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Application areas. Product description.

For every purpose the right filter.
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, cells, microoorganisms, colloids 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 will you use the filter as a support or a porous interface.

On the next pages you will find a brief introduction to six major application areas (listed top right). Should you have questions on these, or require advice on other filtration or separation needs, our highly capable field staff, our product specialists or our application engineers in Goettingen are always at your disposal. Addresses, telephone and telefax numbers are given on the back page.

We wish you every success,
Sartorius Biotechnology

New !

Major applications:

Product descriptions:

Sample cleaning.
Particle and protein removal.

Samples for HPLC
Membrane filters have established themselves as the filters of choice for particle removing preparation of the small volume samples used for HPLC. The most used pore size for this application is 0.45 µm, with 0.2 µm being preferred when the sample contains very fine particles.

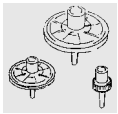
Ready to use Minisart RC and Minisart SRP syringe filtration units are available in both pore sizes, and in 4 mm, 15 mm and 26 mm diameters. The small 4 mm units are packed for ease of removal from the box, as pictured below.

The combination of PTFE filter holders and PTFE membrane filters is particularly suitable for the filtration of samples for the NMR spectrometry and also for the filtration of extremely hydrolysisprone or oxygen sensitive samples (see page 17).

Water samples
Larger sample volumes are required for analytical methods for various substances in water. Particle removal using 0.45 µm membrane filters can be seen in the respective instructions, and using 50 mm membrane filters in glass or stainless steel vacuum filter holders. Difficult-to-filter samples, such as sludge samples, have to be filtrated with pressure (see page 49).

Aqueous solutions and solvents
A 47 mm pressure holder, page 47, allows particle removal from litre volumes of solutions for cell counters. The all-glass filter holder plus 0.45 µm membrane filter, type 184, is perfectly suitable for the particle removal from solvents for HPLC.

Colloid and protein removal
As shown in the guide below, smaller filters have to be inserted for the removal of colloids, e.g. pore sizes of 0.1 µm or smaller for samples in nephelometry. Proteins require ultrafilters, which tend to rapid blockage due to their fineness. The Centrisart I centrifugal units avoid this blockage by filtering in the opposite direction to the centrifugal force. The easy accessibility of the filtrate makes Centrisart I units extremely practical for the preparation of clinical samples and for the liposome separations.

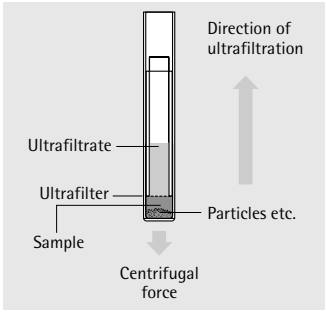


Minisart RC and Minisart SRP Syringe units
Pages 16–19

All-glass filter holder
Page 27–29

Centrisart I and Vivaspin centrifugal units
Page 67–71

Membrane filter
Pages 78–89



Samples for LAL tests
The samples are normally clean solutions free of ultrafilter blocking substances. Ultrasart D20 units are designed for the removal of interfering, low-molecular substances from these samples by simple pressure filtration (see page 76).

Overview: membrane filters and ultrafilters, separation ranges

Coarse particles			Fine particles			Colloids	Liposomes		
	Yeasts | moulds			Bacteria			Viruses	Pyrogens	
Cells							Proteins	Peptides	Salts
8 µm	3 µm	0.8 µm	0.65 µm	0.45 µm	0.2 µm	0.1 µm	300,000 D MWCO	20,000 D MWCO	5,000 D MWCO
├			**Membrane Filters**			┼		**Ultra Filters**	┤

Concentration and Purification of proteins.

The Sartorius separation techniques for biomolecules include ultrafiltration and membrane adsorption.

Vivaspin centrifugal units or Vivacell pressure filtration units are commonly used for small volume concentration by ultrafiltration. Centrisart I, because of its patented separation concept, is particularly advantageous when the ultrafiltrate is of interest.

Crossflow filtration has established itself as an economical mean of processing medium to large volumes. Vivaflow units fills perfectly the gap between the centrifugal units and the cassette systems. These ready-to-connect units are a time- and cost-saving possibility to treat samples in a laboratory standard and to give at the same time forecasts concerning the scale-up to larger volumes.

All of the above products utilize ultrafiltration membranes which separate on the basis of size, and which exhibit low protein adsorption characteristics. Membrane Adsorbers (membrane filters with built-in ion exchanger groups) offer exciting new possibilities for rapid isolation and purification.

New kits for protein purification

Vivapure spin columns are centrifugal filter units with Sartorius membrane adsorbers for protein purification in biomedical research and other biological disciplines. The new Vivapure spin columns are for the separation of pure biological molecules from complex mixtures and use the basic principle of ion exchange. These centrifugal units are available with strong and weak anion or cation charged membrane matrixes.

With this new generation of ion exchange membranes protein binding, elution and consequent purification and concentration will be much faster, more cost-effective, and eliminate additional steps associated with other methodologies.

The main advantage of Vivapure is, that several samples can be treated simultaneously by using simple centrifugal units. This makes extensive isolating endeavours with high sample figures possible also in laboratories without expensive HPLC and FPLC with automatic sample handling.

Please ask for more information!

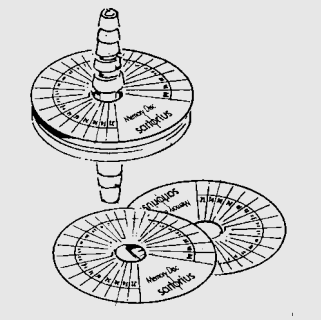
Scale-Up. Which unit for which volume?

Filtration unit	Filter area	Typical sample volume
Vivaspin 500	0.50 cm^2	0.5 ml
Vivaspin 2	1.20 cm^2	2.0 ml
Centrisart I	0.79 cm^2	2.5 ml
Vivaspin 6	2.50 cm^2	6 ml
Vivaspin 20	6.0 cm^2	20 ml
Vivacell 70	20.0 cm^2	70 ml
Vivacell 250	40.0 cm^2	250 ml
Vivaflow 50	50.0 cm^2	1 l
Vivaflow 200	200.0 cm^2	5 l
Sartocon Slice	0.1 – 0.5 m^2	50 l

Sterile venting. Air | Gas filtration. Clean room monitoring.

Sterile venting and air | gas filtration
The naturally hydrophobic PTFE membranes are the filters of choice for these applications. They are heat-resistant and can be repeatedly autoclaved or steam-sterilized, whether they are used as disc filters in stainless steel holders or ready-to-connect units, or as pleated filters in Capsules and Mini cartridges.

Midisart 2000 units can be autoclaved. The larger packs of these units contain Memory Discs, which slip over the hose nipple connector and allow track to be kept of the number of sterilizing cycles.



Midisart 2000 units are designed for the sterile venting of small fermenters and culture vessels (6–120 litres) as well as for the venting of filling vessels for sterile, distilled water and culture media, and for the sterilization of air fed into small fermenters.

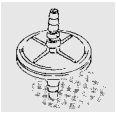
Minisart HY (page 60), has only a fourth of the filtration area and is used for sterile venting of flasks and for air sterilization in tube systems.

The 47 mm stainless-steel device, type 16254 (page 61) is designed for the installation in lines. It features a valve on the inlet side for draining the condensation. The air flow rate corresponds to this of Midisart 2000.

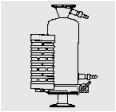
Higher flow rates require proportionately more filter area.

PTFE membrane filter
Page 84

Sartofluor capsules
Page 62



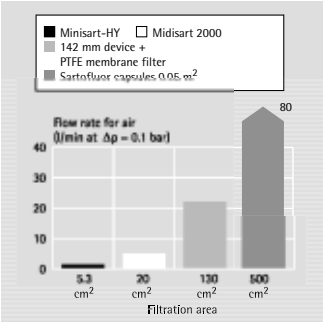
Midisart 2000
Page 60



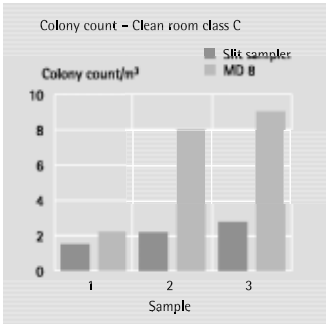
Sartofluor Mini cartridges
Page 64

Sartofluor Capsules are ready-to-connect units, including valves, for the sterile venting of tanks and vessels. They are individually pretested and integrity testable at any time. The Capsule is available in a choice of three different sizes, with the following pleated filtration ares: 0.05 m^3, 0.1 m^3 and 0.2 m^3. Flow rates of air are shown in the diagram on page 62.

Sartofluor Mini cartridges are recommended when the ventilation filter has to be sterilized simultaneously with the corresponding vessel via in-line steam-sterilization. They are mounted in one of the stainless steel housings described on page 63.



Clean room monitoring
The effectiveness with which the gelatine membrane filters (page 104) can collect airborne microorganisms, and simultaneously maintain their viability, is demonstrated in the comparison with a slit sampler. The water-soluble gelatine membranes are also becoming increasingly important for the collection of viruses.



Sterilizing filtration of aqueous solutions.

How ready-to-connect units from Sartorius fulfil your requirements

1. Cost-savings
The combination of large filter area and optimized geometry of the filter supports of Minisarts and Sartolab P20 units ensure high flow rates at low pressures and optimal throughputs. Often, the filterable volume can even be doubled by using Minisart-plus or Sartolab P20 plus units with integrated prefilter. Sartobran 150 and 300 and Sartobran P Capsules contain a pleated double membrane for maximum economy.

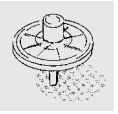
2. Reliability and Testability
All units comprise practice-proven cellulose acetate or polyethersulfone membrane filters, tested according to HIMA. Each single unit is tested for housing and membrane integrity prior to packaging, and statistically valid numbers of units from each batch are subjected to the Bacteria Challenge Test. All types can be integrity tested by the user before and after filtration.

3. No change in the solution
All materials pass the USP Plastics Test classe VI. Sartorius cellulose acetate membrane filters have proven particularly low adsorption and assure minimal loss of proteins and preservatives (see results on the right).

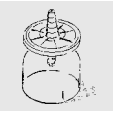
Which unit for which volume?

Filtration unit	Filter area	Typical sample volume
Minisart	5.3 cm^2	100 ml
Minisart-plus	5.3 cm^2	200 ml
Sartolab P20	20 cm^2	5 l
Sartolab P20 plus	20 cm^2 +	10 l
Sartobran 150	150 cm^2 ++	25 l
Sartobran 300	300 cm^2 ++	50 l
Sartobran P	up to 0.45 m^2 ++	200 l

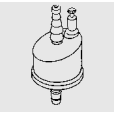
\+ = with integrated glass fibre prefilter
++ = with heterogeneous double membrane



Standard Minisart and Minisart-plus Syringe units
Page 18



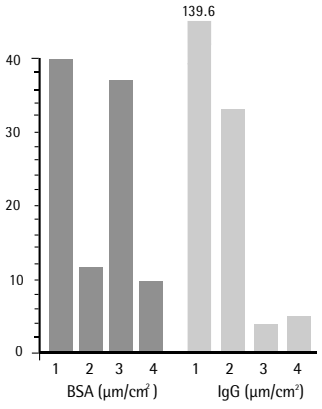
Sartolab P20 and Sartolab P20 plus units
Page 40



Sartobran 150 and 300 Capsules
Page 41

Sartobran P Capsules
Page 42

Comparison results of the adsorption of various filter materials

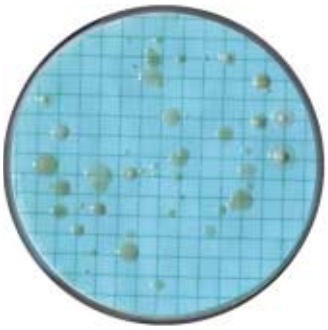


1 = Nylon
2 = SFCA
3 = PVDF
4 = PES

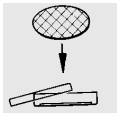
Microbiological quality control.

Colony counts
The requirements for a practical microbiological test method are that it permits quantitative and reproducible detection of trace contamination, and that it can be performed efficiently and economically under routine conditions. These requirements are optimally fulfilled by the membrane filter method.

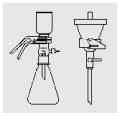
The sample is filtered through a membrane filter, which is then rinsed, placed on a culture medium and incubated. The resulting colonies are counted and related to the filtered volume.



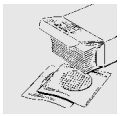
Individually packed, gridded membrane filters are manufactured specifically for this application. They are ready-for-use, quality controlled for colony growth and packed in easily opened envelopes, each clearly marked with product identification and lot number.



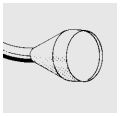
Nutrient Pad Sets
Page 90, 91



Vacuum filtration units
Page 30, 31, 32



Individually packed, gridded membrane filters
Page 88, 89



Gelatin membrane filters
Page 102, 103, 104

Nutrient Pads are a further simplification. They are culture media in dry form, sterile packed in Petri dishes, easy to stock and of consistent high quality, ready for use after simply wetting with water. Typical colonies grown on the various types are shown on page 91. The wide range of media includes types for food, beverage and pharmaceutical industries.

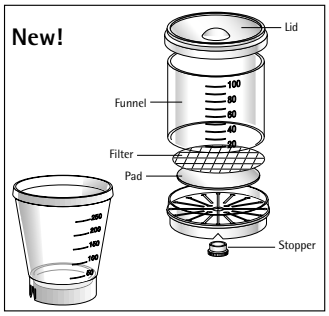
Other water testings
142 mm diameter polyamide membranes of 0.2 µm or 0.45 µm pore size are specified in a method for the collection of legionella organisms (see page 83).

A method using a Sartocon Crossflow system with a 100,000 cut-off polyethersulfone cassettes for the recovery of bacteriophages from water has shown very good results.

Airborne bacteria and viruses
Gelatin membrane filters are routinely used to quantitatively collect airborne microorganisms for clean room and isolator monitoring. Their effectiveness for the collecton of viruses has also been demonstrated. The gelatin appears to have a protective effect on the captured viruses and can be dissolved in buffer or medium for subsequent virus detection.

A recent publication describes their use for the routine monitoring of bacteriophages in the ambient air of milk processing facilities.

For quicker and simpler sample filtration



Sterile, single use Funnels and Monitors to replace stainless steel funnels of vacuum holders.

Biosart 250® Funnels
250 ml funnels (above left) which eliminate the need for time-consuming sterilization between samples. Their large inner base diameter ensures shortest filtration times.

Biosart 100® Monitors
100 ml capacity units (above right) with filters available in different pore sizes, filter colours and diameters. The completely sterile units have to be used in connection with various culture media. Lid and base form a Petri dish after the culture medium has been added.

Further information on request.

Syringe filter holders and vacuum filtration units.

Minisart® RC units with hydrophilic, solvent-resistant RC-membranes.

Ready-to-use syringe filter units for simple, rapid and reliable ultracleaning of small-volume samples for the HPLC or GC analysis.

Minisart RC4 is recommended for sample volumes of up to about 5 ml and Minisart RC25 for sample volumes of up to about 100 ml.

Minisart RC units outperform competitive hydrophilic units in terms of compatibility with aqueous solutions and solvent mixtures.

They are compatible with the following substances:

Acetone	Hexane
Acetonitrile	Isobutanol
Gasoline	Isopropanol
n-Butanol	Methanol
Cellosolve (ethyl)	Methylene-chloride
Chloroform	Methyl-ethylketone
Diethyl acetamide	Pentane
Dimethyl sulfoxide	Tetrahydro-furan
Dioxane	Toluene
Acetic acid (96%)	Trichloro-acetic
Ethanol	acid (25%)
Ethyl acetate	Trichlor-ethane
Ethylene glycol	Water
Freon TF	Xylene

Specifications for Minisart RC4, RC15 and RC25
Connectors, Female luer lock inlet. Luer slip outlet
Bubble point with water, > 2.0 bar (0.45 µm), > 3.4 bar (0.2 µm)

Flow rate for hexane at Δp = 1 bar (100 kPa),
a) Minisart RC4: 10 ml/min (0.45 µm), 3.5 ml/min (0.2 µm)
b) Minisart RC15: 280 ml/min (0.45 µm), 140 ml/min (0.2 µm)
c) Minisart RC25: 430 ml/min (0.45 µm), 230 ml/min (0.2 µm)

Flow rate for methanol at Δp = 1 bar (100 kPa),
a) Minisart RC4: 3.0 ml/min (0.45 µm), 1.5 ml/min (0.2 µm)
b) Minisart RC15: 105 ml/min (0.45 µm), 55 ml/min (0.2 µm)
c) Minisart RC25: 325 ml/min (0.45 µm), 160 ml/min (0.2 µm)

Flow rate for water at Δp = 1 bar (100 kPa),
a) Minisart RC4: 1.5 ml/min (0.45 µm), 0.5 ml/min (0.2 µm)/3 bar
b) Minisart RC15: 30 ml/min (0.45 µm), 10 ml/min (0.2 µm)
c) Minisart RC25: 100 ml/min (0.45 µm), 60 ml/min (0.2 µm)

Filter diameter, 4 mm (RC4), 15 mm (RC15), 25 mm (RC25)
Filter area, 0.07 cm^2 (RC4), 1.7 cm^2 (RC15), 4.8 cm^2 (RC25)
Filling volume, 0.17 ml (RC4), 0.2 ml (RC15), ca. 0.95 ml (RC25)

Housing burst pressure, 6 bar (600 kPa) and higher
Materials, polypropylene (housing), cellulose (membrane filter)
Max. temperature, 121°C, 30 min (autoclave)
Pore size, 0.45 µm or 0.2 µm
Hold-up volume, 5 µl (RC4), 10 µl (RC15), ca.150 µl (RC25)

Order Numbers for Minisart RC4
17821 K with 0.2 µm membrane, pack of 50
17821 Q with 0.2 µm membrane, pack of 500
17822 K with 0.45 µm membrane, pack of 50
17822 Q with 0.45 µm membrane, pack of 500

Order Numbers for Minisart RC15
17761 K with 0.2 µm membrane, pack of 50
17761 ACK with 0.2 µm membrane, pack of 50, sterile, individually packed
17761 Q with 0.2 µm membrane, pack of 500
17762 K with 0.45 µm membrane, pack of 50
17762 ACK with 0.45 µm membrane, pack of 50, sterile, individually packed
17762 Q with 0.45 µm membrane, pack of 500

Order Numbers for Minisart RC25
17764 K with 0.2 µm membrane, pack of 50
17764 ACK with 0.2 µm membrane, pack of 50, sterile, individually packed
17764 Q with 0.2 µm membrane, pack of 500
17765 K with 0.45 µm membrane, pack of 50
17765 ACK with 0.45 µm membrane, pack of 50, sterile, individually packed
17765 Q with 0.45 µm membrane, pack of 500

Minisart® SRP units with a clean and chemically inert PTFE membrane.

Ready-to-use units for simple, rapid and reliable ultracleaning of small-volume samples for the HPLC or GC analysis, which require an even more chemical resistant unit than Minisart RC, e.g. for solvents such as acetone, dimethylformamide and DMSO, or for aggressive aqueous liquids.

Minisart SRP4 is recommended for sample volumes of up to about 1 ml, Minisart SRP15 for up to about 5 ml and Minisart SRP 25 for up to 100 ml.

Specifications for Minisart SRP4, SRP15 and SRP25
Connectors, female luer lock inlet, luer slip outlet
(Minisart-SRP15 is also available with a small spike outlet)
Bubble point with isopropanol, 0.9 bar (0.45 µm) or 1.4 bar (0.2 µm)

Flow rate for ethanol at Δp = 1 bar (100 kPa),
a) Minisart SRP4: 2.0 ml/min (0.45 µm)/3 bar
b) Minisart SRP15: 45 ml/min (0.45 µm), 20 ml/min (0.2 µm)
c) Minisart SRP25: 130 ml/min (0.45 µm), 70 ml/min (0.2 µm)

Flow rate for methanol at Δp = 1 bar (100 kPa),
a) Minisart SRP4: 4.5 ml/min (0.45 µm)
b) Minisart SRP15: 150 ml/min (0.45 µm), 55 ml/min (0.2 µm)
c) Minisart SRP25: 260 ml/min (0.45 µm), 160 ml/min (0.2 µm)

Flow rate for air at Δp = 1 bar (100 kPa),
a) Minisart SRP4: 0.06 l/min (0.45 µm)
b) Minisart SRP15: 1.1 l/min (0.45 µm), 0.5 l/min (0.2 µm)
c) Minisart SRP25: 1.8 l/min (0.45 µm), 1.2 l/min (0.2 µm)

Filter diameter, 4 mm (SRP4),15 mm (SRP15), 25 mm (SRP25)
Filter area, 0.07 cm^2 (SRP4), 1.7 cm^2 (SRP15), 4.8 cm^2 (SRP25)

Housing burst pressure, 6 bar (600 kPa) and higher
Materials, polypropylene (housing), polypropylene-reinforced PTFE (membrane filter)
Max. temperature,121°C, 30 min (autoclave)
Pore size, 0.45 µm or 0.2 µm (Minisart-SRP4, only 0.45 µm)
Hold-up volume,1 µl (SRP4), 10 µl (SRP15),100 µl (SRP25)
Water penetration point, 3.0 bar (0.45 µm) or 4.0 bar (0.2 µm)

Order Numbers for Minisart SRP4
17820 K with 0.45 µm membrane, pack of 50
17820 Q with 0.45 µm membrane, pack of 500

Order Numbers for Minisart SRP15 with spike outlet
17558 K with 0.2 µm membrane, pack of 50
17558 Q with 0.2 µm membrane, pack of 500
17559 K with 0.45 µm membrane, pack of 50
17559 Q with 0.45 µm membrane, pack of 500

Order Numbers for Minisart SRP15 with luer outlet
17573 K with 0.2 µm membrane, pack of 50
17573 ACK with 0.2 µm membrane, pack of 50, sterile, individually packed
17573 Q with 0.2 µm membrane, pack of 500
17574 K with 0.45 µm membrane, pack of 50
17574 Q with 0.45 µm membrane, pack of 500

Order Numbers for Minisart SRP25
17575 K with 0.2 µm membrane, pack of 50
17575 ACK with 0.2 µm membrane, pack of 50, sterile, individually packed
17575 Q with 0.2 µm membrane, pack of 500
17576 K with 0.45 µm membrane, pack of 50
17576 Q with 0.45 µm membrane, pack of 500

Minisart® 0.2 µm syringe filter holders for rapid small volume sterilization with maximum user comfort.

Ready-to-use units, which offer high flow rates at low inlet pressures, make an correspondingly rapid sterile filtration possible. Fitted on a standard syringe, they enable a less hand-tiring sterilization of up to 100 ml of liquid. A Minisart fitted on a standard dosing syringe makes up a very convenient system for simultaneous dosing and sterilization.

The combination of a large filtration area and a optimised geometry of the filter support, which are responsible for the high flow rates, also ensures high total throughputs.

Minisart plus units are of advantage for the sterilization of difficult to filter liquids. They include a fine glass fibre prefilter on the filter membrane, a combination which is so effective that throughputs can often be doubled. Minisarts and their packaging are environmentally friendly, free of PVC!

Minisart High flow are syringe filter holders with a polyethersulfone membrane for the sterile filtration at higher flow rates and a higher filtration speed.

Specifications for 0.2 µm Minisarts and Minisart plus

Adsorption	Values determined for the cellulose acetate membrane, 0.8–3 µg/cm^2 with RSA, 8–12 µg/cm^2 with gamma globulin.
Bubble point	with water, minimum value 3.4 bar (340 kPa)
Colour coding	blue
Connectors	Female luer lock inlet, male luer lock outlet. Alternatively only for standard Minisarts male luer lock outlet
Cytotoxicity	No inhibition with MRC-5 or L-929 cells
Endotoxins	Endotoxin-output below the detection limit of the tests (0.06 EU/ml)
Filter diameter	26 mm
Filter area	5.3 cm^2
Flow rate	Typical values for water at p = 1 bar (100 kPa) 60 ml/min
Hold-up volume	0.1 ml for standard Minisarts, 0.23 ml for Minisart plus
Application	Max. recommended operational pressure, 4.5 bar (450 kPa) limits housing burst pressure, 6 bar (600 kPa) and higher Max. temperature, 50°C
Materials	Cellulose acetate membrane filters, glass fibre prefilters (only for Minisart plus), MBS polymerisate

Order Numbers for 0.2 µm Minisart

a) pack of 50, sterile, individually packed:
16534 K with luer lock outlet
17597 K with male luer lock outlet

b) pack of 500, not sterile bulk packed:
16534 Q with luer lock outlet
17597 Q with male luer slip outlet

Order Numbers for 0.2 µm Minisart plus

a) pack of 50,sterile, individually packed:
17823 K with luer lock outlet

b) pack of 500, not sterile bulk packed:
17823 Q with luer lock outlet

Order Numbers for Minisart high flow

a) 0.1 µm, pack of 50, sterile, individually packed:
16553 K with luer lock outlet

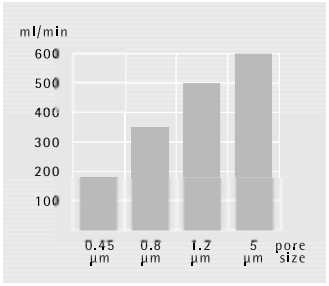
b) 0.2 µm, pack of 50, sterile, individually packed:
16532 K with luer lock outlet
16541 K with luer slip outlet

c) 0.45 µm, pack of 50, sterile, individually packed:
16533 K with luer lock outlet
16537 K with luer slip outlet

High flow rate Minisart® Syringe filters for particle removal, ultracleaning and prefiltration.

Ready-to-use filter units with 0.45 µm, 0.8 µm,1.2 µm or 5 µm pore size membrane filters. These independent filters fulfill your filtration requirements whenever volumes of up to 100 ml must be clarified or ultracleaned. They can also be used as prefilter in combination with a 0.2 µm Minisart, increasing the total filterable volume.

The high flow rates of these units result from the large filter area and the very low flow resistance of the filter support, which is demonstrated by the relative constant increase in the flow rate with increasing pore size.



These flow rates contribute to user comfort by lowering the pressure required for filtration. Minisart GF contains a glass fibre filter with a retention efficiency of 98% for 0.7 µm spherical particles. It is very useful when relatively dirty solutions are to be clarified, or as a prefilter on an 0.2 µm or 0.45 µm Minisart. Minisart plus units also contain this glass fibre filter, but as prefilter on an 0.45 µm or 1.2 µm membrane, for higher total throughputs.

Specifications for Minisarts, Minisart plus and Minisart GF

Connectors	Female luer lock inlet, male luer lock outlet (the 0.45 µm unit is also available with a male luer lock outlet)
Application limits	Max. recommended operating pressure 4.5 bar (450 kPa). Housing burst pressure 6 bar (600 kPa) and higher Max. temperature 50°C
Bubble point	Min. value with water, 2.0 bar (0.45 µm) 0.8 bar (0.8 µm), 0.7 bar (1.2 µm), 0.4 bar (5 µm), 0.5 bar (Minisart-GF)
Flow rate	Typical values for water at Δ = 1 bar (100 kPa), 160 ml/min (0.45 µm), 350 ml/min (0.8 µm), 400 ml/min (1.2 µm), 500 ml/min (5 µm), 450 ml/min (Minisart-GF)
Colour coding	yellow (0.45 µm), green (0.8 µm), red (1.2 µm), brown (5 µm), opaque (Minisart GF)
Filter diameter	26 mm
Filter area	5.3 cm^2
Materials	Cellulose acetate membrane (except Minisart GF). Glass fibre filter (Minisart GF and Minisart plus). MBS polymerisate).
Hold-up volume	0.1 ml
Cytotoxicity	Detectably no inhibitoin with MRC-5 (human lung cells)

Order Numbers for standard 0.45 µm to 5 µm Minisarts

a) pack of 50, sterile, individually packed:
17598 K 0.45 µm Minisart with male luer lock outlet
16555 K 0.45 µm Minisart with luer lock outlet
16592 K 0.8 µm Minisart with luer lock outlet
17593 K 1.2 µm Minisart with luer lock outlet
17594 K 5 µm Minisart with luer lock outlet

b) pack of 500, not sterile bulk packed:
17598 Q 0.45 µm Minisart with male luer lock outlet
16555 Q 0.45 µm Minisart with luer lock outlet
16592 Q 0.8 µm Minisart with luer lock outlet
17593 Q 1.2 µm Minisart with luer lock outlet
17594 Q 5 µm Minisart with luer lock outlet

Order Numbers for Minisart plus units

a) pack of 50, sterile, individually packed:
17829 K 0.45 µm with luer lock outlet

b) pack of 500, not sterile bulk packed:
17829 Q 0.45 µm with luer lock outlet
17825 Q 1.2 µm with luer lock outlet

Order Numbers for Minisart GF units

not sterile bulk packed:
17824 K luer lock outlet (pack of 50)
17824 Q luer lock outlet (pack of 500)

Recommended accessories see page 22

Re-usable, 13 mm Syringe Filter Holders for the ultracleaning of small volumes (up to about 10 ml).

PTFE Holder for solvents and chemicals
Made completely of PTFE, this holder is unaffected by chemicals and contains no trace elements which could be released into the liquid being filtered. It is therefore extremely well suited for particle removal from samples and reagents for analytical methods, such as NMR samples. Another benefit of this application is the low hold-up volume, the easy cleaning and the drying at a temperature of 180°C.

The construction of the holder ensures leak proof sealing without a sealing ring, and avoids twisting of the membrane filter when the top is tightened onto the base.

Specifications for the 13 mm PTFE syringe filter holder

Connectors, female luer lock inlet, luer slip outlet	
Chemical compatibility, as for PTFE	
Flow rate for water at Δp = 1 bar (100 kPa),	
a) with 0.2 µm membrane filter, ca. 10 ml/min	
b) with 0.45 µm membrane filter, 18 ml/min	
Filtration area	0.5 cm^2
Weight	13 g
Materials	PTFE top and bottom part
Max. operating pressure	5 bar (500 kPa)
Membrane filter diameter	13 mm
Sterilization	by autoclaving (max. 134°C) or by dry heat (max. 180°C)
Hold-up volume	less than 0.03 ml after overcoming the bubble point (0.3 ml before)

Order number for the 13 mm PTFE filter holder: 16574

Polycarbonate Holder for aqueous solutions
This inexpensive filter holder is made of clear, autoclavable polycarbonate and contains a silicone gasket for leak proof sealing. It can be used at pressures of up to 7 bar by simple, manual screwing together.

Filter supports in the top and bottom parts allow filtration in either direction.

Specifications for the 13 mm polycarbonate syringe filter holder

Connectors, female luer lock inlet, luer slip outlet	
Chemical compatibility, as for polycarbonate and silicone	
Flow rate for water at Δp = 1 bar (100 kPa), ca. 18 ml/min with 0.2 µm	
Membrane filter	35 ml/min with 0.45 µm membrane filter
Filtration area	0.5 cm^2
Materials	polycarbonate top and bottom part, silicone gasket 10 × 14.9 mm (replacement part no. 6980569 for a pack of 10)
Max. operating pressure	7 bar (700 kPa)
Membrane filter diameter	13 mm
Sterilization	by autoclaving at 121°C
Hold-up volume	less than 0.2 ml after overcoming the bubble point (0.3 ml before)

Order number for the 13 mm polycarbonate syringe filter holder: 16514E (pack of 12)

Recommended accessories are described on page 22.

Re-usable 25 mm Syringe Filter Holders for the ultracleaning and sterilizing filtration of volumes of up to about 100 ml.

Stainless Steel Holder for solvents and chemicals
The PTFE-coated surface on the top part is an important property of the filter holder and ensures leak proof sealing without a sealing ring. As a result, the heat-resistance is extremely good, and the chemical compatibility depends only on the inserted filter type.

The top part can easily be mounted on the bottom part using the enclosed tightening tool.

Filter supports in the top and bottom bottom parts allow filtration in either direction.

Specifications for the 25 mm Stainless Steel Holder
Connectors, female luer lock inlet, luer slip outlet
Chemical compatibility, as for stainless steel and PTFE
Flow rate for water at Δp = 1 bar (100 kPa), ca. 45 ml/min with 0.2 µm Membrane filter, 80 ml/min with 0.45 µm membrane filter

Filtration area	3 cm^2
Materials	stainless steel (1.4305) top and bottom parts. PTFE-coated sealing area in top part. Luran 368R tightening tool (replacement part no. 6980595)
Max. operating pressure	7 bar (700 kPa)
Membrane filter diameter	25 mm
Sterilization	by autoclaving (max. 134°C) or by dry heat (max. 180°C)
Hold-up volume	less than 0.1 ml after overcoming the bubble point (0.3 ml before)

Order number for the 25 mm stainless steel holder: 16214

Recommended accessories are described on page 22.

Polycarbonate Holder for aqueous solutions
This inexpensive filter holder is made of clear, autoclavable polycarbonate and offers a filtration area six times the amount of that of the 13 mm holder described on page 20. The silicone gasket enables a leak free filtration at pressures of up to 7 bar by simple, manual screwing together.

Filter supports in the top and bottom parts allow filtration in either direction.

Specifications for the 25 mm Polycarbonate syringe filter holder
Connectors, female luer lock inlet, luer slip outlet
Chemical compatibility, as for polycarbonate and silicone
Flow rate for water at Δp = 1 bar (100 kPa), ca. 70 ml/min with 0.2 µm membrane filter, 110 ml/min with 0.45 µm membrane filter

Filtration area	3 cm^2
Materials	polycarbonate top and bottom parts, silicone flat gasket 20.5 × 26.5 mm (replacement part no. 6980570 for a pack of 10)
Max. operating pressure	7 bar (700 kPa)
Membrane filter diameter	25 mm
Sterilization	by autoclaving at 121°C
Hold-up volume	less than 0.3 ml after overcoming the bubble point (0.6 ml before)

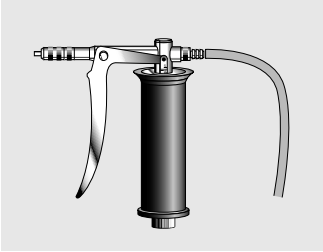
Order number for the 25 mm polycarbonate syringe filter holder: 16517E (pack of 12)

Recommended accessories are described on page 22.

Accessories for ready-to-use Minisarts and re-usable Syringe Filter Holders.

2. Descriptions of Accessories

2a. Dosing Syringe
Order number: 16685-2
The dosing syringe is perfectly suitable in connection with a filter holder for a rapid and simple filtration. The new dosing syringe in combination with our Minisart filter holders are ideal for the wetting of our nutient pad sets with sterile water.



The volume of the dosing syringe can be infinitely adjusted from 0.5 to 5.0 ml by turning the screw at the handle. The syringe is user- and maintenance-friendly. Moreover, it is very easy to handle and avoids so fatigue signs of the hand after longer use.

The dosing syringe can be disinfected by boiling out. It is not recommended to autoclave the syringes. If it is exceptionally necessary, the plastic handle has to be removed first.

2b. 3-way valve
Order number: 16639
Allows continuous filtration to be carried out, connected to a syringe and fitted on the outlet side with a filter holder.

Autoclavable (121°C).
Replacement parts:
6986070 Sealing (4×)
6986071 Pressure spring (2×)
6986072 Fixing spring (2×)
6986073 Perbunan valve (2×)

2c. Disposable syringes
Order numbers:
16644E 5 ml volume, pack of 12
16645E 10 ml volume, pack of 12
16646E 20 ml volume, pack of 12
16647E 50 ml volume, pack of 12

They can be used with the 3-way valve and the filter holders with female luer lock inlet connection. One packet contains 12 individually packed needles and 12 disposable needles.

2d. Needles
Order numbers:
01324 Stainless steel needle
01325 Disposable needle
Fit on the luer slip outlets of the syringe filter holders. Allow silicone caps or rubber bungs to be pierced and the filtrate to be induced selectively into a tube or an other vessel. The stainless steel needle is autoclavable.

2e. Minicheck BP
Order number: 17799
Pressure gauge for the determination of the bubble point of Minisart syringe filter holders with luer lock connectors. For the determination of the bubble point of Sartolab P20 or Sartolab P20 plus units, the integrity test holder 18099 is required.

Sartolab RF and BT.
New possibilities
in vacuum filtration.

Sartorius Sartolab
Vacuum filtration units.

Sartorius RF and BT units are optimised for the application in cell culture. The built-in membrane made of polyethersulfone guarantees extremely high flow rates and low protein binding, and is therefore ideal for the filtration of protein containing solutions.

The receiver flask is delivered with tube adapter and closure lid.

The Sartolab RF units are sterile complete units with drainage vessel, the Sartolab BT holders can be adapted on usual in trade, vacuum resistant bottles with a screw connector 45. Attention: Only use bottles which are licensed for subpressure methods.

Available in different sizes.

Sartorius Sartolab 150 V
Filtration units with pleated 0.2 µm PES membrane for vacuum filtration/sterile filtration of up to several litres.

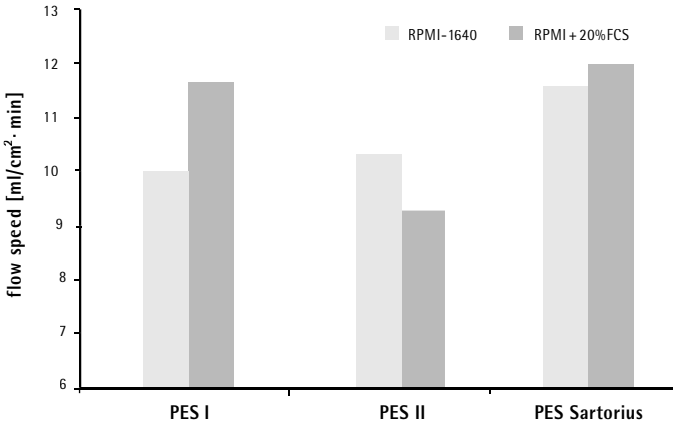
By opening the drain valve protected by a 0.2 µm PTFE membrane, the created vacuum can be interrupted for replacing the filled receiver flask through a new one. Filtration restarts, when the drain valve is getting closed. This procedure of the "continuous" filtration can be repeated several times.

The 0.2 µm pleated PES membrane with an area of 150 cm^2 guarantees a save sterile filtration of media, buffer and a lot of other solutions. They can be universally applied for bottles with a diameter of up to 58 mm.

Order numbers for Sartolab RF Vacuum filtration units
18081-E volume 150 ml, incl. receiver flask, pack of 12
18082-E volume 500 ml, incl. receiver flask, pack of 12
18083-E volume 1000 ml, incl. receiver flask, pack of 12

Order numbers for Sartolab BT Vacuum filtration units
18084-E volume 150 ml, pack of 12
18085-E volume 500 ml, pack of 12
18086-E volume 1000 ml, pack of 12

Order numbers for Sartolab 150 V
18080-M Sterile flask holders, pack of 3



The illustration shows the flow rate of the Sartorius PES membrane with RPMI cell culture media with and without additional FCS compared with polyethersulfone membranes of other manufacturers.

Polycarbonate Holders for the clarification or sterile filtration of up to about 200 ml volumes of aqueous solutions.

Type 16510 is complete with receiver flask, and can be operated with sub-pressure as well as with slight over-pressure (0.5 bar is recommended for highest standing times). It is, together with a vacuum hand pump, a practical, cost-effective system for the filtration in the laboratory or outside.

For sterile filtrations, the filter holder, comprised in the delivery, is equipped with a glass fibre filter 13400-0013 and enables a sterile venting for pressure compensation in order to avoid contamination of the sterile filtrate. The funnel fits onto the central opening of the lid and simplifies the pouring-in of liquid in the top part.

Type 16511 is like 16510, but without receiver flask. It is used on a suction flask or a vacuum manifold, e.g. Combisart, page 32.

Specifications for 47 mm polycarbonat holders

Parts supplied	type 16510, top part complete with lid, stopper for lid, plug and funnel, base part with hose nipple and filter holder, receiver flask with lid, all made of polycarbonate: silicone O-rings for lid (80×3 mm), filter support (40×5 mm) and opening (14×2 mm). Polypropylene filter support
Components	type 16511, like 16510 but without receiver flask
Chemical compatibility	as for polycarbonate, polypropylene and silicone
Flow rate	for water at 90% vacuum, 200 ml/min with 0.2 µm, 700 ml/min with 0.45 µm, 2 l/min with 0.8 µm membrane filter
Capacity	top part and receiver flask, 250 ml
Filtration area	12.5 cm^2
Max. operating pressure	vacuum or max. 2 bar (200 kPa) overpressure Suitable membrane filter diameter, 47 mm (prefilter, 37 mm)
Sterilization	by autoclaving at 121°C. The polycarbonate material withstands numerous cycles, provided aggressive cleaning agents are completely washed off and that the steam does not contain anticorrosive, anti-scaling boiler water additives.

Order Numbers for 47 mm polycarbonate holders

16510 Polycarbonate holder for 47 mm membrane filter, with 250 ml top part and receiver flask, for vacuum or pressure filtration

16511 Polycarbonate holder for 47 mm membrane filter, with 250 ml top part, for vacuum filtration

Recommended Accessories are described under 1d/1e on page 33.

Replacement Parts

16514E	13 mm filter holder (pack of 12)
6980110	Silicone O-ring, 40×5 mm
6980225	Plug (pack of 10)
6980226	Funnel
6980227	Stopper for lid
6980228	Lid
6980229	Silicone O-ring, 80×3 mm (pack of 2)
6980230	Top part, 250 ml
6980232	Filter support (pack of 2)
6980233	Base part
6980234	Hose nipple
6980235	Silicone O-ring, 14×2 mm (pack of 3)
6980236	Silicone cap (pack of 10)
6981090	Receiver flask

School-Kit for microbiological experiments.

Complete Kits
For specific applications in microbiological testing, we recommend our practical, complete kit.

The school kit for microbiological experiments is an ideal teaching aid for instruction in microbiology and environmental protection in schools and other educational institutes. The rugged aluminum case contains the entire equipment for microbiological testing. The handbook included in the case provides general instructions and detailed descriptions of methods for 7 experiments: detection of microorganisms in water, in air, in soil; the effects of antibiotics; detection of yeasts on substrates in nature; production of gas through alcoholic fermentation; and bacterial growth at different temperatures.

The School-Kit for the science subjects.
A complete equipment in a stable-lockable aluminium case for performing microbiological research. The brochure supplied with the kit contains a general introduction and a detailed description of the methods for seven experiments (detection of microorganisms in water, air and soil; effects of antibiotics; detection of yeasts in natural sources; gas formation during alcoholic fermentation; growth of bacteria at different temperatures).

The vacuum, which is necessary for the filtration, is created with help of a syringe and a 3-way valve.

Parts Supplied
Aluminium case
Stainless steel forceps (16625)
Filtration system for samples (device 16510. 3-way valve 16639. adapter 17108D. syringe 16647. glass fibre filter 13400-013S)
Filtration system for sterile water (filter holder 16517E. syringe 16647. membrane filter 11307-025N)
Inoculation loop (17109)
Culture media (nutrient broth) 14132K. Endo nutrient pad sets, 14053. Wort nutrient pad sets14058.
Standard nutrient pad sets, 14055)

Order Number
24002 School-Kit for microbiological experiments, in a lockable aluminium case

25 mm Glass Holder for the filtration of small volumes.

25 mm Glass Holder for hybridisation tests, particle testing and clarification
The two devices differ only in the filter support, the glass frit or the PTFE-coated screen support. The device with glass frit ensures uniform distribution of particles and is therefore recommended, when the retained particles on the filter surface are of interest. The device with a PTFE-coated screen support is, as it is easy to clean, more suitable, when the filtrate is required, or for radiochemical work.

The PTFE ring which holds the glass frit or the screen support allows autoclaving the devices with a filter in position, without stickage of the filter to the support, and also protects the rim of the glass frit from breakage and from potential leakage.

It has a rim around the upper edge, which simplifies the positioning of the membrane filter when inserted, and a silicone ring on the underside for a reliable seal on the filtrate side. The funnel-shaped top part simplifies filling in the sample.

Specifications
Outlet spout, 12 mm ∅
Parts and materials, borosilicate glass funnel and base.
PTFE/glass filter support (type 16306) and PTFE/stainless steel, coated with Teflon (type 16315).
Silicone O-ring, 25 × 3 mm.
Aluminium clamp.
Chemical compatibility, as for glass, PTFE and silicone.
The silicone O-ring can be replaced by a Viton O-ring (order no. 00118)

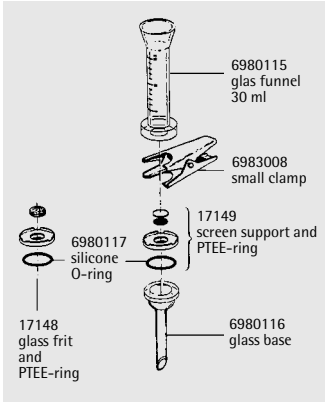
Flow rate for water at 90% vacuum, 50 ml/min with 0.2 µm, 150 ml/min with 0.45 µm, 500 ml/min with 0.8 µm membrane filter
Funnel capacity, 30 ml

Filtration area, 3 cm^2
Suitable membrane filter diameter, 25 mm (or 24 mm)
Sterilization, by autoclaving (max. 134°C) or by dry heat (max. 180°C)

Order numbers
16306 Glass device for 25 mm membrane filter, with glass frit
16315 Glass device for 25 mm membrane filter, with PTFE-coated screen support

Recommended accessories are described under 1a on page 33

Replacement parts see diagram



50 mm Glass Holder with protective PTFE ring, for particle testing or clarification and sterile filtration.

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

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

Specifications for the 50 mm glass holder

Outlet spouts	15 mm outside diameter
Parts and materials	borosilicate glass funnel and base. Anodised aluminium clamp. Silicone caoutchouc lid. PTFE/glass filter support (type 16307) and PTFE/stainless steel filter support, coated with Teflon (type 16316).
Silicone O-ring	45 × 3 mm
Chemical compatibility	as for glass, PTFE and silicone (see page 109). If required, the silicone O-ring can be replaced by a Viton O-ring (order no. 00124).
Flow rate	for water at 90% vacuum, 200 ml/min with 0.2 µm, 600 ml/min with 0.45 µm, 2.2 l/min with 0.8 µm membrane filter
Funnel capacity	250 ml
Filtration area,	12.5 cm^2
Max. operating pressure	only for subpressure
Suitable membrane filter diameter	50 mm (or 47 mm)
Sterilization	by autoclaving (121°C or 134°C) or by dry heat (max. 180°C)

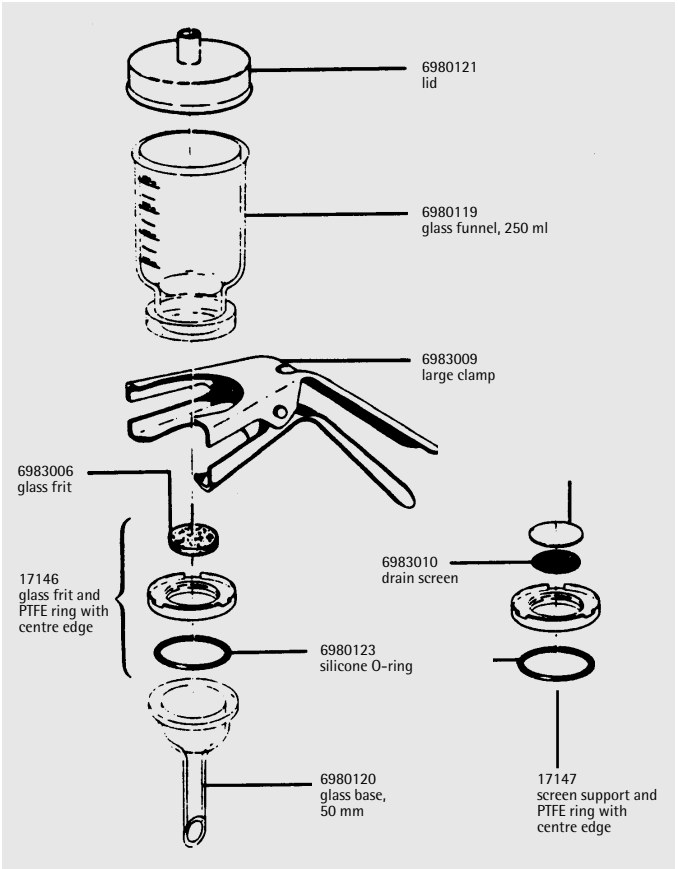
Order number for the 50 mm glass holders

16307 Glass vacuum filtration holder for 50 mm (or 47 mm) membrane filter, with glass frit filter support

16316 Glass vacuum filtration holder for 50 mm (or 47 mm) membrane filter, with PTFE-coated screen filter support

Recommended accessories are described under 1b on page 33

Replacement parts see diagram



All-glass holder for particle removal from solvents for analytical determinations.

All areas, where liquid and device can get directly in contact, are made of glass or PTFE. The device, in combination with solvent-resistant, hydrophilic RC-membranes (type 184, page 84), is therefore ideal for ultracleaning and degassing solvents and solvent mixtures for HPLC, GC and AA.

Convenience of handling is ensured by several beneficial features. A 6 mm wide non-ground rim above the ground glass neck of the suction flask prevents the filtrate from contacting grease on the ground glass surface and so avoids it becoming contaminated while being poured out of the flask.

The hose nipple connector is made of polypropylene for safe connection of vacuum hose. The filtrate outlet spout ends well below the entrance to this hose nipple.

Specifications for the all-glass holder

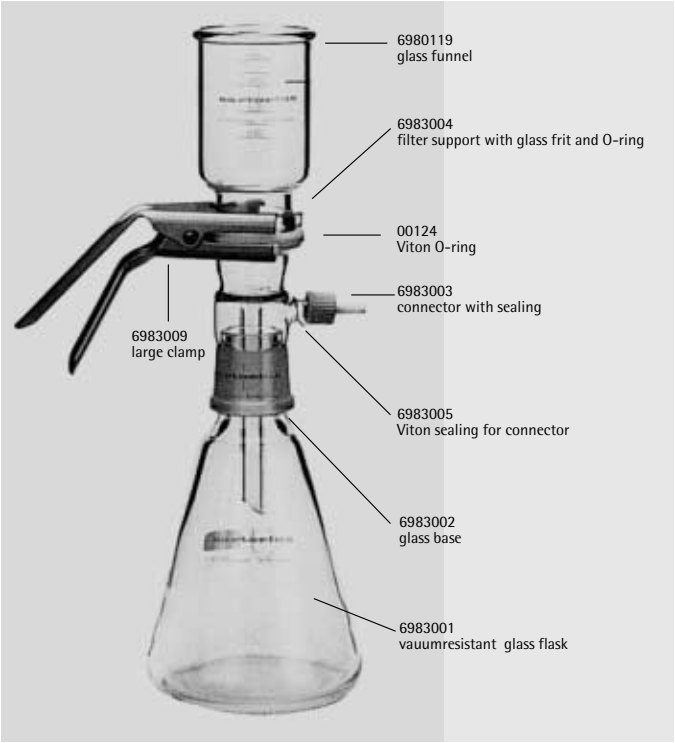
Parts and materials	borosilicate glass funnel, base and flask.
Filter support	PTFE ring holding a glass frit, with Viton O-ring(45 × 3 mm). Anodized aluminium clamp.
Chemical compatibility	as for glass and PTFE
Flow rate	for water at 90% vacuum, 200 ml/min with 0.2 µm, 600 ml/min with 0.45 µm, 2.2 l/min with 0.8 µm membrane filter
Funnel capacity	250 ml
Capacity of the filtrate flask	1 litre
Filtration area	12.5 cm^2
Max. operating pressure	only for subpressure Suitable membrane filter diameter, 50 mm (or 47 mm)
Sterilization (without connector)	by autoclaving (121°C or 134°C) or dry heat (max. 180°C)

Order number for the 50 mm glass holder

16309 All-glass vacuum filtration unit for 50 mm (or 47 mm) membrane filter, with vacuum-resistant flask, capacity 1 litre

Recommended accessories are described under 1c on page 33

Replacement parts see diagram



Stainless steel holders with vacuum control for colony counts and particle collection.

The three holder types differ only in the funnel capacity (either 40 ml, 100 ml or 500 ml). They have been designed specifically for applications in which the particles or microorganisms retained on the membrane filter surface are of interest. The stainless steel frit filter support ensures a uniform distribution of the residues.

Regarding routine examinations, a simple handling is very important. Stainless steel taps in the base part allowing turning on or off the vacuum and the special closure clamps, which simplify putting on or removing the funnels, enable this easy handling.

Specifications for the 50 mm stainless steel filter holders

Outlet spouts	10 mm outside diameter
Parts and materials	lid (16220 without), funnel, base part, filter support, clamp and tap made of stainless steel. Silicone flat gasket. Silicone lid seal
Chemical compatibility	as for stainless steel and PTFE
Flow rate	for water at 90% vacuum, 200 ml/min with 0.2 µm, 600 ml/min with 0.45 µm membrane filter
Filtration area	12.5 cm
Max. operating pressure	only for subpressure
Suitable membrane filter diameter	50 mm/47 mm
Sterilization	by autoclaving (max. 134°C), by dry heat (max. 180°C) or by flaming

Order numbers for the 50 mm stainless steel filter holders

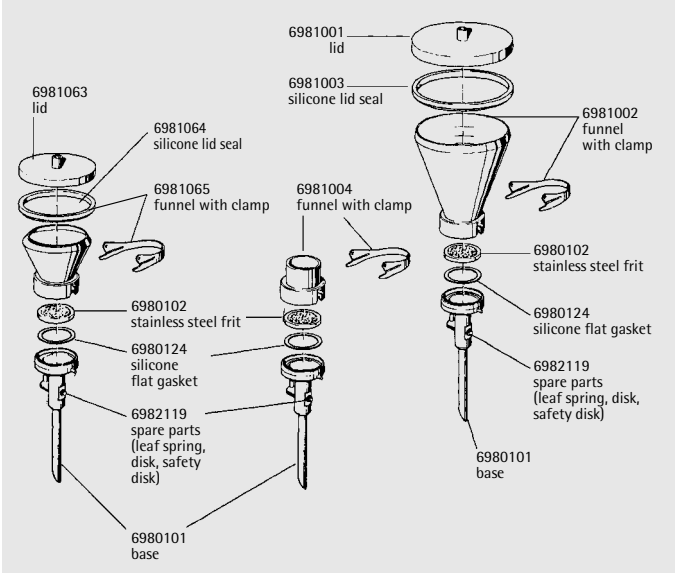
16201 Stainless steel vacuum filtration unit for 50 mm membrane filter, with 500 ml funnel capacity

16219 Stainless steel vacuum filtration unit for 50 mm membrane filter, with 100 ml funnel capacity

16220 Stainless steel vacuum filtration unit for 50 mm membrane filter, with 40 ml funnel capacity

Recommended accessories are described under 1 g on page 33

Replacement parts are shown in the diagram



CombiSart Multi-branch System.

The Sartorius CombiSart system enables you to select the optimal hardware and consumables for your needs in quality assurance. CombiSart features a modular design and field-proven standard accessories to make your choice easier.

At the heart of the CombiSart system is a stainless steel manifold designed to accommodate all types of filter holders and funnels such as:

- Ready-to-use units, including BioSart 100 Monitors and BioSart 250 Funnels
- Flamable units such as stainless steel funnels for colony counting
- Autoclavable polycarbonate and glass filter holders

If required, we can send you brochures with a detailed description of the Combisart systems and the according nutrient media for the Biosart 100 monitors in the Combisart brochure. Biosart 100 monitors and Biosart 250 funnels can be combined with stainless steel single- and multi-manifolds.

Order numbers

16842	3-branch manifold
16843	6-branch manifold
16840	Single base for stainless and disposable funnel
16835	adapter base for Biosart
16836, 16837	adapter for glass holders

BioSart® 100 Monitor, 100 ml.
For colony counting.

Order information:	Order number:
0.2 µm*, white | black	16401-47-07-ACK
0.45 µm*, white | black	16401-47-06-K 16401-47-06-ACK
0.45 µm*, green | dark green	16402-47-06-K 16402-47-06-ACK
0.45 µm*, grey | white	16403-47-06-K 16403-47-06-ACK

* Diameter = 47 mm

BioSart® 250 Funnel, 250 ml.
For colony and particle counting.

Order information:	Order number:
250 ml, pack of 50	16407-25-ALK
250 ml, pack of 50 single packed	16407-25-ACK

Nutrient Media Broth

Order information & Order number
Total Count Broth 16400-02-TC-K
Caso (acc. to USP) Broth 16400-02-CA-K
Cetrimide (acc. to USP) Broth 16400-02-CE-K
RZA Broth 16400-02-RA-K
Orange Serum Broth 16400-02-OS-K
Sabouraud Broth 16400-02-SB-K
M-Endo Broth 16400-02-EN-K
M-Green Broth 16400-02-MG-K
M-FC Broth 16400-02-MF-K
KF Streph. Broth 16400-02-KF-K

Special brochure available on request.

3- and 6-Branch Manifold Systems for routine colony and particle counting.

The manifold systems are available with 100 ml or 500 ml capacity funnels. The three or six separate filtration holders allow time-saving when mass examinations of 100 ml volulme samples have to be carried out. Due to the stainless steel taps on the manifold ports, the subpressure for each holder can be turned on and off individually.

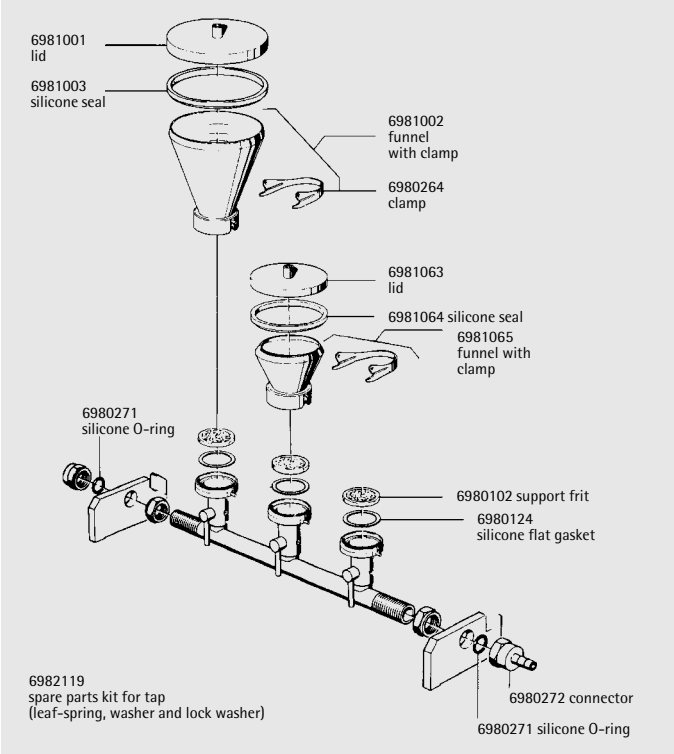
The stainless steel filter support allows a homogenous distribution of the residues on the membrane filter surface. Funnel and filter support can be disinfected by flaming.

Specifications for 3- and 6-branch manifold systems

Compatibility	Chemical resistance as for stainless steel and silicone, see page 109
Filtration area	12.5 cm^2
Flow rate	Typical values for water at 90% vacuum, 600 ml/min with 0.45 µm, 200 ml/min with 0.2 µm filter pore size
Parts and materials	Stainless steel manifold, funnel, lid, frits. Silicone flat gasket. Silicone lid seal, cap and hose connector
Membrane filter	Diameter 50 mm (or 47 mm; but for regular use of this diameter, the frits supplied have to be replaced by frits for 47 mm filter, order no. 6980103)
Max. pressure	only vacuum
Sterilization	by autoclaving (121°C or 134°C), by dry heat (180°C), with hot water or by flaming.

Order numbers for 3- and 6-branch manifold systems

16824 3-Branch Manifold System 3 × 100 ml funnels
16828 3-Branch Manifold System 3 × 500 ml funnels
16831 6-Branch Manifold System 6 × 500 ml funnels
16832 6-Branch Manifold System 6 × 100 ml funnels



Accessories for vacuum filter holders and manifold systems.

System with suction flask
Sartolab RF complete units, the all-glass filter holder type 16309 and the 47 mm polycarbonate holder type 16510 are supplied with a filtrate receiver flask and can be connected directly to the source of vacuum with a vacuum hose.

All other holders must be fitted onto either a suction flask or a manifold. Additionally to the vacuum hose and source, a suction flask and a suitable bored stopper is necessary.

The vacuum source can either be an electrically driven pump, a water jet pump or a hand operated pump. It has to be avoided that filterable liquid flows into the electric pump. This can be achieved by using a Vacusart unit with hydrophobic PTFE filter when the suction flask is filled or foamed over. When a water pump is used, this combination avoids that water flows back into a suction flask. Alternatively, the use of a Woulff's bottle makes a visual control possible. Such a bottle is also useful for a simple adjustment of vacuum with filter holders without tap for vacuum control.

Systems with manifolds
Polycarbonate holders type 16511 can be fitted directly onto 3- or 6-branch manifolds. Glass holders require adapters.

Also stainless steel holders can be mounted by using adapters and multi-manifolds. The complete manifold systems described on the previous page are far less expensive and more convenient to use.

Additionally, a vacuum hose and a source are required. When an electrical pump is used, a vacuum resistant container must be inserted between manifold and pump. The insertion of a Vacusart unit in the vacuum line between the container and the pump is recommended.

Further useful accessories
Forceps are very important for the use of the membrane filters.

A prefiltration attachment (16807) is useful when colony counts are required from particle-rich samples. It clips in between the filter support and the funnel of stainless steel holders to allow the simultaneous use of a particle-removing prefilter above the bacteria-retentive filter, so that resulting colonies are not hidden by a layer of particles.

The 47 mm glass holders for sterility testing are part of the Sartorius Sterility Testing System, a re-usable system which is described in detail in a separate brochure (SL-3008-e, free available on request).

An anaerobic container, a ballpoint pen type colony counter and a laboratory incubator complete the accessories offered.

1. Recommended Accessories for complete filtration systems:

1a. For 25 mm glass holders 16306 and 16315
System with suction flask:
16672 suction flask
17174 stopper
16623 vacuum hose
16610 Woulff's bottle
16692 or
16695 vacuum pump
Manifold system:
16826 3-branch manifold
3×16836 adapter
16623 vacuum hose
17804M Vacusart
16692 or
16695 vacuum pump
and a vacuum-resistant container.

1b. For 50 mm glass holders 16307 and16316
System with suction flask:
16672 suction flask
17175 stopper
16623 vacuum hose
16610 Woulff's bottle
16692 or
16695 vacuum pump
Manifold system:
16826 3-branch manifold
3×16837 adapter
16623 vacuum hose
17804M Vacusart
16692 or
16695 vacuum pump
and a vacuum-resistant container.

1c. For all-glass holder 16510
16623 vacuum hose
16610 Woulff's bottle
16692 or
16695 vacuum pump

1d. For 47 mm polycarbonate holder 16309
16673 hand-operated pump

1e. For 47 mm polycarbonate holder 16511
System with suction flask:
suction flask and fitting stopper with 20 mm hole (outer diameter) for the outlet spout.
16623 vacuum hose
16610 Woulff's bottle
16692 or
16695 vacuum pump
Manifold system:
16826 3-branch manifold
16623 vacuum hose
17804M Vacusart
16692 or
16695 vacuum pump
and a vacuum-resistant container.

1f. For Sartolab RF complete units
16673 hand-operated pump

1g. For stainless steel holders 16201, 16219 and 16220
System with suction flask:
16672 suction flask, 2 l
17173 bored stopper
16623 vacuum hose
17804M Vacusart
16692 or
16695 vacuum pump

1h. For manifold systems 16824, 16828, 16831 and 16832
16623 Vacuum hose
17804M Vacusart
16612 or
16615 vacuum pump
16672-1 suction flask, 5 l including stopper and adapter

Colony counter
Order number: 17649
This compact, battery operated colony counter is as simple to use as a ball-point pen, and has a 4-digit LCD-display. The counter is supplied with an additional marker refill.
Order number for replacement part: 6981540 black marker refill

Container for anaerobic incubation Order number: 16671
Stainless steel container with 11.8 cm inner diameter and 10.7 cm depth, with metal insert for convenient insertion and removal of Petri dishes.

Transparent plastic lid holds two taps (for the vacuum exhaust and for cleaning with inert gas), with 6 mm hose nipples (for 16623), vacuum gauge and sealing ring. For up to fourteen 60 mm, or up to six 90 mm Petri dishes.

Laboratory incubator (230 V, 50/60 Hz)
Order number: 18113
Compact, space saving incubator for the incubation of membrane filters on nutrient pads or other nutrient media, with room for 6 stacks of 6 Petri dishes. The swing-up cover and removable insertion plate simplify loading and unloading. The cover is opaque avoiding light penetration into the chamber.

Dimensions (W×H×D):
Inner 270×205×288 mm
Outer 340×270×431 mm
Max. load for insertion plate: 5 kg
Rated power: 0.2 kW
Temperature range: 20°C (or 5°C above room temperature) to 50°C
Temperature deviation over less than ±0.2°C (at 37°C and RT 20°C). Spacial temperature deviation less than ±0.8°C
Volume: ca.15 liters
Weight: 5.5 kg

Rubber vacuum hose (1 meter)
Order number: 16623
Thick walled rubber hose for connecting suction flasks, vacuum pumps, etc. When ordering, please state length required in metres.

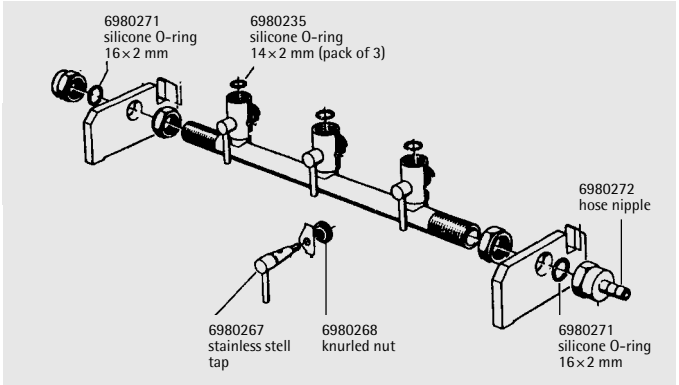
2. Description of accessories
Suction flask, 2 litre capacity
Order number: 16672
Vacuum-resistant flask made of Duran 50 glass with plastic safety hose nipple according to the German Industrial Standard no. 12476. Outer diameter of the hose nipple, 9 mm. Inner diameter of the opening, 60 mm. Stoppers are not enclosed. Order numbers for bored stoppers for the outlet spouts of the various vacuum filtration units:
17173 for 50 mm stainless steel holders
17174 for 25 mm glass holders
17175 for 50 mm glass holders

A 1 liter capacity flask is available for countries which do not have safety restrictions on glass hose nipples. Order number: 16606

Order numbers for stoppers for this flask:
17004 for stainless steel holders,
17005 for 25 mm glass holders,
17005 for 47/50 mm glass holders.

Woulff's bottle, 500 ml
Order number: 16610
Used between suction flask and vacuum source. Allows simple control of the vacuum with glass units without a separate tap and prevents furthermore the filtrate from overflowing from the suction flask.

Hand operated vacuum pump with gauge
Order number: 16673
Practical vacuum source, also outside of a laboratory. Up to 80% vacuum can be obtained. The body is of PVC. Supplied completely with gauge, vacuum release lever and a 60 cm length of clear plastic tubing.



Stainless steel manifolds
Order numbers:
16826 3-branch manifold
16829 6-branch manifold
3 or 6 polycarbonate holders of the type 16511 can be screwed directly. 50 mm glass units (16307 or 16316) can be fitted by using corresponding adapter-/stopper-combinations, order number 16837 (pack of 1).

Each manifold arm has a 3-way tap for turning on and off the vacuum, and for venting the attached filter holder separately. Autoclavable at 121°C.

Replacement parts see diagram.

Water jet pump with G3/4 female thread
Order number: 16611
Simple vacuum source. For connection to a water tap with G3/4 male thread.

Laboratory vacuum pump, 90%
Order numbers:
16692 (220 V, 50 Hz)
16695 (110 V, 60 Hz)
Compact, reliable and oil-free membrane pump with low noise level. Max. vacuum: 90% (100 mbar, 76 torr)
Max. flow rate: 20 l/min
Wattage: 80 W
Weight: 4.5 kg
Dimensions: 203×145×187 mm
Max. ambient temperature: 40°C
Replacement part: Order number 6986105 (set of one neoprene membrane, two valve springs and one neoprene head seal).

Laboratory vacuum pump, 98%
Order numbers:
16612 (220 V, 50 Hz)
16615 (110 V, 60 Hz)
Membrane pump with high performance, reliable vacuum source, oil-free.
Max. vacuum: 13 mbar (10 torr)
Max. flow rate: 26 l/min
Wattage: 120 W
Current: 1.8 Amp
Weight: 9.8 kg
Dimensions: 338×250×225 mm
Max. ambient temperature: 40°C
Replacement part: order number 6986017 (set of two neoprene membranes, four valve springs and two neoprene head seals).

Stainless steel forceps
Order number: 16625
Membrane filters should only be handled with suitable forceps in order to avoid contamination which can result from hand contact. Sartorius stainless steel forceps can be flamed and are autoclavable. They have smooth, flat tips for a careful, firm hold of the membrane filter.

Water trap, Vacusart
Order number: 17804 M
(pack of 3)
Vacusart is a ready-to-connect filtration unit, consisting of a polypropylene housing and a water-repellent, but porous PTFE membrane with a pore size of 0.45 µm. Vacusart is perfectly suitable for the protection of vacuum pumps.

Positioned between suction flask and vacuum source, it stops a sudden overflow of filtrate and avoids that filtrate drops into the pump and is sprayed into the waste air as aerosol. Connected with a water jet pump, it prevents water from flowing back into the suction flask.

On longer use, condensed water can restrict the porosity in the pores of the PTFE membrane filter, and reduces the filtration speed. The water can be remedied by blowing the Vacusart dry from the reverse direction, or the unit can be dried at 105°C in a drying cabinet overnight.

Stainless steel prefilter holder
Order number: 16807
Allows the removal of coarse, solid particles from samples for bacteriological testing before and during the actual bacteria retentive filtration. The device is clipped between funnel and base of the stainless steel vacuum filter holders.

A bacteriological prefilter (11301-050) placed on the holder retains coarse particles from the sample, which flows through the membrane filter down into the test filter of the filter support below. After completed filtration, the test filter is incubated, and the colonies can grow on the filter surface without disturbance from, or being hidden by, an excess of particles.

Can be autoclaved and flamed.
Replacement part: 6981139 support plate
Order number for cellulose nitrate membranes with 50 mm diameter and 8 µm pore size for the prefilter holder:
11301-050 ACN (pack of 100, sterile and individually packed)

Peristaltic pump
16697–––00

Specification
Maximum rotor speeds:
50 rpm and 400 rpm
Operating voltages and frequencies:
110–240 V 50/60 Hz
Speed control ratio:
20:1
Power rating:
100 VA
Operating temperature:
5°C to 40°C
Storage temperature range:
–40°C to 70°C
Weight:
5.35 kg, 12 lb
Noise:
<70 dBA at 1 m
Standards:
IEC 335-1, EN 60529 (IP31)
Machinery Directive:
98/37/EC EN 60204-1
Low Voltage Directive:
73/23/EEC EN 61010-1
EMC Directive:
89/336/EEC EN 50081-1/
EN 50082-1

Sterility test systems.

1. Sterisart NF
Sterisart is a completely closed system for the sterility testing of pharmaceutical products. It is based on the membrane filter method, however it eliminates the procedure of manipulating the filters. By this the main risk of a secondary contamination and false positive results is also eliminated.

A peristaltic pump transfers the sample into the filtration units, and after rinsing the filtration units are filled with media and used for the incubation of the filters without any contact to the environment.

2. Re-usable sterility test system
Re-usable sterility test system for the sterility testing of injection and infusion solutions. The filter holders are easy to clean, dishwatersave and autoclavable. The system can be composed according to the needs of the user, and the membrane filter can be chosen according to requirements.

Please ask for more informations! Special brochure available on request.

Technical Specifications

Pumping performance:	10–700 ml/min (dependent on the tubing)
Noise level at 1 m distance:	< 45 dB (A)
Voltage:	90–230 VAC (a. c. voltage)
Tolerance range acc. to VDE:	–15/+10%
Frequency:	47–63 Hz
Power consumption:	100 W
Fuse:	T 1,6 A
Ambient temperature:	+10°C – +40°C
Protection class:	IP 20
Cooling:	Self-convection and fan
Dimensions:	420×220×120 (W×H×D)
Weight:	approx. 11 kg

Ordering Information

Order No.	Description
16413	Sterisart Universal-pump Additional accessories are available on request, such as a pump cover for Millipore sterility test units, order number 1ZG 0004.

Recommended disposable sterility test units for use with pump.

Order No.	Description
16466 ACD	Sterisart®NF alpha, dual-needle metal spike for closed containers (box of 10, individually sterilized with ETO; single-packed)
16467 ACD	Sterisart®NF alpha, 6-cm metal needle for open containers (box of 10, individually sterilized with ETO; single-packed)
16466 GBD	Sterisart®NF gamma, dual-needle metal spike for closed containers (box of 10, individually sterilized, double-packed, optimal for use in isolators)
16467 GBD	Sterisart®NF gamma, 6-cm metal needle for open containers (box of 10, individually sterilized, double-packed, optimal for use in isolators)
Further units on request:	16464ACD, 16464GBD

Specifications of the Filter Holders

Material:	Glass cylinder; polypropylene base and sealing plug; anodized aluminum closing cap
Sealing:	Silicone gasket, 36/47 mm (6980573) Silicone O-ring, 40.5×3.5 mm (6980574)
Filter diameter:	47 mm
Filtration area:	12.5 cm^2
Capacity:	16522: 85 ml (60 ml up to the mark for anaerobic incubation at a filling level of 70 mm) 16523: 130 ml (56 ml up to the mark for aerobic incubation at a level of 60 mm, 110 ml up to the mark at the 115-mm level)
Operating pressure:	vacuum only
Sterilization:	Autoclaving at 121°C

Order No.	Description
16522	filter holder with 85 ml capacity
16523	filter holder with 130 ml capacity
16826	stainless steel manifold
16696	peristaltic pump

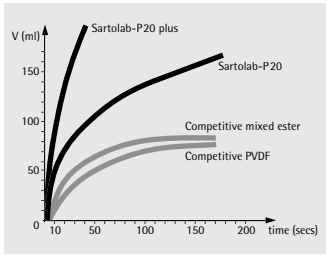
Filtration units and devices for the pressure filtration of liquids.

Sartolab® P20 and Sartolab® P20plus
for reliable sterile filtration of tissue culture solutions.

Ready-to-use units which, attached to a membrane pump or tube pump, quickly and reliably sterilize 100 ml to 5 litre of media and aqueous solutions.

The combination of a large filtration area (20 cm^2) and an automatic de-aeration ensures high flow rates and optimal total throughputs. Any trapped air vents through a water-repellent PTFE membrane, ensuring that the whole filter surface is utilized during filtration.

Sartolab P20 units have an extraordinarily favourable price-performance ratio. Often, the total filterable volume can even be doubled due to an integrated binder-free glass fibre prefilter.



Top part: results with contaminated medium (DMEM + 10% FCS), at 1 bar differential pressure.

Specifications for Sartolab P20 units

Connectors	inlet, luer lock inner cone or 6–12 mm stepped hose nipple. Outlet, 6–12 mm stepped hose nipple
Biosafety	pass the USP Plastics-Class VI-Test
Bubble point	with water, minimum value 3.2 bar (320 kPa)
Flow rate	for water 250 ml/min at Δp = 1 bar (100 kPa)
Filtration area	20 cm^2
Filling volume	6 ml
Housing burst pressure	> 5 bar (500 kPa)
Materials	cellulose acetate membrane filter (0.2 µm). PTFE-Luftfilter. Polycarbonate housing
Max. recommended inlet pressure	3 bar (300 kPa)
Protein adsorption	less than 10 µg γ-Globulin/cm^2
Hold-up volume	0.3 ml after (1.3 ml before) bubble point
Toxicity	non-toxic as confirmed with L929 fibrolast cells of mice and with MRC-5 lung cells of human embryonic origin
Accessories:	integrity holder 18099

Specifications for Sartolab P20plus units

As for P20, except:	
Filling volume	5.5 ml
Materials	supplemented with a binder-free glass fibre prefilter
Protein adsorption	varies due to the prefilter
Hold-up volume	0.9 ml after (1.8 ml before) bubble point

Order numbers for Sartolab P20 units

18052 D	with hose nipple inlet connection, pack of 10
18053 D	with luer lock inlet connection, pack of 10

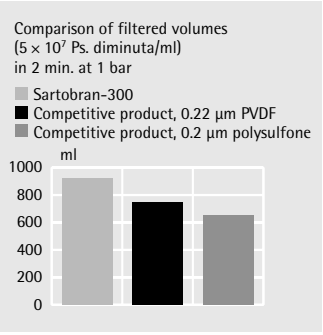
Order numbers for Sartolab P20plus units

18056 D	with hose nipple inlet connection, pack of 10
18058 D	with luer lock inlet connection, pack of 10

Recommended accessories are described under 1a on page 53

Sartobran® 150 and Sartobran® 300 Capsules. Optimum convenience for up to 50 litres. Cost-saving scale-up to larger volumes.

Newly developed, ready-to-use pressure filtration units offering maximum convenience for the sterile filtration of 0.1 to 50 litres of buffers, infusion solutions, tissue culture solutions, sera and other solutions containing proteins. No more problems with air bubbles in the liquid. A hydrophobic PTFE membrane validated for sterile air filtration allows an effective air bubble collection at the highest point upstream.



At the beginning of the filtration the threaded closure can be opened, so that air bubbles can vent away and full use of the complete filter area is guaranteed.

During this venting, the PTFE membrane prevents liquid from emerging, so protecting the filtrate from non-sterile drops, and the environment and user from possible contamination. For the subsequent integrity test, the outlet spout has to be closed with the closure.

Sartobran 150 and Sartobran 300 filter capsules contain the same heterogeneous surfactant-free cellulose acetate double membrane with low adsorption as used in larger Sartobran capsules and Sartobran cartridges. They demonstrate the same superior high flow rates and large throughputs per filtration area. Furthermore, a scale-up to the larger is only a matter of simple multiplications, allowing you to reduce validation costs.

Specifications for Sartobran 150 and Sartobran 300 capsules

Connectors	Sartobran 300: hose nipple inlet and outlet (6–12 mm) Sartobran 150: stepped hose nipple inlet and outlet (6–12 mm) or 1/2" triclamp
Biosafety	pass the USP Plastics-Class VI-Test
Bubble point	with water, minimum value 3.2 bar (320 kPa)
Chemical compatibility	for aqueous solutions of ph 4–8 as well as most alcohols and hydrocarbons
Filtration area	150 cm^2 and 300 cm^2
Materials	Cellulose acetate membrane filter (0.45 µm or 0.2 µm pore size). PTFE air filter (0.2 µm). Polypropylene housing and filter support. Polycarbonate filling bell
Max. differential pressure	4 bar (400 kPa) at 20°C, 2 bar (200 kPa) at 80°C
Sterilization	Supplied steam sterilized. Can be re-sterilized by autoclaving at 121°C
Cytotoxicity	Non-toxic as confirmed with L-929 fibrolast cells of mice and with MRC-5 lung cells of human, embryonic origin.

Sartobran 300

Sartobran 150 (type SS)

Order numbers for Sartobran 150 capsules
Sterile, individually packed:

5231307H4 OO B	Hose nipple inlet and outlet, pack of 5
5231307H4 SS B	1/2" triclamp inlet and outlet, pack of 5
5231307H4 SO B	1/2" triclamp inlet, hose nipple outlet, pack of 5

Order numbers for Sartobran 300 capsules
Sterile, individually packed:

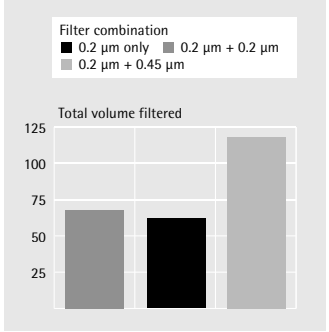
5231307H5 OO V	Hose nipple inlet and outlet, pack of 2
5231307H5 OO B	Hose nipple inlet and outlet, pack of 5

Recommended accessories are described under 1b on page 53

Sartobran P® Filter elements for the filtration of protein containing solutions.

Sartobran P capsules are designed for maximum convenience and performance. They are complete filter units, ready to connect and to use needing no preceding cleaning. Although intended for single use, they can be autoclaved several times and are therefore reusable if the application allows. The membranes are reinforced to increase their mechanical strength, for guaranteeing greatest reliability during filtration and sterilization. Just as in the smaller Sartobran-300 capsules, the pleating of the membranes allows large filter areas to be sealed in small, handy units.

The polypropylene housing contains two membrane filters. The first, coarser membrane acts as prefilter, relieving the next finer membrane,which guarantees a reliable retain according to pore size. This fractionated retention of particles and microorganisms has a very favourable effect on the total throughput, as shown below. A solution of relatively high colloid content was filtered.



Specifications for Sartobran P filter units

Biosafety	All materials pass the USP Plastics-Class VI-Tests.
Chemical Compatibility	with aqueous solutions of pH 4–8 and with most alcohols and hydrocarbons (see page 111)
Filtration area	0.05 m^2, 0.1 m^2, 0.2 m^2 or 0.45 m^2
Integrity test data	All Sartobran P Capsules are integrity tested. Details on minimal bubble points and maximal diffusional values are given in the "directions for use" supplied with them.
Materials	Double layer cellulose acetate membrane, fleece-reinforced. Polypropylene housing and support
Max. differential pressure	4 bar at 20°C, 2 bar at 80°C
Sterilization	By autoclaving at 121°C, 30 min.
Cytotoxicity	All materials are non-toxic, as determined with L-929-cells and with MRC-5-cells.

Type 00 (hose nipple inlet and outlet)

Type SS (Sanitary flange inlet and outlet)

Type SO (Sanitary flange inlet and hose nipple outlet)

Type RO (G3/8 male thread inlet and hose nipple outlet)

Order numbers for Sartobran P filter units

1. With 0.2 µm final filter (and 0.45 µm prefilter):

a) Type 00 with hose nipple inlet and outlet:

5231307H7-00-B	0.05 m^2 filter area (pack of 5)
5231307H8-00-B	0.1 m^2 filter area (pack of 5)
5231307H9-00-A	0.2 m^2 filter area (pack of 4)

b) Type SS with Sanitary flange inlet and outlet:

5231307H7-SS-B	0.05 m^2 filter area (pack of 5)
5231307H8-SS-B	0.1 m^2 filter area (pack of 5)
5231307H9-SS-A	0.2 m^2 filter area (pack of 4)

c) Type SO with Sanitary flange inlet and hose nipple outlet:

5231307H7-SO-B	0.05 m^2 filter area (pack of 5)
5231307H8-SO-B	0.1 m^2 filter area (pack of 5)
5231307H9-SO-A	0.2 m^2 filter area (pack of 4)

d) Type RO G3/8 male thread inlet/hose nipple outlet:

5231307H8-RO-B	0.1 m^2 filter area (pack of 5)
5231307H9-RO-A	0.2 m^2 filter area (pack of 4)

2. With 0.45 µm final filter (and 0.65 µm prefilter):

a) Type 00 with hose nipple inlet and outlet:

5231306D7-00-B	0.05 m^2 filter area (pack of 5)
5231306D8-00-B	0.1 m^2 filter area (pack of 5)
5231306D9-00-A	0.2 m^2 filter area (pack of 4)

b) Type SS Sanitary flange inlet and outlet:

5231306D7-SS-B	0.05 m^2 filter area (pack of 5)
5231306D8-SS-B	0.1 m^2 filter area (pack of 5)
5231306D9-SS-A	0.2 m^2 filter area (pack of 4)

c) Type SO with Sanitary flange and hose nipple outlet:

5231306D7-SO-B	0,05 m^2 filter area (pack of 5)
5231306D8-SO-B	0,1 m^2 filter area (pack of 5)
5231306D9-SO-A	0,2 m^2 filter area (pack of 4)

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

area pore size:	0.05 m^2	0.1 m^2	0.2 m^2
0.2 µm	5231507H7B	5231507H8B	5231507H9B

Capsules for the particle removing filtration or prefiltration of 100 litres and more.

Each of these ready-to-connect units contains a multi-step combination of filters for effective and economical particle removal. These filters are either used alone or as a prefilter in combination with a Sartobran P or Sartofluor capsule. There is a choice of four different types, differing only in the filters they contain. All other parts are the same and made of polypropylene.

1. Sartopure PP2 Capsules
Depth-type filters containing progressively finer polypropylene fleeces for the retention of particles by fractionated depth filtration. Six retention efficiencies of 20, 8, 5, 3,1.2 and 0.65 µm. Major applications: particle removing filtration out of deionized water, pharmaceutical solutions, reagents, chemicals, acids, solvents, air and other gases.

2. Sartopure GF2 Capsules
These contain progressively finer glass fibre and polypropylene fleeces for the retention of particles and some colloids by the combination of fractionated depth filtration and adsorption. Three retention efficiencies of 3, 1.2 and 0.65 µm.
Major applications: prefiltration of biological liquids of relatively high colloid content (such as sera), particle removal out of deionized water and weakly aggressive chemicals.

3. Sartoclean CA Capsules
Available with 3.0 on 0.8 µm and 0.8 on 0.65 µm cellulose acetate double membrane for the retention of particles and larger microorganisms by fractionated membrane filtration, and as single layer capsules with a pore size of 0.2 and 0.45 µm.
Major application: prefiltration in combination with a subsequent Sartobran P capsule for higher filterable volumes in the sterile filtration of serum with minimal adsorption.

4. Sartoclean GF Capsules
Two types, like Sartoclean CA capsules, but additionally with a glass fibre prefilter for the retention of particles, larger microorganisms and colloids, by a combination of depth filtration and fractionated membrane filtration.
Major applications: prefiltration of biological liquids with relatively high colloid content. Clarification of turbid solutions.


See 1a, 2, 3a, 4a.


See 1b, 3b, 4b.


See 1c.


See 1e.

Specifications for Sartopure PP2 and Sartoclean Capsules

Biosafety — All materials pass the USP Plastics-Class VI-Test.

Filter area — 0.03, 0.05, 0.1, 0.2 or 0.3 m^2, as listed under order numbers.

Order numbers for Sartopure PP2 and Sartoclean Capsules*

1. Sartopure PP2 depth filter capsules:
1a. with 10 mm hose nipple inlet and outlet:
5591305P7-00-B 0.65 µm, 0.05 m^2 (pack of 5)
5591305P8-00-B 0.65 µm, 0.1 m^2 (pack of 5)
5591305P9-00-A 0.65 µm, 0.2 m^2 (pack of 4)
5591303P7-00-B 1.2 µm, 0.05 m^2 (pack of 5)
5591303P8-00-B 1.2 µm, 0.1 m^2 (pack of 5)
5591303P9-00-A 1.2 µm, 0.2 m^2 (pack of 4)
5591302P9-00-A 3 µm, 0.2 m^2 (pack of 4)
5591342P9-00-A 5 µm, 0.2 m^2 (pack of 4)
1b. with Sanitary flange inlet and outlet:
5591305P8-SS-B 0.65 µm, 0.1 m^2 (pack of 5)
5591303P9-SS-A 1.2 µm, 0.2 m^2 (pack of 4)
1c. with Sanitary flange inlet and hose nipple outlet:
5591303P8-S0-B 1.2 µm, 0.1 m^2 (pack of 5)
1d. with 1/4" male NPT inlet and outlet:
5591301P7-NN-B 8 µm, 0.5 m^2 (pack of 5)
1e. with G3/8 male thread inlet and outlet:
5591302P8-RR-B 3 µm, 0.1 m^2 (pack of 5)

2. Sartopure GF2 depth filter capsules with 10 mm hose nipple inlet and outlet:
5571305P9-00-A 0.65 µm, 0.2 m^2 (pack of 4)
5571303P9-00-A 1.2 µm, 0.2 m^2 (pack of 4)

3. Sartoclean CA membrane filter capsules
3a. with 10 mm hose nipple inlet and outlet:
5621307A9-00-A 0.2 µm, 0.3 m^2 (pack of 4)
5621306A9-00-A 0.45 µm, 0.3 m^2 (pack of 4)
5621305G9-00-A 0.8 | 0.65 µm, 0.2 m^2 (pack of 4)
5621304E9-00-A 3.0 | 0.8 µm, 0.2 m^2 (pack of 4)
3b. with Sanitary flange inlet and outlet:
5621307A9-SS-A 0.2 µm, 0.3 m^2 (pack of 4)
5621306A9-SS-A 0.45 µm, 0.3 m^2 (pack of 4)
5621305G9-SS-A 0.8 | 0.65 µm, 0.2 m^2 (pack of 4)
5621304E9-SS-A 3.0 | 0.8 µm, 0.2 m^2 (pack of 4)

4. Sartoclean GF Membranfilter capsules
4a. with 10 mm hose nipple inlet and outlet:
5601305G9-00-A 0.8 | 0.65 µm, 0.2 m^2 (pack of 4)
5601304E9-00-A 3.0 | 0.8 µm, 0.2 m^2 (pack of 4)
4b. with 10 mm Sanitary flange inlet and outlet:
5601305G9-SS-A 0.8 | 0.65 µm, 0.2 m^2 (pack of 4)
5601304E9-SS-A 3.0 | 0.8 µm, 0.2 m^2 (pack of 4)

* Further information on Mini Cartridges and Capsules in the brochure S--0024-d | S--0024-e.

Easy to handle, ready to connect complete units for the wash water filtration in hospitals.

It is a well-known fact that many infections occuring in hospitals are caused by tap water used for the patients' personal hygiene (e.g. washing, showering) or to clean instruments (e.g. rinsing of endoscopes). For hospital areas where high standards of hygiene are required, sterilizing filtration of drinking and service water at the point of use is recommended.

The successful use of Sartorius Capsules in actual day-to-day use is well documented by reports of hygiene specialists. The capsules are re-usable complete units without expensive stainless steel housings. The compact form of the units with smooth external surfaces meet the hygiene requirements. They are light in weight and therefore very user convenient, as the snap-on connectors enable an easy and rapid installation on taps or directly in front of shower heads. The double-layered membranes are validated for sterilizing filtration, and have bacteria retention ratings that exceed standard requirements to ensure a high margin of safety.

Biosafety	All components pass the USP Plastics–Class VI-Test.
Bubble point	With water, min. value 3.2 bar (320 kPa)
Flow rate	For water at Δp = 3 bar (300 kPa), ca. 12 l/min
Final pressure	Max. Δp = 4 bar (400 kPa) at 20°C, 2 bar (200 kPa) at 80°C
Filtration area	0.1 m^2 (size 8) | 0.05 m^2 (size 7)
Materials	Cellulose acetate membrane filter (double-layered, 0.45 µm on 0.2 µm pore size), polypropylene support and housing
Sterilization	By autoclaving (121°C, 1 bar, 30 min or 134°C, 2 bar, 15 min)

Order numbers for wash water capsules
5 capsules in a pack, sterile, individually packed:

5231307H8-PQ-B	inlet: 6mm quick connect coupling; outlet: integrated PP-showerhead
5231307H8-PO-B	inlet: 6mm quick connect coupling; outlet: hose barb
5231307H8-VQ-B	inlet: 6mm quick connect coupling; outlet: integrated PP-showerhead
5231307H8-VO-B	inlet: 6mm quick connect coupling; outlet: hose barb
5231307H8-VZ-B	inlet: 6mm quick connect coupling; outlet: G1/2 male thread for installation of a separate autoclavable showerhead
5231307H7-PQ-B	inlet: 6mm quick connect coupling; outlet: integrated PP-showerhead
5231307H7-PO-B	inlet: 6mm quick connect coupling; outlet: hose barb
5231307H7-VQ-B	inlet: 6mm quick connect coupling; outlet: integrated PP-showerhead
5231307H7-VO-B	inlet: 6mm quick connect coupling; outlet: hose barb
5231307H7-VZ-B	inlet: 6mm quick connect coupling; outlet: G1/2 male thread for installation of a separate autoclavable showerhead

Accessories

Couplings	17712 – 8 mm quick-connect coupling without water stop 17713 – 8 mm quick-connect coupling with water stop
Separate showerhead	17771 – autoclavable showerhead G ½ female thread
Adapters to attach the quick-connect couplings to taps or fittings of different thread sizes	17747 – G 3/8-female thread 17748 – G ½-female thread 17749 – M 22 x 1-female thread 17750 – G 1-female thread 17766 – M 24 x 1 male thread
Integrity testing	16296--05 – fully automated integrity test unit Sartocheck-Junior 17751 – Adapter Sartocheck|8 mm quick-connect coupling

Low-cost polycarbonate holder for the filtration of litre volumes of aqueous solutions.

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

The holder distinguishes itself by an excellent resistance to pressure, achieving density by means of simple hand-tightening. The transparent top part allows the visual control of the correct seating of the O-ring.

The hose nipples can be replaced by luer connectors to use it as a large area syringe filter holder.

Specifications for the 50 mm polycarbonate filter holder

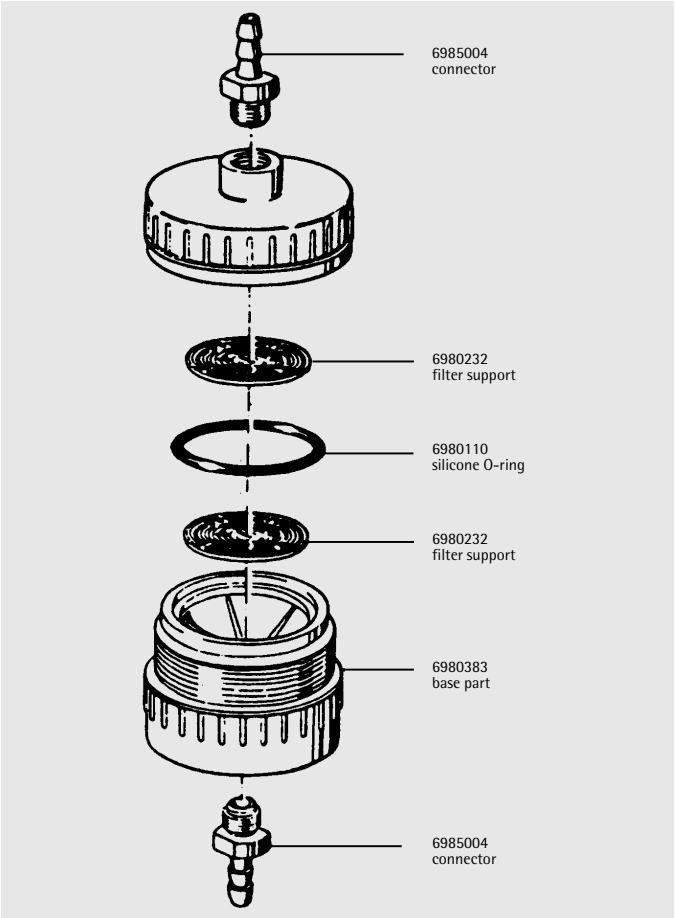
Chemical compatibility	as for polycarbonate, polypropylene and silicone
Flow rate	for water at Δp = 1 bar (100 kPa), 150 ml/min with 0.2 µm, 320 ml/min with 0.45 µm pore size
Filtration area	12.5 cm^2
Weight	83 g
Threads for connectors	M 12×1 female thread
Materials	polycarbonate top part, base part and hose nipple. Polypropylene filter support. Silicone O-ring (40×5 mm)
Max. operating pressure	7 bar (700 kPa)
Suitable membrane filter diameter	50 mm (prefilter, 40 mm)
Sterilization	by autoclaving at 121°C (the material withstands repeated cycles, provided aggressive cleaning agents are completely washed off and that the boiler water does not contain anti-corrosive or anti-scaling additives)

Order number for the 50 mm polycarbonate filter holder

16508B	Polycarbonate in-line pressure filter holder, for 50 mm membrane filter (pack of 5)

Recommended accessories are described under 1d on page 53

Replacement parts are shown in the diagram



Chemical-resistant PTFE holders for the filtration of aggressive liquids.

47 mm holder with 200 ml capacity

The holder does not release trace elements into the filtrate and is resistant to almost all chemicals. The Viton O-ring in the top part allows easy hand tightening, but can be replaced by a PTFE O-ring, order no.17039). The 6 mm outlet nipple is an integral part of the base, the 10 mm inlet hose nipple can be replaced by a G3/8 connector 17051.

Specifications for the 47 mm, 200 ml PTFE filter holder

Chemical compatibility	as for PTFE and Viton
Flow rate	for water at Δp = 1 bar (100 kPa), 170 ml/min with 0.2 µm, 500 ml/min with 0.45 µm, 1.4 l/min with 0.8 µm pore size
Filtration area	12.5 cm^2
Thread for inlet connector	M 14×1.5 male thread
Materials	top part, barrel, base part, corrugated iron, hose nipples and filter support with 40×3.5 mm PTFE O-ring. Aluminium locking rings. 39×3.5 mm Viton O-ring (top part)
Max. operating pressure	5 bar (500 kPa)
Suitable membrane filter diameter	47 mm
Sterilization	by autoclaving (max 134°C) or by dry heat (180°C)

Order number for the 47 mm, 200 ml PTFE filter holder

16579	PTFE pressure filter holder, 47 mm, with 200 ml capacity.

Replacement parts

6985000	PTFE O-ring	6985002	connector
6985001	filter support	6985011	Viton O-ring

142 mm in-line PTFE holder

This filter holder is made completely of PTFE. It is clamped between the two metal plates of the holding frame. An alternative inlet connector for the 13 mm hose nipple is the G3/8 connector (order no. 17105).

Specifications for the 142 mm PTFE pressure filter holder

Chemical compatibility	as for PTFE
Flow rate	with 0.2 µm membrane filter at Δp = 0.5 bar (50 kPa), 1 l/min for water, 1.6 l/min for ethanol
Filtration area	130 cm^2
Weight	6 kg
Materials	top part, base, back pressure screen, filter support with 131×4 mm O-ring, vent valve and PTFE hose nipples. Chromium plated holding frame plates. Aluminium legs
Max. operating pressure	5 bar (500 kPa)
Suitable membrane filter diameter	142 mm (prefilter, 130 mm)
Sterilization	by autoclaving (max 134°C) or by dry heat (180°C)

Order number for the 142 mm PTFE pressure filter holder

16540	In-line 142 mm PTFE pressure filter holder

Replacement parts

6980700	back pressure screen	6980705	PTFE O-ring
		6980706	connector
6980701	filter support	6980712	screw for clamp
6980703	base part	6980713	aluminium legs
6980704	vent valve	6985010	clamp

Stainless steel holder with 200 ml capacity, for the filtration of up to 5 litre volumes.

A practical holder for a lot of laboratory filtrations. It can be attached to a tripod with the help of a steel rod which can be screwed in. The hose nipple is screwed into the side of the top part in order to leave room for a large filling opening. This simplifies the pouring-in of the sample and the sample can be refilled without removing the tube connection to the pressure source. Leak-proof sealing is achieved by hand-tightening of the closing ring.

For the filtration of small volumes (up to about 200 ml soil samples or viscous liquids, such as oils), the holder is connected directly to a pressure source. For the filtration of up to 5 litre volumes of relatively easily filterable liquids (e.g. buffer solutions, solutions for cell counters and tissue culture solutions), it is used in combination with a pressure tank.

Specifications for the 47 mm, 200 ml stainless steel pressure holder

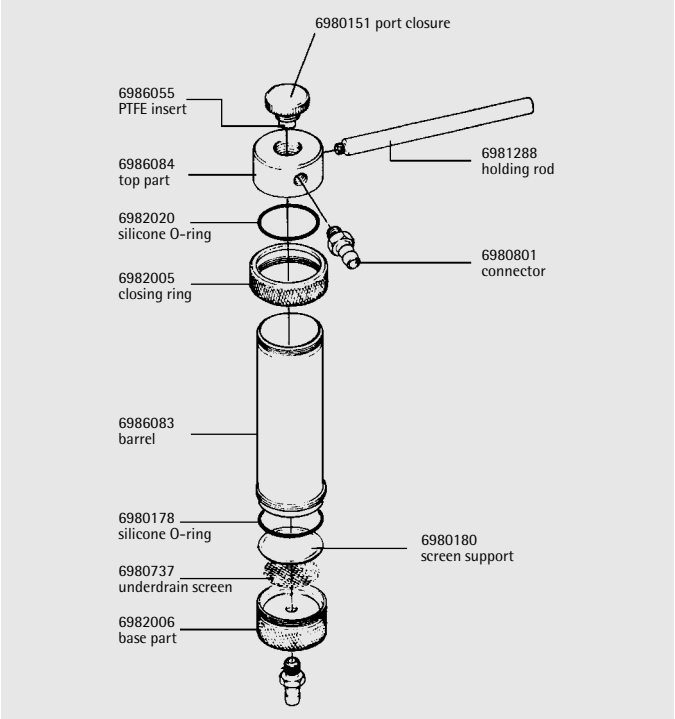
Chemical compatibility	as for stainless steel, PTFE and silicone. If required, the silicone O-ring in the filter support can be replaced by a Viton O-ring 00179 or a PTFE O-ring 17038 (reduces the max. operating pressure to 4 bar!); the silicone O-ring in the top part can be replaced by a Viton O-ring 17145
Flow rate	for water at Δp = 1 bar (100 kPa), 200 ml/min with 0.2 µm, 600 ml/min with 0.45 µm, 1.3 l/min with 0.8 µm pore size
Filtration area	13 cm^2
Weight	960 g
Threads for the connectors	M 12×1 female threads
Materials	top part, barrel, base part, corrugated iron, closing ring, closure cap, back pressure screen and stainless steel hose nipples 1.4401 (AISI 316). PTFE-coated stainless steel filter support. Silicone O-rings, 41×2 mm (top part) and 42×3 mm (filter support). PTFE-sealing (cap)
Max. operating pressure	10 bar (1,000 kPa)
Suitable membrane filter diameter	47 mm (prefilter, 42 mm)
Sterilization	by autoclaving (max 134°C) or by dry heat (180°C)

Order number for the 47 mm, 200 ml stainless steel pressure holder

16249	Stainless steel pressure holder for 47 mm membrane filter, with 200 ml capacity.

Recommended accessories are described under 1e on page 53

Replacement parts are shown in the diagram



142 mm stainless steel holder for the filtration of up to about 50 litre volumes.

This holder is very often used in laboratories for particle removal and for sterile filtration of several litre volumes. It has a stable construction and is easy to operate. The large filtration area of 130 cm^2 ensures high flow rate for the total filter volume. The supplied unscrewable hose nipples can be replaced by G3/8 connectors, if systems with particularly practical handling is required.

The holder is designed for effective sterilization by autoclaving. The arrangement of the air venting valve in the top plate and the test valve in the base plate ensures the necessary vapour penetration. The back pressure screen has a smooth surface in order to avoid damages of the membrane filters, also when a glass fibre prefilter is used.

The swing-out locking clamps ensure a firm sealing with simple hand-tightening.

Specifications for the 142 mm holder with hose nipples

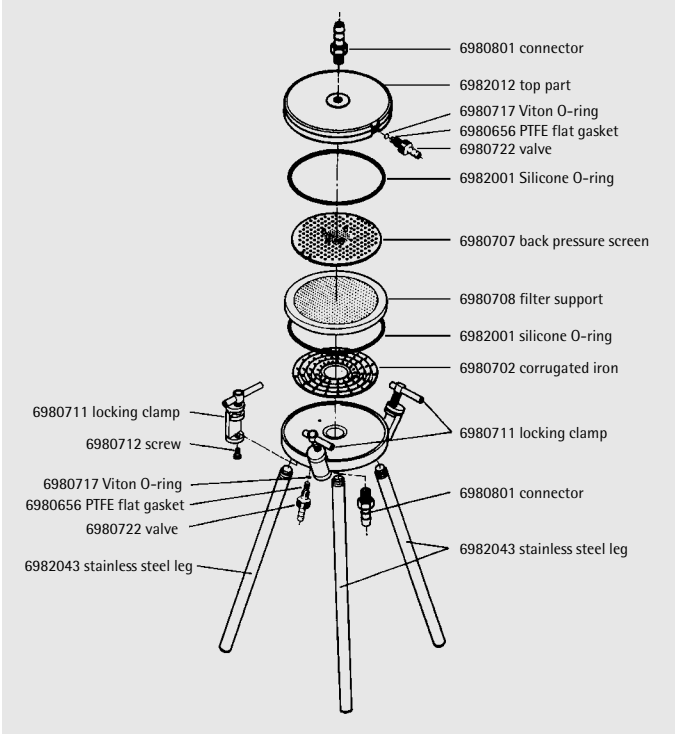
Chemical compatibility	as for stainless steel, PTFE, silicone and Viton. If required, the silicone O-rings can be replaced by EPDM O-rings (order no. 6982071), Viton O-rings (6982070) or PTFE O-rings (6982072, reduce the max. operating pressure to 4 bar!), and the Viton valve O-rings by EPDM O-rings (6985184) or silicone O-rings (6985183).
Flow rate	for water at Δp = 1 bar (100 kPa), 2 l/min with 0.2 µm, 4,5 l/min with 0.45 µm, 11 l/min with 0.8 µm pore size
Filtration area	130 cm^2
Weight	6 kg
Threads for connectors	M 12×1 female threads
Materials	top part, base, corrugated iron, locking clamps, stainless steel legs and valve bodies 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (130×4 mm) in the top part and filter support. Viton valve O-rings (3×1.5 mm). PTFE flat gasket on valves
Max. operating pressure	7 bar (700 kPa)
Suitable membrane filter diameter	142 mm (prefilter, 130 mm)
Sterilization	by autoclaving (max 134°C) or by dry heat (180°C)

Order number for the 142 mm holder with hose nipples

16275	142 mm in-line stainless steel filter holder
16660	laboratory tripod with special socket (100 cm, ca. 33 mm ∅)

Recommended accessories are described under 1f on page 53

Replacement parts are shown in the diagram



Stainless steel holders with 2 litre capacity, for sample preparatoin and sterile filtration of serum.

This device is perfectly suitable for the removal of insoluble components out of samples for the determination of that parts of sludge, which can be eluted with water. Due to the 2 litre capacity, the total sample volume can be filled in with a large filling port allowing simple pouring in of the liquid. The pressure filtration avoids the loss of volatile components. The filter are of 130 cm^2 guarantees short filtration times.

The holder is also used for the sterile filtration of difficult-to-filter liquids, such as serum. Up to three membrane filters with pore sizes getting finer in direction of the filtration are installed into the holder. The fractionated retention of suspended matters enlarges the filterable volume. The swing-out locking clamps ensure firm sealing with simple hand-tightening.

Specifications for the 142 mm, 2000 ml stainless steel pressure holder

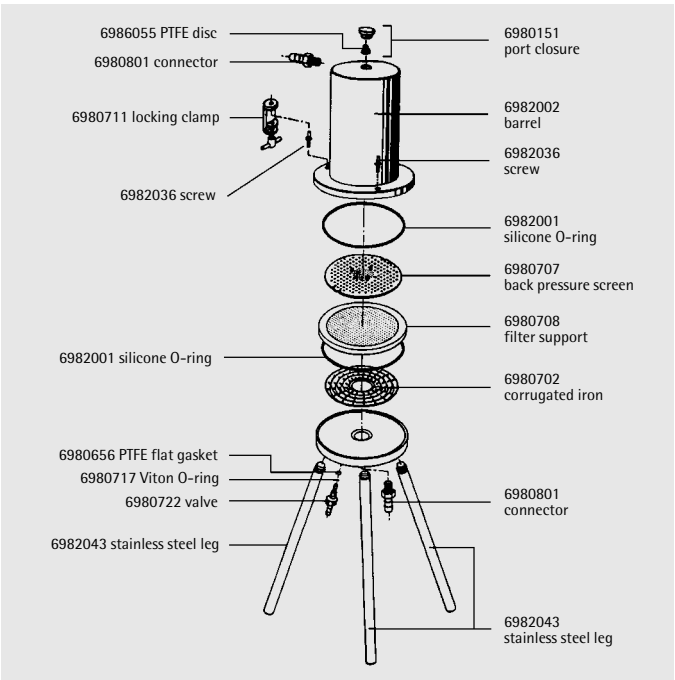
Chemical compatibility	as for stainless steel, PTFE, silicone and Viton. If required, the silicone O-rings can be replaced by EPDM O-rings (order no. 6982071), Viton O-rings (6982070) or PTFE O-rings (6982072, reduce the max. operating pressure to 4 bar!), and the Viton valve O-rings by EPDM O-rings (6985184) or silicone O-rings (6985183).
Flow rate	for water at Δp = 1 bar (100 kPa), 2 l/min with 0.2 µm, 4.5 l/min with 0.45 µm, 11 l/min with 0.8 µm pore size
Filtration area	130 cm^2
Weight	12 kg
Threads for connectors	M 12×1 female threads
Materials	top part, base, corrugated iron, locking clamps, legs, locking cap and valve body made of stainless steel 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (130×4 mm) in the top part and the filter support. Viton valve O-rings (3×1.5 mm). PTFE sealing (valve and cap)
Max. operating pressure	7 bar (700 kPa)
Suitable membrane filter diameter	142 mm (prefilter, 130 mm)
Sterilization	by autoclaving (max 134°C) or by dry heat (180°C)

Order number for the 142 mm, 2000 ml stainless steel pressure holder

16274	Stainless steel pressure filter holders for 142 mm membrane filter, with 2 litre capacity.

Recommended accessories are described under 1e on page 53

Replacement parts see diagram



GMP-complying 142 mm stainless steel holders with sanitary flanges.

The inlet and outlet connectors are Sanitary flanges, which are integral parts of the top and bottom plates. They assist in making the holder easy to clean and simplify the in-line installation. A suitable clamp allows, with the legs removed, to adjust the outlet at any height.

The arrangement of the air venting valve in the top part and the sample removal/test valve in the base guarantees a safe sterilization of the device with mounted filter, as well by autoclaving as by in-line vapour deposition. The swing-out clamps ensure leak-proof installation by simple hand-tightening. The back pressure screen, very easily mounted has a smooth surface in order to avoid damages of the membrane filter when being autoclaved, even when no glass fibre prefilter is used.

Specifications for the 142 mm Sanitary flange holder

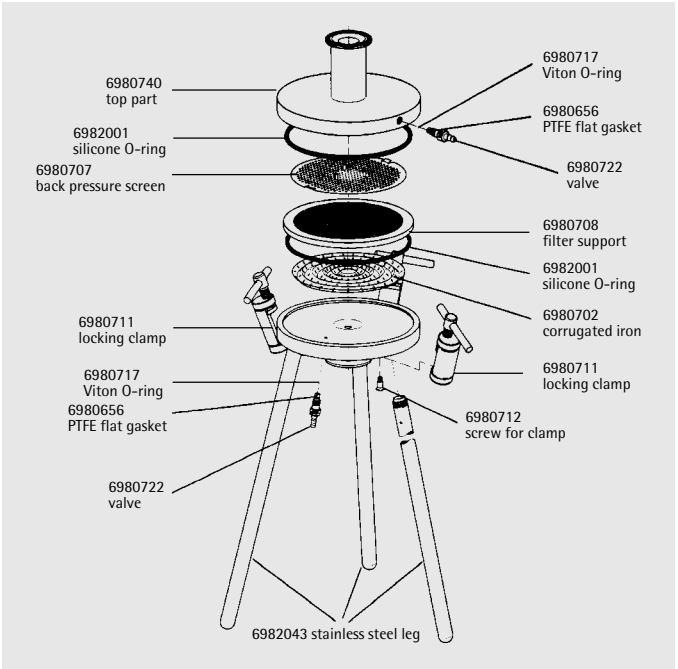
Dimensions	max. height 404 mm, width 231 mm (in height of the clamps) or 293 mm (at the end of the legs)
Chemical compatibility	as for stainless steel, PTFE, silicone and Viton. If required, the silicone O-rings can be replaced by EPDM O-rings (order no. 6982071), Viton O-rings (6982070) or PTFE O-rings (6982072, reduce the max. operating pressure to 4 bar!), and the Viton valve O-rings by EPDM O-rings (6985184) or silicone O-rings (6985183).
Flow rate	for water at Δp = 1 bar (100 kPa), 2 l/min with 0.2 µm, 4.5 l/min with 0.45 µm, 11 l/min with 0.8 µm pore size
Filtration area	130 cm^2
Weight	6 kg
Materials	top part, base, corrugated iron, locking clamps, stainless steel legs and valve body 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (130×4 mm) in the top part and filter support. Viton valve O-rings (3×1.5 mm). PTFE flat gasket on valves.
Max. operating pressure	at 7 bar (700 kPa)
Suitable membrane filter diameter,	142 mm (prefilter, 130 mm)
Sterilization	by autoclaving (max 134°C) or by dry heat (180°C)

Order number for the 142 mm Sanitary flange holder

16276	142 mm stainless steel pressure filter holder for the in-line installation, GMP-complying, with Sanitary flanges

Recommended accessories are described under 1g on page 53

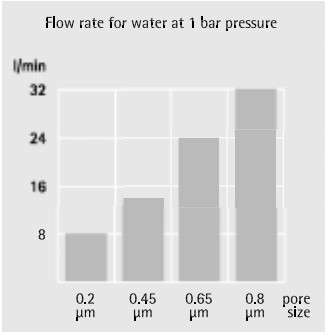
Replacement parts are shown in the diagram



GMP-complying 293 mm stainless steel holder with Sanitary flanges.

The construction of this holder is the same as this of the 142 mm holder described on page 50, except the legs and the number of locking clamps. The three legs are made of stainless steel, too, in order to avoid corrosion problems, as it is sometimes the case with aluminium legs. They are shorter and screwed in vertically to give a very stable footing to the holder with this larger diameter. The swing-out mechanism of the locking clamps is very practical, as there are 6 clamps.

The holder offers the same advantages for the user as the 142 mm holder, but it has a four times larger filtration area and correspondingly higher flow rates and standing time. The filter support is designed for the maximum exploitation of the filter area and the minimum flow resistance, as it is confirmed by the steady increase of flow rates with increasing pore sizes (see diagram).



Specifications for the 293 mm Sanitary flange holder

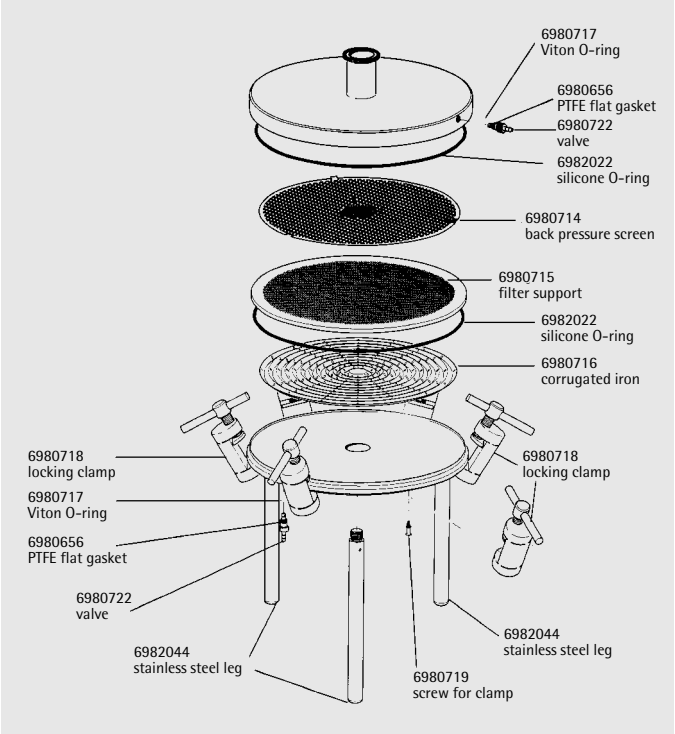
Dimensions	max. height 331 mm, width 416.5 mm
Chemical compatibility	as for stainless steel, PTFE, silicone and Viton. If required, the silicone O-rings can be replaced by EPDM O-rings (order no. 6982077), Viton O-rings (6982078) or PTFE O-rings (6982079, reduce the max. operating pressure to 4 bar!), and the Viton valve O-rings by EPDM O-rings (6985184) or silicone O-rings (6985183).
Flow rate	for water at Δp = 1 bar (100 kPa), 8 l/min with 0.2 µm, 14 l/min with 0.45 µm, 32 l/min with 0.8 µm pore size
Filtration area	560 cm^2
Weight	20 kg
Materials	top part, base, corrugated iron, locking clamps, stainless steel legs and valve body 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (280 × 4 mm) in the top part and filter support. Viton valve O-rings (3 × 1.5 mm). PTFE valve flat gasket
Max. operating pressure	5 bar (500 kPa)
Suitable membrane filter diameter	293 mm (prefilter, 279 mm)
Sterilization	by autoclaving (max 134°C) or by dry heat (180°C)

Order number for the 293 mm Sanitary flange filter holder

16277	293 mm stainless steel pressure filter holder for in-line installation, GMP-complying, with Sanitary flange inlet and outlet

Recommended accessories are described under 1g on page 53

Replacement parts are shown in the diagram



Modular assembly system for stainless steel filter housings.

The Sartorius modular assembly system for filter housings combines highest flexibility with short delivery periods and favourable prices. With the help of a special software, the mini-, standard-single- and multi-systems can be constructed by our field service locally. There is a choice of different construction heights, different de-aerations and tubing according to German Industrial Standards DIN, the ISO and the BSOD. Furthermore, tri-clamp, Flange or tube joint connectors are available according to the usual standards.

Please ask for more information.
Special brochure available on request.

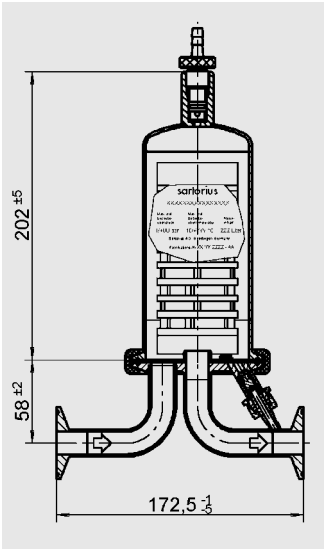
Quality standards for the modular assembly system:

Material:	AISI 316 L
Surfaces:	interior: Ra < 0,5 µm exterior: Ra <1.6 µm
Temperature range:	–10...+150°C
Pressure range:	–1...+10 bar (1,000 kPa)
Adapter:	mini: 15; standard: 25

Stainless steel T-type for 0.05 m², 0.1 m² and 0.2 m² mini cartridges
Stainless steel housings for liquids for the particle or sterile filtration.

The housing features an air venting valve on the inlet side. The change of the mini cartridge with bayonet catch.

Suitable filter cartridges on page 65–66 and 42.



Specifications
Connectors, triclamp 50.5 mm (Sanitary flange)
Width, ca. 172.5 mm
Surface roughness, product touching areas < 0.5 µm
Materials, stainless steel AISI 316L, silicone O-ring
Max. operating pressure, 10 bar (1,000 kPa)
Max. temperature, 150°C

Order number
7M19LSB0021
Stainless steel mini cartridge housing for liquid filtration T-type

Accessories for pressure filtration units.

The accessories required depend on the type of the pressure filtration unit.

Re-usable units with barrels to hold the liquid to be filtered can be connected to a pressure source (pressure pump or nitrogen bottle) after insertion of the membrane filter and prefilter, and if necessary, after sterilization and pouring in of the liquid.

Concerning ready-to-connect units, devices for the conduction installation and mini cartridge housings, the filterable liquid has to be fed in on the inlet side, eigher out of an "open" container through a peristaltic or impeller pump, or out of pressurized conduction system or a pressurized container. Various systems with pressurized containers are described on the next page.

1. Recommended accessories
1a. For Sartolab-P20 units
Units with luer lock inlet connector require only the pump18059, which is supplied complete with suitable tubing.

Units with hose nipple inlet can be connected to a peristaltic pump or a pressurized container using commercially available tubing.

1b. For Sartobran-300 capsules
The hose nipple inlet can be connected to a peristaltic pump or a pressurized container using commercially available tubing.

1c. For Sartobran-P capsules
Connection to a pressurized container: capsule with G3/8 male thread with inlet hose nipple using a PTFE-tube 16999, capsule with inlet hose nipples with commercially available tubing.

Connectors for capsules with inlet Sanitary flange are described under 1g.

1d. For polycarbonate holder 16508
The inlet hose nipple can be connected to a peristaltic pump or a pressurized container using a commercially available tubing. The hose nipple can be replaced by a connector with G3/8 male thread (order no. 17089) in order to connect the device to a pressurized container using a PTFE pressure hose 16999.

The hose nipple can be replaced by a luer lock connector (order no. 16881), in order to use the device as syringe filter holder. A luer slip connector (order no. 16880) can replace the outlet hose nipple.

1e. For stainless steel holders 16249 and 16274
The inlet hose nipple can be connected to a pressure source (pump or nitrogen bottle) with a commercially available hose. Alternatively, the hose nipple can be replaced by a connector with G3/8 male thread (order no. 17089), in order to connect the device to the pressure source with a flexible pressure hose 17091, or a PTFE pressure hose 16999.

For the filtration of easy to filter, large-volume liquids, the 47 mm holder can be connected to a 5 l pressurized container using a connector with G3/8 male thread and a PTFE pressure hose.

1f. For stainless steel holder 16275
The inlet hose nipple can be connected to a peristaltic pump or a pressurized container with a commercially available hose, but it is far more practical to replace the hose nipple by a connector with G3/8 male thread (order no. 17089), for connecting the unit to a pressurized container with a PTFE hose 16999.

However it is connected, further accessories simplify the use of the holder, when the filtrate is to be filled into bottles. A hand-operated valve (16656) on the outlet side allows the control of the filtrate flow. A clamp (17036) replaces the three legs allowing to adjust the height of the outlet to that of the bottles.

1g. For holders, mini cartridge housings and capsules with Sanitary flange inlets
The Sanitary flange at the inlet and outlet require one clamp (17033) and one connector.

The outlet connector is usually a 19 mm (17017) or a 25 mm (17016) hose nipple, or an adapter 17150 for the hand-operated valve (16656), with which the flow of the filtrate can be regulated.

The inlet connector depends on the system:

Connector 17019 with G3/8 male thread allows the connection with a PTFE pressure hose 16999 to a pressurized container.

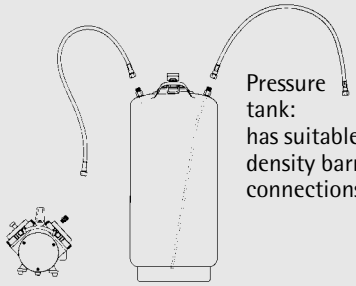
Filtration systems with pressure tanks and three different connection possibilities.

a) With G3/8 connectors
The pressure tank is connected to the pressure source and the filtration unit by means of stainless steel reinforced PTFE hoses. These hoses can be autoclaved and are easy to clean. Due to the density barrel in the connections, a slight tightening with a 19 mm spanner for a leak-proof sealing. No seals and Teflon tapes are required.

Main advantage: easy cleaning.

Pressure hoses: have suitable density barrel connections.

Pressure pump: has a suitable density barrel connection.



Pressure tank: has suitable density barrel connections.

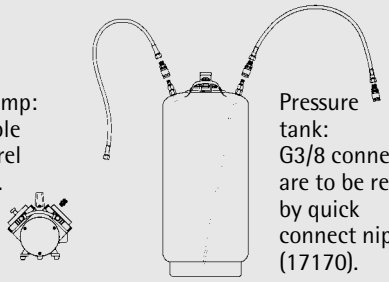
Sartobran P capsules type RO have a suitable density barrel connection. The inlet hose nipple of the holders 16249, 16275 and 16508 have to be replaced by connector 17089 Capsules, holders and holding with inlet Sanitary flange require connector 17019.

b) With quick connectors
The pressure tank is connected to the pressure source and the filtration unit by means of stainless steel reinforced PTFE pressure hoses and quick connect couplings. Hoses and couplings can be autoclaved. The valve in the quick connect coupling closes automatically, when the coupling is removed from the quick connect nipple.

Main advantage: connection and removal of the coupling is quick and simple.

Pressure hoses: require an additional adapter (6985128) on the nuts to the pressure tanks inlet and outlet, and to the filter units.

Pressure pump: has a suitable density barrel connection.



Pressure tank: G3/8 connectors are to be replaced by quick connect nipples (17170).

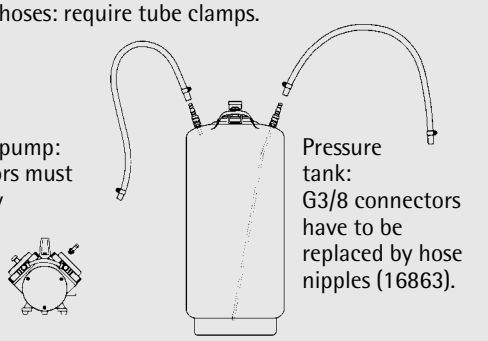
Not recommended for capsules, housings or devices with Sanitary flanges. The inlet hose nipple of the holders 16249, 16275, and 16508 have to be replaced by a connector 17090.

c) With commercially available hoses
The pressure tank is connected to the pressure source and the filtration unit by means of available pressure hoses. The hoses are to be clamped to the hose nipples.

Main advantage: hoses are usually available.

Pressure hoses: require tube clamps.

Pressure pump: connectors must be simply reversed.



Pressure tank: G3/8 connectors have to be replaced by hose nipples (16863).

Sartolab P20 units, Sartobran 300 capsule, Sartobran P capsule type OO as well as the filter holders 16249, 16275 and 16508 feature hose nipples as standard.

2. Description of accessories

Membrane pump
Order number: 18059

A self-priming diaphragm pump with electronic speed regulator, complete with connector tubing set. It pumps aqueous solutions quietly without stressing the product, and is equipped with an overpressure limiter which can be set at 1–3 bar. Pump, stainless steel sinker and tubing are resistant to 1N NaOH.

Input wattage, 15 W
Electrical supply, 220 V, 50 Hz
Diaphragm, max. 3,000/min
Materials, polypropylene housing, PTFE membrane, EPDM seals and valves
Max. operating pressure, 3 bar, preset to 2.5 bar
Rated output for water, 650 ml/min without pressure, 300 ml/min with Sartolab-P20
Self-priming, up to 3 m water column Power consumption, 0.76 A

Replacement part:
6988094 Tubing set, sonsisting of 2.5 m silicone hose (4 mm inner diameter, 1.5 mm wall thickness, 60 Shore A hadness), 5 multi functional adapters, 1 stainless steel sinker

Membrane pump for pressure
Order numbers:
16617 (220 V, 50 Hz)
16662 (110 V, 60 Hz)

Supply oil-free compressed air at up to 7 bar (700 kPa).

Connectors: G3/8 male thread in the pressure outlet side, 9 mm hose nipple in the air inlet side. The connectors are interchangeable.

Weight, ca. 15 kg
Threads for connectors, G1/4 female thread
Dimensions, 35 × 25 × 26 cm
Max. performance, 55 l/min
Max. ambient temp., 40°C
Power, 250 W
Protection, IP 44

Replacement part:
6986006 Spare parts kit, consisting of 2 membranes, 4 valve springs and 2 pump head gaskets

Pressure tank
Order numbers:
17530 5 litre capacity
17531 10 litre capacity
17532 20 litre capacity
17533 40 litre capacity
17534 60 litre capacity
17535 80 litre capacity
17536 100 litre capacity

Pressure tanks serve as reserve container for pressure filtration, and is also used for the transport, storage and distribution of liquids. Two handles simplify the handling and the transport. Special trolleys are available for the 40, 60, 80 and 100 litre pressure tanks.

The pressure tanks are made of 1.4401 (AISI 316) stainless steel, and all surfaces are electropolished. The tanks can be autoclaved at 121°C.

The screwed on G3/8 connectors allow the connection of PTFE pressure hoses 16823 or 16999. They can be replaced by hose nipples, Sanitary flanges or connectors for quick connect systems (see accessories).

As standard, the lid is equipped with a pressure gauge, a safety valve, and a clamp for leak-proof, pressure-resistant closure.
A certificate concerning construction and pressure testing according to the German decree for pressure tanks is enclosed to every tank (the tanks are specifically designed for pressure, and are not usable as vacuum containers).

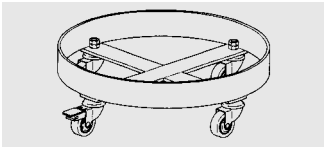
Specifically for the requirements of the pharmaceutical industry, GMP-complying pressure tanks are on request available in various sizes. Benefits of the device are the ease of cleaning, the equipment with triclamp connectors on standard and the low surface roughness.

Specifications
Dimensions (height × diameter)/ weight:
17530 235 × 234 mm/3.9 kg
17531 360 × 234 mm/5.4 kg
17532 600 × 234 mm/8.2 kg
17533 705 × 300 mm/11.8 kg
17534 643 × 400 mm/15.2 kg
17535 802 × 400 mm/18.4 kg
17536 962 × 400 mm/21.7 kg
(opening, for all types, oval, length 98 mm, width 82 mm)

Maximal operating pressure:
7 bar for 17530, 17531, 17532.
5 bar for 17533.
3 bar for 17534.
2 bar for 17535, 17536

Max. operating temperature:
95°C

Accessories
6985093 Spanner, 17–19 mm (to fasten connectors)



17636 Trolley for 17533
17635 Trolley for 17534, 17535 and 17536

The silicone O-rings supplied on standard can be replaced by the following Viton or EPDM O-rings:

6986110 Silicone O-ring (lid)
6986132 Silicone O-ring (tubes)
6986111 EPDM O-ring (lid)
6986133 EPDM O-ring (tubes)

Other connectors:
16863 Hose nipple, DN 10–19
17070 1"–1½" Sanitary flange
17170 Quick connect nipple

Replacement parts
a) for all pressure tanks:
6980389 Viton O-ring (lid)
6980395 Inlet tube
6980396 Viton O-ring (tubes)

6980420 Connector, G3/8
6985131 PTFE cap (2 ×)

b) for 17530, 17531,17532
6980390 Pressure gauge, 7 bar
6986112 Outlet tube (17530)
6986113 Outlet tube (17531)
6986114 Outlet tube (17532)
6986130 Lid with valve

c) for 17533
6980415 Pressure gauge, 5 bar
6986115 Outlet tube (17533)
6986129 Lid with valve

d) for 17534
6986116 Outlet tube (17534)
6986137 Pressure gauge, 3 bar
6986138 Lid with valve

e) for 17535, 17536
6986117 Outlet tube (17535)
6986118 Outlet tube (17536)
6986119 Pressure gauge, 2 bar
6986131 Lid with valve

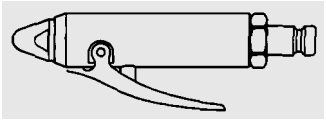
PTFE pressure hose
Order numbers:
16999 1.5 m long
16823 80 cm long

Stainless steel reinforced PTFE pressure hoses with G3/8 nuts on each side. The hoses are solvent resistant and easy to clean. They can be sterilized by autoclaving (121°C or 134°C) or by dry heat (180°C).

The nuts fit on the G3/8 male threads, and ensure a leak-proof connection without the need for sealing rings or Teflon tapes.

The nuts also fit on a function-piece with quick connect coupling (order no. 6985128) for a quick and simple connection to holders fitted with quick connect nipples. The valve in the coupling opens, when it is fitted on a quick connect nipple, and closes when removed from the nipple.

Accessories for 6985128:



6980407 Trigger valve for cleaning

Replacement part for 6985128:
6985216 Seal set (Viton O-ring, flat gasket)

Flexible pressure hose
Order number: 17091
1 m long. G3/8 nuts on each side. It is very flexible and especially practical as pressure hose for pressure holders with capacity barrel. Can be sterilized by autoclaving or by dry heat. Not for use with liquids.

Plastic pressure hose
Order number: 16931
Flexible gas pressure hose with quick connect coupling for direct connection to pressure holders with capacity barrel, fitted with quick connect nipple and with G3/8 nut for connection to the pressure source. Not for use with liquids.

Hand-operated valve
Order number: 16656

This valve is fitted on the outlet side of a filter holder type 16275, and allows a steady regulation of the filtrate or a selective dosage when filling up litre volumes.

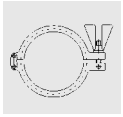
An adapter (order no. 17150) allows the attachment of a capsule and a mini cartridge housing with Sanitary flange.

Fitted to the filter holder, the valve can be sterilized, when open, with all the usual methods. For cleaning purpose, it can be quickly taken apart without problems.

Materials: ball and housing, stainless steel (material no. 1.4401, AISI 316). Seat and nipple for 13 mm hose, PTFE.

Replacement parts:
6981314 Stainless steel bell
6986090 Valve body
6986091 Connector, M12×1
6986092 PTFE hose nipple
6988093 PTFE sealing, (pack of 2)

Clamp for Sanitary flanges
Order number: 17033



Two 1–1½" Sanitary flanges are pressed against the supplied gasket and are attached with the clamp.

Replacement silicone gaskets are available under the order number 6982029 (pack of 2). Ethylene polypropylene gaskets (order no. 6982060) and PTFE reinforced buna (6982061) are also available.

Ready to connect
venting units,
Pressure holders,
Mini cartridge housings
and Mini cartridges.

Midisart® 2000 sterile venting units, light in weight and easy to connect.

Re-usable complete filtration units with naturally hydrophobic PTFE membrane for reliable sterile venting of small fermenters and of containers for culture media.

Midisart 2000 units have been designed for maximum handling ease and reliability. Tapered hose nipples ensure a simple, secure hold for tubing with an inner diameter of 6–12 mm. Due to the low weight of only 20 g, the connected tubing is not snapped off. The membrane is reinforced with polypropylene gauze for stability to pressures of up to 3 bar. The 20 cm^2 large filter area allows high flow rates at low differential pressures.

Each unit is printed with lot number and individual piece number on the housing for total security and traceability.

Specifications for Midisart 2000 units

Connectors	Choice of conical hose nipples for tubing with 6–12 mm inner diameter (with slip-fit for luer syringes), or 1/8" male NPT
Biosafety	All materials pass the USP Plastics Test Class VI.
Bubble point	Min. value with isopropanol for 0.2 µm unit = 1.4 bar (140 kPa) (1.1 bar after autoclaving) and 0.9 bar (90 kPa) for 0.45 µm unit
Air flow rate	Typical values for 0.2 µm pore size: 1.1 l/min at 0.02 bar (1.8 l/min for 0.45 µm) 2.0 l/min at 0.05 bar (4.6 l/min for 0.45 µm) 5.0 l/min at 0.1 bar (8.5 l/min for 0.45 µm)
Filter area	20 cm^2
Filling volume	Ca. 3 ml
Housing diameter	62 mm
Materials	PTFE membrane filter aus PTFE, reinforced with polypropylene gauze, polypropylene housing
Max. recommended operating pressure	3 bar (300 kPa)
Max. temperature	134°C
Sterilization method	By autoclaving at 121°C (at least 20 times) or 134°C. E and G packs are presterilized with ethylene oxide.
Hold-up volume	Ca. 0.5 ml after (1 ml before) bubble point
Water penetration point	4.0 bar (0.2 µm) and 3.0 bar (0.45 µm)

Order numbers for Midisart 2000 units

a) with hose nipple connector:

17804 E	0.45 µm, sterile, individually packed (pack of 12)
17804 G	0.45 µm, sterile, individually packed (pack of 25)
17805 E	0.2 µm, sterile, individually packed (pack of 12)
17805 G	0.2 µm, sterile, individually packed (pack of 25)
17805 UPN	0.2 µm non sterile, bulk packed (pack of 100)

b) with 1/8" male NPT connectors:

17804 NPE	0.45 µm, sterile, individually packed (pack of 12)
17804 NPG	0.45 µm, sterile, individually packed (pack of 25)
17805 NPE	0.2 µm, sterile, individually packed (pack of 12)
17805 NPG	0.2 µm, sterile, individually packed (pack of 25)

Minisart® HY ready to connect units for the sterile venting of small containers and bottles

These 26 mm units consist of a polyester-strengthened 0.2 µm PTFE membrane in a cyrolite housing with luer lock connectors (female top, male bottom).

Specifications for Minisart HY

Bubble point	Min. value with isopropanol 1.2 bar
Air flow rate	Ca. 1.4 l/min at Δ = 0.1 bar
Filter area	5.3 cm^2
Housing burst pressure	Min. value 6.0 bar (600 kPa)
Water penetration point	Min. 4.0 bar (400 kPa)

Order numbers for Minisart HY

16596 HYK	sterile, individually packed (pack of 50)
16596 HYQ	non-sterile (pack of 500)

25 mm and 47 mm stainless steel filter holders for in-line filtration.

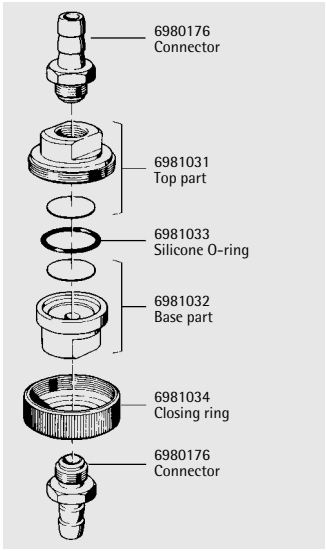
a) The 25 mm filter holder

The G1/4 connection threads with density barrel guarantee leak-proof sealing of the hose nipple and the holder without sealing rings. Other connectors, available as accessories, fit the holder onto reducing valves or pumps with G1/4 female thread (order no. 01030) or G3/8 female thread (01029), or onto pressure tanks with G3/8 male thread (00177).

Specifications
Connectors,
hose nipples DN10
Filtration area, 3 cm^2
Flow rate,
for air at Δp = 1 bar:
0.5 l/min with 0.2 µm,
1.0 l/min with 0.45 µm pore size
Weight, ca. 170 g
Materials,
stainless steel, except silicone O-ring (21×2 mm) and aluminium closing ring
Max. opperating pressure,
5 bar (500 kPa)
Suitable membrane filter,
25 mm , type 118
Sterilization,
by autoclaving (max. 134°C) or by dry heat (max. 180°C).

Replacement parts
are shown in the diagram

Order number
16251 Stainless steel holder for 25 mm ∅ membrane filter



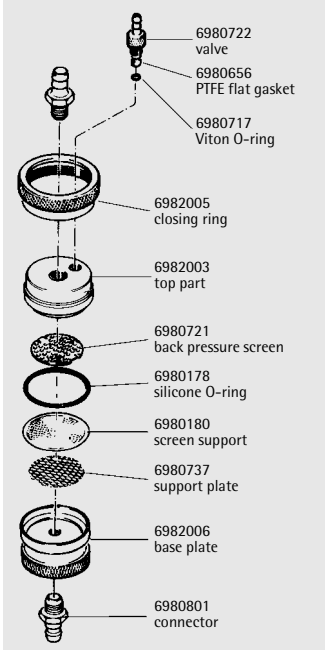
b) The 47mm filter holder

Tolerates pressure of up to 20 bar. The inlet side valve is convenient for the intermittent run-off of waste water. Other connectors, available as accessories, fit the holder onto reducing valves or pumps with G3/8 female thread (order no. 17089), or onto pressure tanks with G3/8 male thread (17069) or on taps with G3/4 male thread (17068).

Specifications
Connectors,
hose nipples DN10
Connection thread, M12×1
Filtration area, 13 cm^2
Flow rate,
for air at Δp = 0.3 bar:
0.5 l/min with 0.2 µm, 1.0 l/min with 0.45 µm pore size
Weight, ca. 490 g
Materials, stainless steel, except silicone O-ring (42 × 3 mm), PTFE and Viton valve seals
Max. operating pressure,
20 bar (2,000 kPa)
Suitable membrane filter, 47 mm, type 118
Sterilization,
by autoclaving (max. 134°C) or by dry heat (max. 180°C).

Replacement parts
are shown in the diagram

Order number
16254 Stainless steel holder for 47 mm ∅ membrane filter



Sartofluor® Capsules with PTFE membrane for maximum security in sterile venting.

Sartofluor Capsules are ready-to-connect, pre-tested, complete filter units. The PTFE membrane is pleated to obtain the largest possible usable filtration area in the small polypropylene housing. The two valves on the upstream side of the housing ensure good steam passage and corresponding certainty of sterilization of the capsules by autoclaving.

The extreme hydrophobicity of the PTFE membrane ensures maximum filtration security, even when filtering moist air. The high air flow rate of the membranes and the large filter area enable effective sterile filtration even at low differential pressures.

The excellent chemical compatibility of the PTFE and polypropylene materials makes Sartofluor capsules additionally useful for the filtration of those acids, bases and non-aqueous solvents for which other capsule types cannot be used.

Specifications for Sartofluor capsules

Connectors	Hose nipple 10 mm or 1"–1½" Sanitary flange
Biosafety	All materials pass the USP Plastics Test Class VI.
Bubble point	Min. value with 60% isopropanol: 1.5 bar (150 kPa) for 0.1 µm pore size 1.0 bar (100 kPa) for 0.2 µm pore size 0.6 bar (60 kPa) for 0.45 µm pore size
Chemical compatibility	See page 111
Air flow rate	For 0.2 µm capsules see diagram bottom left
Filter area	0.015 m^2, 0.03 m^2, 0.05 m^2, 0.1 m^2 or 0.2 m^2
Material	PTFE membrane filter. Housing, polypropylene supporting and drainage layers
Max. differential pressure	4 bar at 20°C, 2 bar at 80°C
Max. operating pressure	4 bar at 20°C
Sterilization	By autoclaving (121°C or 134°C)
Water penetration pressure	Ca. 4.5 bar (450 kPa) for 0.2 µm pore size

Order numbers for Sartofluor Capsules

a) Sartofluor Capsules with hose nipple inlet and outlet:

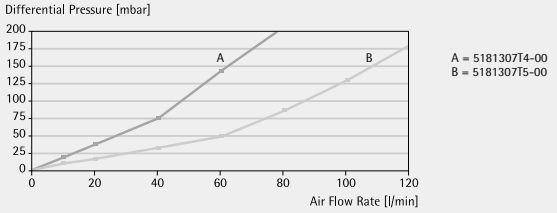
5181358T7-00-B	0.1 µm, 0.05 m^2 (pack of 5)
5181358T8-00-B	0.1 µm, 0.1 m^2 (pack of 5)
5181358T9-00-A	0.1 µm, 0.2 m^2 (pack of 4)
5181307T4-00-B	0.2 µm, 0.015 m^2 (pack of 5)
5181307T5-00-D	0.2 µm, 0.03 m^2 (pack of 10)
5181307T7-00-B	0.2 µm, 0.05 m^2 (pack of 5)
5181307T8-00-B	0.2 µm, 0.1 m^2 (pack of 5)
5181307T9-00-A	0.2 µm, 0.2 m^2 (pack of 4)
5181306T9-00-A	0.45 µm, 0.2 m^2 (pack of 4)

b) Sartofluor Capsules with Sanitary flange inlet and outlet:

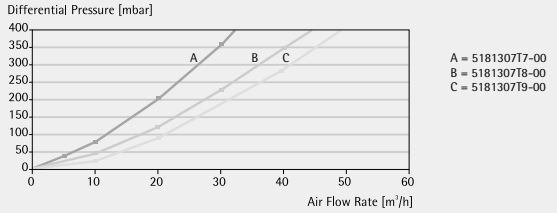
5181307T4-SS-B	(pack of 5)
5181307T7-SS-B	0.2 µm, 0.05 m^2 (pack of 5)
5181307T8-SS-B	0.2 µm, 0.1 m^2 (pack of 5)
5181307T9-SS-A	0.2 µm, 0.2 m^2 (pack of 4)

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

Air Flow Rates at Atmosperic Pressure
Sartofluor®-Capsules 0.2 µm, Type 5181307T4, T5 (00-connectors)



Air Flow Rates at Atmosperic Pressure
Sartofluor®-Capsules 0.2 µm, Type 5181307T7, T8, T9 (00-connectors)



Housings for sterile air venting and for air | gas filtration.

a) Housing for sterile venting

The cut-outs in the top part of the housing for free air guarantee a good air circulation and ensure the drying-out of the system after vapour deposition (avoidance of condensate formation). The base has a plug for the inner O-ring and a bayonet-lock for a firm hold of the inserted mini cartridges.

Specifications

Connector	DN 25 tube joint
Weight	ca. 700 g
Height	ca. 186 mm
Material	stainless steel 1.4571 (= AISI 316)
Max. operating pressure	10 bar (1,000 kPa)
Max. temperature	180°C

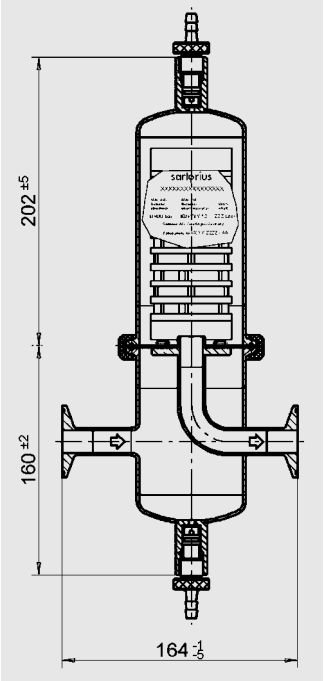
Order number

350019V15-K025A	Stainless steel mini cartridge housing for the sterile venting of housings and tanks, with DN 25 tube joint and bayonet-lock for the inserted mini cartridge.

Housing for pressure gas filtration

The base serves as receiver for the condensate and has also a pharma-valve. The mini cartridge holder prevents the mini cartridge from contacting condense water and ensures best vapour deposition conditions. Attachment of the mini cartridges like for the liquid housing, T-type (page 52).

Suitable filter cartridges on page 64.



Specifications

Connectors,
clamp 50.5 mm (Sanitary flange)
Width, ca. 164 mm
Surface roughness,
product touching areas <0.5 µm
Materials, stainless steel
AISI 316L, silicone O-ring
Max. operating pressure, 10 bar
(1,000 kPa)
Max. temperature, 150°C

Order number

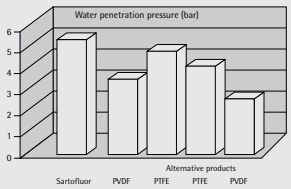
7M19LSB0028
Stainless steel mini cartridge housings for air | pressure gas filtration

Sartofluor® Mini cartridges for highest safety for sterile venting and compressed air | gas filtration.

Sartofluor Mini cartridges are designed particularly for cases of sterile venting when the cGMP directives have to be adhered to.

The sealing system, an inner O-ring plus bayonet twist lock, guarantees safe attachment in mini cartridge housings and a firm hold for back pressure pushes.

The inserted, specially developed PTFE membranes are extremely water-repellent, which is shown impressively by the very high water penetration pressure. The diagram shows values for various 0.2 µm filter materials. Due to the optimal hydrophobicity, steem sterilized Sartofluor mini cartridges re-reach their maximal flow rates in shortest time.



Specifications for Sartofluor Mini Cartridges

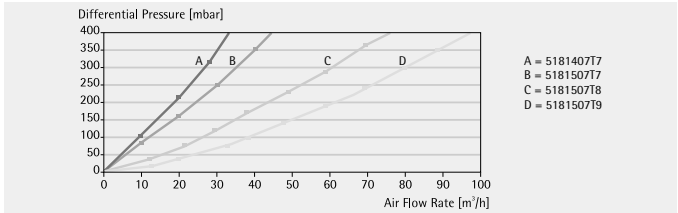
Connector	inner silicone O-ring (replacement part no. 6985150) and bayonet lock
Biosafety	pass USP Plastic Class VI Test
Bubble point	minimum value, wetted with 60% isopropanol, 1.5 bar (150 kPa) for 0.1 µm, 1.0 bar (100 kPa) for 0.2 µm, 0.6 bar (60 kPa) for 0.45 µm pore size
Chemical compatibility	as for polypropylene, PTFE and silicone (silicone O-ring can be replaced by an EPDM O-ring, order no. 6985149, or a Viton O-ring, order no. 6985151)
Flow rate	for air for 0.2 µm
Mini cartridges	see diagramme
Filtration area	0.05 m^2, 0.1 m^2 or 0.2 m^2
Materials	PTFE membrane filter. Polypropylene housing protective fleece and drainage fleece. Silicone O-ring
Max. differential pressure	5 bar (500 kPa) at 20°C, 2 bar (200 kPa) at 80°C
Sterilization	fitted in a mini cartridge housing, autoclaving or in-line steaming (121°C or 134°C). In-line steaming, max. Δp = 0.5 bar
Water penetration pressure	ca. 4.5 bar (450 kPa) for 0.2 µm pore size

Order numbers for Sartofluor Mini Cartridges

With 0.1 µm filter:	
5181558T7 B	0.05 m^2 filter area, pack of 5
5181558T8 B	0.1 m^2 filter area, pack of 5
5181558T9 B	0.2 m^2 filter area, pack of 5
With 0.2 µm filter:	
5181507T7 B	0.05 m^2 filter area, pack of 5
5181507T8 B	0.1 m^2 filter area, pack of 5
5181507T9 B	0.2 m^2 filter area, pack of 5
Sartofluor Junior:	
5181407T7 B	0.05 m^2 filter area, pack of 5
With 0.45 µm filter:	
5181506T9 B	0.2 m^2 filter area, pack of 5

Sartofluor Capsulen see page 62

Air Flow Rates at Atmosperic Pressure
Sartofluor®-Mini 0.2 µm, Type 5181507T7, T8, T9, 5181407T7



Mini filter cartridges for the particle-removing filtration or prefiltration of 100 litres and more.

Each of these mini cartridges contains a series of filters with increasing fineness for effective and economic particle removal, either as independent filter or as prefilter in combination with a Sartobran P or Sartofluor mini cartridge. The four different types differ only in the filter combinations. All other parts are the same, made of polypropylene (support framing) or silicone (sealing ring).

1. Sartopure PP2 mini cartridges
They contain polypropylene fleeces of increasing fineness by fractionated depth filtration. Retention efficiency: 20 µm, 8 µm, 5 µm, 3 µm, 1.2 µm and 0.65 µm. Main applications: particle removing filtration of deionised water, pharmaceutical solutions, chemicals and solvents and other gases.

2. Sartopure GF2 mini cartridges
They contain glass fibre and polypropylene fleeces of increasing fineness for the removal of particles and some colloids through a combination of fractionated depth filtration and adsorption.
Retention efficiency: 3 µm, 1.2 µm and 0.65 µm. Main applications: prefiltration of biologic liquids with relatively high colloid content (e.g. serum) as well as particle removing filtration of deionised water and weakly aggressive chemicals.

3. Sartoclean CA mini cartridges
Available with 3.0 µm/0.8 µm and 0.8 µm/0.65 µm cellulose acetate double membranes, for the retention of particles and larger microorganisms by means of a fractionated membrane filtration, as well as simple membrane mini cartridge with 0.2 and 0.45 µm pore size. Main application: prefiltration in combination with a subsequent Sartobran P mini cartridge (e.g. for lager filterable volumes in the sterile filtration of serum) at minimal adsorption.

4. Sartoclean GF mini cartridges
Same as Sartoclean CA mini cartridges, but complemented by a glass fibre prefilter for the retention of particles, larger microorganisms and colloids through the the combination of depth and fractionated membrane filtration.
Main applications: prefiltration of biological liquids with a relatively high colloid content as well as clarification of turbid solutions.

Specifications for Sartopure and Sartoclean Mini cartridges

Connectors	Inner Silicone O-ring and bayonet lock (twist lock) for safe hold on the base (also refer to descriptions on p. 63 and p. 64)
Flow rate	Typical values for 0.2 m^2 mini cartridges for water at 0.5 bar (50 kPa) pressure:
Sartopure PP2	39 l/min. (1.2 µm), 24 l/min. (0.65 µm)
Sartopure GF2	58 l/min. (1.2 µm), 25 l/min. (0.65 µm)
Sartoclean CA	41 l/min. (0.8 µm), 32 l/min. (0.65 µm)
Sartoclean GF	25 l/min. (0.8 µm), 17 l/min. (0.65 µm)
Filter area	0.05 m^2, 0.1 m^2, 0.2 m^2 or 0.3 m^2, as listed under order numbers

See also diagram on the right with following classification:

Filter materials	Sartopure PP 2, Polypropylene filter Sartopure GF 2, Glass fibre filter Sartoclean CA, Cellulose acetate membranes Sartoclean GF, Glass fibre prefilter, cellulose acetate membranes

Order numbers for Sartopure and Sartoclean Mini Cartridges*

1. Sartopure PP2 Depth Filter Mini Cartridges

5591505P7-B	0.65 µm, 0.05 m^2 (pack of 5)
5591505P8-B	0.65 µm, 0.1 m^2 (pack of 5)
5591505P9-B	0.65 µm, 0.2 m^2 (pack of 5)
5591503P9-B	1.2 µm, 0.2 m^2 (pack of 5)
5591502P9-B	3 µm, 0.2 m^2 (pack of 5)
5591542P9-B	5 µm, 0.2 m^2 (pack of 5)
5591501P9-B	8 µm, 0.2 m^2 (pack of 5)
5591520P9-B	20 µm, 0.2 m^2 (pack of 5)

2. Sartopure GF2 Depth Filter Mini Cartridges

5571505 P7-B	0.05 m (pack of 5) 0.65 µm
5571503P7-B	0.05 m (pack of 5) 1.2 µm
5571502P7-B	0.05 m (pack of 5) 3 µm
5571505P8-B	0.1 m (pack of 5) 0.65 µm
5571503P8-B	0.1 m (pack of 5) 1.2 µm
5571502P8-B	0.1 µm (pack of 5) 3 µm
5571505P9-B	0.8 m (pack of 5) 0.65 µm
5571503P9-B	0.2 m (pack of 5) 1.2 µm
5571502P9-B	0. 2 m (pack of 5) 3 µm

3. Sartoclean CA Membrane Filter Mini Cartridges

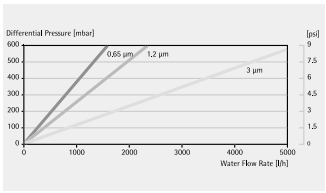
5621507A9-B	0.2 µm, 0.2 m^2 (pack of 5)
5621506A9-B	0.45 µm, 0.2 m^2 (pack of 5)
5621505G9-B	0.8 | 0.65 µm, 0.2 m^2 (pack of 5)
5621504E9-B	3.0 | 0.8 µm, 0.2 m^2 (pack of 5)

4. Sartoclean GF Membrane Filter Mini Cartridges

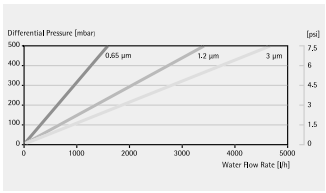
5601505G9-B	0.8 | 0.65 µm, 0.2 m^2 (pack of 5)
5601504E9-B	3.0 | 0.8 µm, 0.2 m^2 (pack of 5)

* For more information about mini cartridges and capsules, see brochure S-0024-d02025

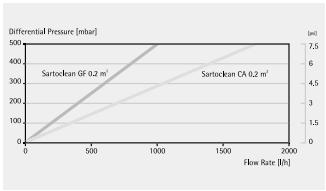
Sartopure PP2 Mini Cartridges 0.2 m^2, 0.65 µm, 1.2 µm, 3 µm



Sartopure GF2 Mini Cartridges 0.2 m^2, 0.65 µm, 1.2 µm, 3 µm



Water Flow Rates for 0.2 m^2 Sartoclean® CA and Sartoclean® GF 0.8|0.65 µm



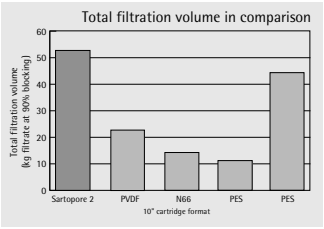
Sartopore 2 Filter elements for best flow rates and standing times over the whole pH-range.

The new Sartopore 2 filter elements ideally supplement the Sartobran P filters described on page 42. Whereas Sartobran P filters are mainly used for pre-filtration and sterile filtration of protein-containing solutions in the pH-range of 4–8, the broad chemical compatibility of the polyethersulfone membranes from pH1 to pH 14 of the Sartopore 2 filter elements allows also the filtratin of aggressive liquids of high or low pH.

Sartopore 2 filter elements are available with 3 different pore sizes. For the prefiltration of difficult to filter solutions, Sartopore 2 filter elements with 0.45 µm final membranes are used, whereas filter elements with 0.2 µm final membrane is used for the sterile filtration of media. Sartopore 2 filter elements with 0.1 µm final membrane are perfectly suitable for combined sterile filtration and retention of mycoplasma in sera and serum-containing culture media.

The asymmetric structure of the membrane and the double-layer construction with build-in pre-filter allow exceptionally high standing times and flow rates. The filter elements are therefore used especially for the filtration of difficult to filter, highly viscous solutions or when short filtration times are required.

The graph below shows the comparison of the total filtration volume of Sartopore 2 polyether-sulfone membranes, PVDF, nylon-66 membranes as well as two different PES membranes, also in the 10"-cartridge format, each in kg filtrate at 90% blocking.



Specifications for Sartopore 2 Capsules

Biosafety	All materials pass the USP Plastics Test Class VI
Chemical compatibility	to aqueous solutions in the pH-range 1–14
Connectors	see order numbers
Cytotoxicity	All materials are detectably non-toxic concerning L929-cells and MRC-5-cells.
Filter area	0.015 m^2, 0.03 m^2, 0.05 m^2, 0.1 m^2, 0.2 m^2 or 0.45 m^2
Integrity test data	All Sartopore 2 Capsules are integrity testable. You find detailed information about minimal bubble points and maximal air diffusion values in the instructions for use, enclosed to every pack.
Materials	Asymmetric, double-layered polyether-sulfone membrane filter, polypropylene housing parts and support framing | drainage devices
Max. differential pressure	Δp = 4 bar at 20°C, 2 bar at 80°C

Order numbers for Sartopore 2 Capsules*

1. Sartopore 2 Capsules with 0.45 µm final filter

5441306G5-00-B	0.03 m^2 filter area
5441306G7-**-B	0.05 m^2 filter area
5441306G8-**-B	0.1 m^2 filter area
5441306G9-**A	0.2 m^2 filter area
5441306G0-**	0.45 m^2 filter area

Type 00
(hose nipple inlet and outlet)

2. Sartopore 2 Capsules with 0.2 µm final filter

5441307H4-**-B	0.015 m^2 filter area
5441307H5-00-B	0.03 m^2 filter area
5441307H7-**-B	0.05 m^2 filter area
5441307H8-**-B	0.1 m^2 filter area
5441307H9-**-A	0.2 m^2 filter area
5441307H0-**	0.45 m^2 filter area

Type SS
(Sanitary flange inlet and outlet

3. Sartopore 2 Capsules with 0.1 µm final filter

5441358K4-**-B	0.015 µm filter area
5441358K5-00-B	0.03 m^2 filter area
5441358K7-**-B	0.05 m^2 filter area
5441358K8-**-B	0.1 m^2 filter area
5441358K9-**-A	0.2 m^2 filter area
5441358K0-**	0.45 m^2 filter area

* Also available as mini cartridges with the same pore sizes and areas. Order numbers for packs of 5:

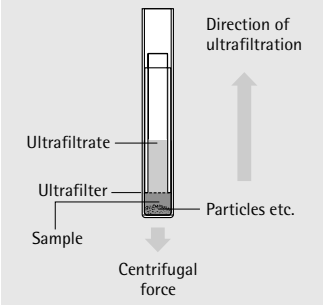
area pore size:	0.05 m^2	0.1 m^2	0.2 m^2
0.1 µm	5441558K7B	5441558K8B	5441558K9B
0.2 µm	5441507H7B	5441507H8B	5441507H9B
0.45 µm	5441506D7B	5441506D8B	5441506D9B

**: available with -SS, -SO, -00 connector

Products for ultrafiltration, protein purification and cell culture.

Centrisart® centrifugal units for rapid sample preparation.

Centrisart® I for preparation of protein-free ultrafiltrates.
Ready-to-use units for protein binding studies and for removal of proteins from biological samples, e.g. for determination of cretanine in human serum.



Centrisart I consists of a sample tube and a free-sliding inner tube with an ultrafilter bottom. The principle of construction turns the traditional way upside down: ultrafiltration takes place in the opposite direction of the centrifugal force. This prevents blocking of the ultrafilter and even allows filtration of particle-containing samples. The ultrafiltrate is collected in the inner tube and can be easily removed.

Specifications for Centrisart I

Dimensions	of the Centrifugal tube, max. outer diameter, 14 mm. 93 mm long. Can be used in each laboratory centrifuge for 14 mm or 17 mm × 100 mm tubes
Filtration area	0.79 cm^2
Materials	polystyrene centrifugal tubes. Cellulose proprionate inner tube. Cellulose triacetate or polysulfone ultrafilter. Polyethylene cap
Max. centrifugal force	2,500 × g (swing bucket rotor) and 2,000 × g (fixed angle rotor)
Sample volume	max. 2.5 ml. Min. final volume, 100 µl
Ultrafiltration rate	depends on the protein content of the sample, the temperature, and on the ultrafilter cut-off used. In general, 2.5 ml sample volumes can be ultrafiltered in 30 to 90 minutes.

Order numbers for Centrisart I

13209 E	Trial pack, with 3 each units of 5,000, 10,000, 20,000 and 100,000 MWCO
13229 E	with 5,000 MWCO cellulose triacetate ultrafilter, pack of 12
13239 E	with 10,000 MWCO cellulose triacetate ultrafilter, pack of 12
13249 E	with 20,000 MWCO cellulose triacetate ultrafilter, pack of 12
13269 E	with 100,000 MWCO polyethersulfone ultrafilter, pack of 12
13279 E	with 300,000 MWCO polyethersulfone ultrafilter, pack of 12

Centrisart® C4 microfiltration units for particle removal.
Centrisart C4 0,2 µm units are designed for centrifugal small volume microfiltration. Major applications are the removal of agarose particles from DNA eluted from gels and retention of cells and bacteria.

Specifications for Centrisart C4

Maximal capacity	0.4 ml
Maximal centrifugal force	10,000 × g
Filter area	0.28 cm^2
Hold-up volume	less than 4 µl
Materials	Polypropylene centrifuge tube, cap and inner tube. Cellulose acetate membrane filter (0.2 µm pore size). Silicone O-ring
Filtration rate	Particle removal with 0.2 µm units takes 30 minutes at most.

Order number for Centrisart C4

13207 C4-G	0.2 µm (pack of 25)

The Vivaspin range of centrifugal concentrators for volumes from 500 µl to 20 ml.

Vivaspin 500
Vivaspin 500 centrifugal filter units offer a simple, one step procedure for sample preparation. They can effectively be used in either swing out or fixed angle rotors accepting 2.2 ml centrifuge tubes.

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

Vivaspin 2
The Vivaspin 2 bridges the gap between the 500 µl and 6 ml centrifugal concentrators. This device combines the speed of the classic Vivaspin products with low internal surface and membrane area for superior recoveries from very dilute solutions.

Available with a choice of PES, Cellulose Triacetate and Regenerated Cellulose membranes, Vivaspin 2 offers the highest flexibility for process optimisation.

Vivaspin 6 and Vivaspin 20
The Vivaspin 6 and 20 centrifugal concentrators have been developed to offer increased volume flexibility and performance.

Vivaspin 6 can process a record 6 ml in either swing bucket or fixed angle rotors accepting standard 15 ml conical bottom test tubes.

Vivaspin 20 handles up to 20 ml in swing bucket centrifuges, 14 ml in 25° fixed angle rotors accepting 50 ml centrifuge tubes.

For further flexibility, the Vivaspin 20 can be used as a gas pressurised device.

Ordering information

Vivaspin 500 (100–500 µl samples)
Polyethersulfone Membrane, pack of 25

	Prod. No.
3,000 MWCO	VS0191
5,000 MWCO	VS0111
10,000 MWCO	VS0101
30,000 MWCO	VS0121
50,000 MWCO	VS0131
100,000 MWCO	VS0141
300,000 MWCO	VS0151
0.2 µm	VS0171

Vivaspin 2 (0.4–2 ml samples)
Polyethersulfone Membrane, pack of 25

3,000 MWCO	VS0291
5,000 MWCO	VS0211
10,000 MWCO	VS0201
30,000 MWCO	VS0221
50,000 MWCO	VS0231
100,000 MWCO	VS0241
0.2 µm	VS0271
Start pack (5 of each MWCO)	VS0251

Vivaspin 2 (0.4–2 ml samples)
Regenerated Cellulose Membrane, pack of 25

	Prod. No.
10,000 MWCO	VS02K1
30,000 MWCO	VS02L1
100,000 MWCO	VS02M1

Vivaspin 2 (0.4–2 ml samples)
Cellulose Triacetate Membrane, pack of 25

5,000 MWCO	VS02U1
10,000 MWCO	VS02V1
20,000 MWCO	VS02X1

Vivaspin 6 (2–6 ml samples)
Polyethersulfone Membrane, pack of 25

5,000 MWCO	VS0611
10,000 MWCO	VS0601
30,000 MWCO	VS0621
50,000 MWCO	VS0631
100,000 MWCO	VS0641
0.2 µm	VS0671
Start Pack.	VS06S1

Vivaspin 20 (5–20 ml samples)
Polyethersulfone Membrane, pack of 12

	Prod. No.
3,000 MWCO	VS2091
5,000 MWCO	VS2011
10,000 MWCO	VS2001
30,000 MWCO	VS2021
50,000 MWCO	VS2031
100,000 MWCO	VS2041
300,000 MWCO	VS2051
1,000,000 MWCO	VS2061
0.2 µm	VS2071
Start Pack. (2 of each 5 K, 10 K, 30 K, 50 K, 100 K, 0.2 µm)	VS20S1

Packs of 100 (VS500, VS2, VS6) and packs of 48 (VS20) are available (see special catalogue).

Special brochure available on request.

The Vivacell range of gas pressure concentrators for volumes from 10 ml to 250 ml.

Vivacell 70
Vivacell 70 combines the ease of use of centrifugal devices with the flexibility and control provided by pressurised ultrafiltration cells. Vivacell 70 is inexpensive, quick and easy to assemble, requires no tubing connections or stirring mechanisms and can be adapted to equipment availability or to specific user preferences.

The longitudinal membrane inhibits fouling, whilst the built-in dead stop will hinder further concentration when residual volume drops below 150 µl.

Vivacell 100
Vivacell 100 is the latest member of the Vivacell family and bridges the volume range between the Vivacell 70 and the Vivacell 250.

The patented vertical membrane design allows highest performance and unmatched flexibility.

Vivacell 100 is a unique and innovative concentrator for volumes from 20 ml to 100 ml, which utilizes Pressure, Centrifuge, Shaking or Pressure-Shake to rapidly concentrate even samples with very high particle loading.

Vivacell 100 is designed for centrifugal concentration of samples up to 100 ml which makes it the largest centrifugal unit available. At the same time, the new construction design allows for maximum centrifugal force of 4.000 × g to be used for even faster concentration.

Vivacell 250
The Vivacell 250 is a totally new concept for the concentration of larger biological samples. This product offers numerous advantages when compared to stirred cells.

The Vivacell 250 handles a volume range from under 50 ml to 250 ml. Use free standing on a bench top or in a refrigerator for maximum simplicity, or use on laboratory shaker for fastest concentrations.

The unique conical dead stop built into the bottom of the membrane insert allows concentrations to under 1 ml.

The gentle vortex action controls membrane polarisation whilst greatly reducing the shear effects typical of stirring mechanisms.

Ordering information

Vivacell 70 (10–70 ml samples) Includes Polycarbonae filtrate bottles, pack of 2	
	Prod. No.
5,000 MWCO PES	VS6011
10,000 MWCO PES	VS6001
30,000 MWCO PES	VS6021
50,000 MWCO PES	VS6031
100,000 MWCO PES	VS6041
0.2 µm PES	VS6071

Vivacell 100 (10–100 ml samples) Includes Polycarbonae filtrate bottles, pack of 2	
	Prod. No.
5,000 MWCO PES	VC1011
10,000 MWCO PES	VC1001
30,000 MWCO PES	VC1021
50,000 MWCO PES	VC1031
100,000 MWCO PES	VC1041
300,000 MWCO PES	VC1051
1,000,000 MWCO PES	VC1061
0.2 µm	VC1071

Vivacell 250 (50–250 ml samples)	
	Prod. No.
Vivacell 250, complete with accessories	VCA250
Vivacell 250 Membrane Inserts, pack of 5	
5,000 MWCO PES	VC2511
10,000 MWCO PES	VC2501
30,000 MWCO PES	VC2521
50,000 MWCO PES	VC2531
100,000 MWCO PES	VC2541
Starter Kit (One of each membrane MWCO)	VC2551

For larger packs and list of accessories see special cataloque.

The Vivaflow range of tangential flow concentrators for volumes from 500 ml to over 5 liters.

Vivaflow 50

The novel Vivaflow system (patents pending) provides a standard of ease of use, performance, flexibility and economy which is unrivalled by any laboratory or pilot scale filtration system on the market.

Thin channel flip-flow recirculation path provides high cross flow velocities with minimum pump requirements. Unique Interlocking modules with series connectors for easy scale up.

A single 50 cm^2 module will typically reduce 500 ml to less than 15 ml in under 50 minutes. Less than 500 µl non recoverable hold up volume.

Vivaflow 200

Concentrate 250 ml to under 20 ml in just a few minutes or concentrate one litre 50 times in less than 30 minutes. Alternatively, use two Vivaflow 200 in parallel and concentrate 5 litres in under 75 minutes.

Near total sample recoveries can be expected with most solutions. Desalting or buffer exchange is just as quick when using the optional recirculation assembly available from Vivascience.

The economical standard package comes complete with tubing, pressure control gauge, flow restrictor and high pressure pump tubing. All you need is a peristaltic pump capable of handling 6.4 mm OD (size 16) tubing.

Ordering information

VivaFlow 50 (pack of 2)
Includes size 16 tygon peristaltic tubing, Luer fittings, filtrate tube and flow restrictor

	Prod. No.
5,000 MWCO PES	VF05P1
10,000 MWCO PES	VF05P0
30,000 MWCO PES	VF05P2
50,000 MWCO PES	VF05P3
100,000 MWCO PES	VF05P4
0.2 µm PES	VF05P7
10,000 MWCO RC	VF05C0
30,000 MWCO RC	VF05C2
100,000 MWCO RC	VF05C4

For accessories see special catalogue.

VivaFlow 20 (1 unit)
Includes pressure indicator, flow restrictor, size 16 tygon persitaltic tubing and fittings

	Prod. No.
5,000 MWCO PES	VF20P1
10,000 MWCO PES	VF20P0
30,000 MWCO PES	VF20P2
50,000 MWCO PES	VF20P3
100,000 MWCO PES	VF20P4
0.2 µm (PES)	VF20P7
10,000 MWCO (RC)	VF20C0
30,000 MWCO (RC)	VF20C2
100,000 MWCO (RC)	VF20C4
10,000 MWCO (Hydrosart®)	VF20H0
30,000 MWCO (Hydrosart®)	VF20H2

miniPERM | Lab Scale Protein Production.

A step forward in cell culture
miniPERM is an economical easy-to-use bioreactor which simplifies high density cultivation of hybridoma and other cell types. The main focus is laid on cost efficient production of antibodies and other desired extracellular products in high concentration.

miniPERM is suitable for cultivation of a variety of cell types. Suspension cells and anchorage dependent cells can be cultivated in the miniPERM. Cells densities greater than 10^7 cells/ml and product concentrations of several mg/ml can be achieved.

Applications
miniPERM is appropriate for use in a wide spectrum of research and laboratory applications:
- Hybridoma
- Transfected cells
- Production of viruses
- Insect cells
- Plant cells
- Production of biomass

miniPERM is available in two versions:
- single-use bioreactor, completely assembled and sterilized
- reusable nutrient module and sterile single-use production module

miniPERM construction
miniPERM consists of a production module (with culture volumes of 5, 35 or 50 ml) and a nutrient module which serves as a medium reservoir (400 ml).

Basic principle
When assembled, the modules are separated by a semi-permeable dialysis membrane. Neither the cells, nor high molecular weight products released by the cells are able to pass through the membrane. However, nutrients and dissolved gases can diffuse from the nutrient module into the production module. Low molecular weight metabolites can leave the production module via the dialysis membrane where they are diluted in the medium of the nutrient module.

The outer side of the production module is sealed with a thin, gas-permeable silicone membrane for an optimal exchange of O_2 and CO_2.

Cultivation
In the miniPERM the cell suspension must be circulated constantly, preferably on the Universal Turning Device. Then cells are optimally supplied and their metabolic waste products are removed.

Ordering Information

Kits	Contents	miniPERM classic	miniPERM SM
miniPERM Kit	12 Production Modules, 4 Nutrient Modules, 4 Stands	IV-76001052	IV-76077617
miniPERM SM Kit Sterile	4 miniPERM Bioreactors	IV-76001059	IV-76077618
miniPERM Test Kit 1 Start-up Support Kit	4 Production Modules, 2 Nutrient Modules,	IV-76001058	IV-76077619
miniPERM Test Kit Sterile	4 Bioreactors, 1 Start-up Support Kit	IV-76077009	IV-76077609
Production module	1 Pack (12 units)	IV-76001055	IV-76077616

Special brochure available on request.

quadriPERM, flexiPERM, petriPERM.

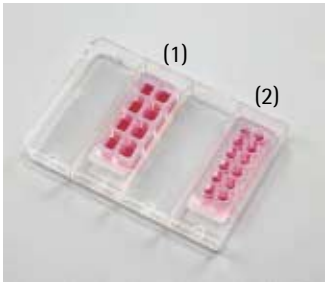
Cell culture vessel for parallel investigations

The rectangular quadriPERM cell culture vessel with its four subdivisions, offers space for slides with universally recognised dimensions (26 × 76 mm). Cells can be grown simultaneously in the four separate compartments under identical conditions, either on coated or un-coated slides or without slides.

Applications
Cells can be fixed, stained and immunohistologically tagged. Cells grown on slides in quadriPERM can be used for all molecular biological and immunological detection methods.

- In-situ preparation of amniotic cells
- Chromosome analysis
- Micronucleus assay
- Replication studies
- Cytoskeleton staining
- Immunfluorescence tests (FISH)

flexiPERM – The flexible cell culture chamber

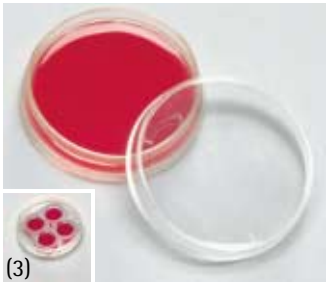


flexiPERM, a reusable cell culture insert made of silicone, can be combined with standard microscope slides (26 × 76 mm) and petri dishes, creating multiple growth chambers.

flexiPERM is heat and cold resistant, hydrophobic and non-toxic to cells. Because of its highly adhesive underside, it sticks to all smooth surfaces, e.g. glass, plastic and foil.

flexiPERM slide (1) with 8 and flexiPERM micro 12 (2) with 12 subdivisions, are perfect for parallel cell culture studies on DIN standard microscope slides. flexiPERM disc (3) splits every 50 mm diameter petri dish (e.g. petriPERM) into four separate cell culture chambers.

Cell culture dish with gas-permeable base



petriPERM is a cell culture dish with a gas-permeable base made of a 25 µm thick plastic foil (bioFOLIE). The cells grow directly on the border between gas and liquid phase, where the culture medium does not act as a diffusion barrier. Therefore an optimal transfer of CO_2 and O_2 is guaranteed.

Optimal growth conditions
petriPERM is available with a diameter of 50 and 35 mm. The user can choose between a hydrophilic or a hydrophobic culture surface. Therefore, both adherent and suspension cells can be cultivated on petriPERM.

For sensitive cells we offer petriPERM 50 in tissue culture (TC) quality with a hydrophilic culture surface which guarantees high adherence for cells.

Ordering Information

	Pack Size	Cat. No.
quadriPERM	192, (16 × 12), sterile	IV-76077308
flexiPERM micro 12	5, reusable	IV-50011436
flexiPERM slide	5, reusable	IV-50032039
flexiPERM disc	5, reusable	IV-50034067
petriPERM 35 hydrophilic	50, sterile	IV-76077331
petriPERM 35 hydrophobic	50, sterile	IV-76077333
petriPERM 50 hydrophilic	50, sterile	IV-76077303
petriPERM 50 hydrophobic	50, sterile	IV-76077306
petriPERM 50 TC hydrophilic	50, sterile	IV-76077410

Sartocon® Slice. The pilot-scale crossflow system for batches of 1 to 100 litres.

Sartocon Slice cassettes have the same materials and the same construction and therefore also the identical flow path length as the Sartocon cassettes, used for larger production scale. The scale-up and the scale-down is perfectly linear throughout the range of applications, from protein purification and concentration to cell harvesting and blood filtration. Validation requirements, and their high costs, are greatly reduced or entirely eliminated.

All cassettes have an excellent chemical compatibility, covering a wide pH-range. Depending on the MWCO, they are autoclavable or in-line steamable, so that they can be easily and efficiently cleaned and sterilized prior to re-use.

The Sartocon Slice holding system can accommodate up to three Sartocon Slice cassettes. It is designed for maximum performance and ease of cleaning. The construction with all process connectors on a stationary plate allows the fixed tubing of the holder and an effective cleaning. Sartoflow alpha is an optimised ultrafiltration system including pump with optional data recording.

Specifications for Sartocon Slice Cassettes:

Biosafety	All materials pass the USP Plastics Test Class VI.
Chemical compatibility	pH 2–14 (Hydrosart), pH 1–14 (polyethersulfone)
Filter area	0.1 m^2
Application limits	Max. 4 bar inlet pressure. Max. 50°C operating temperature

Order numbers for the Sartocon Slice holding system:

17521-001	Sartocon Slice holding device (without accessories)
17521-101	Sartocon Slice Set with accessories for microfiltration
17521-102	Sartocon Slice Set with accessories for ultrafiltration

Order numbers for the Sartocon Slice Cassettes:

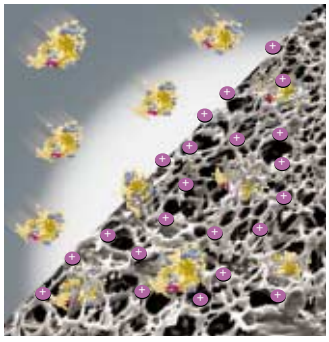
3051860601W--SG	Hydrosart, 0.45 µm pore size
3051860701W--SG	Hydrosart, 0.2 µm pore size
30518606010--SG	Hydrosart, 0.45 µm open channel
30518607010--SG	Hydrosart, 0.2 µm open channel
3051467901E--SG	Polyethersulfone, 300,000 MWCO
3051466801E--SG	Polyethersulfone, 100,000 MWCO
3051465001E--SG	Polyethersulfone, 50,000 MWCO
3051465901E--SG	Polyethersulfone, 30,000 MWCO
302146AL01K--SG	PESU max. for albumin
3051463401E--SG	Polyethersulfone, 8,000 MWCO
3051463901E--SG	Polyethersulfone, 10,000 MWCO
3051462901E--SG	Polyethersulfone, 5,000 MWCO
3051460901E--SG	Polyethersulfone, 1,000 MWCO
3051442901E--SG	Hydrosart, 5,000 MWCO
3051443901E--SG	Hydrosart, 10,000 MWCO
3051445901E--SG	Hydrosart, 30,000 MWCO

The Vivapure range of ion exchange spin columns for rapid protein separation and purification.

New Vivapure spin columns employ an innovative and powerful ion exchange membrane technology for purification of proteins. Vivapure purification protocols allow the isolation of ultrapure proteins with high yield in less than 30 minutes.

Separation of pure proteins from complex mixtures is a key process in biomedical research and other biological disciplines. One of the most widely used techniques to separate proteins is ion exchange chromatography, but this typically involves lengthy procedures and expensive equipment.

Vivapure centrifugal ion exchange membrane spin columns will dramatically change the way you isolate and purify proteins.



Rapid
Vivapure replaces time-consuming, tedious and expensive methods such as HPLC and FPLC® for many protein applications. The rapid purification protocol based on membrane adsorbers allows the isolation of ultrapure protein with high yield in less than 30 minutes. Ion exchange separation is the most widely used technique for chromatographic separation of proteins.

User friendly
Vivapure spin columns are available with strong or weak cation or anion charged membrane matrices. With these ion exchange membrane devices, protein binding, elution and consequent purification and concentration are made almost as simple as filtration.

High purity sample
The protein sample purified using the Vivapure spin column can be used in downstream applications including SDS-PAGE gel electrophoresis, Western blotting, iso-electric focusing, X-ray crystallisation, NMR spectroscopy, MALDI-TOF mass spectrometry and related proteomics applications.

Ordering Information

Vivapure Mini (up to 0.5 ml), pack of 24		Vivapure Maxi (up to 20 ml), pack of 8	
VS-IX01CH24	Carboxyl, weak cation	VS-IX20CH08	Carboxyl, weak cation
VS-IX01DH24	Diethylamine, weak anion	VS-IX20DH08	Diethylamine, weak anion
VS-IX01QH24	Quaternary ammonium, strong anion	VS-IX20QH08	Quaternary ammonium, strong anion
VS-IX01SH24	Sulfonic acid, strong cation	VS-IX20SH08	Sulfonic acid, strong cation
VS-IX01ST16	Starter kit (4 each)		

Vivapure Mini are available in high (H), medium (M) and low (L), Vivapure Maxi in high (H) and medium (M) protein binding capacity. For detailed information see special brochure.

Special brochure available on request.

Ultrasart D20 for undisturbed LAL tests.

Ultrasart D20
The Limulus Amoebocyte Lysate test is commonly used in the pharmaceutical quality control. The ready-to-use ultrafiltration units Ultrasart D20 allow the removal of disturbing, low-molecular substances out of LAL-test samples within 15–30 minutes, without reducing the sensitivity of the test.

Specifications

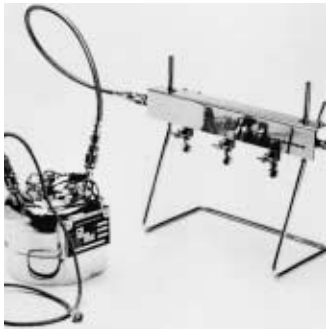
Chemical compatibility	resistant to aqueous solutions of pH 3–9, and when contacting 1M amino acid up to 2 hours
Filtration area	5.3 cm^2
Flow rate	for water at 1 bar, 2 ml/min
Materials	Cellulose triacetate ultrafilter (20,000 D MWCO, 100% endotoxin retention), SAN and MBS-cyrolite housing
Max. sample volume	15 ml

Order numbers

16520 C	Ultrasart D20 ultrafiltration units, sterile and pyrogen-free (pack of 6)

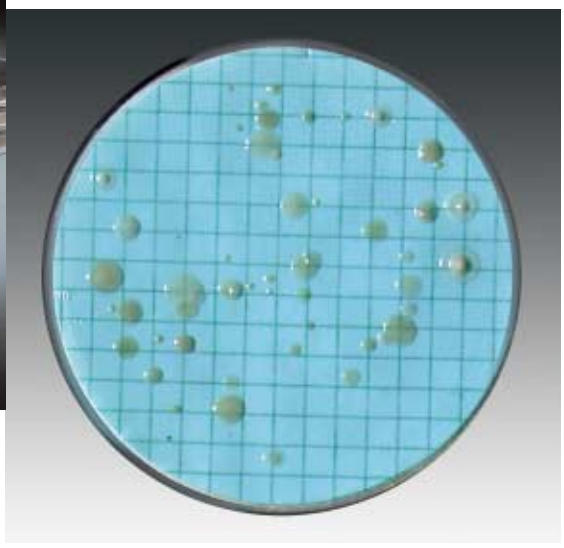
Accessories

Pressure system for Ultrasart D20
Order number: 16506
Consists of a pressure manifold for 3 Ultrasart D20 units, taps for individual control of pressure and/or flow and air venting, a 3 litre pressure tank and connecting hoses. Additional pressure manifolds can be connected by using an adapter 17152 or 17153.



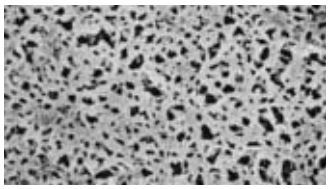
Depyrogenation, after removal of the pressure gauge, at up to 200°C.

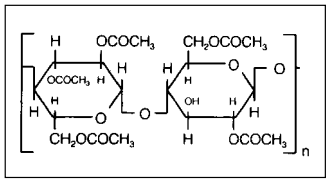
Max. operating pressure, 5 bar.



Membrane Filters and Nutrient Pad Sets for use in analysis, research and control.

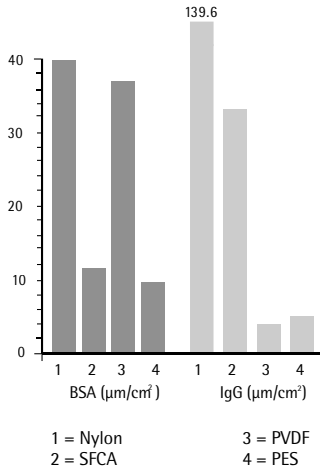
Low adsorption Cellulose Acetate membranes, type 111, for the filtration of aqueous solutions.





Cellulose acetate membranes combine high flow rates and thermal stability with very low adsorption characteristics, and are therefore excellently suited for use in pressure filtration devices.The membrane with 0.2 µm is the filter of choice for sterile filtration of aqueous solutions, such as nutrient media, buffers and sera.

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 graph shown below presents results of our application laboratories. 0.2 membranes of different materials were first autoclaved, in order to simulate normal usage conditions. The adsorption (µg/cm²) was then measured.



Specifications for Cellulose Acetate membrane filters

Adsorption	see graph, bottom left
Extractables with water	less than 1%
Autoclaving	at 121°C or 134°C
Bubble Point acc. DIN 58355	minimum value for 0.2 µm = 3.3 bar (330 kPa), for 0.45 µm = 1.9 bar (190 kPa), for 0.65 µm = 1.3 bar (130 kPa), for 0.8 µm = 0.8 bar (80 kPa)
Chemical compatibility	resistant to aqueous solutions, pH 4–8, against most alcohols, hydrocarbons and oils
Thickness	average value 120 µm
Flow rate for water	average value per cm^2 area at Δp = 1 bar (100 kPa): 25 ml/min for 0.2 µm, 69 ml/min for 0.45 µm, 130 ml/min for 0.65 µm, 200 ml/min for 0.8 µm pore size
Material	cellulose acetate
Sterilizing filtration	filters with 0.2 µm pore sizes are validated by Bacteria Challenge Tests.
Sterilization	by autoclaving, with γ-radiation, dry heat or ethylene oxide
Thermal stability	max. 180°C

Order Numbers for Cellulose Acetate membrane filters

13 mm diameter:

11104-013N	0.8 µm, pack of 100
11106-013N	0.45 µm, pack of 100
11107-013N	0.2 µm, pack of 100

25 mm diameter:

11104-025N	0.8 µm, pack of 100
11105-025N	0.65 µm, pack of 100
11106-025N	0.45 µm, pack of 100
11107-025N	0.2 µm, pack of 100

30 mm diameter:

11106-030N	0.45 µm, pack of 100
11107-030N	0.2 µm, pack of 100

47 mm diameter:

11104-047N	0.8 µm, pack of 100
11105-047N	0.65 µm, pack of 100
11106-047N	0.45 µm, pack of 100
11107-047N	0.2 µm, pack of 100

50 mm diameter:

11104-050N	0.8 µm, pack of 100
11105-050N	0.65 µm, pack of 100
11106-050N	0.45 µm, pack of 100
11107-050N	0.2 µm, pack of 100
11107-050ACN	0.2 µm, pack of100 individually, sterile packed

85 mm diameter:

11106-085N	0.45 µm, pack of 100

90 mm diameter:

11106-090G	0.45 µm, pack of 25
11107-090G	0.2 µm, pack of 25

100 mm diameter:

11106-100G	0.45 µm, pack of 25
11106-100N	0.45 µm, pack of 100
11107-100G	0.2 µm, pack of 25
11107-100N	0.2 µm, pack of 100

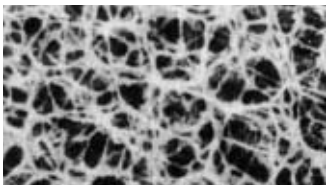
142 mm diameter:

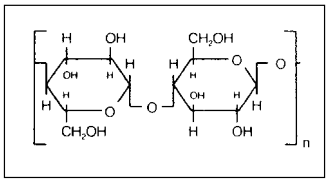
11104-142 G	0.8 µm, pack of 25
11104-142 N	0.8 µm, pack of 100
11105-142 G	0.65 µm, pack of 25
11106-142 G	0.45 µm, pack of 25
11106-142 N	0.45 µm, pack of 100
11107-142 G	0.2 µm, pack of 25
11107-142 N	0.2 µm, pack of 100

293 mm diameter:

11104-293 G	0.8 µm, pack of 25
11104-293 N	0.8 µm, pack of 100
11105-293 G	0.65 µm, pack of 25
11106-293 G	0.45 µm, pack of 25
11106-293 N	0.45 µm, pack of 100
11107-293 G	0.2 µm, pack of 25
11107-293 N	0.2 µm, pack of 100

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:

Acetone	Hexane
Acetonitrile	Isobutanol
Gasoline	Isopropanol
n-Butanol	Methylene
Cellosolve (ethyl)	Methylene chloride
Chloroform	Methyl ethyl ketone
Diethyl acetamide	Pentane
Dimethylsulfoxide	Tetrahydro-furan
Dioxane	Toluene
Acetic acid (96%)	Trichloro-acetic acid (25%)
Ethanol	Trichlor-ethane
Ethyl acetate	Water
Ethylene glycol	Xylene
Freon TF	

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 29.

Regenerated cellulose membranes also feature low non-specific adsorption.

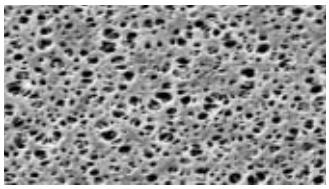
Specifications for Regenerated Cellulose membranes

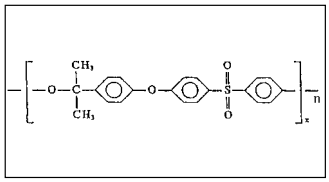
Adsorption	Ca. 24 µg/cm² for 0.2 µm pore size, 18 µg/cm² for 0.45 µm pore size
Extractables	With water, less than 1%
Bubble-Point acc. DIN 58355	Min. values, wetted with water, 4.4 bar (440 kPa) for 0.2 µm, 2.8 bar (280 kPa) for 0.45 µm
Chemical compatibility	Resistant to almost all solvents (see table below left) and against aqueous solutions in the pH-range 3–12. Further details on p. 107
Thickness	Average value 180 µm
Flow rate	Average value per cm² area for water at 1 bar (100 kPa) pressure, 15 ml/min for 0.2 µm, 28 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), and gamma radiation (25 kGy) or with ethylene oxide
Validation	The correlation of the bubble point values of the membranes of 0.2 µm pore size to the reliability of sterilizing filtration has been validated by standard Bacteria Challenge Tests.

Order Numbers for regenerated cellulose membranes

13 mm diameter:	
18406-013N	0.45 µm (pack of 100)
18407-013N	0.2 µm (pack of 100)
25 mm diameter:	
18407-025N	0.2 µm (pack of 100)
47 mm diameter:	
18406-047N	0.45 µm (pack of 100)
18407-047N	0.2 µm (pack of 100)
50 mm diameter:	
18407-050N	0.2 µm (pack of 100)
100 mm diameter:	
18406-100G	0.45 µm (pack of 25)
142 mm diameter:	
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:	
18406-293G	0.45 µm (pack of 25)
18407-293G	0.2 µm (pack of 25)

Polyethersulfone membrane filter, type 154, for the filtration of aqueous and aggressive solutions.





The new polyethersulfone membrane filters have excellent flow speeds and, connected to it, a high filterable volume.

Biologic and pharmaceutic solutions can be filtered, in the wide pH-range of pH 2-12, because of their low protein adsorption.

Furthermore, the membranes are very well suitable for samples of the environmental sector.

The filters with 0.1 µm are used for the ultracleaning of solutions, e.g. in case of nephelometry.

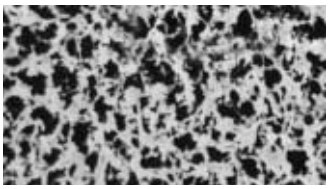
Specifications for Polyethersulfone Membrane Filters

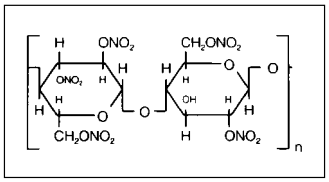
Adsorption	10 µg/cm² for IgG, 5 µm/cm² for BSA, 1.9 µg/cm² for insulin
Extractables with water	less than 0.2 %
Autoclavable	at 121°C or 134°C
Bubble point acc.	0.1 µm with Isopropanol/water (60/40)
DIN 58355	≥2.1 bar 0.2 µm = 3.2 bar (320 kPa) 0.45 µm = 2.3 bar
Chemical compatibility	resistant to some solutions and aggressive. aqueous solutions, pH 2–12
Thickness average value	140 µm
Flow rate for water	average value per cm² area at ΔP = 1 bar (100 kPa): 0.1 µm – > 7 ml/min. 0.2 µm – >28 ml/min. 0.45 µm – >32 ml/min.
Material	Polyethersulfone
Sterilization capacity	filters with 0.2 µm pore sizes have been validated with the Bacteria Challenge Test
Sterilization	by autoclaving, gamma radiation or with ethylenoxide

Order Numbers for Polyethersulfone, Type 154

25 mm diameter:	
15458-025N	0.1 µm (pack of 100)
15407-025MIN	0.2 µm (pack of 100)
15406-025N	0.45 µm (pack of 100)
47 mm diameter:	
15458-047N	0.1 µm (pack of 100)
15407-047MIN	0.2 µm (pack of 100)
15406-047N	0.45 µm (pack of 100)
50 mm diameter:	
15458-050N	0.1 µm (pack of 100)
15407-050MIN	0.2 µm (pack of 100)
15406-050N	0.45 µm (pack of 100)

Cellulose Nitrate membrane (ester) filters, type 113, for sample pretreatment, particle testing and chemotaxis.

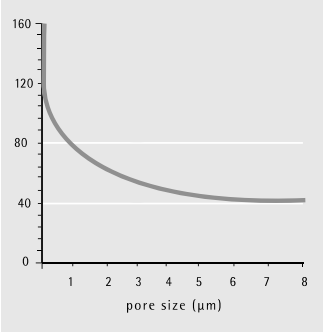




Cellulose nitrate is a standard material for membrane filters and offers a wide range of pore sizes from 8 µm to 0.45 µm. The larger pore sizes (8 µm, 5 µm, 3 µm) find use for chemotaxis and cell retention, the 0.45 µm pore size for particle collection.

The high non-specific adsorption of the cellulose nitrate membrane is very advantageous for diagnostic kits.
The adsorption decreases with increasing pore size, as shown in the diagram below.

Adsorption
(µm g-Globulin/cm²)



Specifications for cellulose nitrate (ester) membrane filters

Adsorption	see diagram, bottom left
Extractables with water	less than 1%
Sterilization	by autoclaving, at 121°C
Bubble Point	wetted with water, minimum values:
acc. DIN 58355	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
	2.4 bar (240 kPa) for 0.45 µm pore size, 11306
Chemical compatibility	resistant to aqueous solutions in the pH-range 4-8 to hydrocarbons and to some solvents
Thickness	130 µm
Flow rate for water	average values per cm^2 area at Δp = 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
Material	Cellulose nitrate
Sterilization	by autoclaving, γ-radiation (25 kGy) or with ethylene oxide
Thermal stability	max. temperature 130°C

Order numbers for cellulose nitrate membrane filters see next page

Order numbers for cellulose nitrate membrane filters type 113

13 mm diameter:
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

20 mm diameter:
11304-020N 0.8 µm, pack of 100
11306-020N 0.45 µm, pack of 100

25 mm diameter:
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

30 mm diameter:
11306-030N 0.45 µm, pack of 100

37 mm diameter:
11301-037N 8 µm, pack of 100
11304-037N 0.8 µm, pack of 100
11306-037N 0.45 µm, pack of 100

47 mm diameter:
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

50 mm diameter:
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

80 mm diameter:
11301-080ALN 8 µm, pack of 100
sterile, non-individually packed

85 mm diameter:
11306-085N 0.45 µm, pack of 100

90 mm diameter:
11342-090G 5 µm, pack of 25
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

142 mm diameter:
11301-142G 8 µm, pack of 25
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
11342-142G 5 µm, pack of 25
11342-142N 5 µm, pack of 100

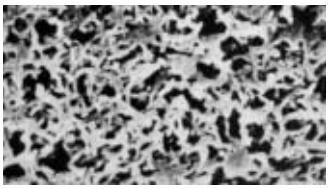
293 mm diameter:
11301-293G 8 µm, pack of 25
11303-293G 1.2 µm, pack of 25
11304-293G 0.8 µm, pack of 25
11304-293N 0.8 µm, pack of 100
11306-293G 0.45 µm, pack of 25
11306-293N 0.45 µm, pack of 100
11342-293G 5 µm, pack of 25

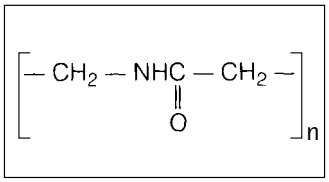
47 mm and 50 mm filters are, in some pore sizes, sterile, individually packed, available in packs of 100.

Order numbers are the following:
47 mm diameter:
11301-047 ACN 8 µm
11302-047 ACN 3 µm
11303-047 ACN 1.2 µm
11304-047 ACN 0.8 µm
11305-047 ACN 0.65 µm
11306-047 ACN 0.45 µm

50 mm diameter:
11301-050 ACN 8 µm
11302-050 ACN 3 µm
11303-050 ACN 1.2 µm
11304-050 ACN 0.8 µm
11305-050 ACN 0.65 µm
11306-050 ACN 0.45 µm

Polyamide membrane filters, type 250, for the filtration of alkaline solutions and organic solvents.





Polyamide membrane filters are hydrophilic and chemically resistant to alkaline solutions and organic solvents. They are therefore recommended for particle-removing filtration of water, aqueous solutions and solvents for analytical determination such as HPLC, as well as for the sterile filtration of these liquids.

They are also highly recommended for the isolation of legionella.

Their relatively high non-specific adsorption, which can cause loss of important substances, e.g. from tissue culture solutions, limit their application. For these kind of solutions, the low adsorption cellulose acetate membrane filters, type 111, described on page 78, are preferred.

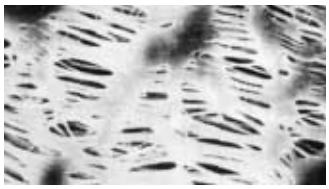
Specifications for polyamide membrane filters

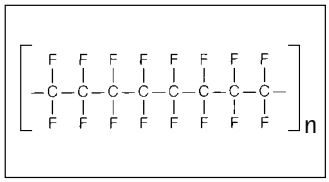
Adsorption	100 µg/cm² for bovine serum albumin (0.2 µm pore size)
Extractables with water	less than 0.2 %
Autoclaving	at 121°C or 134°C
Bubble Point acc. DIN 58355	minimum value for 0.2 µm = 3.4 bar (340 kPa), for 0.45 µm = 2.2 bar (220 kPa).
Chemical compatibility	resistant to many solvents and alkali-solutions.
pH-range	3–14
Thickness	average value 125 µm
Flow rate for water	average value per cm² area at Δp = 1 bar (100 kPa): >12 ml/min for 0.2 µm, >26 ml/min for 0.45 µm pore size
Material	Polyamide
Sterilizing filtration	filters with 0.2 µm pore size are validated by the Bacteria Challenge Test.
Sterilization	by autoclaving or with ethylene oxide

Order Numbers for polyamide membrane filters

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

Hydrophobic PTFE Membranes, type 118, for the filtraton of air, gases or chemicals.





The main application of this membrane filter types is the air/gas filtration.
They are made purely of PTFE (polytetra-fluorethylene), and are therefore permanently hydrophobic. Unlike other (hydrophilic) filter types, they are not wetted by air humidity, allowing unhindered passage of air also at low differential pressures.

PTFE membrane filters have an excellent chemical compatibility, so that they are also used for the filtration of solutions and acids, to which other filter types are resistant. Due to their hydrophobic characteristics, they must be pre-wetted with ethanol or methanol before the filtration of aqueous media.

Specifications for PTFE membrane filters

Adsorption	8 µg/cm² for gamma-globulin (0.2 µm pore size)
Extractables with water	none detectable
Autoclaving	at 121°C or 134°C
Bubble Point acc. DIN 58355	minimum value for 0.2 µm = 1.2 bar (120 kPa), for 0.45 µm = 0.8 bar (80 kPa). Average value for 1.2 µm = 0.45 bar (45 kPa), for 5 µm = 0.1 bar (10 kPa)
Chemical compatibility	resistant to almost all chemicals
Thickness	average values, 65 µm for 0.2 µm and 100 µm for 5 µm pore size
Flow rate for air	average values per cm² area at Dp = 0.05 bar (5 kPa): 0.2 l/min for 0.2 µm, 0.3 l/min for 0.45 µm, 1.6 l/min for 1.2 µm and 4 l/min for 5 µm pore size
Material	Polytetrafluorethylene
Sterilization capacity	filters with 0.2 µm pore size are validated with the Bacteria Challenge Test.
Sterilization	by autoclaving or with ethylene oxide

Order Numbers for PTFE membrane filters

13 mm diameter:

11803-013N	1.2 µm, pack of 100
11806-013N	0.45 µm, pack of 100
11807-013N	0.2 µm, pack of 100

25 mm diameter:

11842-025N	5 µm, pack of 100
11803-025N	1.2 µm, pack of 100
11806-025N	0.45 µm, pack of 100
11807-025N	0.2 µm, pack of 100

47 mm diameter:

11842-047N	5 µm, pack of 100
11803-047N	1.2 µm, pack of 100
11806-047N	0.45 µm, pack of 100
11807-047N	0.2 µm, pack of 100

50 mm diameter:

11842-050N	5 µm, pack of 100
11803-050N	1.2 µm, pack of 100
11806-050N	0.45 µm, pack of 100
11807-050N	0.2 µm, pack of 100

100 mm diameter:

11842-100G	5 µm, pack of 25
11803-100G	1.2 µm, pack of 25
11806-100G	0.45 µm, pack of 25
11807-100G	0.2 µm, pack of 25

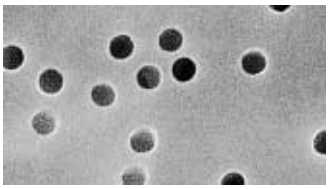
142 mm diameter:

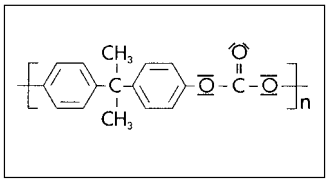
11842-142G	5 µm, pack of 25
11803-142G	1.2 µm, pack of 25
11806-142G	0.45 µm, pack of 25
11807-142G	0.2 µm, pack of 25

293 mm diameter:

11806-293G	0.45 µm, pack of 25
11807-293G	0.2 µm, pack of 25

Polycarbonate Track-Etch-Membranes, type 230, for the analysis of particles.





Polycarbonate Track-Etch-Membranes are manufactured from high grade polycarbonate film using track-etch technology. They retain particles on their surfaces. Their capillary pore structure is uniform and precise, with a narrow pore size distribution. Track-etch membranes are an excellent choice for accurate fractionation of particulates because of their precise pore size. In addition, their smooth, flat surface results in high particulate visibility.

Track-etch technology offers the user distinct performance advantages when excellent surface capture and high sample visibility are required. Applications: Particulate analysis, epifluorescence microscopy, fluid clarification, cytology, cell biology, bioassays, water microbiology, environmental analysis.

Specifications for polycarbonate membrane filters

Low extractables	
Autoclaving,	at 121° C
Thermal stability	max. temperature 140° C
Bubble Point	minimum value for 0.2 µm = 4.8 bar,
acc. DIN 58355	for 0.4 µm 2.5 bar
Chemical compatibility	see table
Thickness	6 –11 µm
Flow rate for water	20 ml/min/cm^2 for 0.2 µm,
	70 ml/min/cm^2 for 0.4 µm
Porosity	<15 %
Material	polycarbonate
Sterilization	by autoclaving

Order numbers

For polycarbonate membrane filters

25 mm diameter:
23007-25 N 0.2 µm, pack of 100, diameter 25 mm
23006-25 N 0.4 µm, pack of 100, diameter 25 mm

47 mm diameter:
23006-47 N 0.4 µm, pack of 100, diameter 47 mm
23007-47 N 0.2 µm, pack of 100, diameter 47 mm

Glass fibre prefilters for larger totally filterable volumes in clarification and sterile filtration.

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.

Specifications	
Autoclaving	121°C or 134°C
Thickness	ca. 0.55 mm for 13400
Flow rates for water	at Δp = 1 bar (100 kPa), 320 ml/min/cm^2 for 13400
Materials	13400, glass fibre with acrylic latex binder.
Max. temperature	220°C for 13400
Sterilization	by dry heat, at 180°C

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. 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.

Order Numbers

a) Type 13400. Standard glass fibre filters

13400-013S	13 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)
13400-100K	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

13430-127K	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

13440-042Q	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)
13440-130K	130 mm (pack of 50)

d) Type 13420. Polyester separators

13420-088K	88 mm (pack of 50)

For more glass fiber filters and for paper filters a detailed brochure is available.

Gridded Membrane filters, acc. to ISO 7704, ISO 7899-2, ISO 8199, ISO 9108-1, ISO 9308-1 and EN 12780 sterile and individually packed, for colony counts.

Sterile, individually packed filters have long become standard for routine microbiological quality control because of the user benefits they offer.

They are pre-sterilized and ready-to-use and save preparatory time. As they are individually packed, 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 increasing demand on these filters requires the construction of a new packaging machine with ultra-modern stamping. Each membrane is checked to ensure it is not dammaged 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. Quality control par excellence!

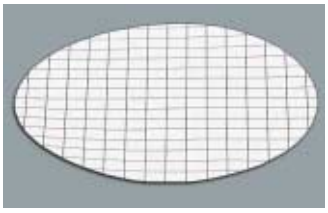
The membrane filters
All membranes are made of cellulose nitrate, a material which assures effective retention with high flow rates and optimum colony growth. The printed grid has a size of 3.1×3.1makes the counting easier, especially for higher bacteria counts and for micro colonies, but does not influence the growth. The various filter colours allow the best contrast to the colonies (see membrane filter types, chosen for the nutrient pad sets, page 89).

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

Specifications for gridded filter types, as for filter type 113 (page 81).

Order Numbers for sterile, individually packed membrane filters

1. Type 114, white with black grid, for bacteriologic research



47 mm diameter,
a) In packs of 100:

11403-047ACN	1.20 µm
11404-047ACN	0.80 µm
11405-047ACN	0.65 µm
11406-047ACN	0.45 µm
11407-047ACN	0.20 µm

b) In packs of 1000:

11406-050ACR	0.45 µm
11403-047ACR	1.20 µm
11404-047ACR	0.80 µm
11406-047ACR	0.45 µm

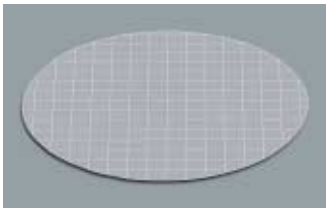
50 mm diameter,
a) In packs of 100:

11403-050ACN	1.20 µm
11404-050ACN	0.80 µm
11405-050ACN	0.65 µm
11406-050ACN	0.45 µm

b) In packs of 1000:

11406-050ACR	0.45 µm
11403-050ACR	1.20 µm

2. Type 130, grey (black after wetting) with white grid, for the detection of yeasts and moulds



47 mm diameter,
a) In packs of 100:

13004-047ACN	0.80 µm
13005-047ACN	0.65 µm
13006-047ACN	0.45 µm

b) In packs of 1000:

13004-047ACR	0.80 µm
13006-047ACR	0.45 µm

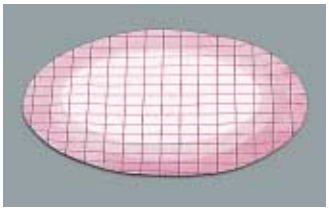
50 mm diameter,
a) In packs of 100:

13004-050ACN	0.80 µm
13005-050ACN	0.65 µm
13006-050ACN	0.45 µm

b) In packs of 1000:

11403-050ACR	1.20 µm
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 edge
47 mm diameter,
In packs of 100:

13106-047ACN	0.45 µm
13107-047ACN	0.20 µm

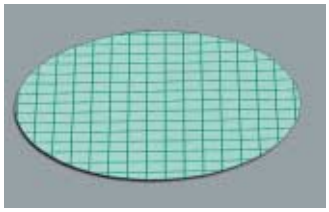
50 mm diameter,
In packs of 100:

13106-050ACN	0.45 µm
13107-050ACN	0.20 µm

3b. With 6 mm edge
47 mm diameter,
In packs of 100:

13106-047HEN	0.45 µm

4. Type 138, green with dark-green grid, for bacteriological research



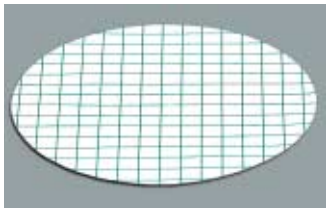
47 mm diameter,
a) In packs of 100:
13806-047ACN 0.45 µm

b) In packs of 1000:
13806-047ACR 0.45 µm

50 mm diameter,
a) In packs of 100:
13806-050ACN 0.45 µm

b) In packs of 1000:
13806-050ACR 0.45 µm

5. Type 139, white with green grid, for the research on E.coli and coliform germs



47 mm diameter,
a) In packs of 100:
13903-047ACN 1.20 µm
13906-047ACN 0.45 µm

b) In packs of 1000:
13905-047ACN 0.65 µm
13906-047ACR 0.45 µm

50 mm diameter,
a) In packs of 100:
13906-050ACN 0.45 µm

b) In packs of 1000:
13906-050ACR 0.45 µm

6. Type 113, white, no grid, for prefilter holder 16807, page 36

47 mm diameter,
In packs of 100:
11301-047ACN 8 µm

50 mm diameter,
In packs of 100:
11301-050ACN 8 µm

7. Dispenserfilter ... SCM

47 mm diameter,
contains 3 boxes of 100 membranes
white|grey
11406--47----SCM* 0.45 µm
grey|white
13006--47----SCM 0.45 µm
green|dark green
13806--47----SCM 0.45 µm

* 50 mm are available on request

Gridded membrane filter, non-sterile, not individually packed, for particle testing and microcospy

1. Type 114, white with black grid

25 mm diameter,
In packs of 100:
11403-025N 1.20 µm
11404-025N 0.80 µm
11406-025N 0.45 µm

37 mm diameter,
In packs of 100:
11404-037N 0.80 µm

47 mm diameter,
In packs of 100:
11403-047N 1.20 µm
11404-047N 0.80 µm
11405-047N 0.65 µm
11406-047N 0.45 µm

50 mm diameter,
In packs of 100:
11403-050N 1.20 µm
11404-050N 0.80 µm
11406-050N 0.45 µm

2. Type 130, grey (black after wetting) with white grid

25 mm grid,
In packs of 100:
13006-025N 0.45 µm
13001-025N 8.00 µm

47 mm diameter,
In packs of 100:
13001-047N 8.00 µm
13004-047N 0.80 µm
13005-047N 0.65 µm
13006-047N 0.45 µm

50 mm diameter,
In packs of 100:
13001-050N 8.00 µm
13004-050N 0.80 µm
13005-050N 0.65 µm
13006-050N 0.45 µm

3. a) Type 131, white with black grid and 3 mm pink-coloured, hydrophobic edge

25 mm diameter,
In packs of 100:
13106-025N 0.45 µm
13107-025N 0.20 µm

47 mm diameter,
In packs of 100:
13101-047N 8.00 µm
13106-047N 0.45 µm
13107-047N 0.20 µm

50 mm diameter,
In packs of 100:
13101-050N 8.00 µm
13106-050N 0.45 µm
13107-050N 0.20 µm

3. b) Type 131, with 6 mm pink-coloured, hydrophobic edge

47 mm diameter,
In packs of 100:
13106-047-HCN 0.45 µm

4. Type 138, green with dark-green grid

47 mm diameter,
a) In packs of 100:
13806-047N 0.45 µm
b) In packs of 1000:
13806-047R 0.45 µm

50 mm diameter,
a) In packs of 100:
13806-050N 0.45 µm
b) In packs of 1000:
13806-050R 0.45 µm

5. Type 139, white with green grid

47 mm diameter,
a) In packs of 100:
13906-047N 0.45 µm
b) In packs of 1000:
13906-047R 0.45 µm

50 mm diameter,
a) In packs of 100:
13906-050N 0.45 µm
b) In packs of 1000:
13906-050R 0.45 µm

6. Type 135, cellulose acetate, white, with hydrophobic edge

47 mm diameter,
In packs of 100:
13506-47ACN
13506-47HCN
13506-47N
13507-47ACN
13507-47N

50 mm diameter,
In packs of 100:
13506-50ACN

Dessicated media in Petri dishes, with matching membrane filters for economic, time-saving microbiologic quality control.

Sartorius Nutrient Pad Sets have been used successfully in combination with the membrane filter method for more than 20 years now. They ease and simplify a lot of microbiologic research procedure, due to their practical handling.

One nutrient pad set consists of a 50 mm pad, steadily impregnated with nutrient media, packed dry and sterile in a Petri dish, plus a suitable membrane filter, tested concerning colony growth, sterile and individually packed.

Directly after wetting with sterile, demineralised water, the nutrient pad set is ready to use.

Benefits for the user:
Economy.
No time-consuming and labour-intensive preparation of the nutrient media (sterilization, cleaning, etc.).

Easy handling.
Nutrient Pad Sets can also be used in laboratories without a comprising microbiologic equipment.

Consistent quality.
During the production, each Nutrient Pad Set batch is compared with the according agar medium, in order to guarantee consistent quality and reproducible results.

Trouble-free storage.
Nutrient Pad Sets can be stored at room temperature in a dry, dark warehouse, between 9 and 24 months depending on the type.

Order Numbers for Nutrient Pad Sets in Petri dishes

Nutrient Pad Set type	Determinaton | Detection*:	Order number**:
Azide	Enterococci (1)	14051-047N
Bismut sulfite	Salmonellae (1)	14057-047N
Caso	Colony count (1)	14063-047N
Cetrimide	Pseudomonas aeruginosa (2)	14075-047N
Chapman	Staphylococci (2)	14074-047N
Chromocult	E. coli and coliforms (8)	14087-047N
ECD	E. coli (2)	14082-047N
Endo	E. coli and coliforms (2)	14053-047N
Glucose-Tryptone	mesophilic bacteria and thermophilic spore formers (2)	14066-047N
Lysine	Wild yeasts (3)	14061-047N
Malt extract	Yeasts and moulds (7)	14086-047N
McConkey	Enterobacteria (2)	14097-047N
M-FC	E. coli and coliforms (2)	14068-047N
Orange serum	Acid-tolerant microbes (1)	14062-047N
Orange serum (pH 3.2)	Acid-tolerant microbes (1)	14096-047N
R2A	Colony count (1)	14084-047N
Sabouraud	Yeasts and moulds (4)	14069-047N
Schaufus-Pottinger	Yeasts and moulds (5)	14070-047N
Schaufus-Pottinger	Yeasts and moulds (6)	14072-047N
Schaufus-Pottinger	Yeasts and moulds (7)	14080-047N
Schaufus-Pottinger	Yeasts and moulds (4)	14083-047N
Standard	Colony count (1)	14064-047N
Standard TTC	Colony count (1)	14055-047N
Teepol	E. coli und coliforms (2)	14067-047N
Tergitol TTC	E. coli und coliforms (2)	14056-047N
Tomato juice	lactic acid bacteria, special Leuconostoc oenos (1)	14079-047N
VLB-S7-S	beer spoiling bacteria (2)	14059-047N
Weman	Leuconostoc mesenteroides (1)	14065-047N
Wallerstein	lactic acid bacteria and other beverage spoilers	14089-047N
Wort	Yeasts and moulds (4)	14058-047N
Wort (pH 4,4)	Yeasts and moulds (4)	14078-047N
Yeast extract	colony count (1)	14090-047N

* A pack contains 100 sterile Nutrient Pad Sets, each of them individually packed in a Petri dish, and 100 sterile, individually packed membrane filters. The membrane filters are selected for optimum growth in the interaction with the corresponding nutrient media. The supplied membrane filter type is listed within brackets:

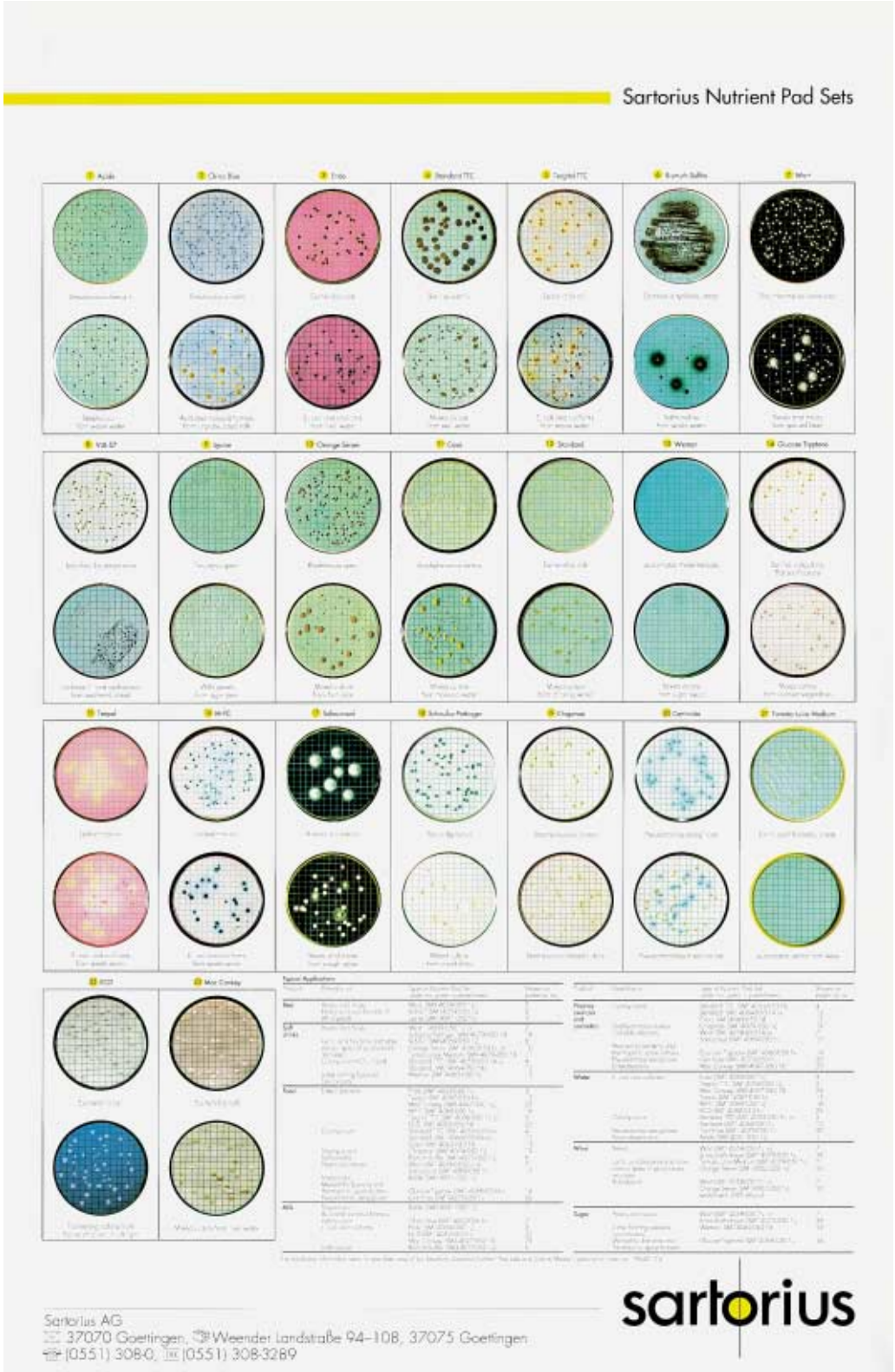
(1) = green with dark green grid, 0.45 µm pore size
(2) = white with green grid, 0.45 µm pore size
(3) = green with dark green grid, 0.65 µm pore size
(4) = grey (black after wetting) with white grid, 0.65 µm pore size
(5) = white with green grid, 0.65 µm pore size
(6) = white with green grid, 1.2 µm pore size
(7) = grey (black after wetting) with white grid, 0.8 µm pore size
(8) = white with black grid, 0.45 µm pore size

** Diameter of the membrane filter, 47 mm. Order number for Nutrient Pad Set with 50 mm membrane filter as above, but -047N replaced by -050N.

Some Nutrient Pad Sets are available polyethylene bags, without Petri dishes. Each pack containts 25 bags with 2 Nutrient Pad Sets and 2 membrane filters each, all sterile. Order numbers with 50 membrane filters: Endo, 14003-050K. Standard TTC, 14005-050K. Tergitol TTC, 14006-050K. Wort, 14008-050K. Order numbers with 50 mm membrane filters as for 47 mm but with -050 instead of -047.

Detailed brochure available.

Nutrient Pad Set Poster.



The photo shows a poster, original size 70 cm × 50 cm, with growth patterns and typical applications for the Nutrient Pad Sets, described on the previous page. On request, you can get the poster free of charge.

Culture media in tubes ancl bottles. Absorbent Pads.

Culture media for direct incubation are available in two different forms, in tubes and in bottles.

1. Culture media in tubes
For the casting of plates.
The content of one tube is enough for two 90 mm or three 60 mm Petri dishes.

Order numbers
(50 tubes with 20 ml each):

14130K	Orange serum agar
14131K	Standard agar
14135K	Malt extract agar
14137K	Nutrient agar according to DEV
14138K	Wort agar
14158K	Endo agar
14130K	Orange serum agar

2. Culture media in bottles

2a. Agar culture media in bottles

Culture media for self-casting in forms at very favourable prices.

Order numbers
(4 bottles with 250 ml each):

14144A	Nutrient agar according to EDV
14148A	VLB-S7-S-Agar
14156A	Endo agar
14157A	Wort agar
14166A	Sabouraud agar

2b. Lactose bouillon in bottles

Order numbers

14155A	Two times concentrated (4 Bottles à 100 ml)
14160	three times concentrated (1 Bottle à 1000 ml)

Absorbent pads
Our 1.4 mm thick absorbent pads are wetted with the appropriate liquid culture medium before a membrane filter is placed on them. They come presterilized in plastic tubes, which fit onto the Sartorius Manual Dispensing Device, and are available in two diameters:

47 mm:	approx. 3ml absorption capacity
50 mm:	approx. 3.5 ml absorption capacitiy.

Order numbers
(1,000/box, in 10 tubes, each with 100 pads, and with manual dispensing device, all presterilized)

47 mm ∅: 15410-047 ALR
50 mm ∅: 15410-050 ALR

Absorbent pads
including membrane filters and 2 manual dispensing devices.
ETO presterilized
13906-47 APR

Plastic Petri dishes

Disposable Petri dishes for reception of agar culture media.

Order numbers
(pack of 100, sterile):

14311-60N	60 mm diameter
14311-90N	90 mm diameter

Instruments for use
in laboratories.

arium 613® Reverse Osmosis (RO)
System for general laboratory water requirements.

Designed to meet the demands of today's laboratories for RO water.

With production volumes of up to 15 liters per hour, 99% rejection of monovalent and polyvalent ions, bacteria and viruses, automated membrane back flushing, together with it's compact design the arium® 613 is the ideal choice for general laboratory applications such as dish washing water, humidifiers and as a pretreatment step prior to ultrapure laboratory water systems.

Low energylhigh output thin film composite membranes, dramatically reduce the volume of water rejected to waste and increase the % recovery.

Energy consumption is reduced by the incorporation of a uniquely designed RO module housing which negates the need for solenoid valves to regulate and control permeate flow.
The absence of any solenoid valves not only conserves power, it also reduces maintenance and increases reliability.

Water storage is simplified by the use of a closed pressure vessel. This dramatically reduces the costs of maintenance due to airborne contamination, while at the same time reducing gas uptake by product water in storage. A pressurized storage tank provides more flexibility as to its location, without the need of an expensive distribution pump to deliver the water to point of use.

Specifications

Unit Measurements:	43 cm (17") Width, 48 cm (19") High 33.4 cm (13.5") Depth
System Weight:	14 Kg (30 lbs.)
Operation Weight.	20.5 Kg (45 lbs.)
Storage tank [55 l]	67 cm (26.5") High, 41 cm (16") Wide 6.8 Kg (15 lb) Empty, 55 Kg (121 lb) Full
Inlet Water Requirement:	Potable Tap Water Feed Only Feed water to meet drinking water standards of US EPA, European Union or Japan. Max. Total Dissolved Solids (TDS) = 800.0 ppm as $CaCO_3$ Max. Total Hardness = 200.0 ppm as $CaCO_3$ Iron Maximum 0.1 ppm Turbidity: <1 NTU pH Range 3-11 Temperature Range 2°C -37°C (38°F- 100° F) Minimum Inlet Pressure = 1 bar (15 psi) Maximum Inlet Pressure = 6.8 bar (100 psi) Silting Density Index (SDI) < 5% Langelier Saturation Index (LSI) negative
Operating Specification:	Monovalent Ion rejection 94-99% Polyvalentions 94-99% Microorganism rejection >99% Particle rejection >99% TOC <100 ppb or >99%for MW >300
Flow Rate:	ProductlPermeate up to 15 l/hr @ 25°C Rejectlconcentrate up to 12 l/hr Recovery approximately 55%
Electrical:	100–240 VAC, 50/60 HZ single phase
Ambient Operation:	5–28°C, 80% RH
Ambient Storage:	5–45°C, 80% RH

Order Numbers

61315055F05M1A	Complete RO system including 55 l storage tank, RO membranes and 2 pretreatment cartridges.
613CPF05———-V	Pretreatment Cartridge × 2
613CPM1—————V	RO module × 2
613CDS2	RO sanitizing syringe × 2
611 CDS2	Storage Tank sanitizing syringe × 2
613APV55	55 l storage tank
613APV75	75 l storage tank

arium 611® Laboratory Water Systems for critical reagent grade water requirements.

Type 1* laboratory water purification system. Designed to meet the requirements of reagent grade water for routine analysis

* Water exceeds ASTM, NCCLS, ISO and USP reagent water standards.

Advanced Design Features Include:

Carbon-resin Technology
A unique carbon-resin combination enables the 611 system to produce ultrapure water with a resistivity up to 18.2 MΩ × cm, with Total Organic Carbon (TOC) levels as low as < 1 ppb.

Four Line Alphanumeric VDU
Continuously indicates water quality in MΩ × cm or µS/cm with compensated or non-compensated temperature.

Removable Display & Dispense
Enables high quality water to be provided at point of use up to two meters from the systems installation point.

Standby Mode
Water recirculates 15 minutes every hour of inactivity to maintain purity.

Timed (Volume) Dispense
Automated dispensing option.

Quality
Inert materials used for all wetted parts .

Security
0.2 µm PESU membrane filter capsule ensures a bacterial free filtrate.

Specifications

Unit Measurements:	43 cm (17") Width, 48 cm (19") High 33.4 cm (13.5 ") Depth
Removable display:	30.2 cm (11.9") Width, 11.3 cm (4.4") High, 15.7 cm (6.2") Depth
System Weight:	14 Kg (30 lbs.)
Operation Weight:	20.6 kg (45.5 lb) 611 DI& 611 UF, 23.6 kg (52 lb) 611 VF
Clearances:	Side 17 cm (7") for handling Top 5 cm (2") for ventilation Front 35 cm (14") for door opening
Inlet Water Requirements	Specific Resistivity RO water 20 KΩ x cm (50µS/cm) Distilled water 250 KΩ × cm (4µS/cm) Deionized water: 50 KΩ × cm (20µS/cm) TOC <1000 ppb Turbidity <1 N.T.U. Silica <1000 ppb Minimum inlet pressure: Gravity Maximum inlet pressure: 7 bar (103 psi)
Electrical:	100–240 VAC, 50/60 HZ single phase
Ambient Operation:	5–28°C, 80% RH
Ambient Storage:	5–45°C, 80% RH
Interface:	RS232 Parallel Port

Product H_2O Quality	611DI	611 UV	611UF	611 VF
Resistivity MΩ × cm	18.2	18.2	18.2	18.2
TQC	< 4ppb	< 1ppb	< 4ppb	< 1ppb
Particles @ 0.2 µm	< 1/ml	< 1/ml	< 1/ml	< 1/ml
Endotoxin	NA	NA	< 0.001 EU/ml	< 0.001 EU/ml
Bacteria	<1 CFU/ml	<1 CFU/ml	<1 CFU/ml	<1 CFU/ml
Flow rate up to	2 l/min	2 l/min	1.5 l/min	1.5 l/min
UV light	No	Yes	No	Yes
Ultrafilter	No	No	Yes	Yes

Order Numbers
As the model and cartridge type is application specific please contact us for a complete data sheet and quotation

BBI
Laboratory Instruments

CERTOMAT® Benchtop Shakers.

CERTOMAT® benchtop shakers from B.Braun Biotech International have proven their value for long-term use in microbiology, cell biology, pharmacology and chemistry laboratories worldwide.

Instruments available range from the economical **CERTOMAT® MO II** with simple speed and time control, over the **CERTOMAT® S II** with analogue output for data documentation and memory function, to the **CERTOMAT® RM** with variable mass compensation allowing maximum speed with maximum load. The **CERTOMAT® R** and **CERTOMAT® U** models in addition are extremely silent runners due to their strong magnetic drive.

All benchtop shakers can be combined with our incubation hoods **CERTOMAT® H or HK** in order to provide a temperature controlled environment.

CERTOMAT® benchtop shakers are available with shaking amplitudes of 12,5 mm, 25 mm or 50 mm and can be run at up to 400 rpm which makes them very efficient tools for cell cultivation and general mixing applications.

For more details see our special brochures available on request from your local Sartorius office.

Accessories
CERTOMAT® benchtop shakers are compatible with the full range of accessories:

- Stainless steel trays (type EU, 420 × 420 mm or type FU, 420 × 800 mm)
- Stainless steel or reinforced plastic clamps for Erlenmeyer or Fernbach flasks from 25 ml up to 5 L volume
- Hinged racks for test tubes or centrifuge tubes up to 30 mm diameter
- Universal mounting system with clamping rods for odd-shaped vessels
- Sticky tape or anti-skid layer for easy exchange of flasks of flat-bottomed containers such as microplates
- Holders for microtiter plates

Accessories are not part of the instruments and have to be ordered separately.

Order Numbers

CERTOMAT® MO II	12.5 mm	BBI-8860858
	25 mm	BBI-8860866
CERTOMAT® S II	25 mm	BBI-8862524
	50 mm	BBI-8862621
CERTOMAT® RM	25 mm	BBI-8862320
	50 mm	BBI-8862427
CERTOMAT® R	25 mm	BBI-8863024
CERTOMAT® U	25 mm	BBI-8863121
CERTOMAT® H	heating	BBI-8863202
CERTOMAT® HK	heat | cool	BBI-8863245

Detailed brochure available.

CERTOMAT® Incubation Shakers.

CERTOMAT® incubation shakers from B.Braun Biotech International provide a temperature-controlled environment for cell cultivation in microbiology, cell biology and other application fields.

Temperature ranges from 8°C above ambient up to +70°C, with the optional integrated cooling between 10°C below ambient and +70°C can be achieved. All units have shaking orbits of 25 or 50 mm and can be run up to 400 rpm.

CERTOMAT® incubation shakers are fully programmable for all parameters: up to 5 programs with 4 steps each can be stored password protected. Safety features include the memory function that stores the last set points and installs them after power failure, and a stainless steel spill tray. Continuous recording of all parameters is possible by analogue output.

The **CERTOMAT® IS** is a benchtop model with small footprint of 540 × 680 mm and can be used for flasks up to 3 L volume.

The **CERTOMAT® BS-1** is a large capacity unit for up to six 5 L flasks. Illumination units for photosynthetic applications are optional. Three CERTOMAT® BS-1 units can be stacked without additional equipment and run independently.

The **CERTOMAT® BS-T** is a top-loading incubator-shaker with the same features as described above for the BS-1, including an interior made of polished stainless steel (1.4301) for easy cleaning and sanitizing.

For more details see our special brochures available on request from your local Sartorius office.

Accessories
CERTOMAT® benchtop shakers are compatible with the full range of accessories:

- Stainless steel trays (type EU, 420 × 420 mm or type FU, 420 × 800 mm)
- Stainless steel or reinforced plastic clamps for Erlenmeyer or Fernbach flasks from 25 ml up to 5 L volume
- Hinged racks for test tubes or centrifuge tubes up to 30 mm diameter
- Universal mounting system with clamping rods for odd-shaped vessels
- Sticky tape or anti-skid layer for easy exchange of flasks or flat-bottomed containers such as microplates
- Holders for microtiter plates
- Illumination units, 6 × 18 W fluorescent tubes

Accessories are not part of the instruments and have to be ordered separately.

Order Numbers

CERTOMAT® IS	25 mm	heating	BBI-8864829
		heat|cool	BBI-8864845
	50 mm	heating	BBI-8864926
		heat|cool	BBI-8864942
CERTOMAT® BS-1	25 mm	heating	BBI-8865027
		heat|cool	BBI-8865221
	50 mm	heating	BBI-8865124
		heat|cool	BBI-8865329
CERTOMAT® BS-T	25 mm	heating	BBI-8865426
		heat|cool	BBI-8865620
	50 mm	heating	BBI-8865523
		heat|cool	BBI-8865728

Homogenizers.

Laboratory work often requires that a sample is prepared for subsequent analysis by homogenization. This may involve just mixing of liquids, but more often it means destroying the structure of biological material so that substances become accessible for isolation and analysis. Depending on the sample material, the required volume and the intended analysis of the homogenates, samples have to be treated with different homogenizers. For this reason B. Braun Biotech International offers a wide range of homogenizers for different applications.

The ball mill Mikro-Dismembrator U is very popular among scientists who have to disrupt **brittle or frozen material**. For operation a shaking flask and suitable grinding balls or glass beads are required.

The famous MSK Cell Homogenizer uses glass beads to disrupt a cooled sample. This is the most efficient way to disrupt **yeast cells, bacteria, fungal spores or small algae** – materials which are difficult to homogenize with other techniques. Shaking flasks, glass beads and cooling capillary are all available from B. Braun Biotech International.

The Potter S is well known among scientist who want to disrupt **soft tissues or cultured cells**. In addition this unit can be used to disaggregate bacterial colonies – this has been used for testing surface disinfectants. Cylinders and pestles for volumes between less than 2 ml and up to 60 ml are available in 3 different versions. An integrated cooling vessel allows to cool the sample during homogenization. Due to its gentle action the Potter S can even be used to isolate nuclei from cells.

The LABSONIC® homogenizers are applied for disintegrating cells using ultrasound. Of course, emulsions can also be generated. The LABSONIC®M is a small unit with an output of up to 100W. The operating frequency of 30 kHz reduces cavitation noises. Due to its innovative design probes as small as 0.5 ml can be combined with this instrument. Thus even small volumes can be sonicated.

Ordering information:

Cat.-No.	Description
BBI-8531722	Mikro-Dismembrator U, 230 V, 50 Hz
BBI-8530220	MSK Cell Homogenizer
BBI-8533024	Homogenizer Potter S, 230 V, 50 Hz
BBI-8535027	LABSONIC M, 100 W, 230 V, 50 Hz
BBI-8535108	LABSONIC P, 400 W, 230 V, 50 Hz

For accessories please refer to the brochures!

The LABSONIC®P has a power of 400 W thus enabling to treat much larger sample volumes. Both instruments allow to use flow-through chambers for working under sterile conditions. For sonicated contaminated samples, e. g. radioactively labeled material, the LABSONIC®P can be equipped with a cup probe. If desired, these LABSONICs can be controlled via a special PC card.

Hand homogenizers are often used in the laboratory for simple sample preparations, e. g. crushing tissue samples. You can choose from a range of Dounce type models from 1 ml to 60 ml with 2 different gaps. Thus you can switch from L models (wide gap) to S models (narrow gap) for finer homogenization.

Altematively, choose an Eppendorf or conical type.

Laboratory centrifuges.

Sartorius AG offers a comprehensive line of centrifuges ranging from small centrifuges for reaction vials up to floor-standing models with a capacity of up to 6 L. Of course all our centrifuges comply with the relevant EC regulations and are CE marked. All centrifuges feature a brushless drive for reduced maintenance. Running speeds may be entered as rpm or g-force values. All refrigerated units are CFC-free.

The small centrifuges have a short spin function: the unit counts and displays the time spent for this run. This way, it becomes very easy to treat several samples the same way

The centrifuge 2-16K and all larger models have an automatic rotor recognition to prevent overspeeding. In addition these centrifuges can calculate g-forces from rpm values and vice versa. As an option, free programming allows to define and store individual centrifuge runs.

For models 3K30, 6-15|6K15 and 8K10 free programming is integrated as a standard.

Depending on your exact application you can choose between refrigerated and non-refrigerated versions. Of course, PCR tubes or strips may be spun in our centrifuges. For special applications, such as oil analysis, even heated centrifuges can be delivered. Please enquire with your local representative for details.

To help you select the appropriate unit, please consult the guideline below. Upon request, we will provide you with brochures giving details about the individual units and their accessories

Guide on selection of centrifuge models –
small (1-13) to large floor-standing model (8K10)

Model	Refrig	Max. speed Angle rotor	Max. speed Swing out rotor	Suitable tubes (ml)
1-13	no	13,000	11,800	0.2 to 2.2, hematocrit
1-15	no	14,000	12,000	0.2 to 2.2, hematocrit, PCR
1-15K	yes	14,000	14,000	0.2 to 2.2, hematocrit, PCR
1-6	no	5,650	n.a.	4.5, 5, 7, 15
2-5	no	n.a.	3,900	0.2 to 100
2-16	no	15,000	12,000	0.2, to 100, microtiter, PCR
2-16K	yes	15,300	14,000	0.2 to 100, PCR
3-16	no	14,500	5,000	0.2 to 200, microtiter, cyto
3-16K	yes	15,300	5,500	0.2 to 200, microtiter, cyto
3-18K	yes	18,000	5,500	0.2 to 200, microtiter, cyto
3K30	yes	30,000	10,000	0.2 to 125
4-15	no	13,500	4,500	0.2 to 500, microtiter
4K15	yes	15,000	5,100	0.2 to 500, microtiter
6-15	no	12,500	4,500	0.2 to 750, microtiter, blood bags
6K15	yes	15,000	5,100	0.2 to 750, microtiter, blood bags
8K10	yes	10,500	5,130	0.2 to 1000, microtiter, blood bags

n.a. = not applicable

For accessories and order details please consult the brochures for the individual centrifuge models.

AirPort MD8.
Accu-power, portable air sampler.

AirPort MD8 is the new air sampler for the pharmaceutical industry, the biotechnology, the food and beverage industry, for hospitals environmental care and for works safety.

AirPort MD8 offers following benefits:

- Accu-powered and portable for universal use.
- Accu-control guarantees constant performance during the air sampling.
- Ergonomic design and easy to clean.
- Flexible adjustment possibilities of the volume flow and the sample volume.
- The device can be calibrated locally.

AirPort MD8 uses the gelatin membrane filter method guaranteeing reliable and exact measurement results.

Specifications
AirPort MD8
Volume flow regulation by integrated anemometer. Volume flow adjustable in three steps:
30 l/min., 40 l/min and 50 l/min.
Fixed given sample volumes:
25, 50, 100, 250, 500, 750 and 1000 litres.
In addition, the sample volume can be chosen in 5-liter steps.

Operational life with one store-loading:
approx. 4.5 hours
Noise development:
For gelatin membrane filters 48 dB (A)
Weight: approx. 2.5 kg
Dimensions (L × W × H):
300 × 135 × 165 mm

Power supply:
Store:
NiMH 16.8 Volt/3800 mAh
Battery charger inlet:
100–240 V/47–63 Hz/600 mA
Battery charger outlet:
24 V/1000 mA
Loading time:
approx. 4.5 hours for empty store.

Order information
AirPort MD8, complete with holder (17801) for gelatin disposable units and battery charger (1ZE-0006),
Order no. 16757
Accessories for AirPort MD8
Adapter for disposable gelatin filter units, order no.17801
Battery charger, order no. 1ZE-0006
Further accessories on request!

Consumables
Disposable gelatin units (pack of 10, each unit sterile packed in a polyethylene bag),
Order no.
17528-080-ACD

Disposable gelatin units (pack of 10, each unit three times packed, sterile, in a polyethylene bag),
Order no.
17528-080-BZD

Further consumables on request!

The detection of microorganisms and viruses out of air. Quantitatively and reproducible with the MD8 airscan.

The system consists of the MD8 airscan air sampler and disposable gelatin filter units. The system is routinely used for the quantitative detection of airborne organisms, mainly in sterile spaces of classe A and B (classification according to „EU-Guide for GMP") or isolators. The very high air flow rate of 8 m^3/h enables isokinetic sample removal at flow speed usual in laminar flow as well as for the filtration of 1 m^3 air very quickly (less than 8 minutes). The filter unit can be placed far way from the air sampler.

The MD8 airscan air sampler allows to adjust selectively and easily air flow rate and sample removal speed. By means of a specially developed calibration unit (see accessories) the user can calibrate the MD8 airscan locally, e.g. within the scope of validation steps.

After removing the sample, the gelatin filter can be placed directly on the agar culture medium for incubation and colony growth.

Specifications for gelatin filters

Gelatin filter	Water-soluble, pore size 3 µm. Diameter 80 mm. Thickness approx. 250 µm.
Max. temperature	60°C.
Residual dampness content	46%–49%.
Air flow rates approx.	2.7/min./cm^2 at Δp = 0.05 bar.
Retention rates:	a) Bac. subtilis niger 99.9995% at 0.25 m/s inlet velocity b) Coli-Phages: phage T1, 99.9% at 0.3 m/s inlet velocity and 50% rel. air humidity. Phage T3, 99.94% at 0.3 m/s inlet velocity and 80% rel. air humidity
Filtration area	38.5 cm^2
Limiting conditions of gelatin filter units	Room temperature, max. 30°C, rel. air humidity 85%
Dimensions	Diameter 93 mm, Height 16 mm
Sterilization	supplied presterilized by gamma irradiation

Specifications for the MD8 airscan air sampler

Air flow rate	2.0 m^3/h – 8 m^3/h adjustable in 100 litre steps
Time switch off	1–99 minutes, adjustable in 1 minute steps
Max. divergence	±5% in a temperature range of 15°–35°C
Noise development	for gelatin membrane filters, max. 62 dB (A)
Weight	ca. 6.5 kg
Dimensions	375 × 242 × 228 mm (L × W × H)
Correction of the air flow-adjustments	If the used air flow rate can not be achieved, the display shows the max. achieved flow rate for a corresponding new adjustment below this value

Order Numbers

a) for the MD8 airscan air sampler

16746 MD8 airscan air sampler, 230 V, 50 Hz	50/60 HZ
16747 MD8 airscan air sampler, 115 V, 60 Hz	50/60 HZ
16748 MD8 airscan air sampler, 100 V, 50–60 Hz	50/60 HZ

Each version can be switched from 50 to 60 Hz and back.
17801 Holder for disposable gelatin filter units

b) for disposable gelatin filter units

Sterile, pack of 10:

17528-080 ACD	Individually packed in1 Polyethylene bag each
17258-080 BZD	Individually packed in 3 Polyethylene bags each

Accessories for the MD8 air sampler.

a) Calibration unit
Order number:16740

The user himself can calibrate theMD 8 airscan and AirPort MD8 directly on the job by means of the calibration unit*.
This is absolutely necessary above all within the scope of validation steps, for which it is important, that the shown air flow rate (desired value at the MD8) corresponds to the actual air amount (actual value at the calibration device). On request, a calibration certificate of the German Calibration Service can be available. The calibration unit is supplied complete with battery charger| mains appliance (country-related), filter holder, connectors set and connection tube (PVC, 2m).

Specifications:
Dimensions,
a) Lenght without filter holder, 295 mm
b) Width, 174 mm
c) Height with handling, 246 mm

Connectors, quick locks (bayonet principle)
Operational life with full accu, ca. 70 hours
Weight, ca. 5.6 kg
Charge time for empty accu, ca. 30 hours
Max. fault, to 3.2 m^3/h, ±3%
Max. fault, 3.2 to 16 m^3/h, ±1.5%
Measuring range, 1.6–16 m^3/h
Type of protection, IP 40

Ambient conditions:
a) Rel. air humidity, 30%–80%
b) Temperature,min. –10°C, max. 40°C

* Alternatively, a maintenance agreement can be signed. Within the scope of the contractual services, Sartorius technicians will carry out a calibration of the MD8 at regular intervals.

b) Tubing and connectors set

Order numbers:
17085 Plastic hose, 2 m
17088 Plastic hose, 5 m
17662 Silicone hose, 1 m (25 × 3 mm)
17657 Connectors set

If the disposable gelatin filter unit is not placed directly at the MD8, but in a distance from it, a flexible plastic hose (2m or 5m), a connectors set and, if not available, a holder (tripod 16970, double socket 16976, clamp 17037) are necessary for the connection between filter and device.

The autoclavable silicone hose is used instead of the flexible plastic hose, if the MD 8 airscan has to be used in sterile rooms, operating rooms, isolators, etc.

With this hose attached to the air openings, the waste air can be led off into an other room.

c) Case
Order number: 17208
Stable case for the transport and the storage of a MD 8 airscan incl. accessories.

Gelatin membrane filter

Gelatin membrane filters are still available as 80 mm filter discs, suitable for the filter holder supplied with the MD8 airscan.

Order numbers:
12602-080 ALK
Gelatin membrane filter, 80 mm, sterile (pack of 50)

The filters are sterile supplied, but the filter holders have to be sterilized by dry heat (180°C, 2 h) and then equipped with the filters under sterile conditions. For performing routine check-ups, a stack is recommended in this case.

Order numbers:
17656 Aluminium stack

It consists of a middle part, 10 numbered filter holders and 2 end caps. The stack is first sterilized (by 180°C dry heat,2 h), and then equipped with the filters under sterile conditions (LF-workbench). The prepared filter holders are put on a side of the middle part. After removing the sample, the inserted filter holders are put on the other side of the middle part, so that used and not-used filter holders are separated from each other.

Replacement parts for the stack:
17655 Individual filter holders
17660 Middle part
17661 End cap

Sartocheck® Junior BP plus.
The battery-operable diffusion and bubble point tester.

This automatically working, micro-processor controled integrity tester is used for determining the bubble point of disc filter systems, as well as for diffusion and bubble point tests of capsules, mini and standard filter cartridges.

It features several benefits: Continuously displays updates of the data measured and documentation of the data measured via printer. Battery-operable (one charge of the batteries is sufficient to run at least 20 tests). Special programme for measuring and recording the net inlet volume. 3 user programmes can be stored. Can be calibrated. RS 232 interface.


```
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Sartocheck
Junior BP plus
Program  1

========================

Date.....:     1994.11.10
Time.....:     01.52 PM W

Test record
===========

Operator.....:Miller
Product......:Inf.2
Prod. batch no.:23a
Filter type....:S-bran
Filter lot no..:49000S
Pore size.....:0.2
Type of housing:34001
Wetting liquid.:water

Test parameters
===============

Test-code....:    4
Net volume...: 1662 ml
Test pressure: 2500 mbar
Stab. time...: 5.00 min
Test time....: 5.00 min
Max.diffusion:   15 ml/m
B.P.min......: 3200 mbar
B.P.max......: 4300 mbar

Test results
============

Test pressure  2519 mbar
Test time      5.00 min
Pressure drop    27 mbar
Diffusion       9.0 ml/m
Bubble point   3370 mbar

Evaluation
==========

Test passed
```

Specifications for Sartocheck Junior BP plus

Dimensions (W × D × H)	260 × 330 × 85 mm
Lead-in voltage (for the battery charger)	220/240V 50Hz, 110/120V 60Hz
Weight	4.8 kg
Max. inlet pressure	8,000 mbar
Max. transmission distance	15 m

Measuring range

Bubble point	0.5–6 bar
Diffusion	0 –999 ml/min
Pressure drop rate	0–200 mbar/min
Net volume of the system	0.05–5 l
Test pressure	100–6,000 mbar

Measuring accuracy

Bubble point	±0.1 bar
Diffusion determination	±6%
Pressure regulation	±0.4% at 2.5 bar
Volume determination	±5%

Type of protection against splashes of water: IP 54
Test record, on the left, a present example. In order to increase the test transparency and to ensure the detectability of the results, net inlet volumes, test pressure (actual value), pressure drop value and test time are also documented.

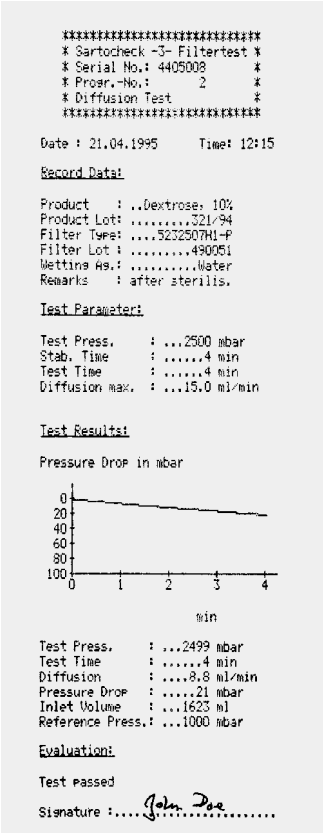
Order number for Sartocheck Junior BP plus

16296	Sartocheck Junior BP plus

Equipment supplied:
Sartocheck Junior BP plus integrity tester. Battery charger. Pressure inlet tubing with pressure filter. Pressure outlet tubing. 1 litre reference tank. Colour ribbon cassette. Paper roll. Operating instructions. Test certificate. Calibration certificate.

The new standard in integrity test measuring: Sartocheck®3.

With the development of the first tester for automatical testing of the integrity of membrane filters worldwide, Sartorius came up with an important pioneering feat in 1981.
This increased significantly the process safety, particularly in sterile filtration.
As the Sartocheck II before, the Sartocheck® 3 sets again completely new standards concerning objective valuaton, easy handling, use under production conditions - key word protection against splashes of water, high reliability, exact measuring techniques, fast results and possibilities of integration in modern, automated process control.



```
*****************************
* Sartocheck -3- Filtertest *
* Serial No.: 4405008       *
* Progr.-No.:       2       *
* Diffusion Test            *
*****************************

Date : 21.04.1995      Time: 12:15

Record Data:

Product    : ..Dextrose: 10%
Product Lot: .........321/94
Filter Type: ....5232507H1-P
Filter Lot : .........490051
Wetting Ag.: ..........Water
Remarks    : after sterilis.

Test Parameter:

Test Press.     : ...2500 mbar
Stab. Time      : ......4 min
Test Time       : ......4 min
Diffusion max.  : ...15.0 ml/min

Test Results:

Pressure Drop in mbar

  0
 20
 40
 60
 80
100
  0   1   2   3   4
                min

Test Press.     : ...2499 mbar
Test Time       : ......4 min
Diffusion       : ....8.8 ml/min
Pressure Drop   : ......21 mbar
Inlet Volume    : ...1623 ml
Reference Press.: ...1000 mbar

Evaluation:

Test passed

Signature :....John Doe.....
```

Sartocheck 3 also meets all standards required for electronic measuring instruments for the validation of pharmaceutical processes. An extensive validation set is available.

Specifications for Sartocheck 3

Dimensions	460 × 360 × 65 × 126 mm (W × D × H1 × H2)
Lead-in voltage	85–240 V; 47–440 Hz
Operating pressure	3,000–9,999 mbar
Pressure sensor	absolut. class 0.2
Weight	11.2 kg

Operational field, integrity test of disc filters (bubble point), capsules, mini cartridges and cartridge systems up to 50 litre net inlet volume.

Measuring range and accuracy

Test pressure	100-6,000 mbar, 0.2 % of the max. value
Pressure drop	0-999 mbar, ±1 mbar
System net volume	50,000 ml, ±4%
Programming	code-word protected
Programme number	memory card system allows saving of 240 test programmes
Type of protection against splashes of water:	IP 54

Test documentation, on the left, a Sartocheck 3 test record.
In the first part of the "test results", a pressure drop diagram shows the pressure curve during the test phase.
In the second part, the really measured parameters and the test results are listed.
The test is then evaluated by comparing the entered limit data.
If the test is not passed, the concerned measurements and the evaluation are printed out in red.

Test methods,
Bubble point test; Diffusion test; Multidiffusion test.
Water intrusions test (Sartorius newly developed the WIT for "in place" testing of air filter cartridges and hydrophobic membrane filters)

Order Numbers for Sartocheck 3

16286	Sartocheck 3.
Equipment supplied	Sartocheck 3 with memory card. Pressure inlet tubing (ø 6 mm) with air pressure filter. Pressure outlet tubing (ø 4 mm). Colour ribbon cassette (black/red). Printer paper. Test certificate. Calibration certificate. Outline instructions. Operating instructions. Power connecting lead (country-related).

Chemical compatibility
a) Filter materials and Mini Cartridges.

Solvents	Cellulose acetate 111	Cellulose nitrate 113	Reg. Cellulose 184	PTFE 118	Poly-amide 250	Glass fibre 134	Polycar-bonate 230	Poly-ether-sufone 154	Sartobran P cartridge	Sartofluor cartridge
Acetone	–	–	■	■	–	■	❑	–	–	E
Acetonitrile	?	?	■	■	–	?	?	■	?	?
Gasoline	■	■	■	■	■	■	■	■	V	–
Benzene	■	■	■	■	■	■	?	■	–	–
Benzyl alcohol	❑	❑	■	■	■	■	?	–	❑	■
n-Butyl acetate	❑	–	■	■	■	■	■	■	E	?
n-Butanol	■	■	■	■	■	■	■	■	■	■
Cellosolve	■	–	■	■	?	■	–	■	–	–
Chloroform	–	■	■	■	■	■	–	–	–	–
Cyclohexane	❑	❑	■	■	?	■	■	–	❑	V
Cyclohexanone	–	–	■	■	■	■	?	?	–	–
Diethylacetamide	–	–	■	■	■	■	?	?	–	?
Diethyl ether	■	–	■	■	■	■	■	?	–	–
Dimethyl formamide	–	–	❑	■	❑	■	–	?	–	■
Dimethylsulfoxide	–	–	■	■	■	■	–	–	–	■
Dioxane	–	–	■	■	■	■	–	■	–	■
Ethanol, 98%	■	❑	■	■	■	■	■	■	■	■
Ethyl acetate	–	–	■	■	■	■	?	–	–	–
Ethylene glycol	■	❑	■	■	?	■	■	■	■	■
Formamide	?	?	?	■	?	■	–	?	–	■
Glycerin	■	■	■	■	■	■	■	■	■	■
n-Heptane	■	■	■	■	?	■	?	?	■	V
n-Hexane	■	■	■	■	■	■	■	?	V	–
Isobutanol	❑	❑	■	■	■	■	■	?	–	■
Isopropanol	■	❑	■	■	■	■	■	■	■	■
Isopropyl acetate	❑	–	■	■	?	■	?	■	–	■
Methanol, 98%	■	–	■	■	?	■	■	■	■	■
Methyl acetate	–	–	■	■	■	■	?	–	–	■
Methylene chloride	–	❑	■	■	■	■	–	–	–	–
Methyl ethyl ketone	–	–	■	■	■	■	?	–	–	■
Methyl isobutyl ketone	■	–	■	■	■	■	?	?	–	–
Monochlorobenzene	■	■	■	■	■	■	–	?	V	V
Nitrobenzene	■	❑	■	■	■	■	–	?	–	–
n-Pentane	■	■	■	■	■	■	■	?	V	V
Perchlorethylene	■	■	■	■	■	■	■	?	V	V
Pyridine	–	–	■	■	■	■	–	–	–	–
Carbon tetrachloride	❑	■	■	■	■	■	?	■	–	?
Tetrahydrofuran	–	–	■	■	■	■	–	–	–	–
Toluene	■	■	■	■	■	■	?	■	–	–

a) Filter materials and Mini Cartridges.

Solvents	Cellulose acetate 111	Cellulose nitrate 113	Reg. Cellulose 184	PTFE 118	Poly-amide 250	Glass fibre 134	Polycar-bonate 230	Poly-ether-sufone 154	Sartobran P cartridge	Sartofluor cartridge
Trichlorethane	❑	■	■	■	?	■	?	?	–	?
Trichlorethylene	■	■	■	■	■	■	–	■	–	?
Xylene	■	■	■	■	■	■	■	■	–	–
Acids										
Acetic acid, 25%	■	■	■	■	❑	?	❑	■	■	?
Acetic acid, 96%	–	–	■	■	–	?	?	■	–	■
Hydrofluoric acid, 25%	■	❑	❑	■	–	?	■	?	–	–
Hydrofluoric acid, 50%	■	❑	–	■	–	?	■	?	–	–
Perchloric acid, 25%	–	❑	❑	■	–	?	?	?	–	■
Phosphoric acid, 25%	■	❑	❑	■	–	?	?	?	■	■
Phosphoric acid, 85%	❑	❑	❑	■	–	?	–	?	–	V/E
Nitric acid, 25%	–	❑	–	■	–	?	■	■	–	V
Nitric acid, 65%	–	–	–	■	–	?	■	■	–	–
Hydrochloric acid, 25%	–	❑	–	■	–	?	■	■	–	V/E
Hydrochloric acid, 37%	–	–	–	■	–	?	■	■	–	V/E
Sulfuric acid, 25%	–	❑	❑	■	–	■	?	■	–	■
Sulfuric acid, 98%	–	–	–	■	–	?	–	?	–	–
Trichloroacetic acid, 25%	–	❑	■	■	–	?	?	?	–	■
Bases										
Ammonium, 1N	■	■	❑	■	■	■	–	■	E	■
Ammonium hydroxide, 25%	–	❑	–	❑	■	❑	–	■	–	■
Potassium hydroxide, 32%	–	–	❑	■	❑	❑	–	■	–	■
Sodium hydroxide, 32%	–	–	❑	■	❑	❑	–	■	–	■
Sodium, 1N	❑	–	❑	■	■	■	–	■	–	■
Aqueous solutions										
Formalin, 30%	❑	■	❑	■	❑	■	■	■	–	■
Sodium hypochlorite, 5%	■	❑	■	■	❑	■	?	?	–	■
Hydrogen peroxide, 35%	■	■	❑	■	❑	?	?	?	■	■

Key to symbols

■ = compatible
– = not compatible
❑ = limited compatibility
? = not tested

E = compatible after replacing silicone O-ring with an EPDM O-ring
V = compatible after replacing the silicone O-ring with a Viton O-ring

Contact time: 24 hours at 20°C
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with actual filtration.

b) Filter holder, Cartridge housing and O-ring Materials.

Solvents	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless steel	EPDM O-ring	PTFE O-ring	Silicone O-ring	Vitron O-ring
Acetone	■	❑	■	■	■	■	■	–	–
Acetonitrile	■	?	■	■	■	❑	■	–	■
Gasoline	■	❑	■	■	■	–	■	–	■
Benzene	■	–	–	■	■	–	■	–	■
Benzyl alcohol	■	–	■	■	■	❑	■	■	■
n-Butyl acetate	■	–	❑	■	■	■	■	–	–
n-Butanol	■	■	■	■	■	■	■	■	■
Cellosolve	■	–	–	■	■	❑	■	–	–
Chloroform	■	–	–	■	■	–	■	–	■
Cyclohexane	■	❑	■	■	■	–	■	–	■
Cyclohexanone	■	–	■	■	■	–	■	–	–
Diethylacetamide	■	–	?	■	■	?	■	■	–
Diethyl ether	■	–	❑	■	■	–	■	–	–
Dimethyl formamide	■	–	■	■	■	■	■	❑	–
Dimethylsulfoxide	■	?	?	■	■	?	■	❑	–
Dioxane	■	–	❑	■	■	■	■	–	–
Ethanol, 98%	■	■	■	■	■	■	■	■	■
Ethyl acetate	■	–	■	■	■	■	■	–	–
Ethylene glycol	■	■	■	■	■	■	■	■	■
Formamide	■	–	■	■	■	■	■	–	❑
Glycerin	■	❑	■	■	■	■	■	■	■
n-Heptane	■	■	■	■	■	–	■	■	■
n-Hexane	■	■	■	■	■	–	■	–	■
Isobutanol	■	■	■	■	■	■	■	■	■
Isopropanol	■	❑	■	■	■	■	■	■	■
Isopropyl acetate	■	■	■	■	■	■	■	–	–
Methanol, 98%	■	–	■	■	■	■	■	■	■
Methyl acetate	■	?	■	■	■	■	■	–	–
Methylene chloride	■	–	–	■	■	–	■	–	❑
Methyl ethyl ketone	■	–	■	■	■	■	■	–	–
Methyl isobutyl ketone	■	–	?	■	■	–	■	–	–
Monochlorobenzene	■	–	■	■	■	–	■	–	■
Nitrobenzene	■	–	❑	■	■	–	■	–	–
n-Pentane	■	■	■	■	■	–	■	–	■
Perchlorethylene	■	–	❑	■	■	–	■	–	■
Pyridine	■	–	❑	■	■	–	■	–	–
Carbon tetrachloride	■	–	❑	■	■	–	■	–	■
Tetrahydrofuran	■	–	❑	■	■	–	■	–	–
Toluene	■	–	■	■	■	–	■	–	❑

b) Filter holder, Cartridge housing and O-ring Materials.

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless steel	EPDM O-ring	PTFE O-ring	Silicone O-ring	Vitron O-ring
Solvents									
Trichlorethane	■	–	?	■	■	–	■	–	■
Trichlorethylene	■	–	–	■	■	–	■	–	■
Xylene	■	–	❑	■	■	–	■	–	❑
Acids									
Acetic acid, 25%	■	■	■	■	■	■	■	■	–
Acetic acid, 96%	■	–	■	■	■	■	■	?	–
Hydrofluoric acid, 25%	–	–	■	■	–	❑	■	–	❑
Hydrofluoric acid, 50%	–	–	■	■	–	❑	■	–	❑
Perchloric acid, 25%	■	❑	■	■	–	■	■	–	■
Phosphoric acid, 25%	■	❑	■	■	❑	■	■	–	■
Phosphoric acid, 85%	■	❑	■	■	❑	■	■	–	■
Nitric acid, 25%	■	–	■	■	–	❑	■	–	■
Nitric acid, 65%	■	–	–	■	–	–	■	–	■
Hydrochloric acid, 25%	■	❑	■	■	–	❑	■	–	■
Hydrochloric acid, 37%	■	–	■	■	–	■	■	–	■
Sulfuric acid, 25%	■	■	■	■	❑	■	■	–	■
Sulfuric acid, 98%	■	–	–	■	–	–	■	–	■
Trichloroacetic acid, 25%	■	❑	■	■	–	■	■	–	–
Bases									
Ammonium, 1N	■	–	■	■	■	■	■	–	–
Ammonium hydroxide, 25%	■	–	■	■	■	■	■	■	–
Potassium hydroxide, 32%	■	–	■	■	■	■	■	❑	❑
Sodium hydroxide, 32%	■	–	■	■	■	■	■	❑	■
Sodium, 1N	■	–	■	■	■	■	■	■	■
Aqueous solutions									
Formalin, 30%	■	■	■	■	■	■	■	❑	■
Sodium hypochlorite, 5%	■	■	■	■	■	■	■	■	■
Hydrogen peroxide, 35%	■	■	■	■	■	■	■	■	■

Key to symbols

■ = compatible
– = not compatible
❑ = limited compatibility
? = not tested

Contact time: 24 hours at 20°C
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with actual filtration.

c) Ready-to-connect Filtration Units.

Solvents	Midisart 2000	Minisart	Minisart HY	Minisart RC	Minisart SRP	Sartobran 300	Sartobran P Capsule	Sartofluor Capsule	Sartolab P20
Acetone	■	–	–	■	–	–	–	■	–
Acetonitrile	■	–	?	■	■	?	?	?	?
Gasoline	■	■	■	■	■	■	■	■	❑
Benzene	■	–	–	?	■	–	–	❑	–
Benzyl alcohol	■	?	?	?	■	❑	❑	■	–
n-Butyl acetate	■	–	–	?	■	■	■	■	–
n-Butanol	■	❑	❑	■	■	■	■	■	■
Cellosolve	❑	–	–	■	❑	–	–	❑	–
Chloroform	■	–	–	■	■	–	–	■	–
Cyclohexane	■	–	–	?	■	❑	❑	■	❑
Cyclohexanone	■	–	–	?	■	–	–	■	–
Diethylacetamide	■	–	–	■	■	–	–	■	–
Diethyl ether	■	?	?	?	■	❑	❑	■	–
Dimethyl formamide	■	–	–	?	■	–	–	■	–
Dimethylsulfoxide	■	–	–	■	■	–	–	■	–
Dioxane	■	–	–	■	■	–	–	❑	–
Ethanol, 98%	■	–	–	■	■	■	■	■	■
Ethyl acetate	■	❑	❑	■	■	–	–	❑	–
Ethylene glycol	■	?	?	■	■	■	■	■	■
Formamide	■	?	?	?	■	?	?	■	–
Glycerin	■	■	■	?	■	■	■	■	❑
n-Heptane	■	■	■	?	■	■	■	■	■
n-Hexane	■	■	■	■	■	■	■	■	■
Isobutanol	■	❑	❑	■	■	❑	❑	■	❑
Isopropanol	■	❑	❑	–	■	■	■	■	❑
Isopropyl acetate	■	❑	❑	?	■	❑	❑	■	❑
Methanol, 98%	■	–	–	■	■	■	■	■	–
Methyl acetate	■	–	–	?	■	–	–	■	–
Methylene chloride	■	–	–	■	■	–	–	❑	–
Methyl ethyl ketone	■	–	–	■	■	–	–	■	–
Methyl isobutyl ketone	■	?	?	?	■	?	?	■	–
Monochlorobenzene	■	?	?	?	■	■	■	■	–
Nitrobenzene	■	?	?	?	■	❑	❑	■	–
n-Pentane	■	■	■	■	■	■	■	■	■
Perchlorethylene	■	❑	❑	?	■	❑	❑	■	–
Pyridine	■	–	–	?	■	–	–	■	–
Carbon tetrachloride	■	❑	❑	?	■	❑	❑	■	–
Tetrahydrofuran	■	–	–	■	■	–	–	❑	–
Toluene	■	–	–	■	■	■	■	■	–

c) Ready-to-connect Filtration Units.

Solvents	Midisart 2000	Minisart	Minisart HY	Minisart RC	Minisart SRP	Sarto-bran 300	Sartobran P Capsule	Sartofluor Capsule	Sartolab P20
Trichlorethane	■	❑	❑	■	■	?	?	■	–
Trichlorethylene	❑	?	?	?	❑	–	–	–	–
Xylene	■	–	–	■	■	❑	❑	■	–
Acids									
Acetic acid, 25%	■	❑	❑	?	?	■	■	■	■
Acetic acid, 96%	■	–	–	?	■	–	–	■	–
Hydrofluoric acid, 25%	■	❑	❑	?	■	■	■	■	–
Hydrofluoric acid, 50%	■	❑	❑	?	■	–	–	■	–
Perchloric acid, 25%	■	?	?	?	■	–	–	■	–
Phosphoric acid, 25%	■	■	■	?	■	■	■	■	■
Phosphoric acid, 85%	–	?	?	?	–	❑	❑	–	❑
Nitric acid, 25%	■	–	–	?	■	–	–	■	–
Nitric acid, 65%	■	–	–	?	■	–	–	❑	–
Hydrochloric acid, 25%	■	–	–	?	■	–	–	■	–
Hydrochloric acid, 37%	■	–	–	?	■	–	–	■	–
Sulfuric acid, 25%	■	–	–	?	■	–	–	■	–
Sulfuric acid, 98%	■	–	–	?	■	–	–	■	–
Trichloroacetic acid, 25%	■	–	–	■	■	–	–	■	–
Bases									
Ammonium, 1N	■	■	■	?	■	■	■	■	–
Ammonium hydroxide, 25%	■	❑	❑	?	■	❑	❑	■	–
Potassium hydroxide, 32%	■	–	–	?	■	–	–	■	–
Sodium hydroxide, 32%	■	–	–	?	■	–	–	■	–
Sodium, 1N	■	❑	❑	?	■	❑	❑	■	–
Aqueous solutions									
Formalin, 30%	■	–	–	?	■	❑	❑	■	❑
Sodium hypochlorite, 5%	■	■	■	?	■	–	–	■	■
Hydrogen peroxide, 35%	■	■	■	?	■	■	■	■	■

Key to symbols

■ = compatible ❑ = limited compatibility
– = not compatible ? = not tested

Contact time: 24 hours at 20°C
Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with actual filtration.

Sartobind™ Membrane Adsorbers
A separation technology based on microporous membrane ion exchangers.

The membrane ion exchangers in syringe filter format are the ultimate for simple, ultra-rapid concentration of proteins from highly dilute solutions or protein separation from a mixture.
Four different types of membrane ion exchangers, S, Q, C and D are available, with the following functional groups:

Functional groups
Sulfonic acid (type S)
$R\text{-}CH_2\text{-}SO_3^{--}$
Strongly acidic cation exchanger

Quaternary ammonium (type Q)
$R\text{-}CH_2\text{-}N^+\text{-}(CH_3)_3$
Strongly basic anion exchanger

Carboxyl groups (type C)
R-COO
Weakly acidic cation exchanger

Diethylamine (type D)
$R\text{-}CH_2\text{-}N^+\text{-}(C_2H_5)_2$
Weakly basic anion exchanger

They are offered as ready-to-use disposable units with 5 cm^2 adsorption area (MA5 units) and as reusable units with 15 cm^2 and 100 cm^2 adsorption area (MA15 and MA100 units).

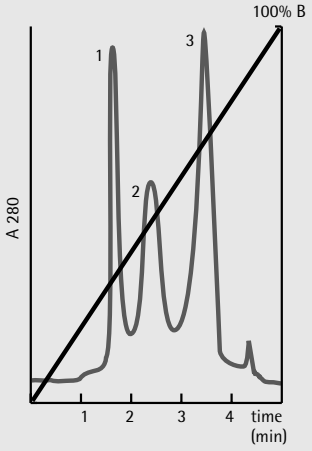
The units are easy to handle and compatible with simple syringes, peristaltic pumps or existing workstations, so that no time is lost in changing from a traditional chromatography column to the new membrane ion exchangers. Procedures which take one hour or more can now be reduced to minutes.

Membrane Adsorbers can be used with an FPLC® system. The connection is very easy because of the Luer lock inlet/outlet connectors of the MA units. Workstations with high performance flow rates, e.g. the BioPilot system, can take full advantage of the reproducible separations at high flow rates which are possible with MA units.

The figure shows the separation profiles of reference proteins at 3 different flow rates on a BioPilot system. No sacrifice in separation performance or capacity was found under the applied conditions, even when the cycle time is reduced by a factor of 10.

The chemical stability (pH 2–13) of Membrane Adsorbers allows regeneration by using aggressive cleaning agents. It is possible to regenerate the MA units with 1N NaOH for one hour. As Fig. 7 shows, 100 cycles of protein separation using an FPLC® system were done without any change in resolution (one cycle includes: equilibration, loading, washing, elution with KCl and regeneration with 0.2 N NaOH).

Conditions:
Flow rate: 50 ml/min
Buffer A: 20 mM Tis pH 8,5
Buffer B: A + 0.4 M KCL
Gradient: 0–100% B



Separation of 3 standard proteins on Q15 (1 = Transferrin, 2 = Ovalbumin, 3 = b-Lactoglobulin-A)

Different application notes about the purification and concentration of proteins and monoclonal antibodies, about the seperation of nucleotides and plasmids, and about the removal of endotoxins and DNA are available.

Specifications for MA5, MA15 and MA100 units.

	MA5 disposable units	**MA15** reusable units	**MA100** reusable units
Membrane material	crosslinked regenerated cellulose	crosslinked regenerated cellulose	crosslinked regenerated cellulose
Adsorption area*	5 cm^2	15 cm^2	100 cm^2
Housing material	MBS-copolymer	polysulfone	polysulfone
Inlet connector	female Luer lock	female Luer lock	female Luer lock
Outlet connector	male Luer lock	male Luer lock	male Luer lock
Protein binding capacity**	4 mg | S5 unit 4 mg | Q5 unit 3 mg | C5 unit 3 mg | D5 unit	12 mg | S15 unit 12 mg | Q15 unit 9 mg | C15 unit 9 mg | D15 unit	80 mg | S100 unit 80 mg | Q100 unit 60 mg | C100 unit 60 mg | D100 unit
Flow rate at 1 bar	> 100 ml/min	> 50 ml/min	> 75 ml/min
Hold-up volume	0.8 ml	1.0 ml	4.2 ml
Maximum pressure	6 bar	7 bar	6 bar
pH stability	–	pH 2–13	pH 2–13
Storage before use	dry at room temperature	dry at room temperature	dry at room temperature
Regeneration	not applicable	1 hr treatment with 1 N NaOH or 1 N HCl at room temperature. Back flushing is possible.	
Storage after use	not applicable	wet in buffer or saline solution at 4–8°C in the presence of anti-microbial agents. Do not expose to pure water or to organic solvents.	

All MA types passed the USP 24 cytotoxity test with MRC-5 and USP 24 Plastics Class VI test.
36.4 cm^2 adsorption area ≅ 1 ml membrane volume
** Reference proteins: Lysozyme for cation and BSA for anion exchangers using appropriate buffer system. The binding capacity depends upon the MA type and conditions used.

Order numbers for MA5, MA15 and MA100 units

Type of exchanger	**MA5** disposable units (packs of 15)	**MA15** reusable units* (packs of 2)	**MA100** reusable units (packs of 1)
Strong cation exchanger	S5F	S15X	S100X
Strong anion exchanger	Q5F	Q15X	Q100X
Weak cation exchanger	C5F	C15X	C100X
Weak anion exchanger	D5F	D15X	D100X

MA15 and MA45 packages include 1 Minisart 0.2 µm syringe filter for prefiltration.

Expand your mind.
Trainings and Seminars.

Training Seminar for the Pharmaceutical Industry

 # 862017
Microbiological Quality Control of Sterile Products in Clean Rooms and Isolators

Theoretical Aspects:
- Basic principles and regulatory requirements for working under clean room conditions
- Monitoring of microbiological air quality in clean rooms and isolators
- Basic principles of sterility testing according to EP
- Microbiological control of ambient conditions and quality management in drug manufacturing

Practical Exercises:
- Sampling of airborne microorganisms in laminar flow systems and in a demo isolator
- Sterility test handling

Total course time: 2 days

Target Group:
This training seminar is particularly suited for staff working in quality assurance and/or quality control in the pharmaceutical industry.

Prerequisites:
The participants must be familiar with the basic principles of microbiology.

 # 862008
The Use of Crossflow Filtration in Pharmaceutics, Pharmacology and Biotechnology

The participants will acquire state-of-the-art knowledge about GMP-compliant processing using crossflow filtration.

Theoretical Section:
- Crossflow filtration theory
- Membrane characterization | membrane selection
- Factors critical to performance
- Scaling up
- Operating conditions
- Cleaning-in-place (CIP)
- Steaming-in-place (SIP)
- Integrity testing
- Applications in biotechnology

Practical Section:
- Operational set-up of the systems
- Determining the flux rate for water
- Demonstration of steaming in place (optional)
- Cell (particle) retention by Microfiltration (model solution)
- Concentration of protein solutions by ultrafiltration
- Removal of low-molecular weight constituents by diafiltration
- Cleaning
- Discussion of the results

Total course time: 2 days

Target Group:
Staff working in areas ranging from research to production. The modular structure of the course allows the participants to request their own topics as well.

 # 862024
Sterilization and Integrity Testing of Membrane Filters

The participants in this training seminar on steaming-in-place and in-place integrity testing will acquire theoretical knowledge and practical experience in the handling of filters used in sterile filtration.

Theoretical Section:
- Basic principles of filtration (depth filters, membrane filters)
- Integrity testing of membrane filters (methods, testing equipment)
- Physical and theoretical principles of the steam sterilization of filter lines

Practical Section:
- Performing integrity tests
- Practical tests with in-line steam sterilization of filter cartridge lines

Total course time: 2 days

Target Group:
Staff working in the areas of production, quality assurance and quality control

In-house Training at Your Company!

 # 862026 Plant Hygiene in Pharmaceutical Industry

This seminar is specifically designed to be held in-house so that as many employees as possible can attend.

Contents:
- Basic principles of microbiology
- General rules of hygiene
- Critical factors
- Personnel hygiene
- Behavior in clean rooms
- Microbiological limit values
- Minimizing particle load and germ counts
- Hygiene monitoring

Total course time: 1 day

Target Group:
Staff working in production and staff members involved with microbiological monitoring

 # 862024
Sterilization and Integrity Testing of Membrane Filters

The participants in this training seminar on steaming-in-place and in-place integrity testing will acquire theoretical knowledge and practical experience in the handling of filters used in sterile filtration.

Theoretical Section:
- Basic principles of filtration (depth filters, membrane filters)
- Integrity testing of membrane filters (methods, testing equipment)
- Physical and theoretical principles of the steam sterilization of filter lines

Practical Section:
- Performing integrity tests
- Practical tests with in-line steam sterilization of filter cartridge lines

Total course time: 2 days

Target Group:
Staff working in the area of production, quality assurance and quality control

Training Seminar for the Food & Beverage and Pharmaceutical Industry

 # 862001 Microbiological Basic Principles of Product Safety and Plant Hygiene

Theoretical Aspects:

- Introduction to the general microbiology and die membrane filtration technology
- Determination of germ counts in water (European Drinking Water Regulation) and aqueous solutions
- Culture conditions
- Personnel hygiene

Practical Exercises:
- Introduction to microbiological work with products with low microbe counts
- Sample filtration runs with various media: water, particulate media, oil-containing media

Total course time: 2 days

Target Group:
This training seminar is intended for staff members working in the areas of quality assurance and/or quality control in the pharmaceutical industry and food and beverage industry.

Training Seminar for the Pharmaceutical Industry

 # 862023
Biotechnology Workshop Cultivation of high-cell density Escherichia coli and Initial Work-up
In Part 1 (# 862021) of this workshop, the participants will be divided into small groups and work with high cell density cultivation in laboratory bioreactors. The pertinent subjects will be dealt with in theory and practice In Part 2 (#862022) the various methods for primary work-up will be dealt with in theory and practice. You can sign up for individual sections or for all together under course number #862023.

Contents:
The main focus of the first part will be on the efficient high cell density cultivation or HCDC, safe use and operation of bioreactors in the laboratory and how to avoid problems with sterility. The second part offers an intensive introduction to primary work-up methods. Topics of discussion will include ways of achieving adequate oxygen supply, genetic fundamentals of Escherichia coli, suitable vectors and the initial steps in obtaining a target protein, called product capturing.

- Laboratory bioreactors, handling methods starting with processing up to cell harvesting
- Sterile techniques, sterilization kinetics Media design for high cell density cultivation
- Cultivation strategies and analysis
- Escherichia coli and vectors
- Primary work-up: Centrifugation, Crossflow Filtration (micro- and ultrafiltration)
- Cell digestion
- Qualification and validation

Total course time:
802021 Part 1 High cell density cultivation: 3 days
802022 Part 2 Primary work-up: 2 days
802023 Part 1 and Part 2: 5 days

Target Group:
This course specifically targets biologists, biochemists, chemists, biotechnologists, engineers and technical staff who have a basic knowledge of microbiology, cultivation of microorganisms and molecular biology and work on practical applications with laboratory bioreactors or in the processing of fermentation products or want to work in these areas. The most important fundamentals will be taught to decision-makers and laboratory managers in the fields of biotechnology, pharmaceutical biotechnology and enzyme production.

 # 862U25 Implementation of PDA TR 26
The main focus of this course is on the practical implementation of the PDA Technical Report No. 26 according to which any validation will stand up to every audit.

Contents:
- The introduction will start by explaining the basic differences between depth filters and membrane filters and about the materials available for the production of the respective filters.
- The different integrity tests will be presented and their correlation to the destructive bacteria challenge test will be explained.
- A brief historical review of the development of the GMP idea with regard to handling sterile filter elements will facilitate access to a more detailed interpretation of the PDA TR 26.
- Using the example of the CONFIDENCE Validation Service, explanations will be given about which tests and analyses must be conducted and how they should be conducted in order to implement CGMP theory successfully.
- A concluding discussion gives the participants the opportunity to ask questions about their daily work and identify ways of approaching the solutions.

Total course time: 1 day

Target Group:
Staff working in the field of quality assurance | quality control and production

Training Seminar for the Food and Beverage Industry

 # 862019 Sensory Analysis of Non-alcoholic Beverages
This basic and advanced training course on sensory science will teach you about current topics in the theory and practice of sensor analysis.

Theoretical Section:
- The importance of sensory analysis as a method and tool for ensuring consistent product quality
- Current topics in the theory and practice of sensory analysis
- How do I carry out proper tests in my everyday routine?
- Basic theory
- Methods of sensor analysis according to DIN and ISO standards
- Drafting a profilogram

Practical exercises:
- Basic test (taste thresholds)
- Taste testing (Paired comparison, Triangular test, Duo-trio test)
- Olfactory tests
- The practical part will be concluded with a test of your personal performance in a tasting and smelling

Total course time: 2 days

Target Group:
Staff working in the fields of quality assurance | quality control and test panel members in the non-alcoholic beverage industry

 # 862016 Microbiological Quality Assurance and Plant Hygiene in the Food and Beverage Industry

This training course in advanced microbiology lasts two full days with theoretical and practical sections.

Theoretical Section:
- Basic principles and application of the HACCP concept
- Plant hygiene
- Product spoiling microorganisms
- Methods of differentiation

Practical exercises:
- Differentiation of bacteria
- Practical exercises with the API 20E and BBL Crystal
- Microscopy of bacteria, yeasts and fungi

Total course time: 2 days

Target Group:
Staff working in fields of quality assurance | quality control.

Prerequisites:
The participants must be familiar with the basic principles of microbiology.

Order Number Index.

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Product Name Index.

Product Name Index.

For the purpose of product development we reserve the right to make changes without notice.

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