
Disc filters	66-70, 72-75, 94	Polyester separators	71	Syringes	17
Dosing syringe	16	Polyethersulfone cassettes	60, 61	Suction flasks	27
EasyFlow	58	Polysulfone ultrafilters	78	Three-way valve	17
Forceps	17, 28, 48	Prefilters	71	Ultrafilters	78
Gelatin filter units	96	Prefilter attachment	28	Ultrafiltration units	55-58
Glass fibre filters	71	Prefilter Capsules	34	Ultrasart D20	59
Glass holders	21, 22, 23	Prefilter Mini Cartridges	80	Ultrasart X	62
Gray membranes	74-75	Pressure filter holders	36-42, 52, 94	Vacusart	28
Green membranes	75	Pressure filtration units	31-35, 50, 51, 94	Vacuum filter holders	20-25
Gridded membranes	74-75	Pressure hose	48	Vacuum filtration units	19
Hand vacuum pump	27	Pressure tanks	46	Vacuum hose	29
Hydrophobic edge membranes	74-75	PTFE holders	14, 37	Vacuum pumps	27, 28
Hydrophobic membranes	73	PTFE membranes	73	Vent filters	50, 51
Hydrosart cassettes	60, 61	Pumps	27, 28, 46, 63	Wash water Capsules	35
Impeller pumps	46, 47	Quick connectors	48	Water jet pump	27
Incubator	29	RC membrane filters	67	Woulffe's bottle	27
Integrity testers	98, 99	Sartobind discs, modules	94		
		Sartobran 300 Capsules	32		
		Sartobran-P Capsules	33		
		Sartocheck 3	99		
		Sartocheck Junior BPplus	98		

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1

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2

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