sartorius

Laboratory Product Catalogue

Total Laboratory Science Support

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About Sartorius

Sartorius AG is an internationally leading process technology supplier covering the segments of biotechnology and mechatronics. The Goettingen-based company founded in 1870 currently employs a good 3,660 persons. Its biotechnology segment focuses on filtration and separation applications, fermenters and proteomics. The mechatronics segment particularly consists of products for weighing, measurement and automation technology in laboratory and industrial applications.

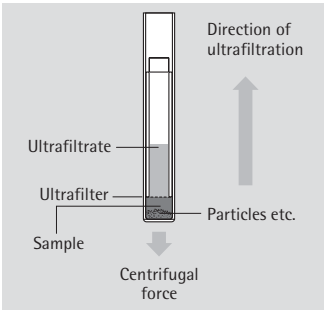
Sartorius key customers are from the pharmaceutical, chemical and food and beverage industries and from numerous research and educational institutes of the public sector.

Sartorius has its own production facilities in Europe, Asia and America as well as sales subsidiaries and local commercial agencies in more than 110 countries.


SARTOPORE 2 150

Major Filtration Applications

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 commonly used pore size for this application is 0.45 µm, although 0.2 µm is 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 25 mm diameters. The small 4 mm units are packed for ease of removal from the box.

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 hydrolysis-prone or oxygen sensitive samples (see pages 23 and 74).

Water samples
Analytical methods for various substances in water require larger sample volumes. Particle removal using 0.45 µm membrane filters is described in the respective instructions as well as using 50 mm membrane filters in glass or stainless steel vacuum filter holders. Difficult to filter samples, such as sludge samples, must be filtrated with pressure (see page 51).

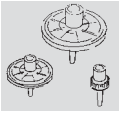
Aqueous solutions and solvents
A 47 mm pressure holder (see page 73) allows particle removal from liter volumes of solutions for cell counters. The all-glass filter holder with a 0.45 µm membrane filter, Type 184, is perfectly suitable for the particle removal from solvents for HPLC.

Colloid and protein removal
As shown in the guide below, smaller filters must 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 quickly cause blockage due to their fineness. The Centrisart I centrifugal units prevent this blockage by filtering in the opposite direction of the centrifugal force. The easy accessibility of the filtrate makes Centrisart I units extremely practical for the preparation of clinical samples and for liposome separations.

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 40).

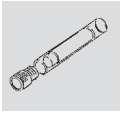
Separation ranges of membrane filters and ultrafilters

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**	┤



Minisart RC and Minisart SRP syringe units
Pages 32 to 35

Glass filter holders
Pages 43 to 45



Centrisart I and Vivaspin centrifugal units
Pages 102 to 106

Membrane filters
Pages 16 to 27

Concentration 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 with ultrafiltration. Centrisart I, because of its patented separation concept, is particularly advantageous when the ultrafiltrate is of interest.

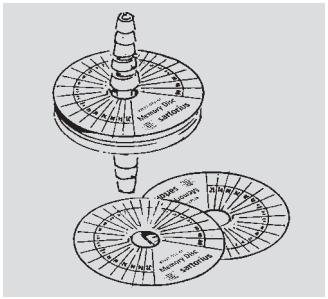
Crossflow filtration has established itself as an economical means of processing medium to large volumes. Vivaflow units perfectly fill the gap between the centrifugal units and the cassette systems. These ready-to-connect units are a time- and cost-saving method to treat samples according to laboratory standards and, at the same time, offer forecasts concerning the scale-up to larger volumes.

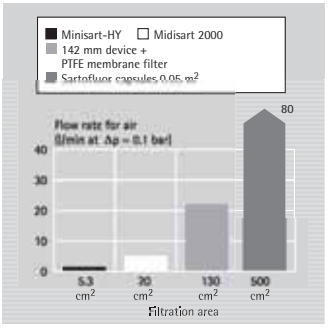
All of the above products utilize ultrafiltration membranes which separate based on the size and low protein adsorption characteristics the volume exhibits.

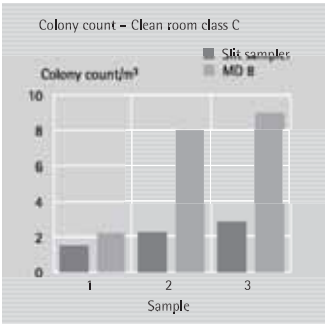
Scale-Up. Which unit for which volume?

Filtration unit	Filter area	Typical sample volume
Vivaspin 500	0.50 cm^2	0.5 ml
Vivaspin 2	1.20 cm^2	2 ml
Centrisart I	0.79 cm^2	2.5 ml
Vivaspin 4	2.00 cm^2	4 ml
Vivaspin 6	2.50 cm^2	6 ml
Vivaspin 15	4.00 cm^2	15 ml
Vivaspin 20	6.00 cm^2	20 ml
Vivacell 70	20.00 cm^2	70 ml
Vivacell 100	23.50 cm^2	90 ml
Vivacell 250	40.00 cm^2	250 ml
Vivaflow 50	50.00 cm^2	1 l
Vivaflow 200	200.00 cm^2	5 l
Sartocon Slice 200	200.00 cm^2	5 l
Sartocon Slice	0.10–0.50 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 keep track of the number of sterilizing cycles.

Midisart 2000 units are designed for the sterile venting of small fermenters and culture vessels (6–120 liters), 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.

Midisart BV (page 92) disposable venting filter manufactured with hydropobic, reinforced PTFE membranes, are specially designed for sterile venting on disposable bag manifolds and tubing systems. Midisart BV allows sterilization by gamma irridiation and is integrity testable.

Minisart HY (page 91), 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 73), is designed for the installation in lines. It features a valve on the inlet side for the drainage of condensation. The air flow rate corresponds to that of Midisart 2000.

Higher flow rates require proportionately more filter area.

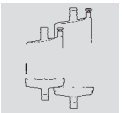
Sartofluor Capsules are ready-to-connect units, including valves, for the sterile venting of tanks and vessels. They are individually pretested and integrity testable at any time. The Capsule is available in a choice of three different sizes, with the following pleated filtration areas: 0.05 m^3, 0.1 m^3 and 0.2 m^3. Air flow rates are shown in the diagram on page 93.

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 99.

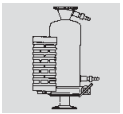
Clean room monitoring
The effectiveness with which the gelatine membrane filters (page 140) can collect airborne microorganisms and simultaneously maintain their viability is demonstrated in comparison with a slit sampler. The water-soluble gelatine membranes are also becoming increasingly important for the collection of viruses.

PTFE membrane filters
Page 23

Midisart 2000
Page 90



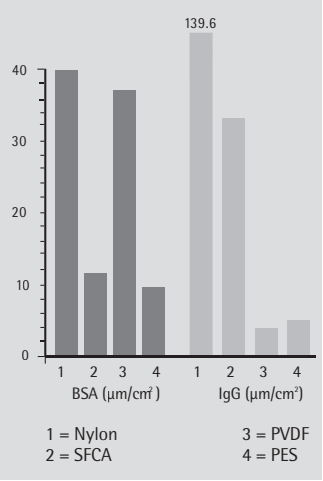
Sartofluor capsules
Page 93



Sartofluor Mini cartridges
Page 99

Sterilizing Filtration of Aqueous Solutions

Comparison of the adsorption of various filter materials



How ready-to-connect units from Sartorius fulfill the requirements of the customers.

Scale-up
The combination of the large filter area and the 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 an integrated prefilter. Sartobran 150 and 300 and Sartobran P Capsules contain a pleated double membrane for maximum economy.

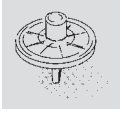
Regulatory compliance
All units are comprised of practice-proven cellulose acetate or polyethersulfone membrane filters, tested according to HIMA. Each single unit is tested for housing and membrane integrity prior to packaging, and statistically valid numbers of units from each batch are subjected to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

All materials pass the USP Plastics Test Class VI. Sartorius cellulose acetate and PES membrane filters have proven to display particularly low adsorption and assure minimal loss of proteins and preservatives (see diagram).

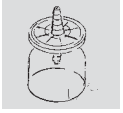
Which unit for which volume?

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 fiber prefilter
++ = with heterogeneous double membrane



Standard Minisart and Minisart plus syringe units
Page 29



Sartolab P20 and Sartolab P20 plus units
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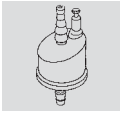
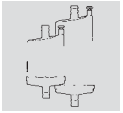


Sartobran 150 and 300 capsules
Page 55



Sartobran P capsules
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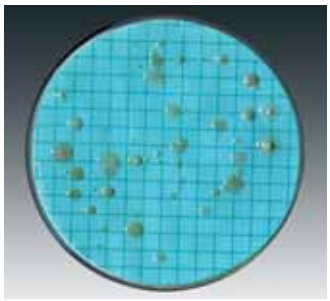
Microbiological Quality Control

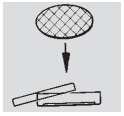


Colony counts
The requirements for a practical microbiological test method are to permit quantitative and reproducible detection of trace contamination, and to be performed efficiently and economically under routine conditions. These requirements are optimally fulfilled by the membrane filter method.

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 pads are a further simplification. They are culture media in dry form, sterilely packed in Petri dishes, easy to stock, of consistently high quality and ready for use after simply wetting with water. Typical colonies grown on the various types are shown on page 156. The wide range of media includes types for food, beverage and pharmaceutical industries.



Nutrient pad sets
Page 156

Microsart e.motion
membrane filter dispenser:
Page 146

Individually packed,
gridded membrane filters
Pages 144

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 22).

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

Airborne bacteria and viruses
Gelatine membrane filters are routinely used to quantitatively collect airborne microorganisms for clean room and isolator monitoring. Their effectiveness for the collection of viruses has also been demonstrated. The gelatine 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 replace stainless steel funnels of vacuum holders.

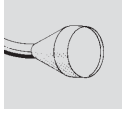
Biosart 250 funnels
250 ml funnels which eliminate the need for time-consuming sterilization between samples. Their large inner base diameter ensures the shortest filtration times.

Biosart 100 monitors
100 ml capacity units with filters available in different pore sizes, filter colours and diameters. The completely sterile units must 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.

Biosart® 250:
Page 165

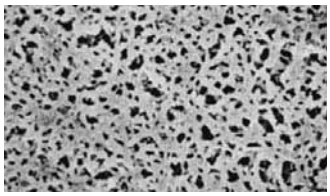
Biosart® 100:
Page 160

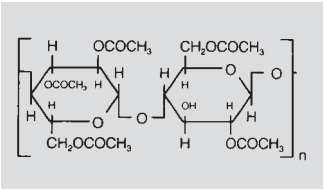


Gelatine membrane filters
Page 140

Filtration

Low Adsorption Cellulose Acetate Membrane Filters, 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 0.2 µm membrane 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 previous sterilization.

Typical performance for cellulose acetate membrane filters

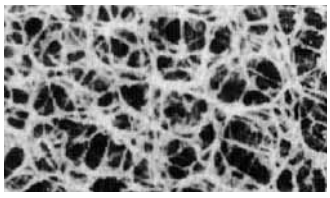
Adsorption	Bovine serum albumin <10 µg/cm^2
Bubble point acc. DIN 58355	Minimum value for 0.2 µm > 2.9 when measured with an automatic integrity tester, for 0.45 µm = 1.9 bar (190 kPa, 27.5 psi), for 0.65 µm = 1.3 bar (130 kPa, 18.9 psi), for 0.8 µm = 0.8 bar (80 kPa, 11.6 psi)
Chemical compatibility	Resistant to aqueous solutions, pH 4–8, against most alcohols, hydrocarbons and oils.
Extractables with water	Less than 1%
Flow rate for water acc. DIN 58355	Average value per cm^2 area at Δp = 1 bar (100 kPa, 14.5 psi): 24 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
Sterilization	By autoclaving at 121°C or 134°C with γ-radiation, dry heat or ethylene oxide.
Sterilizing filtration	Filters with 0.2 µm pore sizes are validated by Bacteria Challenge Tests.
Thermal stability	Max. 180°C
Thickness acc. DIN 53105	Average value 120 µm

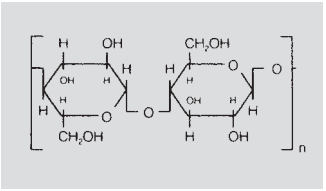
Order numbers for cellulose acetate membrane filters, type 111

13 mm diameter	11104-013 N	0.8 µm, pack of 100
	11106-013 N	0.45 µm, pack of 100
	11107-013 N	0.2 µm, pack of 100
25 mm diameter	11104-025 N	0.8 µm, pack of 100
	11105-025 N	0.65 µm, pack of 100
	11106-025 N	0.45 µm, pack of 100
	11107-025 N	0.2 µm, pack of 100
30 mm diameter	11106-030 N	0.45 µm, pack of 100
	11107-030 N	0.2 µm, pack of 100
47 mm diameter	11104-047 N	0.8 µm, pack of 100
	11105-047 N	0.65 µm, pack of 100
	11106-047 N	0.45 µm, pack of 100
	11107-047 N	0.2 µm, pack of 100
50 mm diameter	11104-050 N	0.8 µm, pack of 100
	11105-050 N	0.65 µm, pack of 100
	11106-050 N	0.45 µm, pack of 100
	11107-050 N	0.2 µm, pack of 100
	11107-050 ACN	0.2 µm, pack of100 individually, sterile packed
85 mm diameter	11106-085 N	0.45 µm, pack of 100
90 mm diameter	11106-090 G	0.45 µm, pack of 25
	11107-090 G	0.2 µm, pack of 25
100 mm diameter	11106-100 G	0.45 µm, pack of 25
	11106-100 N	0.45 µm, pack of 100
	11107-100 G	0.2 µm, pack of 25
	11107-100 N	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

Special brochure for all membrane filters available. Order no. SM-1503-e

Chemical Resistant RC-Membrane Filters, 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.

The 50 mm diameter, 0.45 µm pore size filter, for example, is standardly used in combination with the all-glass holder (described on page 45) to ultraclean and de-gas solvents and mobile phases for HPLC.

Regenerated cellulose membranes also feature low non-specific adsorption.

Typical performance for regenerated cellulose membrane filters

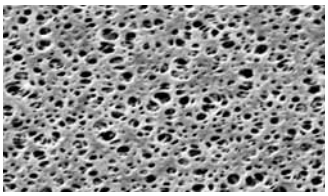
Adsorption	Bovine serum albumin approx. <10 µg/cm²
Bubble point acc. DIN 58355	Min. values, wetted with water, 4.4 bar (440 kPa, 63.8 psi) for 0.2 µm, 2.8 bar (280 kPa, 40.6 psi) for 0.45 µm
Chemical compatibility	Resistant to almost all solvents (see list above) and against aqueous solutions in the pH-range 3–12. Further details on page 124.
Extractables with water	Less than 1%
Flow rate acc. DIN 58355	Average value per cm² area for water at 1 bar (100 kPa, 14.5 psi) pressure, 16 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
Thickness acc. DIN 53105	160-200 µm

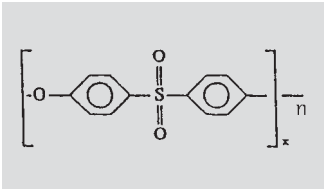
Order numbers for regenerated cellulose membrane filters, type 184

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

Special brochure for all membrane filters available. Order no. SM-1503-e

Polyethersulfone Membrane Filters, Type 154, for the Filtration of Aqueous and Aggressive Solutions





The new polyethersulfone membrane filters feature excellent flow speeds and 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 suited for samples of the environmental sector.

The 0.1 µm filters are used for the ultra-cleaning of solutions, e.g. in the case of nephelometry.

Typical performance for polyethersulfone membrane filters

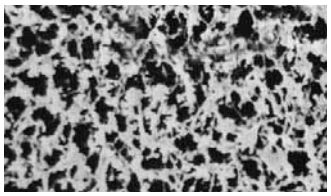
Adsorption	10 µg/cm² for IgG, 5 µm/cm² for BSA, 1.9 µg/cm² for Insulin
Bubble point acc. DIN 58355	0.1 µm with Isopropanol/water (60/40) >2.1 bar (30.45 psi) 0.2 µm = 3.2 bar (320 kPa, 46 psi) 0.45 µm = 2.3 bar (33.4 psi)
Chemical compatibility	Resistant to some solutions and aggressive, aqueous solutions, pH 1-13.
Extractables with water	Less than 0.2%
Flow rate for water acc. DIN 58355	Average value per cm² area at ΔP = 1 bar (100 kPa, 14.5 psi): 0.1 µm – >7 ml/min. 0.2 µm – >28 ml/min. 0.45 µm – >32 ml/min.
Material	Polyethersulfone (non ionic)
Sterilization	By autoclaving at 121°C or 134°C, gamma radiation or with ethylenoxide.
Sterilizing filtration	Filters with 0.2 µm pore sizes have been validated with the Bacteria Challenge Test.
Thickness acc. DIN 53105	150 µm

Order numbers for polyethersulfone membrane filters, type 154

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

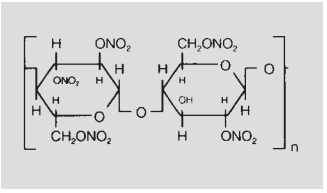
Special brochure for all membrane filters available. Order no. SM-1503-e

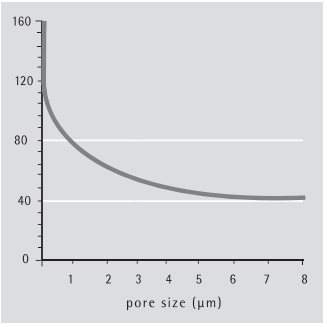
Cellulose Nitrate (Ester) Membrane Filters, Type 113, for Sample Pretreatment, Particle Testing and Chemotaxis



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) can be used 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.





Adsorption
(γ-Globulin, approx. 125 µg/cm²)

Typical performance for cellulose nitrate (ester) membrane filters

Adsorption	See diagram
Bubble point acc. DIN 58355	Wetted with water, minimum values: 0.3 bar (30 kPa, 4.35 psi) for 8 µm pore size, 11301 0.5 bar (50 kPa, 7.25 psi) for 5 µm pore size, 11342 0.6 bar (60 kPa, 8.7 psi) for 3 µm pore size, 11302 1.0 bar (100 kPa, 14.5 psi) for 1.2 µm pore size, 11303 1.4 bar (140 kPa, 20.3 psi) for 0.8 µm pore size, 11304 2.0 bar (200 kPa, 29 psi) for 0.65 µm pore size, 11305 2.4 bar (240 kPa, 34.8 psi) 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.
Extractables with water	Less than 1%
Flow rate for water acc. DIN 58355	Average values per cm² area at Δp = 1 bar (100 kPa, 14.5 psi): 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 at 121°C, gamma radiation (25 kGy) or with ethylene oxide.
Thermal stability	Max. temperature 130°C
Thickness acc. DIN 53105	130 µm

Order numbers for cellulose nitrate membrane filters, type 113

13 mm diameter	11301-013 N	8 µm, pack of 100
	11342-013 N	5 µm, pack of 100
	11302-013 N	3 µm, pack of 100
	11304-013 N	0.8 µm, pack of 100
	11306-013 N	0.45 µm, pack of 100
20 mm diameter	11304-020 N	0.8 µm, pack of 100
	11306-020 N	0.45 µm, pack of 100
25 mm diameter	11301-025 N	8 µm, pack of 100
	11342-025 N	5 µm, pack of 100
	11302-025 N	3 µm, pack of 100
	11303-025 N	1.2 µm, pack of 100
	11304-025 N	0.8 µm, pack of 100
	11305-025 N	0.65 µm, pack of 100
	11306-025 N	0.45 µm, pack of 100
30 mm diameter	11306-030 N	0.45 µm, pack of 100
37 mm diameter	11301-037 N	8 µm, pack of 100
	11304-037 N	0.8 µm, pack of 100
	11306-037 N	0.45 µm, pack of 100

Order numbers for cellulose nitrate membrane filters, type 113

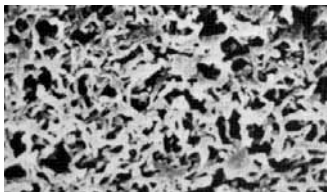
47 mm diameter	11301-047 N	8 µm, pack of 100
	11342-047 N	5 µm, pack of 100
	11302-047 N	3 µm, pack of 100
	11303-047 N	1.2 µm, pack of 100
	11304-047 N	0.8 µm, pack of 100
	11305-047 N	0.65 µm, pack of 100
	11306-047 N	0.45 µm, pack of 100
50 mm diameter	11301-050 N	8 µm, pack of 100
	11342-050 N	5 µm, pack of 100
	11302-050 N	3 µm, pack of 100
	11303-050 N	1.2 µm, pack of 100
	11304-050 N	0.8 µm, pack of 100
	11305-050 N	0.65 µm, pack of 100
	11306-050 N	0.45 µm, pack of 100
80 mm diameter	11301-080 ALN	8 µm, pack of 100 sterile, non-individually packed
85 mm diameter	11306-085 N	0.45 µm, pack of 100
90 mm diameter	11342-090 G	5 µm, pack of 25
	11303-090 G	1.2 µm, pack of 25
	11304-090 G	0.8 µm, pack of 25
	11306-090 G	0.45 µm, pack of 25
	11306-090 N	0.45 µm, pack of 100
142 mm diameter	11301-142 G	8 µm, pack of 25
	11302-142 G	3 µm, pack of 25
	11303-142 G	1.2 µm, pack of 25
	11304-142 G	0.8 µm, pack of 25
	11304-142 N	0.8 µm, pack of 100
	11305-142 G	0.65 µm, pack of 25
	11306-142 G	0.45 µm, pack of 25
	11306-142 N	0.45 µm, pack of 100
	11342-142 G	5 µm, pack of 25
	11342-142 N	5 µm, pack of 100
293 mm diameter	11301-293 G	8 µm, pack of 25
	11303-293 G	1.2 µm, pack of 25
	11304-293 G	0.8 µm, pack of 25
	11304-293 N	0.8 µm, pack of 100
	11306-293 G	0.45 µm, pack of 25
	11306-293 N	0.45 µm, pack of 100
	11342-293 G	5 µm, pack of 25

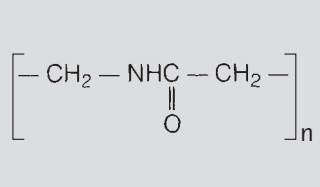
47 mm and 50 mm filters are, in some pore sizes, sterile, individually packed, available in packs of 100.

Order numbers

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 16, are recommended.

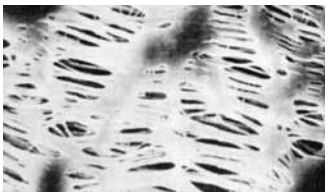
Typical performance for polyamide membrane filters

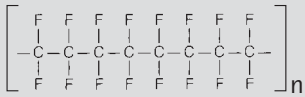
Adsorption	100 µg/cm² for bovine serum albumin (0.2 µm pore size)
Bubble point acc. DIN 58355	Minimum value for 0.2 µm = 3.4 bar (340 kPa, 49.3 psi), for 0.45 µm = 2.2 bar (220 kPa, 33.35 psi).
Chemical compatibility	Resistant to many solvents and alkali-solutions, pH range 3-14.
Extractables with water	Less than 1%
Flow rate for water acc. DIN 58355	Average value per cm² area at Δp = 1 bar (100 kPa, 14.5 psi): >12 ml/min for 0.2 µm, >26 ml/min for 0.45 µm pore size
Material	Polyamide
Sterilization	By autoclaving at 121°C or 134°C or with ethylene oxide.
Sterilizing filtration	Filters with 0.2 µm pore size are validated by the Bacteria Challenge Test.
Thickness acc. DIN 53105	Average value 115 µm

Order numbers for polyamide membrane filters, type 250

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

Hydrophobic PTFE Membrane Filters, Type 118, for the Filtraton of Air, Gases or Chemicals





The main application of this membrane filter type is 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 at low differential pressures as well.

PTFE membrane filters have an excellent chemical compatibility, so that they are also used for the filtration of solvents and acids, to which other filter types are not resistant. Due to their hydrophobic characteristics, they must be pre-wetted with ethanol or methanol before the filtration of aqueous media.

Typical performance for PTFE membrane filters

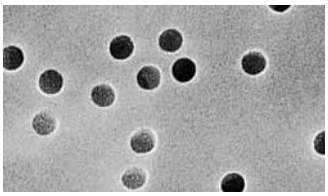
Adsorption	8 µg/cm² for gamma-globulin (0.2 µm pore size)
Bubble point acc. DIN 58355	Minimum value for Isopropanol 0.2 µm = 1.0 bar (100 kPa, 15 psi), for 0.45 µm = 0.7 bar (70 kPa, ~10 psi). Average value for 1.2 µm = 0.45 bar (45 kPa, 6.52 psi), for 5 µm = 0.1 bar (10 kPa, 1.45 psi)
Chemical compatibility	Resistant to almost all chemicals
Extractables with water	None detectable
Flow rate for air	Average values per cm² area at Δp = 0.05 bar (5 kPa, 0.725 psi): 0.2 l/min for 0.2 µm, 0.3 l/min for 0.45 µm, 1.6 l/minfor 1.2 µm and 4 l/min for 5 µm pore size
Material	Polytetrafluorethylene
Sterilization	By autoclaving at 121°C or 134°C or with ethylene oxide.
Sterilizing filtration	Filters with 0.2 µm pore size are validated with the Bacteria Challenge Test.
Thickness acc. DIN 53105	Average values, 65 µm for 0.2 µm and 100 µm for 5 µm pore size.

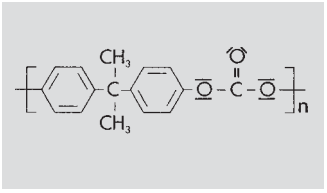
Order numbers see next page.

Order numbers for PTFE membrane filters, type 118

13 mm diameter	11803-013 N	1.2 µm, pack of 100
	11806-013 N	0.45 µm, pack of 100
	11807-013 N	0.2 µm, pack of 100
25 mm diameter	11842-025 N	5 µm, pack of 100
	11803-025 N	1.2 µm, pack of 100
	11806-025 N	0.45 µm, pack of 100
	11807-025 N	0.2 µm, pack of 100
47 mm diameter	66042--47------N	5 µm, PTFE supported, pack of 100
	11842-047 N	5 µm, pack of 100
	11803-047 N	1.2 µm, pack of 100
	11806-047 N	0.45 µm, pack of 100
	11807-047 N	0.2 µm, pack of 100
50 mm diameter	11842-050 N	5 µm, pack of 100
	11803-050 N	1.2 µm, pack of 100
	11806-050 N	0.45 µm, pack of 100
	11807-050 N	0.2 µm, pack of 100
100 mm diameter	11842-100 G	5 µm, pack of 25
	11803-100 G	1.2 µm, pack of 25
	11806-100 G	0.45 µm, pack of 25
	11807-100 G	0.2 µm, pack of 25
142 mm diameter	11842-142 G	5 µm, pack of 25
	11803-142 G	1.2 µm, pack of 25
	11806-142 G	0.45 µm, pack of 25
	11807-142 G	0.2 µm, pack of 25
293 mm diameter	11806-293 G	0.45 µm, pack of 25
	11807-293 G	0.2 µm, pack of 25

Polycarbonate Track-Etch-Membrane Filters, 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 provides 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.

Typical performance for polycarbonate membrane filters

Bubble point acc. DIN 58355	Minimum value for 0.2 µm = 4.8 bar (69.6 psi), for 0.4 µm 2.5 bar (36.3) psi
Chemical compatibility	See table page 124
Extractables	Low
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 at 121° C
Thermal stability	Max. temperature 140° C
Thickness acc. DIN 53105	6–11 µm

Order numbers for polycarbonate membrane filters, type 230

25 mm diameter	23007-25 N	0.2 µm, pack of 100
	23006-25 N	0.4 µm, pack of 100
47 mm diameter	23007-47 N	0.2 µm, pack of 100
	23006-47 N	0.4 µm, pack of 100

Glass Fiber Prefilters for Larger Totally Filterable Volumes in Clarification and Sterile Filtration

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

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

Serial filtration may be necessary for difficult to filter liquids such as serum. Two or three membrane filters of different pore sizes are placed on each other, with a glass fiber prefilter on top and 13420 polyester separators between them (diameter as same as prefilter) to assist liquid passage.

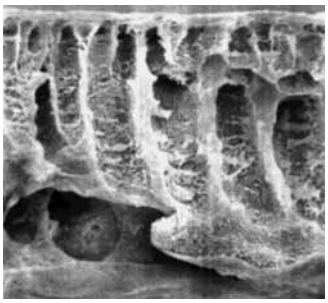
Typical performance

Flow rates for water	At Δp = 1 bar (100 kPa, 14.5 psi), 320 ml/min/cm^2 for 13400
Materials	13400, glass fiber with acrylic latex binder.
Sterilization	By dry heat, at 180°C or by autoclaving at 121°C or 134°C.
Thermal stability	220°C for 13400
Thickness	Ca. 0.55 mm for 13400

Order numbers

a) Type 13400, standard glass fiber filters	13400-013 S	13 mm, pack of 200
	13400-042 Q	42 mm, pack of 500
	13400-044 Q	44 mm, pack of 500
	13400-047 Q	47 mm, pack of 500
	13400-050 Q	50 mm, pack of 500
	13400-100 K	100 mm, pack of 50
	13400-120 K	120 mm, pack of 50
	13400-124 K	124 mm, pack of 50
	13400-127 K	127 mm, pack of 50
	13400-130 K	130 mm, pack of 50
	13400-142 K	142 mm, pack of 50
	13400-150 K	150 mm, pack of 50
	13400-257 K	257 mm, pack of 50
	13400-260 K	260 mm, pack of 50
	13400-279 K	279 mm, pack of 50
	13400-293 K	293 mm, pack of 50
b) Type 13430, extra thick glass fiber filters	13430-127 K	127 mm, pack of 50
	13430-130 K	130 mm, pack of 50
	13430-142 K	142 mm, pack of 50
	13430-257 K	257 mm, pack of 50
	13430-279 K	279 mm, pack of 50
	13430-293 K	293 mm, pack of 50
c) Type 13440, binder-free glass fiber filters	13440-042 Q	42 mm, pack of 500
	13440-044 Q	44 mm, pack of 500
	13440-047 Q	47 mm, pack of 500
	13440-050 Q	50 mm, pack of 500
	13440-130 K	130 mm, pack of 50
d) Type 13420, polyester separators	13420-088 K	88 mm, pack of 50

Ultrafiltration Membrane Filters from PES 146..., CTA 145... and RC 144... for the Concentration, Purification and Removal of Proteins



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

Cellulose triacetate (CTA)
High hydrophilicity and very low non-specific binding characterize this membrane. Cast without any membrane support that could trap or bind passing microsolutes, these membranes are to be preferred for sample cleaning and protein removal and when high recovery of the filtrate solution is of primary importance.

Regenerated cellulose (RC)
These membranes are also highly hydrophillic and are often preferred for their higher protein recovery when processing very dilute solutions. Resistance to autoclaving, ease of cleaning and extended chemical resistance also characterize this type of membrane.

Typical performance for polyethersulfone, type 146

Thickness	120 µm	
pH range	1–14	
Waterflux	MWCO 10,000	0.2 ml/min/cm^2
Protein retention	Cytochrome C	95%

Specifications for cellulose triacetate, type 145

Thickness	120 µm	
pH range	4–8	
Waterflux	MWCO 10,000	0.11 ml/min/cm^2
Protein retention	Cytochrome C	90%

Specifications for regenerated cellulose, type 144

Thickness	180 µm	
pH range	1–13	
Waterflux	MWCO 10,000	0,08 ml/min/cm^2
Protein retention	Cytochrome C	99%

Order numbers see next page.

Order numbers for polyethersulfone membrane filters, type 146

47 mm diameter	14609-047 D	1.000 MWCO, pack of 10
	14629-047 D	5.000 MWCO, pack of 10
	14639-047 D	10.000 MWCO, pack of 10
	14659-047 D	30.000 MWCO, pack of 10
	14650-047 D	50.000 MWCO, pack of 10
	14668-047 D	100.000 MWCO, pack of 10
	14679-047 D	300.000 MWCO, pack of 10

Order numbers for cellulose triacetate membrane filters, type 145

47 mm diameter	14529-047 D	5.000 MWCO, pack of 10
	14539-047 D	10.000 MWCO, pack of 10
	14549-047 D	20.000 MWCO, pack of 10
	14549-047 N	20.000 MWCO, pack of 100

Order numbers for regenerated cellulose membrane filters, type 144

47 mm diameter	14429-047 D	5.000 MWCO, pack of 10
	14439-047 D	10.000 MWCO, pack of 10
	14459-047 D	30.000 MWCO, pack of 10

Minisart® 0.2 µm Syringe Filter Holders for Rapid Small Volume Sterilization with Maximum User Convenience

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

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

Minisart plus units are advantageous for the sterilization of difficult to filter liquids. They include a fine glass fiber 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	Min. value with water 3.2 bar (320 kPa, 46 psi)
Color coding	Blue
Connectors	Female luer lock inlet, male luer lock outlet. Alternatively only for standard Minisarts male luer slip 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, 14.5 psi) 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, 65 psi) limits housing burst pressure, 6 bar (600 kPa, 87 psi) and higher Max. temperature, 50°C
Materials	Cellulose acetate membrane filters, glass fiber prefilters (only for Minisart plus), MBS polymerisate

Order numbers for 0.2 µm Minisart

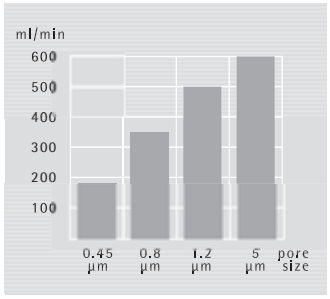
Pack of 50, sterile, individually packed	16534 K with luer lock outlet 17597 K with male luer slip outlet
Pack of 500, non-sterile bulk packed	16534 Q with luer lock outlet 17597 Q with male luer slip outlet

Order numbers for 0.2 µm Minisart plus

Pack of 50, sterile, individually packed	17823 K with luer lock outlet
Pack of 500, non-sterile bulk packed	17823 Q with luer lock outlet

Special brochure available. Order no. SL-0003-e

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 convenience by lowering the pressure required for filtration. Minisart GF contains a glass fiber 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 when a prefilter is needed on an 0.2 µm or 0.45 µm Minisart. Minisart plus units also contain this glass fiber filter, but as a prefilter on a 0.45 µm or 1.2 µm membrane, for higher total throughputs.

Order numbers for Minisart high flow

0.1 µm, pack of 50, sterile, individually packed	16553 K with luer lock outlet
0.2 µm, pack of 50, sterile, individually packed	16532 K with luer lock outlet 16541 K with luer slip outlet
0.45 µm, pack of 50, sterile, individually packed	16537 K with luer lock outlet 16533 K with luer slip outlet

Order numbers for standard 0.45 µm to 5 µm Minisarts

Pack of 50, sterile, individually packed	17598 K 16555 K 16592 K 17593 K 17594 K	0.45 µm Minisart with male luer slip outlet 0.45 µm Minisart with luer lock outlet 0.8 µm Minisart with luer lock outlet 1.2 µm Minisart with luer lock outlet 5 µm Minisart with luer lock outlet
Pack of 500, non-sterile bulk packed	17598 Q 16555 Q 16592 Q 17593 Q 17594 Q	0.45 µm Minisart with male luer slip outlet 0.45 µm Minisart with luer lock outlet 0.8 µm Minisart with luer lock outlet 1.2 µm Minisart with luer lock outlet 5 µm Minisart with luer lock outlet

Order numbers for Minisart plus units

Pack of 50, sterile, individually packed	17829 K	0.45 µm with luer lock outlet
Pack of 500, non-sterile bulk packed	17829 Q 17825 Q	0.45 µm with luer lock outlet 1.2 µm with luer lock outlet

Order numbers for Minisart GF units

Non-sterile bulk packed	17824 K 17824 Q	luer lock outlet, pack of 50 luer lock outlet, pack of 500

Recommended accessories see page 41.

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 slip outlet)
Application limits	Max. recommended operating pressure 4.5 bar (450 kPa, 65 psi).
Housing burst pressure	6 bar (600 kPa, 87 psi) and higher
Max. temperature	50°C
Bubble point	Min. value with water 2.0 bar (29 psi) (0.45 µm), 0.8 bar (12 psi) (0.8 µm), 0.7 bar (10 psi) (1.2 µm), 0.4 bar (6 psi) (5 µm), 0.5 bar (7 psi) (Minisart GF)
Flow rate	Typical values for water at Δ = 1 bar (100 kPa, 14.5 psi), 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)
Color 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 fiber filter (Minisart GF and Minisart plus). MBS polymerisate).
Hold-up volume	0.1 ml
Cytotoxicity	Detectably no inhibition with MRC-5 (human lung cells)

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 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
Acetonitrile
Gasoline
n-Butanol
Cellosolve (ethyl)
Chloroform
Diethyl acetamide
Dimethyl sulfoxide
Dioxane
Acetic acid (96%)
Ethanol
Ethyl acetate
Ethylene glycol
Freon TF
Hexane
Isobutanol
Isopropanol
Methanol
Methylenechloride
Methylethylketone
Pentane
Tetrahydrofuran
Toluene
Trichloroacetic acid (25%)
Trichlorethane
Water
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, 14.5 psi),	
Minisart RC4	10 ml/min (0.45 µm), 3.5 ml/min (0.2 µm)
Minisart RC15	280 ml/min (0.45 µm), 140 ml/min (0.2 µm)
Minisart RC25	430 ml/min (0.45 µm), 230 ml/min (0.2 µm)
Flow rate for methanol at Δp = 1 bar (100 kPa, 14.5 psi),	
Minisart RC4	3.0 ml/min (0.45 µm), 1.5 ml/min (0.2 µm)
Minisart RC15	105 ml/min (0.45 µm), 55 ml/min (0.2 µm)
Minisart RC25	325 ml/min (0.45 µm), 160 ml/min (0.2 µm)
Flow rate for water at Δp = 1 bar (100 kPa, 14.5 psi),	
Minisart RC4	1.5 ml/min (0.45 µm), 0.5 ml/min (0.2 µm)/3 bar
Minisart RC15	30 ml/min (0.45 µm), 10 ml/min (0.2 µm)
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, 87 psi) 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)

Minisart-NY25 (Nylon)
Versatile filter for both aqueous and solvent-based sample filtration.

Hold-up volume	ca. 0.15 ml	
Outlet connector	Luer slip	
Inlet connector	Female luer lock	
Pore size	0.2 µm	0.45 µm
Order number (50 units)	17845 ACK, sterile, individually packed	17846 ACK, sterile, individually packed
Order number (500 units)	17845 Q	17846 Q
Housing material	Polypropylene	Polypropylene
Membrane filter material	Nylon	Nylon
Membrane filter diameter	25 mm	25 mm
Filter area	4.8 cm^2	4.8 cm^2
Priming volume	ca. 0.95 ml	ca. 0.95 ml
Maximum Pressure	600 kPa	600 kPa
Max. temperature (autoclave)	121°C, 30 min	121°C, 30 min
Flow rate for water	50 ml/min	80 ml/min

at Δp = 100 kPa (1 bar)

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 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 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 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, 14.5 psi), Minisart SRP4 Minisart SRP15 Minisart SRP25	 2.0 ml/min (0.45 µm)/3 bar 45 ml/min (0.45 µm), 20 ml/min (0.2 µm) 130 ml/min (0.45 µm), 70 ml/min (0.2 µm)
Flow rate for methanol at Δp = 1 bar (100 kPa, 14.5 psi), Minisart SRP4 Minisart SRP15 Minisart SRP25	 4.5 ml/min (0.45 µm) 150 ml/min (0.45 µm), 55 ml/min (0.2 µm) 260 ml/min (0.45 µm), 160 ml/min (0.2 µm)
Flow rate for air at Δp = 1 bar (100 kPa, 14.5 psi), Minisart SRP4 Minisart SRP15 Minisart SRP25	 0.06 l/min (0.45 µm) 1.1 l/min (0.45 µm), 0.5 l/min (0.2 µm) 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, 87 psi) 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

Re-usable, 13 mm Syringe Filter Holders for the Ultracleaning of Small Volumes (up to about 10 ml)

PTFE holder for solvents and chemicals
Made completely of PTFE, this holder is unaffected by chemicals and contains no trace elements which could be released into the liquid being filtered. It is therefore extremely well suited for particle removal from samples and reagents for analytical methods, such as NMR samples.

Other benefits of this application are the low hold-up volume, the easy cleaning and the drying at a temperature of 180°C.

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

Specifications 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, 14.5 psi), With 0.2 µm membrane filter With 0.45 µm membrane filter	 Approx. 10 ml/min 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, 72.5 psi)
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 syringe 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 simply manually screwing it 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, 14.5 psi), With 0.2 µm membrane filter With 0.45 µm membrane filter	 Approx. 18 ml/min 35 ml/min

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, 101.57 psi)
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 41.

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 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, 14.5 psi), With 0.2 µm membrane filter With 0.45 µm membrane filter	 Approx. 45 ml/min 80 ml/min
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, 101.5 psi)
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

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 37. The silicone gasket enables a leak-free filtration at pressures of up to 7 bar by simply manually screwing it together.

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

Specifications for the 25 mm polycarbonate syringe filter holder

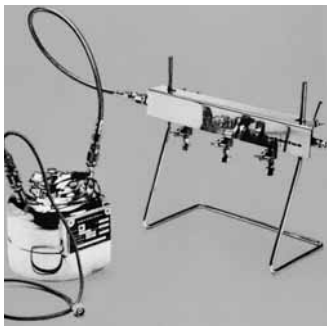
Connectors	Female luer lock inlet, luer slip outlet
Chemical compatibility	As for polycarbonate and silicone
Flow rate for water at Δp = 1 bar (100 kPa, 14.5 psi), With 0.2 µm membrane filter With 0.45 µm membrane filter	 70 ml/min 110 ml/min
Filtration area	3 cm^2
Materials	Polycarbonate top and bottom parts, silicone flat gasket 20×25 mm (replacement part no. 1EDS-D0053 for a pack of 10)
Max. operating pressure	7 bar (700 kPa, 101.5 psi)
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 41.
Filters see page 16.

Ultrasart D20 for LAL Tests without Interference



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

Pressure system for Ultrasart D20
Consists of a pressure manifold for 3 Ultrasart D20 units, valves for individual control of pressure and/or flow and air venting, a 3 liter pressure tank and connecting hoses. Additional pressure manifolds can be connected by using the adapter 17152 or 17153.

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

Specifications for Ultrasart D20

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 (14.5 psi), 2 ml/min
Materials	Cellulose triacetate ultrafilter (20,000 D MWCO, 100% endotoxin retention), SAN and MBS-cyrolite housing
Max. sample volume	15 ml

Specifications for pressure system for Ultrasart D20

Max. operating pressure	5 bar

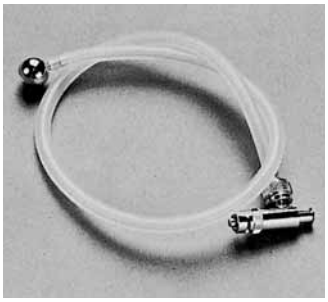
Order numbers for Ultrasart D20

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

Order numbers for pressure system for Ultrasart D20

16506	Complete Pressure system
16565	Pressure manifold
16663	Pressure tank 3 l
16698	Pressure hose for connceting tank to manifold
16664	Pressure hose for connceting tank to pressure source

Accessories for Ready-to-Use Minisarts and Re-usable Syringe Filter Holders



Dosing syringe
The dosing syringe is perfectly suitable in connection with a filter holder for rapid and simple filtration. The new dosing syringe in combination with our Minisart filter holders are ideal for wetting 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 on the handle. The syringe is user- and maintenance-friendly. Moreover, it is very easy to handle and so avoids fatigue signs of the hand after longer use.

The dosing syringe can be disinfected by boiling. It is not recommended to autoclave the syringes. If autoclaving is absolutely necessary, the plastic handle must first be removed.

3-way valve
Allows conduction of continuous filtration when connected to a syringe and fitted on the outlet side with a filter holder.

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

Needles
Fit on the luer slip outlets of the syringe filter holders. Accomodates the piercing of silicone caps or rubber bungs and the selective induction of the filtrate into a tube or an other vessel. The stainless steel needle is autoclavable.

Minicheck BP
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.

Order number for dosing syringe	16685--2	
Order number for 3-way valve	16639	Autoclavable (121 °C).
Replacement parts	6986070	Sealing (4×)
	6986071	Pressure spring (2×)
	6986072	Fixing spring (2×)
	6986073	Perbunan valve (2×)
Order numbers for disposable syringes	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
Order numbers for needles	01324	Stainless steel needle
	01325	Disposable needle
Order number for Minicheck BP	17799	

Sartorius Sartolab RF | BT Vacuum Filtration Units

Sartorius RF and BT units are optimized 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 solutions containing proteins.

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

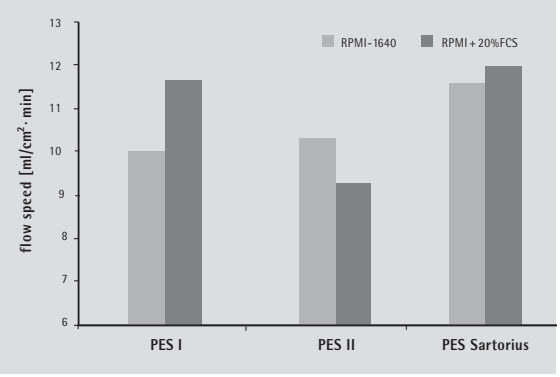
The Sartolab RF units are sterile complete units with a drainage vessel; the Sartolab BT holders can usually be adapted to trade, vacuum resistant bottles with a screw connector 45. Attention: only use bottles which are licensed for sub-pressure methods.

Available in different sizes.

Sartorius Sartolab 150 V filtration unit with pleated 0.2 µm PES membrane for vacuum filtration | sterile filtration of up to several liters.

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

The 0.2 µm pleated PES membrane with an area of 150 cm^2 guarantees reliable sterile filtration of media, buffers and many other solutions. They can be used universally on bottles with a diameter of up to 58 mm.



The graph 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.

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

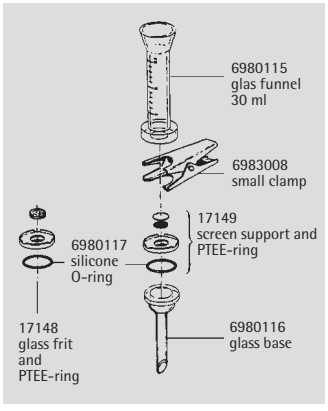
18084-E	Volume 150 ml, pack of 12
18085-E	Volume 500 ml, pack of 12
18086-E	Volume 1000 ml, pack of 12

Order number for Sartolab 150 V

18080-M	Vacuum filtration unit, pack of 3

Special brochure for all membrane filters available. Order no. SM-1503-e

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. As it is easy to clean, the device with a PTFE-coated screen support is more suitable when the filtrate is required or for radiochemical work.

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

It has a rim around the upper edge to simplify 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 on page 48.
Replacement parts see diagram.

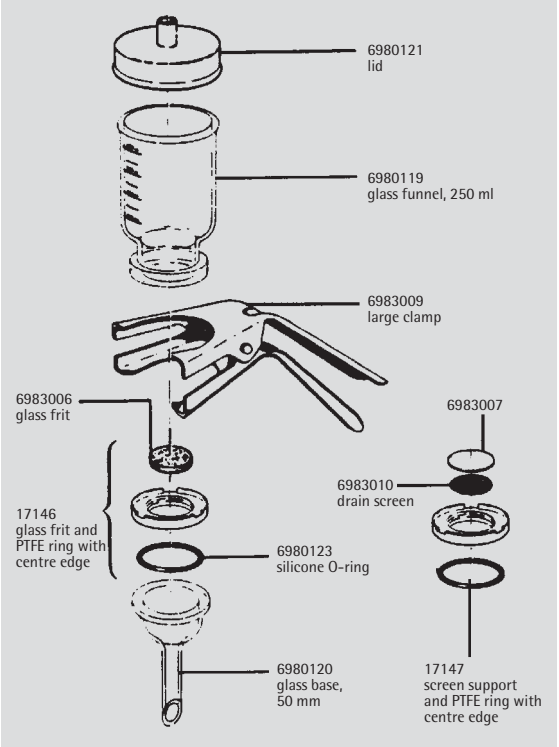
50 mm Glass Holder with Protective PTFE Ring, for Particle Testing or Clarification and Sterile Filtration

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. Because it is easy to clean, the device with the PTFE-coated screen support is preferable when the filtrate is required, or when liquids difficult to remove from glass frits must be examined.

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

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 124). 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 vacuum
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 numbers 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 on page 48.
Replacement parts see diagram.

All-glass Holder for Particle Removal from Solvents for Analytical Determinations

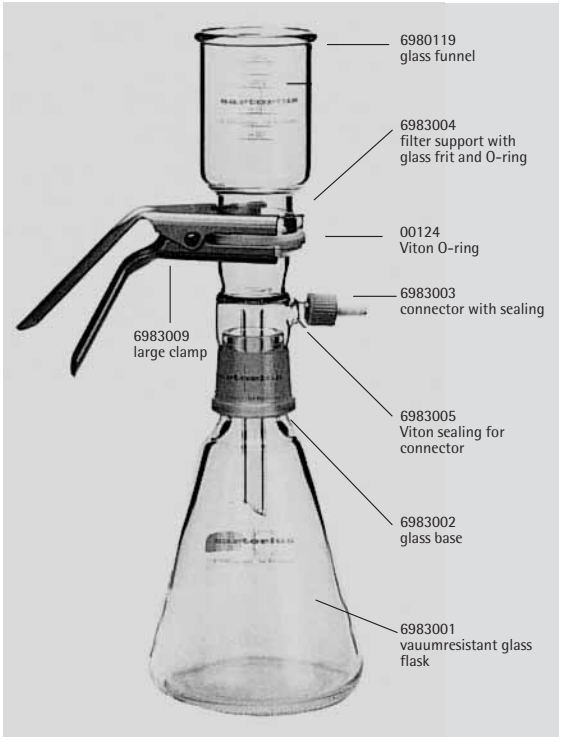
All areas, where liquid and device can come into direct contact, are made of glass or PTFE. The device, in combination with solvent-resistant, hydrophilic RC-membranes (Type 184, see page 18), is therefore ideal for ultracleaning and degassing solvents and solvent mixtures for HPLC, GC and AA.

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

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

Specifications 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 liter
Filtration area	12.5 cm^2
Max. operating pressure	Only for vacuum
Suitable membrane filter diameter	50 mm (or 47 mm)
Sterilization (without connector)	By autoclaving (121°C or 134°C) or by dry heat (max. 180°C).



Order number for the all-glass holder

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

Recommended accessories are described on page 48.
For replacement parts, see diagram.

Polycarbonate Holders for the Clarification or Sterile Filtration of up to about 200 ml Volumes of Aqueous Solutions

Type 16510 is complete with a 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 and outside the laboratory.

For sterile filtrations, the filter holder, included in the delivery, is equipped with a glass fiber filter 13400-0013 and enables 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 filling the liquid in the top part.

Type 16511 is like 16510, but without a receiver flask. It is used on a suction flask or a vacuum manifold, e.g. Combisart, see page 166.

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 on page 48 | 82

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

Accessories for Vacuum Filter Holders

Laboratory vacuum pump, 90%
Compact, reliable and oil-free membrane pump with low noise level.

Specifications

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

Order numbers

16692	220 V, 50 Hz
16695	110 V, 60 Hz
Replacement part 6986105	Set of one neoprene membrane, two valve springs and one neoprene head seal.

Laboratory vacuum pump, 98%
Membrane pump with high performance, reliable vacuum source, oil-free.

Specifications

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

Order numbers

16612	220 V, 50 Hz
16615	110 V, 60 Hz
Replacement part 6986017	Set of two neoprene membranes, four valve springs and two neoprene head seals.

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

Order number

16611

Suction flask, 2 liter capacity
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.

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

Order numbers

16672	For 2 l capacity
16672-----1	For 5 l capacity including stopper and adapter
16606	For 1 l capacity for countries which do not have safety restrictions on glass hose nipples.

Order numbers
for bored stoppers for vacuum-resistant flask, 2 l, 16672

17173	For stainless steel holders 16201, 16219, 16220
17174	For 25 mm glass holders
17175	For 50 mm glass holders

Order numbers
for stoppers for 1 l flask, 16606

17004	For stainless steel holders 16201, 16219, 16220
17005	For 25 mm glass holders
17006	For 47/50 mm glass holders

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

Order number

16610

Water trap, Vacusart
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.

Order number	
17804 M	Pack of 3

Peristaltic pump

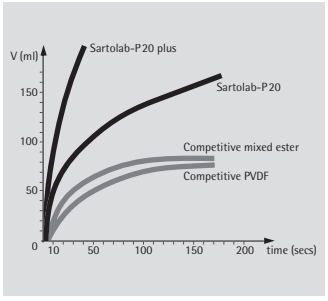
Specification

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

Order number

16697---00

Sartolab® P20 and Sartolab® P20 plus for Reliable Sterile Filtration of Tissue Culture Solutions



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

Ready-to-use units which, attached to a membrane pump or tube pump, quickly and reliably sterilize 100 ml to 5 liter 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. Automatic venting of any trapped air through the PTFE membrane-protected vent ports ensures that the entire filter surface is used for effective filtration.

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

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	Min. value with water, 3.2 bar (320 kPa, 46 psi)
Flow rate	For water 250 ml/min at Δp = 1 bar (100 kPa, 14.5 psi)
Filtration area	20 cm^2
Filling volume	6 ml
Housing burst pressure	> 5 bar (500 kPa, 72.5 psi)
Materials	Cellulose acetate membrane filter (0.2 µm). PTFE airfilter. Polycarbonate housing
Max. recommended inlet pressure	3 bar (300 kPa, 43.5 psi)
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 P20 plus units

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

Order numbers see next page.

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 P20 plus 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 on page 82.
Special brochure available on request. Order no. SL-3009-e

SartoScale
Filter Test Disposables for Use in the Biopharmaceutical Industry

Description
SartoScale filter test disposables are designed to perform reliable filterability trials with 47 mm flat filter discs of original filter cartridge material. The use of disposables for filtration trials avoids time consuming preparation of filter discs in stainless steel filter holders and prevents installation mistakes of the flat filter discs.

Applications
SartoScale filter test disposables are ideally suited to perform all kind of filterability trials with the target to select the optimal membrane material for a certain application or to determine the ideal combination of prefilters and final filters with minimum product volumes.

Original Filter Material
SartoScale filter test disposables contain the original filter active material of the respective filter cartridges in order to assure reproducible test results.

Scale-up
After material selection or determination of a prefilter | final filter scheme with SartoScale filter test disposables a scale-up for flow rate and total throughput performance of the selected materials should be done using small scale pleated capsule devices (e. g. capsules of type 150).

Optimized Design
SartoScale filter test disposables feature ultra low hold up and dead volumes in order to perform filterability trials with minimized product volumes.

Reliability
SartoScale filter test disposables containing integrity testable membrane filters can be tested for integrity by a bubble-point test to assure reliable test results.

Zero-T-Test System
We recommend to use SartoScale filter test disposables together with our Zero-T Filter Test System in order to perform filtration trials effectively. The Zero-T-System consists of hardware and software modules which allow easy handling and installation of the SartoScale filter test disposables. Automatic data acquisition is achieved by the connection of a balance to a laptop. The software analyses automatically the incoming data for scale-up calculations.

Availabilility
SartoScale filter test disposables will become available for all filter materials of Sartorius AG including:
- Sartopore 2 544...
- Sartobran P 523..
- Sartolon 510...
- Sartofluor 518...
- Sartoclean CA 562...
- Sartoclean GF 560...
- Sartopure PP2 559...
- Sartopure GFPlus 555...

Specifications for SartoScale

Biosafety	All materials pass the USP Plastic Test Class VI
Extractables	Meet or exceed the requirements for WFI quality standards set by the current USP
Connectors	see order numbers
Filter area	13 cm^2
Materials	Capsule housing polypropylene, all common filter materials of Sartorius AG
Regulatory Compliance	Non pyrogenic according to USP Bacterial Endotoxins, non fibre releasing according to 21 CFR
Max. differential pressure	5 bar (72.5 psi) at 20°C, 2 bar (29 psi) at 80°C
Sterilization	By autoclaving at 134°C, 2 bar, 30 min. Non in-line steam sterilization

Order information

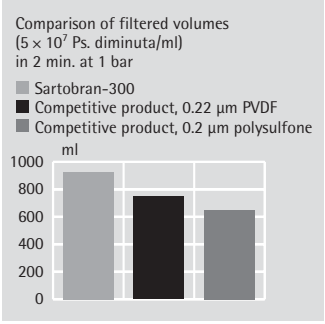
5445307HS--**--M	Sartopore 2 0.2 µm, pack of 3
5445358KS--**--M	Sartopore 2 0.1 µm, pack of 3
5445306GS--**--M	Sartopore 2 0.45 µm, pack of 3
5235307HS--**--M	Sartobran P 0.2 µm, pack of 3
5235358HS--**--M	Sartobran P 0.1 µm, pack of 3
5235306DS--**--M	Sartobran P 0.45 µm, pack of 3
5105307HS--**--M	Sartolon 0.2 µm, pack of 3
5625307AS--**--M	Sartoclean CA 0.2 µm, pack of 3
5625306AS--**--M	Sartoclean CA 0.45 µm, pack of 3
5625305GS--**--M	Sartoclean CA 0.65 µm, pack of 3
5625304ES--**--M	Sartoclean CA 0.8 µm, pack of 3
5605305GS--**--M	Sartoclean GF 0.65 µm, pack of 3
5605304ES--**--M	Sartoclean GF 0.8 µm, pack of 3
5595305PS--**--M	Sartopure PP2 0.65 µm, pack of 3
5595303PS--**--M	Sartopure PP2 1.2 µm, pack of 3
5595302PS--**--M	Sartopure PP2 3 µm, pack of 3
5595342PS--**--M	Sartopure PP2 5 µm, pack of 3
5595301PS--**--M	Sartopure PP2 8 µm, pack of 3
5595320PS--**--M	Sartopure PP2 20 µm, pack of 3
5595350PS--**--M	Sartopure PP2 50 µm, pack of 3
5555305PS--**--M	Sartopure GF Plus 0.65 µm, pack of 3
5555303PS--**--M	Sartopure GF Plus 1.2 µm, pack of 3

** = Connector type	Description
F	½" Tri-Clamp
H	¼" multiple stepped hose barb

Sartobran® P 150 and Sartobran® P 300 Capsules; Optimum Convenience for up to 50 Liters; Cost-Saving Scale-up to Larger Volumes

Sartobran P 300

Sartobran P 150 (type SS)



Newly developed, ready-to-use pressure filtration units offering maximum convenience for the sterile filtration of 0.1 to 50 liters 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 for 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, thus protecting the filtrate from non-sterile drops and the environment and user from possible contamination. For the subsequent integrity test, the outlet spout must be closed with the closure.

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

Specifications for Sartobran P 150 and Sartobran P 300

Connectors	Sartobran P 150: ¼" multiple stepped hose barb inlet and outlet or ½" sanitary flange Sartobran P 300: ¼" multiple stepped hose barb inlet and outlet
Biosafety	Pass the USP Plastics-Class VI-Test
Bubble point	With water, minimum value 3.2 bar (320 kPa, 46 psi)
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, 58 psi) at 20°C, 2 bar (200 kPa, 29 psi) 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.

Order numbers for Sartobran 150 capsules with 0.2 µm final filter and 0.45 µm prefilter
Sterile, individually packed

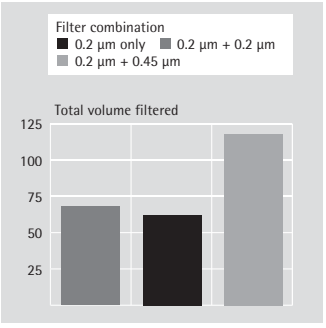
5231307H4-00-B	¼" Hose nipple inlet and outlet, pack of 5
5231307H4-SS-B	½" triclamp inlet and outlet, pack of 5
5231307H4-S0-B	½" triclamp inlet, ¼" hose nipple outlet, pack of 5

Order numbers for Sartobran 300 capsules with 0.2 µm final filter and 0.45 µm prefilter
Sterile, individually packed

5231307H5-00-V	¼" Hose nipple inlet and outlet, pack of 2
5231307H5-00-B	¼" Hose nipple inlet and outlet, pack of 5

Recommended accessories are described on page 82.
Special data sheet available. Order no. SPK2027-e

Sartobran® P MidiCaps for the Filtration of Protein Containing Solutions



Sartobran P MidiCaps are designed for maximum convenience and performance. They are complete filter units, ready-to-connect and to-use without prior 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, thus 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 a prefilter relieving the next finer membrane,which guarantees a reliable retention according to pore size. This fractionated retention of particles and microorganisms has a very favorable 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 124).
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 (58 psi) at 20°C, 2 bar (29 psi) 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, with hose nipple inlet and outlet

Type SS, with sanitary flange inlet and outlet

Type SO, with sanitary flange inlet and hose nipple outlet

Type FF, with sanitary flange inlet and outlet

Order numbers for Sartobran P MidiCaps*

With 0.2 µm final filter and 0.45 µm prefilter

Type 00, with ½" hose nipple inlet and outlet

5235307H7-00-A	0.05 m^2 filter area, pack of 4
5235307H8-00-A	0.1 m^2 filter area, pack of 4
5235307H9-00-A	0.2 m^2 filter area, pack of 4
5235307H0-00-V	0.45 m^2 filter area, pack of 2

Type SS, with 1½" sanitary flange inlet and outlet

5235307H7-SS-A	0.05 m^2 filter area, pack of 4
5235307H8-SS-A	0.1 m^2 filter area, pack of 4
5235307H9-SS-A	0.2 m^2 filter area, pack of 4
5235307H0-SS-V	0.45 m^2 filter area, pack of 2

Type SO, with 1½" sanitary flange inlet and ½" hose nipple outlet

5235307H7-SO-A	0.05 m^2 filter area, pack of 4
5235307H8-SO-A	0.1 m^2 filter area, pack of 4
5235307H9-SO-A	0.2 m^2 filter area, pack of 4
5235307H0-SO-V	0.45 m^2 filter area, pack of 2

Type HH, with ¼" multiple stepped hose barb inlet and outlet

5235307H7-HH-A	0.05 m^2 filter area, pack of 4

Type FF, with ¾" sanitary flange inlet and outlet

5235307H7-FF-A	0.05 m^2 filter area, pack of 4
5235307H8-FF-A	0.1 m^2 filter area, pack of 4
5235307H9-FF-A	0.2 m^2 filter area, pack of 4
5235307H0-FF-V	0.45 m^2 filter area, pack of 2

With 0.45 µm final filter and 0.65 µm prefilter

Type 00, with ½" hose nipple inlet and outlet

5235306D7-00-A	0.05 m^2 filter area, pack of 4
5235306D8-00-A	0.1 m^2 filter area, pack of 4
5235306D9-00-A	0.2 m^2 filter area, pack of 4
5235306D0-00-V	0.45 m^2 filter area, pack of 2

Type SS, with 1½" sanitary flange inlet and outlet

5235306D7-SS-A	0.05 m^2 filter area, pack of 4
5235306D8-SS-A	0.1 m^2 filter area, pack of 4
5235306D9-SS-A	0.2 m^2 filter area, pack of 4
5235306D0-SS-V	0.45 m^2 filter area, pack of 2

Type SO, with 1½" sanitary flange and ½" hose nipple outlet

5235306D7-SO-A	0.05 m^2 filter area, pack of 4
5235306D8-SO-A	0.1 m^2 filter area, pack of 4
5235306D9-SO-A	0.2 m^2 filter area, pack of 4
5235306D0-SO-V	0.45 m^2 filter area, pack of 2

* Also available as mini cartridges with the same pore sizes and areas.

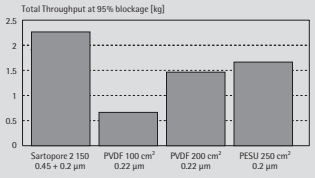
Order numbers for packs of 5

Pore size	0.05 m^2 filter area	0.1 m^2 filter area	0.2 m^2 filter area
0.2 µm	5231507H7B	5231507H8B	5231507H9B

Special brochure available on request. Order no. S--0024-e

Sartopore 2 150 and Sartopore 2 300
Best Flow Rates and Optimum Convenience for up to 50 Liters

Total Throughput Comparison



At 0.5 bar | 7.25 psi differential pressure

Sartopore 2 150 and Sartopore 2 300 are disposable, sterile, ready-to-use membrane filter capsules for convenient sterilizing grade filtration of 0.1 to 50 liters. The polyethersulfone membrane is compatible with a pH range from pH 1 to pH 14. Therefore Sartopore 2 150 and Sartopore 2 300 are ideal for filtration of solutions with high | low pH.

Sartopore 2 150 and 300 are with 3 different pore sizes available. For prefiltration filter with 0.45 µm final membranes are used, whereas Sartopore 2 150 and 300 MidiCaps with 0.2 µm final membranes are used for the sterile filtration. Filters with 0.1 µm final membranes are perfect suitable for combined sterile filtration and mycoplasma retention in sera and serum-containing culture media.

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

The vent design enables easy access to the venting valve. A hydrophobic PTFE membrane positioned on the highest point upstream allows an easy venting of the filter elelment and prevents product loss during the venting process.

Sartopore 2 150 and Sartopore 2 300 contain the design like the Sartopore 2 MidiCaps and MaxiCaps. Thus, a scale-up to larger sizes is only a matter of simple multiplications, allowing you to reduce validation costs.

Specifications for Sartopore 2 150 and Sartopore 2 300

Biosafety	All materials pass the USP Plastic Test Class VI
Chemical comparbilaty	To aqueous solutions in the pH-range 1–14
Connectors	see order numbers
Cytotoxicty	All materials are detectably non-toxic concerning L929-cells and MRC-5-cells
Filter area	0.015 m^2 and 0.03 m^2
Materials	Asymetric, double-layerd polyethersulfone membrane filter, polypropylene housing parts and support framing, PTFE air filter

Order numbers for Sartopore 150

With 0.45 µm final filter and 0.65 µm prefilter

5441306D4-SS-B	0.015 m^2, ½" sanitary flange inlet and outlet
5441306D4-OO-B	0.015 m^2, ¼" mutiple stepped hose barb inlet and outlet
5441306D4-SO-B	0.015 m^2, ½" sanitary flange inlet and ¼" mutiple stepped hose barb outlet

With 0.2 µm final filter and 0.45 µm prefilter

5441307H4-SS-B	0.015 m^2, ½" sanitary flange inlet and outlet
5441307H4-OO-B	0.015 m^2, ¼" mutiple stepped hose barb inlet and outlet
5441307H4-SO-B	0.015 m^2, ½" sanitary flange inlet and ¼" mutiple stepped hose barb outlet

With 0.1 µm final filter and 0.2 µm prefilter

5441358K4-SS-B	0.015 m^2, ½" sanitary flange inlet and outlet
5441358K4-OO-B	0.015 m^2, ¼" mutiple stepped hose barb inlet and outlet
5441358K4-SO-B	0.015 m^2, ½" sanitary flange inlet and ¼" mutiple stepped hose barb outlet

Order numbers for Sartopore 300

With 0.45 µm final filter and 0.65 µm prefilter

5441306D5-OO-B	0.03 m^2, ¼" mutiple stepped hose barb inlet and outlet

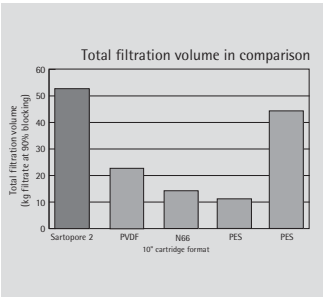
With 0.2 µm final filter and 0.45 µm prefilter

5441307H5-OO-B	0.03 m^2, ¼" mutiple stepped hose barb inlet and outlet

With 0.1 µm final filter and 0.2 µm prefilter

5441358K5-OO-B	0.03 m^2, ¼" mutiple stepped hose barb inlet and outlet

Sartopore® 2 MidiCaps for Best Flow Rates and Standing Times Over the Whole pH-range



The new Sartopore 2 MidiCaps ideally supplement the Sartobran P filters described on page 56. Whereas Sartobran P filters are mainly used for prefiltration 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 also allows the filtration of aggressive liquids of high or low pH.

Sartopore 2 MidiCaps are available with three different pore sizes. For the prefiltration of difficult to filter solutions, Sartopore 2 MidiCaps with 0.45 µm final membranes are used, whereas filter elements with 0.2 µm final membranes are used for the sterile filtration of media. Sartopore 2 MidiCaps with 0.1 µm final membranes 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 a build-in prefilter 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 shows the comparison of the total filtration volume of Sartopore 2 polyethersulfone membranes, PVDF, nylon-66 membranes as well as two different PES membranes, also in the 10"-cartridge format, each measured 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	0.05 m^2, 0.1 m^2, 0.2 m^2 or 0.45 m^2
Integrity test data	All Sartopore 2 MidiCaps 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 polyethersulfone membrane filter, polypropylene housing parts and support framing | drainage devices
Max. differential pressure	Δp = 4 bar at 20°C, 2 bar at 80°C

Type 00, with hose nipple inlet and outlet

Type SS, with sanitary flange inlet and outlet

Mini cartridges

Order numbers for Sartopore 2 MidiCaps*

Sartopore 2 MidiCaps with 0.45 µm final filter

5445306G7-**-A	0.05 m^2 filter area
5445306G8-**-A	0.1 m^2 filter area
5445306G9-**A	0.2 m^2 filter area
5445306G0-**	0.45 m^2 filter area

Sartopore 2 MidiCaps with 0.2 µm final filter

5445307H7-**-A	0.05 m^2 filter area
5445307H8-**-A	0.1 m^2 filter area
5445307H9-**-A	0.2 m^2 filter area
5445307H0-**	0.45 m^2 filter area

Sartopore 2 MidiCaps with 0.1 µm final filter

5445358K7-**-A	0.05 m^2 filter area
5445358K8-**-A	0.1 m^2 filter area
5445358K9-**-A	0.2 m^2 filter area
5445358K0-**	0.45 m^2 filter area

* Also available as mini cartridges with the same pore sizes and areas.

Order numbers for packs of 5

Pore size	0.05 m^2 filter area	0.1 m^2 filter area	0.2 m^2 filter area
0.1 µm	5441558K7B	5441558K8B	5441558K9B
0.2 µm	5441507H7B	5441507H8B	5441507H9B
0.45 µm	5441506G7B	5441506G8B	5441506G9B

** Available with -SS, -SO, -00 connector (HH only size 7)

MidiCaps for the Particle Removing Filtration or Prefiltration of 100 Liters 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 MidiCaps. 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.

Sartopure PP2 MidiCaps
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 of deionized water, pharmaceutical solutions, reagents, chemicals, acids, solvents, air and other gases.

Sartopure GF Plus MidiCaps
Sartopure GF Plus MidiCaps feature highly charged glass fiber layers and polypropylen fleeces for effective clarification of fluids streams based on the combination of adsoptive and mechanical retention. The 3-dimensional filter matrix assures highest total thoughputs and effective clarification. Two retention efficiencies of 1.2 and 0.65 µm.

Major applications: prefiltration and clarification of biological liquids of relatively high colloid content (such as sera) and particle removal out of biological liquids like cell culture media and fermentation broths.

Sartoclean CA MidiCaps
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 MidiCaps for higher filterable volumes in the sterile filtration of serum with minimal adsorption.

Sartoclean GF MidiCaps
Two types, like Sartoclean CA MidiCaps, but additionally with a glass fiber prefilter for the retention of particles, larger microorganisms and colloids, using a combination of depth filtration and fractionated membrane filtration.

Major applications: prefiltration of biological liquids with relatively high colloid content. Clarification of turbid solutions.

Specifications for Sartopure PP2 and Sartoclean MidiCaps

Biosafety	All materials pass the USP Plastics-Class VI-Test.
Filter area	0.05, 0.1, 0.2 or 0.45 m^2, as listed under order numbers.

Type 00, with hose nipple inlet and outlet

Type SS, with sanitary flange inlet and outlet

Type SO, with sanitary flange inlet and hose nipple outlet

Order numbers for Sartopure PP2 MidiCaps and Sartopure GF Plus MidiCaps

Sartopure PP2 depth filter MidiCaps

Type 00, with ½" single stepped hose barb

5595305P7-00-A	0.65 µm, 0.05 m^2, pack of 4
5595305P8-00-A	0.65 µm, 0.1 m^2, pack of 4
5595305P9-00-A	0.65 µm, 0.2 m^2, pack of 4
5595305P0-00-V	0.65 µm, 0.45 m^2, pack of 2
5595303P7-00-A	1.2 µm, 0.05 m^2, pack of 4
5595303P8-00-A	1.2 µm, 0.1 m^2, pack of 4
5595303P9-00-A	1.2 µm, 0.2 m^2, pack of 4
5595303P0-00-V	1.2 µm, 0.45 m^2, pack of 2
5595302P7-00-A	3 µm, 0.05 m^2, pack of 4
5595302P8-00-A	3 µm, 0.1 m^2, pack of 4
5595302P9-00-A	3 µm, 0.2 m^2, pack of 4
5595302P0-00-V	3 µm, 0.45 m^2, pack of 2
5595342P7-00-A	5 µm, 0.05 m^2, pack of 4
5595342P8-00-A	5 µm, 0.1 m^2, pack of 4
5595342P9-00-A	5 µm, 0.2 m^2, pack of 4
5595342P0-00-V	5 µm, 0.45 m^2, pack of 2

Type SS, with 1½" sanitary flange inlet and outlet

5595305P7-SS-A	0.65 µm, 0.05 m^2, pack of 4
5595305P8-SS-A	0.65 µm, 0.1 m^2, pack of 4
5595305P9-SS-A	0.65 µm, 0.2 m^2, pack of 4
5595305P0-SS-V	0.65 µm, 0.45 m^2, pack of 2
5595303P7-SS-A	1.2 µm, 0.05 m^2, pack of 4
5595303P8-SS-A	1.2 µm, 0.1 m^2, pack of 4
5595303P9-SS-A	1.2 µm, 0.2 m^2, pack of 4
5595303P0-SS-V	1.2 µm, 0.45 m^2, pack of 2

Type SO, with 1½" sanitary flange inlet and ½" single stepped hose barb outlet

5595303P7-SO-A	1.2 µm, 0.05 m^2, pack of 4
5595303P8-SO-A	1.2 µm, 0.1 m^2, pack of 4
5595303P9-SO-A	1.2 µm, 0.2 m^2, pack of 4
5595303P0-SO-V	1.2 µm, 0.45 m^2, pack of 2

Sartopure GF Plus depth filter MidiCaps

Type 00, with ½" single stepped hose barb

5555305P7-00-A	0.65 µm, 0.05 m^2, pack of 4
5555305P8-00-A	0.65 µm, 0.1 m^2, pack of 4
5555305P9-00-A	0.65 µm, 0.2 m^2, pack of 4
5555305P0-00-V	0.65 µm, 0.45 m^2, pack of 2
5555303P7-00-A	1.2 µm, 0.05 m^2, pack of 4
5555303P8-00-A	1.2 µm, 0.1 m^2, pack of 4
5555303P9-00-A	1.2 µm, 0.2 m^2, pack of 4
5555303P0-00-V	1.2 µm, 0.45 m^2, pack of 2

Type SS, with 1½" sanitary flange inlet and outlet

5555305P7-SS-A	0.65 µm, 0.05 m^2, pack of 4
5555305P8-SS-A	0.65 µm, 0.1 m^2, pack of 4
5555305P9-SS-A	0.65 µm, 0.2 m^2, pack of 4
5555305P0-SS-V	0.65 µm, 0.45 m^2, pack of 2
5555303P7-SS-A	1.2 µm, 0.05 m^2, pack of 4
5555303P8-SS-A	1.2 µm, 0.1 m^2, pack of 4
5555303P9-SS-A	1.2 µm, 0.2 m^2, pack of 4
5555303P0-SS-V	1.2 µm, 0.45 m^2, pack of 2

Type OO, with hose nipple inlet and outlet

Type SS, with sanitary flange inlet and outlet

Type SO, with sanitary flange inlet and hose nipple outlet

Type SO, with 1½" sanitary flange inlet and ½" single stepped hose barb outlet

5555305P7-SO-A	0.65 µm, 0.05 m^2, pack of 4
5555305P8-SO-A	0.65 µm, 0.1 m^2, pack of 4
5555305P9-SO-A	0.65 µm, 0.2 m^2, pack of 4
5555305P0-SO-V	0.65 µm, 0.45 m^2, pack of 2
5555303P7-SO-A	1.2 µm, 0.05 m^2, pack of 4
5555303P8-SO-A	1.2 µm, 0.1 m^2, pack of 4
5555303P9-SO-A	1.2 µm, 0.2 m^2, pack of 4
5555303P0-SO-V	1.2 µm, 0.45 m^2, pack of 2

Order numbers for Sartopure CA MidiCaps and Sartoclean GF Midi Caps

Sartoclean CA MidiCaps

Type OO, with ½" single stepped hose barb

5625307A7-OO-A	0.2 µm, 0.05 m^2, pack of 4
5625307A8-OO-A	0.2 µm, 0.1 m^2, pack of 4
5625307A9-OO-A	0.2 µm, 0.2 m^2, pack of 4
5625307A0-OO-V	0.2 µm, 0.45 m^2, pack of 2
5625306A7-OO-A	0.45 µm, 0.05 m^2, pack of 4
5625306A8-OO-A	0.45 µm, 0.1 m^2, pack of 4
5625306A9-OO-A	0.45 µm, 0.2 m^2, pack of 4
5625306A0-OO-V	0.45 µm, 0.45 m^2, pack of 2
5625305G7-OO-A	0.8/0.65 µm, 0.05 m^2, pack of 4
5625305G8-OO-A	0.8/0.65 µm, 0.1 m^2, pack of 4
5625305G9-OO-A	0.8/0.65 µm, 0.2 m^2, pack of 4
5625305G0-OO-V	0.8/0.65 µm, 0.45 m^2, pack of 2
5625304E7-OO-A	3.0/0.8 µm, 0.05 m^2, pack of 4
5625304E8-OO-A	3.0/0.8 µm, 0.1 m^2, pack of 4
5625304E9-OO-A	3.0/0.8 µm, 0.2 m^2, pack of 4
5625304E0-OO-V	3.0/0.8 µm, 0.45 m^2, pack of 2

Type SS, with 1½" sanitary flange inlet and outlet

5625307A7-SS-A	0.2 µm, 0.05 m^2, pack of 4
5625307A8-SS-A	0.2 µm, 0.1 m^2, pack of 4
5625307A9-SS-A	0.2 µm, 0.2 m^2, pack of 4
5625307A0-SS-V	0.2 µm, 0.45 m^2, pack of 2
5625306A7-SS-A	0.45 µm, 0.05 m^2, pack of 4
5625306A8-SS-A	0.45 µm, 0.1 m^2, pack of 4
5625306A9-SS-A	0.45 µm, 0.2 m^2, pack of 4
5625306A0-SS-V	0.45 µm, 0.45 m^2, pack of 2
5625305G7-SS-A	0.8/0.65 µm, 0.05 m^2, pack of 4
5625305G8-SS-A	0.8/0.65 µm, 0.1 m^2, pack of 4
5625305G9-SS-A	0.8/0.65 µm, 0.2 m^2, pack of 4
5625305G0-SS-V	0.8/0.65 µm, 0.45 m^2, pack of 2
5625304E7-SS-A	3.0/0.8 µm, 0.05 m^2, pack of 4
5625304E8-SS-A	3.0/0.8 µm, 0.1 m^2, pack of 4
5625304E9-SS-A	3.0/0.8 µm, 0.2 m^2, pack of 4
5625304E0-SS-V	3.0/0.8 µm, 0.45 m^2, pack of 2

Type 00, with hose nipple inlet and outlet

Type SS, with sanitary flange inlet and outlet

Type SO, with sanitary flange inlet and hose nipple outlet

Type SO, with 1½" sanitary flange inlet and ½" single stepped hose barb outlet

5625307A7-SO-A	0.2 µm, 0.05 m^2, pack of 4
5625307A8-SO-A	0.2 µm, 0.1 m^2, pack of 4
5625307A9-SO-A	0.2 µm, 0.2 m^2, pack of 4
5625307A0-SO-V	0.2 um, 0.45 m^2, pack of 2
5625306A7-SO-A	0.45 µm, 0.05 m^2, pack of 4
5625306A8-SO-A	0.45 µm, 0.1 m^2, pack of 4
5625306A9-SO-A	0.45 µm, 0.2 m^2, pack of 4
5625306A0-SO-V	0.45 µm, 0.45 m^2, pack of 2
5625305G7-SO-A	0.8/0.65 µm, 0.05 m^2, pack of 4
5625305G8-SO-A	0.8/0.65 µm, 0.1 m^2, pack of 4
5625305G9-SO-A	0.8/0.65 µm, 0.2 m^2, pack of 4
5625305G0-SO-V	0.8/0.65 µm, 0.45 m^2, pack of 2
5625304E7-SO-A	3.0/0.8 µm, 0.05 m^2, pack of 4
5625304E8-SO-A	3.0/0.8 µm, 0.1 m^2, pack of 4
5625304E9-SO-A	3.0/0.8 µm, 0.2 m^2, pack of 4
5625304E0-SO-V	3.0/0.8 µm, 0.45 m^2, pack of 2

Sartoclean GF MidiCaps

Type 00, with ½" single stepped hose barb

5605305G7-00-A	0.8/0.65 µm, 0.05 m^2, pack of 4
5605305G8-00-A	0.8/0.65 µm, 0.1 m^2, pack of 4
5605305G9-00-A	0.8/0.65 µm, 0.2 m^2, pack of 4
5605305G0-00-V	0.8/0.65µm, 0.45 m^2, pack of 2
5605304E7-00-A	3.0/0.8 µm, 0.05 m^2, pack of 4
5605304E8-00-A	3.0/0.8 µm, 0.1 m^2, pack of 4
5605304E9-00-A	3.0/0.8 µm, 0.2 m^2, pack of 4
5605304E0-00-V	3.0/0.8 µm, 0.45 m^2, pack of 2

Type SS, with 1½" sanitary flange inlet and outlet

5605305G7-SS-A	0.8/0.65 µm, 0.05 m^2, pack of 4
5605305G8-SS-A	0.8/0.65 µm, 0.1 m^2, pack of 4
5605305G9-SS-A	0.8/0.65 µm, 0.2 m^2, pack of 4
5605305G0-SS-V	0.8/0.65 µm, 0.45 m^2, pack of 2
5605304E7-SS-A	3.0/0.8 µm, 0.05 m^2, pack of 4
5605304E8-SS-A	3.0/0.8 µm, 0.1 m^2, pack of 4
5605304E9-SS-A	3.0/0.8 µm, 0.2 m^2, pack of 4
5605304E0-SS-V	3.0/0.8 µm, 0.45 m^2, pack of 2

Type SO, with 1½" sanitary flange inlet and ½" single stepped hose barb outlet

5605305G7-SO-A	0.8/0.65 µm, 0.05 m^2, pack of 4
5605305G8-SO-A	0.8/0.65 µm, 0.1 m^2, pack of 4
5605305G9-SO-A	0.8/0.65 µm, 0.2 m^2, pack of 4
5605305G0-SO-V	0.8/0.65 µm, 0.45 m^2, pack of 2
5605304E7-SO-A	3.0/0.8 µm, 0.05 m^2, pack of 4
5605304E8-SO-A	3.0/0.8 µm, 0.1 m^2, pack of 4
5605304E9-SO-A	3.0/0.8 µm, 0.2 m^2, pack of 4
5605304E0-SO-V	3.0/0.8 µm, 0.45 m^2, pack of 2

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 hygiene requirements. They are light in weight and therefore very convenient for the user, 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, 46 psi)
Flow rate	For water at Δp = 3 bar (300 kPa, 43.5 psi), ca. 12 l/min
Final pressure	Max. Δp = 4 bar (400 kPa, 59 psi) at 20°C, 2 bar (200 kPa, 29 psi) 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: 6 mm quick connect coupling; outlet: integrated PP-showerhead
5231307H8-PO-B	Inlet: 6 mm quick connect coupling; outlet: hose barb
5231307H8-VQ-B	Inlet: 8 mm quick connect coupling; outlet: integrated PP-showerhead
5231307H8-VO-B	Inlet: 8 mm quick connect coupling; outlet: hose barb
5231307H8-VZ-B	Inlet: 8 mm quick connect coupling; outlet: G1/2 male thread for installation of a separate autoclavable showerhead
5231307H7-PQ-B	Inlet: 6 mm quick connect coupling; outlet: integrated PP-showerhead
5231307H7-PO-B	Inlet: 6 mm quick connect coupling; outlet: hose barb
5231307H7-VQ-B	Inlet: 8 mm quick connect coupling; outlet: integrated PP-showerhead
5231307H7-VO-B	Inlet: 8 mm quick connect coupling; outlet: hose barb
5231307H7-VZ-B	Inlet: 8 mm quick connect coupling; outlet: G1/2 male thread for installation of a separate autoclavable showerhead

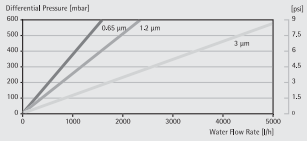
Accessories

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 22×1-female thread
	17750	G 1-female thread
	17766	M 24×1 male thread
Integrity testing	16296--05	Fully automated integrity test unit Sartocheck Junior
	17751	Adapter Sartocheck | 8 mm quick-connect coupling

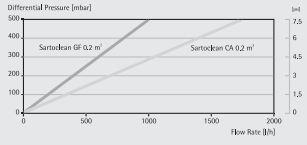
Special brochure available on request. Order no. SL-1503-e

Mini Filter Cartridges for the Particle-Removing Filtration or Prefiltration of 100 Liters and More

Sartopure PP2 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



Each of these mini cartridges contains a series of filters with increasing fineness for effective and economical particle removal, either as an independent filter or as a 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).

Sartopure PP2 mini cartridges
They contain polypropylene fleeces of increasing fineness for 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 deionized water, pharmaceutical solutions, chemicals and solvents and other gases.

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 fractionated membrane filtration, as well as simple membrane mini cartridge with 0.2 and 0.45 µm pore sizes. Main application: prefiltration in combination with a subsequent Sartobran P mini cartridge (e.g. for larger filterable volumes in the sterile filtration of serum) with minimal adsorption.

Sartoclean GF mini cartridges
Same as Sartoclean CA mini cartridges, but complemented by a glass fiber prefilter for the retention of particles, larger microorganisms and colloids using the combination of depth and fractionated membrane filtration. Main applications: prefiltration of biological liquids with a relatively high colloid content and 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 page 99 and page 101)	
Flow rate*	Typical values for 0.2 m^2 mini cartridges for water at 0.5 bar (50 kPa, 7.25 psi) pressure:	
	Sartopure PP2	39 l/min. (1.2 µm), 24 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	
Filter materials	Sartopure PP 2, Polypropylene filter Sartoclean CA, Cellulose acetate membranes Sartoclean GF, Glass fiber prefilter, cellulose acetate membranes	

Order numbers see next page.

* See also diagram on the left.

Order numbers for Sartopure and Sartoclean mini cartridges*

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

Sartoclean CA membrane filter mini cartridges

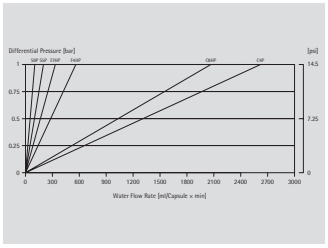
5621507A9-B	0.2 µm, 0.2 m^2, pack of 5
5621506A9-B	0.45 µm, 0.2 m^2, pack of 5
5621505G9-B	0.8 | 0.65 µm, 0.2 m^2, pack of 5
5621504E9-B	3.0 | 0.8 µm, 0.2 m^2, pack of 5

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

* Special brochure available on request. Order no. S--0024-e

Sartoclear® P Depth Filter Capsules for Bench Scale Trials



Description
Sartoclear® P Caps are especially developed to serve small scale volumes in cell harvest and clarification applications. The product features encapsulated cellulose based depth filter media with highest dirt holding capacity. Sartoclear® P Caps are being manufactured using the advantage of the unique and closed Sartoscale system.

Applications
Sartoclear® P Caps are being used as single use capsules for bench scale trials, scale up trials and small scale manufacturing.

Filter area
Each Sartoclear® P Cap contains an effective filter area of 25 cm^2.

Product benefits
Sartoclear® P Caps are completely disposable capsules. This technology provides highest flexibility for disposable small scale manufacturing and scale up work. Sartoclear® P Caps can be simply and directly connected to the downstream processing line or disposable bags. The integrated teflon vent valve features unique venting procedure and eliminates contamination of the laboratory environment.

Flexibility
Sartoclear® P Caps can be used for small volume processing from 50 ml up to 1.000 ml.

Sterilization
1 cycle of wet autoclaving 121°C
at 1 bar for 30 min
Sartoclear® P Caps may not be in line steam sterilized!

Extractables
The depth filter media of Sartoclear® P meets the requirements for WFI quality standards set by the USP 26.
- Non pyrogenic according to USP Bacterial Endotoxins after a flush of 50l/m^2 WFI
- LAL level < 0.125 UE/ml
- Pass USP Plastic Class VI Test

Metal extractables
(Please see validation guide of Sartoclear® P Depth Filter Module)

Non fiber releasing according 21 CFR

Specifications

Materials	Depth Filter Media:	Cellulosic depth filter media with inorganic filter aids
	Core:	Polypropylene
	Capsule Housing:	Polypropylene
Retention rates	C4P	8 µm
	C8HP	4 µm
	F4HP	1.5 µm
	F7HP	1 µm
	S5P	0.3 µm
	S9P	0.1 µm
Filtration area	25 cm^2	
Operating parameters	Max. Allowable System Pressure:	5.5 bar | 80 psi at 20°C
	Max. Allowable Pressure Differential:	2.0 bar | 29 psi
	Max. Allowable Back Pressure:	0.03 bar | 0.4 psi

Technical references

Directions for use:	85030-521-62

Order information

293 C4– P 13 A C FF – – M

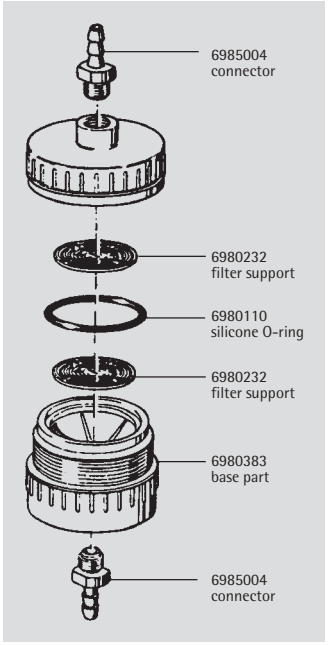
- **Sartoclear® P**
- **Retention Rate**
- **Pharma Biotech**
- **Capsule Design**
- **Internal Code**
- **25 cm^2 Capsule**
- **Connector**
  FF = Sanitary Inlet + Outlet
- **Dash | Space**
- **3 Capsules per box**

Low-Cost Polycarbonate Holder for the Filtration of Liter Volumes of Aqueous Solutions

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

The holder is charakterized by an excellent resistance to pressure and density setting by simply hand-tightening. The transparent top part allows the visual control of the correct fit of the O-ring.

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



Specifications 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, 14.5 psi), 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, 101.5 ps)
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.

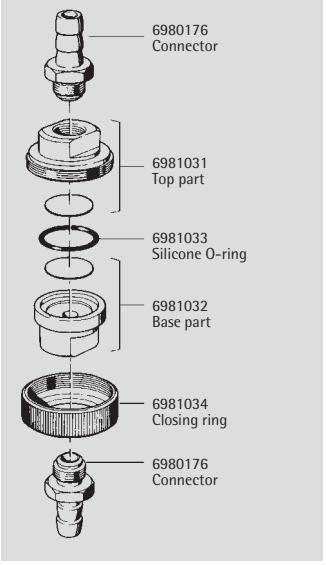
Order number for the 50 mm polycarbonate filter holder

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

Recommended accessories are described on page 82.
Replacement parts are shown in the diagram.

25 mm Stainless Steel Filter Holder for In-line Filtration

The 25 mm filter holder
The G1/4 connection threads with density barrel, guaranteed 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 (14.5 psi): 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, 72.5 psi)
Suitable membrane filter	25 mm, type 118
Sterilization	By autoclaving (max. 134°C) or by dry heat (max. 180°C).

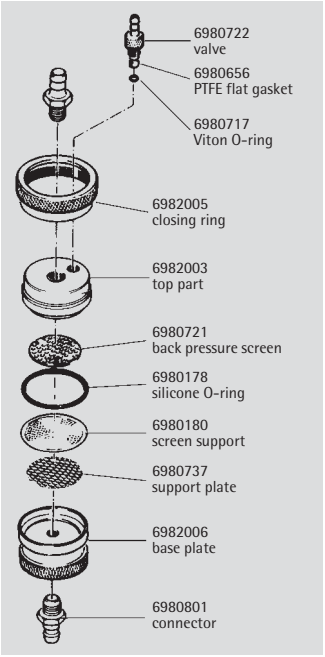
Order number

16251	Stainless steel holder for 25 mm ∅ membrane filter.

Replacement parts are shown in the diagram.

47 mm Stainless Steel Filter Holder for In-line Filtration

The 47 mm 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 (4.35 psi): 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, 290 psi)
Suitable membrane filter	47 mm, type 118
Sterilization	By autoclaving (max. 134°C) or by dry heat (max. 180°C).

Order number

16254	Stainless steel holder for 47 mm ∅ membrane filter.

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 hinders the 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, 14.5 psi), 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, 72.5 psi)
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, 7.25 psi), 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, 72.5 psi)
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 Liter Volumes

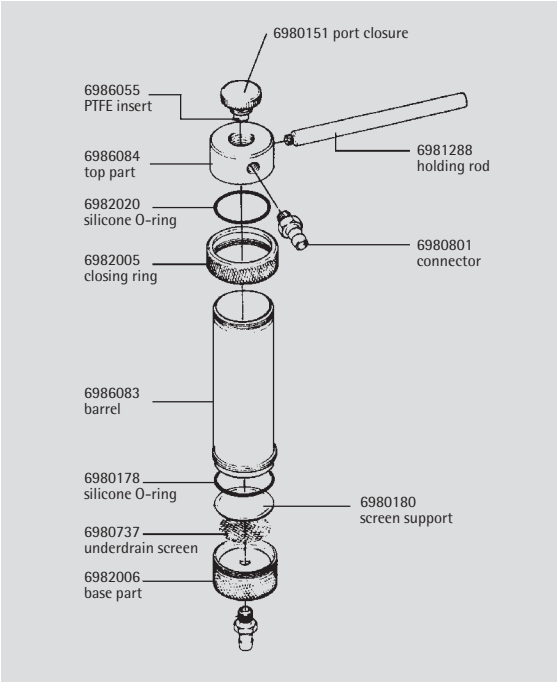
A practical holder for many laboratory filtrations. It can be attached to a tripod with the help of a steel rod which can be screwed in. The hose nipple is screwed into the side of the top part, leaving room for a large filling opening. This makes pouring in the sample easier, and the sample can be refilled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

For the filtration of small volumes (up to about 200 ml of soil samples or viscous liquids, such as oils), the holder is connected directly to a pressure source.

For the filtration of up to 5 liter 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, 58 psi!); 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, 14.5 psi), 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, 145 psi)
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 on page 82.
Replacement parts are shown in the diagram.

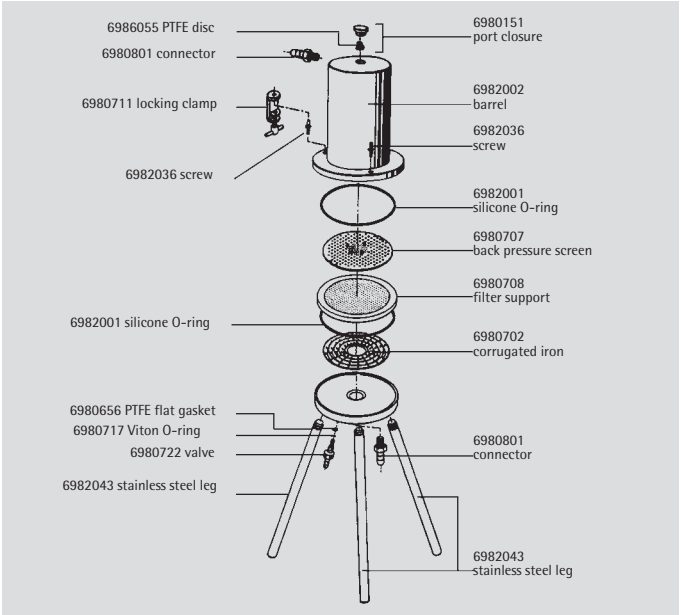
Stainless Steel Holder with 2 Liter Capacity, for Sample Preparation and Sterile Filtration of Serum

This device is perfectly suited for the removal of insoluble components from samples for the determination of the particular constituents of sludge that can be eluted with water. Due to the 2 liter capacity, the total sample volume can be filled in with a large filling port, allowing simple pouring of the liquid. The pressure filtration avoids the loss of volatile components. The filter are 130 cm^2, which 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 progessively finer pore sizes in direction of the filtration are installed into the holder. The fractionated retention of suspended material enlarges the filterable volume. The swing-out locking clamps ensure firm sealing simply by 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, 58 psi), 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, 14.5 psi), 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 (26.5 lbs)
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, 101.5 psi)
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 liter capacity.

Recommended accessories are described on page 82.
Replacement parts see diagram.

142 mm Stainless Steel Holder for the Filtration of up to about 50 Liter Volumes

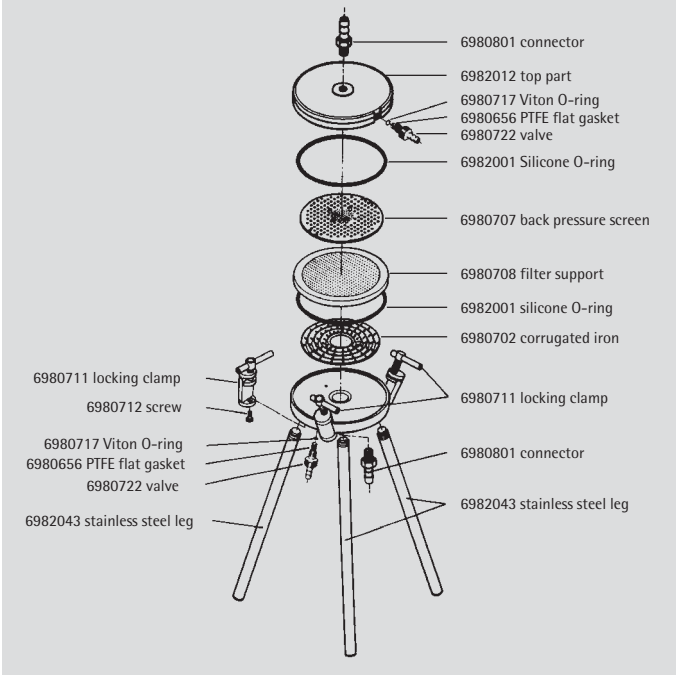
This holder is very often used in laboratories for particle removal and for sterile filtration of several liters of volume. It has a stable construction and is easy to operate. The large filtration area of 130 cm^2 ensures high flow rate for the total filter volume. The supplied unscrewable hose nipples 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 fiber prefilter is used.

The swing-out locking clamps ensure a firm sealing simply by 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, 58 psi), 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, 14.5 psi), 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, 101.5 psi)
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 on page 82.
Replacement parts are shown in the diagram.

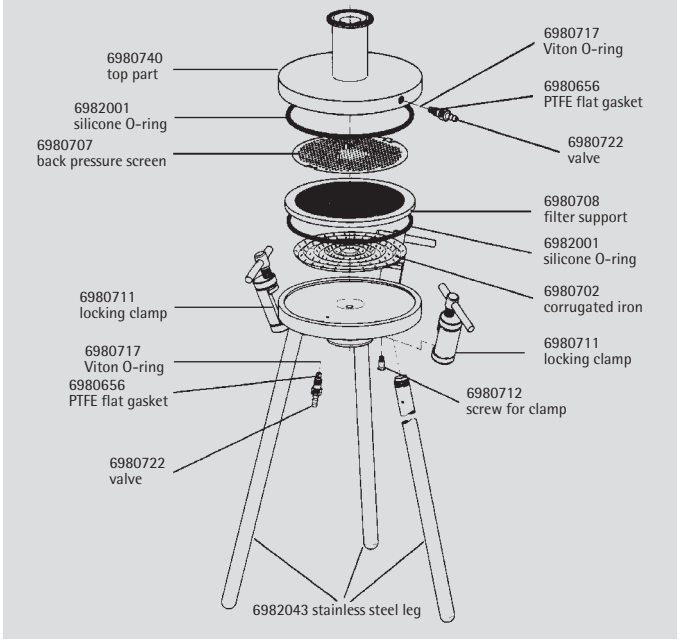
GMP-complying 142 mm Stainless Steel Holder with Sanitary Flanges

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, the adjustment of the outlet to any height.

The arrangement of the air venting valve in the top part and the sample removal/test valve in the base guarantees safe sterilization of the device with a mounted filter, either by autoclaving or by in-line vapour deposition. The swing-out clamps ensure leak-proof installation simply by hand-tightening. The back pressure screen is very easy to mount and has a smooth surface in order to avoid damages to the membrane filter when being autoclaved, even when no glass fiber 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, 58 psi), 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, 14.5 psi), 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

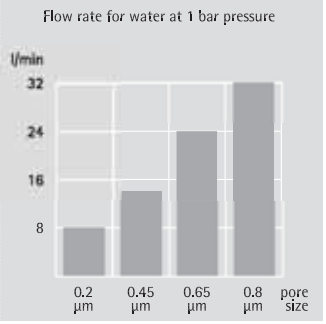
16276	142 mm stainless steel pressure filter holder for the in-line installation, GMP-complying, with sanitary flanges

Recommended accessories are described on page 82.
Replacement parts are shown in the diagram.

GMP-Complying 293 mm Stainless Steel Holder with Sanitary Flanges

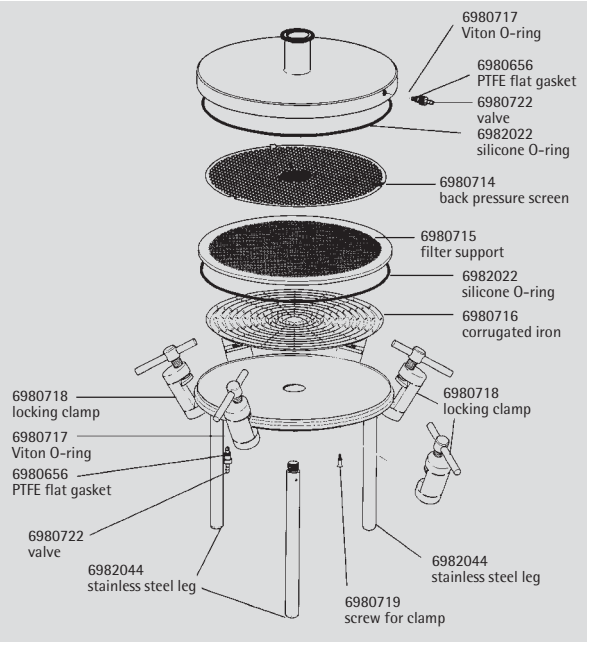
The construction of this holder is the same as that of the 142 mm holder described on page 79, except for the legs and the number of locking clamps. The three legs are made of stainless steel in order to avoid corrosion problems, as is sometimes the case with aluminium legs. They are shorter and screwed in vertically to give a very stable footing to the holder with a 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, however the filtration area is four times larger, correspondingly the flow rates are higher and the in-service life is longer. The filter support is designed for the maximum exploitation of the filter area and minimum flow resistance, as 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, 58 psi), 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, 14.5 psi), 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 on page 82.
Replacement parts are shown in the diagram.

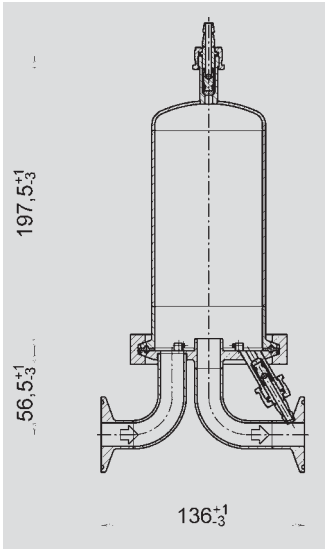
Modular Assembly System for Stainless Steel Filter Housings

The Sartorius modular assembly system for filter housings combines the highest flexibility with short delivery periods and favorable prices. With the help of a special software, the mini-, standard-single- and multisystems 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, triclamp, flange or tube joint connectors are available according to the usual standards.

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

The housing features an air venting valve on the inlet side. The mini cartridge is changed by opening the housing with a bayonet catch.

Suitable filter cartridges on page 67.



Quality standards for the modular 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, –14.5 psi.. + 145.0 psi)
Adapter	Mini: 15 Standard: 25

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, 145.0 psi)
Max. temperature	150°C

Order number

7M19LSB00085	Stainless steel mini cartridge housing for liquid filtration T-type

Special brochure available on request. Order no. SPG1501-e

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.

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

Recommended accessories

1. For Sartolab P20 units
Units with a luer lock inlet connector require only the pump 18059, which is supplied complete with suitable tubing.

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

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

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

Connectors for capsules with inlet sanitary flange are described under 7.

4. For polycarbonate holder
The inlet hose nipple can be connected to a peristaltic pump or a pressurized container using 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 the PTFE pressure hose 16999.

The hose nipple can also 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.

5. For stainless steel holders
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 the flexible pressure hose 17091, or the 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.

6. For stainless steel holder
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 with a connector with G3/8 male thread (Order no. 17089), in order to connect the unit to a pressurized container with the 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 the adjustment of the height of the outlet to that of the bottles.

7. 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 accomodates the connection with the PTFE pressure hose 16999 to a pressurized container.

Order numbers

16508	Polycarbonate holder
16249	Stainless steel holder
16274	Stainless steel holder
16275	Stainless steel holder

Filtration Systems with Pressure Tanks and Three Different Connection Possibilities

Description of accessories

Membrane pump
A self-priming diaphragm pump with an 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.
The pump, stainless steel sinker and tubing are resistant to 1N NaOH.

Membrane pump for pressure
Supplies oil-free compressed air at up to 7 bar (700 kPa, 101.5 psi).

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

Specifications for membrane pump

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 (43.5 psi), preset to 2.5 bar (36.3 psi)
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.

Order numbers for membrane pump

18059	

Replacement part

6988094	Tubing set, consisting 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.

Specifications for membrane pump for pressure

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

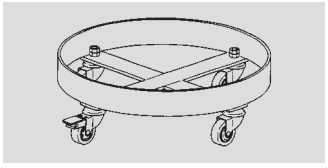
Order numbers for membrane pump for pressure

16617	(220 V, 50 Hz)
16662	(110 V, 60 Hz)

Replacement part

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

Filtration Systems with Pressure Tanks and Three Different Connection Possibilities (continued)



Pressure tank
Pressure tanks serve as reserve containers for pressure filtration, and are 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 liter pressure tanks.

The pressure tanks are made of 1.4401 (AISI 316) stainless steel and meet the requirements of PED/97/23/EC. The 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 a 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 in every tank (the tanks are specifically designed for pressure, and are not to be used as vacuum containers).

For the specific requirements of the pharmaceutical industry, GMP-complying pressure tanks are available in various sizes upon request. Benefits of the device include the ease of cleaning, the equipment with triclamp connectors as a standard and the low surface roughness.

Specifications

Dimensions height × diameter | weight	17530	235 × 234 mm | 3.9 kg (8.6 lbs)
	17531	360 × 234 mm | 5.4 kg (11.9 lbs)
	17532	600 × 234 mm | 8.2 kg (18.2 lbs)
	17533	705 × 300 mm | 11.8 kg (26 lbs)
	17534	643 × 400 mm | 15.2 kg (33.5 lbs)
	17535	802 × 400 mm | 18.4 kg (40.5 lbs)
	17536	962 × 400 mm | 21.7 kg (47.8 lbs)
	(opening, for all types, oval, length 98 mm, width 82 mm)	
Maximal operating pressure	7 bar (101.5 psi)	for 17530, 17531, 17532.
	5 bar (72.5 psi)	for 17533.
	3 bar (43.5 psi)	for 17534.
	2 bar (29 psi)	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

Order numbers

17530	5 liter capacity
17531	10 liter capacity
17532	20 liter capacity
17533	40 liter capacity
17534	60 liter capacity
17535	80 liter capacity
17536	100 liter capacity

Replacement parts

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×)
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
For 17533	6980415	Pressure gauge, 5 bar
	6986115	Outlet tube (17533)
	6986129	Lid with valve
For 17534	6986116	Outlet tube (17534)
	6986137	Pressure gauge, 3 bar
	6986138	Lid with valve
For 17535, 17536	6986117	Outlet tube (17535)
	6986118	Outlet tube (17536)
	6986119	Pressure gauge, 2 bar
	6986131	Lid with valve

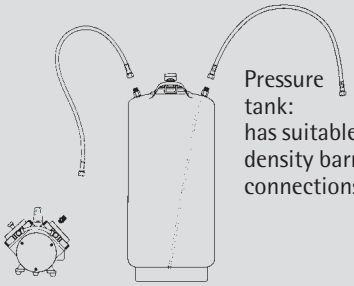
Filtration Systems with Pressure Tanks and Three Different Connection Possibilities (continued)

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 wrench for a leak-proof sealing is necessary. 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.

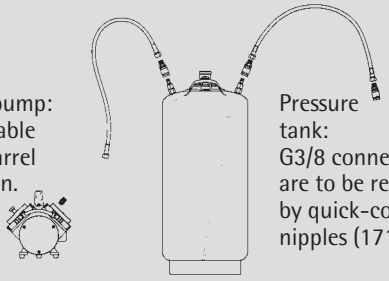
Sartobran P capsules Type RO have a suitable density barrel connection. The inlet hose nipple of the holders 16249, 16275 and 16508 have to be replaced by connector 17089. Capsules, holders and holding with inlet sanitary flange require connector 17019.

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 tank inlet and outlet, and to the filter units.

Pressure pump: has a suitable density barrel connection.



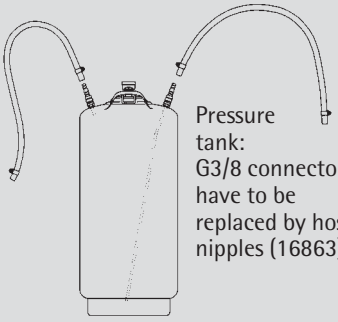
Pressure tank: G3/8 connectors are to be replaced by quick-connect nipples (17170).

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 the connector 17090.

With commercially available hoses
The pressure tank is connected to the pressure source and the filtration unit by means of commercially available pressure hoses. The hoses must be clamped to the hose nipples. Main advantage: hoses are usually available.

Pressure hoses: require tube clamps.

Pressure pump: connectors must simply be reversed.



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

Sartolab P20 units, Sartobran 300 capsule, Sartobran P capsule Type 00 as well as the filter holders 16249, 16275 and 16508 feature hose nipples as a standard.

PTFE pressure hose
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 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.

Flexible pressure hose
1 m long. G3/8 nuts on each side. It is very flexible and especially practical as a 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
Flexible gas pressure hose with quick-connect coupling for direct connection to pressure holders with a capacity barrel. The hose has a quick-connect nipple and a G3/8 nut for connection to the pressure source. Not for use with liquids.

Hand-operated valve
This valve is fitted on the outlet side of the filter holder Type 16275, and allows a steady regulation of the filtrate or a selective dosage when filling up liter volumes.

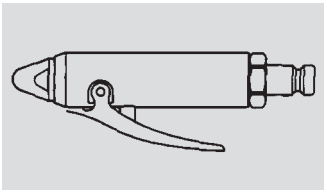
An adapter (Order no. 17150) allows the attachment of a capsule and a mini cartridge housing with sanitary flange.

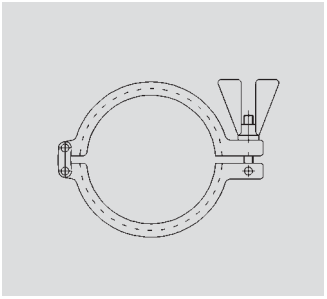
Fitted to the filter holder, the valve can be sterilized, when open, with all the usual methods. For cleaning purpose, it can be quickly disassembled without problems.

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

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

For order numbers, see next page.





Order numbers for PTFE pressure hose

16999	1.5 m long
16823	80 cm long

Accessories for 6985128

6980407	Trigger valve for cleaning

Replacement part for 6985128

6985216	Seal set (Viton O-ring, flat gasket)

Order number for flexible pressure hose

17091

Order number for plastic pressure hose

16931

Order number for hand-operated valve

16656

Replacement parts

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

Order number for clamp for sanitary flanges

7ZSB--0009	1½" (50.5 mm)

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.

Midisart® 2000 Sterile Venting Units, Light 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 at pressures of up to 3 bar (43.5 psi). The 20 cm^2 large filter area allows high flow rates at low differential pressures.

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

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 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, 20.3 psi) (1.1 bar after autoclaving) and 0.9 bar (90 kPa, 13 psi) for 0.45 µm unit.
Air flow rate	Typical values for 0.2 µm pore size: 1.1 l/min at 0.02 bar (.29 psi) (1.8 l/min for 0.45 µm) 2.0 l/min at 0.05 bar (.72 psi) (4.6 l/min for 0.45 µm) 5.0 l/min at 0.1 bar (1.45 psi) (8.5 l/min for 0.45 µm)
Filter area	20 cm^2
Filling volume	Approx. 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, 43.5 psi)
Max. temperature	134°C
Sterilization method	By autoclaving at 121°C (at least 20 times) or 134°C. E and G packs are presterilized withethylene oxide.
Hold-up volume	Approx. 0.5 ml after (1 ml before) bubble point
Water penetration point	4.0 bar (58 psi) (0.2 µm) and 3.0 bar (43.5 psi) (0.45 µm)

Specifications for Minisart HY

Bubble point	Min. value with isopropanol 1.2 bar (17.4 psi)
Air flow rate	Approx. 1.4 l/min at Δ = 0.1 bar (1.45 psi)
Filter area	5.3 cm^2
Housing burst pressure	Min. value 6.0 bar (600 kPa, 87 psi)
Water penetration point	Min. 4.0 bar (400 kPa, 58 psi)

Order numbers see next page.

Order numbers for Midisart 2000 units

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

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

Order numbers for Minisart HY

16596 HYK	Sterile, individually packed, pack of 50
16596 HYQ	Non-sterile, pack of 500

Special brochure available on request. Order no. SL-1021-e

Midisart® BV Sterile Venting Filter on Disposable Bag and Tubing Assemblies

Description
Midisart® BV disposable venting filter manufactured with hydrophobic, reinforced PTFE membranes, are especially designed for sterile venting on disposable bag manifolds and tubing systems .

Applications
Midisart® BV filter elements used on disposable bags do prevent the collapsing of the bag chamber during draining by sterile venting.

Used on disposable bag manifolds Midisart® BV facilitate sterile drainage of the tubing in order to empty the tubing connection between the single bags of the bag manifold.

Stability
The reinforcement of the hydrophobic PTFE membrane by a Polyester fleece assures the full mechanical stability of the PTFE membrane for specified applications after gamma sterilization. Midisart® BV is integrity testable.

Documentation
Midisart® BV filter elements are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.

Specifications

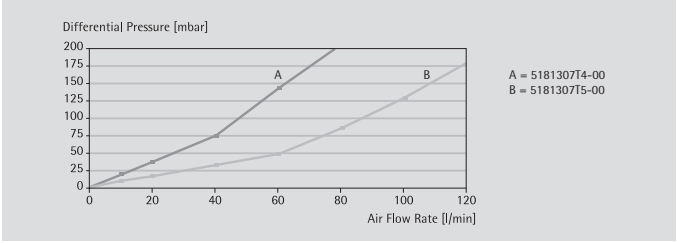
Materials	Membrane: Support fleece: Housing:	PTFE Polyester Polypropylene
Pore size	0.2 µm	
Article codes	17805--------BVE (12 per box) 17805--------BVN (100 per box)	
Connectors	Multiple stepped hosebarb (in- and outlet)	
Filtration area	20 cm^2 | 3 square inch	
Housing diameter	64 mm | 2.5"	
Sterilization	Gamma Irradiation 50 kGy (max.)	
Max. operation pressure	In direction of filtration: Opposite direction:	1.5 bar | 22 psi 0.5 bar | 7 psi

Sartofluor® MidiCaps with PTFE Membrane for Maximum Security in Sterile Venting

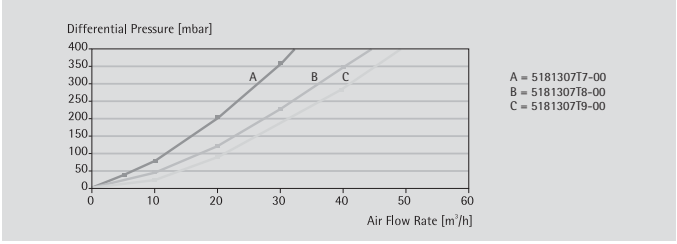
Sartofluor MidiCaps are ready-to-connect, pre-tested, complete filter units. The PTFE membrane is pleated to obtain the largest possible usable filtration area in the small polypropylene housing. The two valves on the upstream side of the housing ensure good steam passage and correspondingly accomodate 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 MidiCaps additionally useful for the filtration of those acids, bases and non-aqueous solvents for which other capsule types cannot be used.



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)

Specifications for Sartofluor MidiCaps

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, 21.75 psi) for 0.1 µm pore size 1.0 bar (100 kPa, 14.5 psi) for 0.2 µm pore size 0.6 bar (60 kPa, 8.7 psi) for 0.45 µm pore size
Chemical compatibility	See page 124
Air flow rate	For 0.2 µm capsules see diagram on page 93
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 (58 psi) at 20°C, 2 bar at 80°C
Max. operating pressure	4 bar (58 psi) at 20°C
Sterilization	By autoclaving (121°C or 134°C)
Water penetration pressure	Approx. 4.5 bar (450 kPa, 65.3 psi) for 0.2 µm pore size

Order numbers for Sartofluor MidiCaps
Sartofluor MidiCaps with hose nipple inlet and outlet

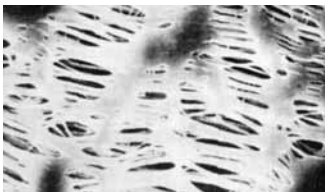
5185358T7-XX-B	0.1 µm, 0.05 m^2, pack of 5
5185358T8-XX-B	0.1 µm, 0.1 m^2, pack of 5
5185358T9-XX-A	0.1 µm, 0.2 m^2, pack of 4
5185307T7-XX-B	0.2 µm, 0.05 m^2, pack of 5
5185307T8-XX-B	0.2 µm, 0.1 m^2, pack of 5
5185307T9-XX-A	0.2 µm, 0.2 m^2, pack of 4
5185306T9-XX-A	0.45 µm, 0.2 m^2, pack of 4

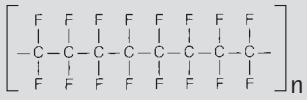
XX: Connector styles

Available Connectors
SS, SO, OO, FF, FO, HH (only for size 7)

S	1½" Tri-Clamp (Sanitary)
O	Single stepped hose barb
F	¾" Tri-Clamp (Sanitary)
H	Small, multiple stepped hose barb (with filling bell at the outlet)

Hydrophobic PTFE Membranes, Type 118, for the Filtraton of Air, Gases or Chemicals





The main application of this membrane filter type 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 excellent chemical compatibility, so that they are also used for the filtration of solvents and acids, to which other filter types are not resistant. Due to their hydrophobic characteristics, they must be pre-wetted with ethanol or methanol before the filtration of aqueous media.

Specifications for PTFE membrane filters

Adsorption	8 µg/cm² for gamma-globulin (0.2 µm pore size).
Bubble point acc. DIN 58355	Minimum value for Isopropanol 0.2 µm = 1.0 bar (100 kPa, 15 psi), for 0.45 µm = 0.7 bar (70 kPa, ~10 psi). Average value for 1.2 µm = 0.45 bar (45 kPa, 6.52 psi), for 5 µm = 0.1 bar (10 kPa, 1.45 psi)
Chemical compatibility	Resistant to almost all chemicals
Extractables with water	None detectable
Flow rate for air	Average values per cm² area at Δp = 0.05 bar (5 kPa, 0.725 psi): 0.2 l/min for 0.2 µm, 0.3 l/min for 0.45 µm, 1.6 l/minfor 1.2 µm and 4 l/min for 5 µm pore size
Material	Polytetrafluorethylene
Sterilization	By autoclaving at 121°C or 134°C or with ethylene oxide.
Sterilizing filtration	Filters with 0.2 µm pore size are validated with the Bacteria Challenge Test.
Thickness acc. DIN 53105	Average values, 65 µm for 0.2 µm and 100 µm for 5 µm pore size.

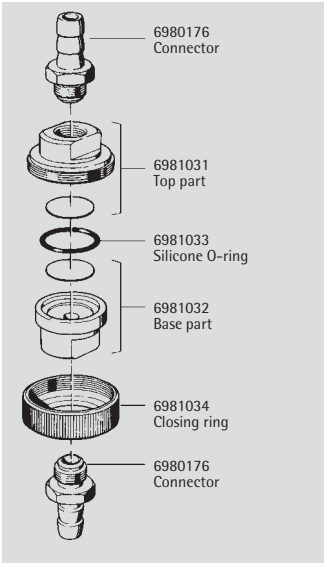
Order numbers see next page.

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	66042--47------N	5 µm, PTFE supported, pack of 100
	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

25 mm Stainless Steel Filter Holder for In-line Filtration

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 (14.5 psi): 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, 72.5 psi)
Suitable membrane filter	25 mm, type 118
Sterilization	By autoclaving (max. 134°C) or by dry heat (max. 180°C).

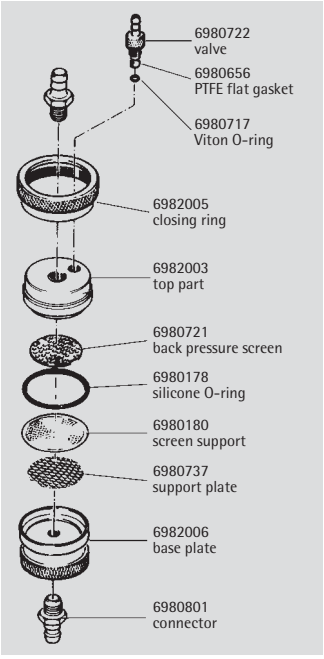
Order number

16251	Stainless steel holder for 25 mm ∅ membrane filter.

Replacement parts are shown in the diagram.

47 mm Stainless Steel Filter Holder for In-line Filtration

The 47 mm 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 (4.35 psi): 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, 290 psi)
Suitable membrane filter	47 mm, type 118
Sterilization	By autoclaving (max. 134 °C) or by dry heat (max. 180 °C).

Order number

16254	Stainless steel holder for 47 mm ∅ membrane filter.

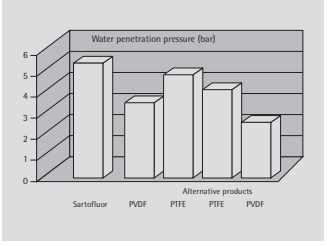
Replacement parts are shown in the diagram.

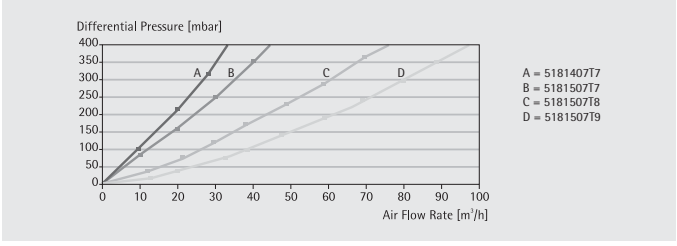
Sartofluor® Mini Cartridges for Highest Safety in Sterile Venting and Compressed Air | Gas Filtration

Sartofluor mini cartridges are designed particularly for cases of sterile venting when the cGMP directives must 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, steam sterilized Sartofluor mini cartridges re-reach their maximal flow rates in shortest time.





Air flow rates at atmosperic pressure Sartofluor® mini 0.2 µm, Type 5181507T7, T8, T9, 5181407T7

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, 21.75 psi) for 0.1 µm, 1.0 bar (100 kPa, 14.5 psi) for 0.2 µm, 0.6 bar (60 kPa, 8.7 psi) 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 diagram
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, 72.5 psi) at 20°C, 2 bar (200 kPa, 29 psi) 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 (7.25 psi)
Water penetration pressure	Approx. 4.5 bar (450 kPa, 65.2 psi) for 0.2 µm pore size.

Order numbers see next page.

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 capsules see page 93.

Special brochure available on request. Order no. SPK1502-e

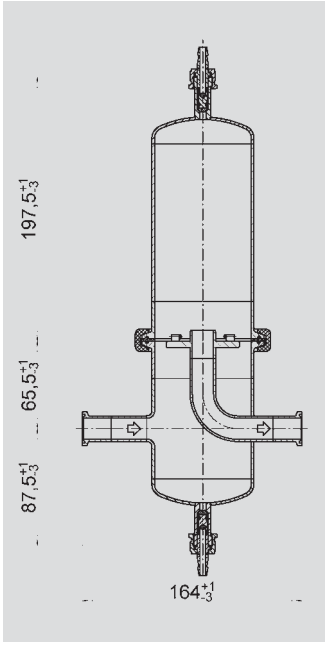
Housings for Sterile Air Venting and for Air | Gas Filtration

Housing for sterile venting

Housing for sterile venting
The cut-outs in the top part of the housing guarantee good air circulation and ensure the drying-out of the system after vapor 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.

Housing for pressure gas filtration
The bowl accomodates the condensate which can be drained via a pharma-valve. The mini cartridge holder prevents the mini cartridge from contacting condense water and ensures the best vapor deposition conditions. Attachment of the mini cartridges like that of the T-type liquid housing, (page 81).
The housing follows PED 97/23/EC.

Suitable filter cartridges on page 67.



Housing for pressure gas filtration

Specifications for housing for sterile venting

Connector	DN 25 tube joint
Weight	Approx. 700 g
Height	Approx. 186 mm
Material	Stainless steel 1.4571 (= AISI 316)
Max. operating pressure	10 bar (1,000 kPa, 145 psi)
Max. temperature	180°C

Specifications for housing for pressure gas filtration

Connectors	Clamp 25 mm (sanitary flange)
Width	Approx. 164 mm
Surface roughness	Product contact areas <0.5 µm
Materials	Stainless steel AISI 316L, silicone O-ring
Max. operating pressure	10 bar (1,000 kPa, 145 psi)
Max. temperature	150°C

Order numbers for housing for sterile venting

7M19LSB00012	Stainless steel mini cartridge housing for the sterile venting of housings and tanks, with DN 15 tube joint and bayonet-lock for the inserted mini cartridge.

Order number for housing for pressure gas filtration

7M19LSB00098	Stainless steel mini cartridge housings for air	pressure gas filtration.

Special brochure available on request. Order no. SPG1501-e

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 concentration. They can effectively be used in fixed angle rotors accepting 2.2 ml centrifuge tubes.

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

Vivaspin 2
The Vivaspin 2 centrifugal concentrators for sample volumes between 0.4 ml and 2 ml combine the speed of the classic Vivaspin products with low internal surface and membrane area for superior recoveries from very dilute solutions.

Available with a range of different membranes including PES, CTA and Hydrosart® membranes, Vivaspin 2 offers the highest flexibility for process optimization. The concentrators allow the choice of recovering the concentrate by either directly pipetting it from the dead stop pocket, or alternatively, reverse spinning of the concentrate into the concentrate recovery cap.

Vivaspin 4
Vivaspin 4 centrifugal filter units for sample volumes between 1 ml and 4 ml are ideally suited for the concentration of biological samples. They can effectively be used in either swing out or fixed angle rotors accepting 15 ml centrifuge tubes. Vivaspin 4 centrifugal concentrators are available with the high flux Polyethersulfone membrane range which is recommended for most solutions.

Vivaspin 6
The Vivaspin 6 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. The concentrator features twin vertical membranes for unparalleled filtration speeds and 100x plus concentrations.

Ordering information

Vivaspin 500, 100–500 µl samples

Polyethersulfone membrane, pack of 25	VS0191	3,000 MWCO
	VS0111	5,000 MWCO
	VS0101	10,000 MWCO
	VS0121	30,000 MWCO
	VS0131	50,000 MWCO
	VS0141	100,000 MWCO
	VS0151	300,000 MWCO
	VS0171	0.2 µm

Vivaspin 2, 0.4–2 ml samples

Polyethersulfone membrane, pack of 25	VS0291	3,000 MWCO
	VS0211	5,000 MWCO
	VS0201	10,000 MWCO
	VS0221	30,000 MWCO
	VS0231	50,000 MWCO
	VS0241	100,000 MWCO
	VS0251	300,000 MWCO
	VS0261	1,000,000 MWCO
	VS0271	0.2 µm
	VS0251	Starter pack (5 of each MWCO)

Ordering information

Vivaspin 2, 0.4–2 ml samples

Cellulose triacetate membrane, pack of 25	VS02U1	5,000 MWCO
	VS02V1	10,000 MWCO
	VS02X1	20,000 MWCO

Vivaspin 2, 0.4–2 ml samples

Hydrosart® membrane, pack of 25	VS02H11	5,000 MWCO
	VS02H01	10,000 MWCO
	VS02H21	30,000 MWCO

Vivaspin 4, 1–4 ml samples

Polyethersulfone membrane, pack of 25	VS0413	5,000 MWCO
	VS0403	10,000 MWCO
	VS0423	30,000 MWCO
	VS0433	50,000 MWCO
	VS0443	100,000 MWCO
	VS0473	0.2 µm
	VS04S3	Starter pack (5 each of 5k, 10k, 30k, 50k, 100k)

Vivaspin 6, 2–6 ml samples

Polyethersulfone membrane, pack of 25	VS0691	3,000 MWCO
	VS0611	5,000 MWCO
	VS0601	10,000 MWCO
	VS0621	30,000 MWCO
	VS0631	50,000 MWCO
	VS0641	100,000 MWCO
	VS0651	300,000 MWCO
	VS0661	1,000,000 MWCO
	VS0671	0.2 µm
	VS06S1	Starter pack (5 of each 5k, 10k, 30k, 50k, 100k)

Special brochure available on request. Order no. SLU0001-e

The Vivaspin Range of Centrifugal Concentrators for Volumes from 500 µl to 20 ml (continued)

Vivaspin 15
The Vivaspin 15 concentrator is a disposable ultrafiltration device for use in swing bucket centrifuges accommodating 50 ml tubes. Vivaspin 15 is used for the concentration of biological samples in the 2–15 ml range. The innovative design (US Patent no. 5,647,990, second patent pending), simplicity, speed and exceptional concentrate recoveries are the main features of the concentrator.

Vivaspin 15R
Vivaspin 15R is the latest member of the Vivaspin product family with all the unique features of Vivascience concentrators including a patented vertical membrane and a dead stop.

Vivaspin 15R is targeting the volume segment 2 to 15 ml with a modified regenerated cellulose membrane: Hydrosart®. This membrane is ideal where extremely high recovery with very low adsorption is needed, for example in applications such as desalting and concentration of antibody fractions.

Vivaspin 20
The Vivaspin 20 centrifugal concentrators have been developed to offer increased volume flexibility and performance. Vivaspin 20 handles up to 20 ml in swing bucket centrifuges and 14 ml in 25° fixed angle rotors accepting 50 ml centrifuge tubes.

Featuring twin vertical membranes for unparalleled filtration speeds the Vivaspin 20 can achieve 100x plus concentrations.

Remaining volume is easy to read off the printed scale on the side of the concentrator and the modified dead stop pocket further simplifies direct pipette recovery of the final concentrate.

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

24-WellUltrafiltration Frame
The unique and reusable 24-well ultrafiltration frame is designed to be fitted with up to 24 individual Vivaspin 500 ultrafiltration devices. The vertical membrane design and built in dead stop pocket inherent to all Vivaspin devices allow fast and safe high throughput concentration of 24 samples per plate. Vivaspin 500 HT have been designed for high throughput applications by replacing the individual device caps with cap-strips for sealing 4 devices simultaneously.
SL-2026-e; SL-2027-e

Ordering information

Vivaspin 15, 2–15 ml samples

Polyethersulfone membrane, pack of 10	VS1511	5,000 MWCO
	VS1501	10,000 MWCO
	VS1521	30,000 MWCO
	VS1531	50,000 MWCO
	VS1541	100,000 MWCO
	VS1571	0.2 µm
	VS15S1	Starter pack (5 each of 5 k, 10 k, 30 k, 50 k, 100 k)

Accessories

Conical bottom tubes and lids	VSA001	

Vivaspin 15R, 2–15 ml samples

Hydrosart membrane, pack of 12	VS15H91	2,000 MWCO
	VS15RH11	5,000 MWCO
	VS15RH01	10,000 MWCO
	VS15RH21	30,000 MWCO

Vivaspin 20, 5–20 ml samples

Polyethersulfone membrane, pack of 12	VS2091	3,000 MWCO
	VS2011	5,000 MWCO
	VS2001	10,000 MWCO
	VS2021	30,000 MWCO
	VS2031	50,000 MWCO
	VS2041	100,000 MWCO
	VS2051	300,000 MWCO
	VS2061	1,000,000 MWCO
	VS2071	0.2 µm
	VS20S1	Starter pack (2 of each 5 K, 10 K, 30 K, 50 K, 100 K, 0.2 µm)

24-well

24-well ultrafiltration frame pack of 2	VW24HT051	(includes 2 collection plates)
24-well collection plates pack of 25	VW24PS0225	

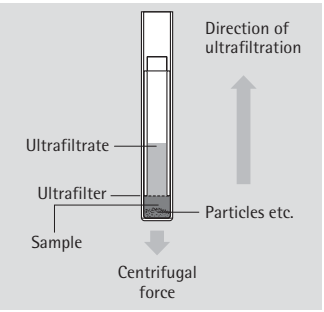
Vivaspin 500 HT (High Throughput)

Vivaspin 500 HT, pack of 480	VS01HT01	10.000 MWCO PES (inclues 120 cap strips)
	VS01HT21	30.000 MWCO PES (inclues 120 cap strips)

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

Special brochure available on request. Order no. SLU0001-e

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 creatinine 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 method upside down: ultrafiltration takes place opposite to the 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

Vivapore Solvent Absorption Concentrators

0.5 ml – 20 ml samples
With no need for additional equipment, pressure or vacuum, solvent absorption is the most economic and user friendly concentration technique available to the clinician and research scientist.

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

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

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

Specifications

	Vivapore 2	Vivapore 5	Vivapore 10 | 20
Membrane material	Modified PES		
Membrane MWCO	7,500 PES		
Membrane surface area	15 cm^2	20 cm^2	28 cm^2
Reservoir material	TPX, (PMP)	SAN	SAN
Volume range	0.5–2.5 ml | 15 ml	1–5 ml	2–10 ml | 20 ml
Minimun concentrate volume	20 µl	50 µl	50 µl
Vivapore overall dimensions (W×H)	66×68 mm	42×82 mm	46×100 mm

Ordering information

		Order no.	Pack size
Vivapore 2 Expandable to 15 ml with pipette reservoir	7,500 MWCO PES	VP0201	30
Vivapore 5 Includes stand and recovery pipettes	7,500 MWCO PES	VP0503	4
	7,500 MWCO PES	VP0501	30
Vivapore 5 Requires stand	7,500 MWCO PES	VP0502	100
Vivapore 10 | 20 Includes stand and recovery pipettes	7,500 MWCO PES	VP2003	4
	7,500 MWCO PES	VP2001	30
Vivapore 10 | 20 Requires stand	7,500 MWCO PES	VP2002	100

Accessoires	Order no.	Pack size
Disposable stands for 4 units	VPA002	6
Pipette reservoir (Vivapore 2)	VPA004	50
Plastic recovery pipettes (Vivapore 10 | 20)	VPA005	100
10 ml expansion reservoir (Vivapore 10 | 20)	VPA006	10
Plastic recovery pipettes (Vivapore 5)	VPA007	100
10 position acrylic stand	VPA010	1

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 pressurized 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, while 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 2.000 × 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 for concentrations under 1 ml.

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

Ordering information

Vivacell 70, 10–70 ml samples

Includes polycarbonae filtrate bottles, pack of 2	VS6011	5,000 MWCO PES
	VS6001	10,000 MWCO PES
	VS6021	30,000 MWCO PES
	VS6031	50,000 MWCO PES
	VS6041	100,000 MWCO PES
	VS6071	0.2 µm PES

Vivacell 100, 10–100 ml samples

Includes polycarbonae filtrate bottles, pack of 2	VC1011	5,000 MWCO PES
	VC1001	10,000 MWCO PES
	VC1021	30,000 MWCO PES
	VC1031	50,000 MWCO PES
	VC1041	100,000 MWCO PES
	VC1051	300,000 MWCO PES
	VC1061	1,000,000 MWCO PES
	VC1071	0.2 µm

Vivacell 250, 50–250 ml samples

Vivacell 250, complete with accessories	VCA250	
Vivacell 250 membrane inserts, pack of 5	VC2511	5,000 MWCO PES
	VC2501	10,000 MWCO PES
	VC2521	30,000 MWCO PES
	VC2531	50,000 MWCO PES
	VC2541	100,000 MWCO PES
	VC2551	Starter Kit (One of each membrane MWCO)

For larger packs and list of accessories see special catalogue. Order no. SLU0001-e

The Vivaflow Range of Tangential Flow Concentrators for Volumes from 500 ml to over 5 Liters

Vivaflow 50
The novel Vivaflow system (patents pending) standardly provides 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 make it 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 of non-recoverable hold up volume remains.

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

VF05P1	5,000 MWCO PES
VF05P0	10,000 MWCO PES
VF05P2	30,000 MWCO PES
VF05P3	50,000 MWCO PES
VF05P4	100,000 MWCO PES
VF05P7	0.2 µm PES
VF05C0	10,000 MWCO RC
VF05C4	100,000 MWCO RC

Vivaflow 20 (1 unit)

Includes pressure indicator, flow restrictor, size 16 tygon persitaltic tubing and fittings

VF20P1	5,000 MWCO PES
VF20P0	10,000 MWCO PES
VF20P2	30,000 MWCO PES
VF20P3	50,000 MWCO PES
VF20P4	100,000 MWCO PES
VF20P7	0.2 µm (PES)
VF20C0	10,000 MWCO (RC)
VF20C4	100,000 MWCO (RC)
VF20H0	10,000 MWCO (Hydrosart®)
VF20H2	30,000 MWCO (Hydrosart®)

For accessories see special catalogue.

Sartocon® Slice
The Pilot-Scale Crossflow System for Batches of 1 to 100 Liters

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

All cassettes have 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 or five Sartocon Slice cassettes.
It is designed for maximum performance and ease of cleaning. The system is designed with all process connectors on a stationary plate, which allows the fixed tubing of the holder and effective cleaning. Sartoflow alpha is an optimized ultrafiltration system including a 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 (58 psi) bar inlet pressure. Max. 50°C operating temperature.

Order numbers for the Sartocon Slice holding system

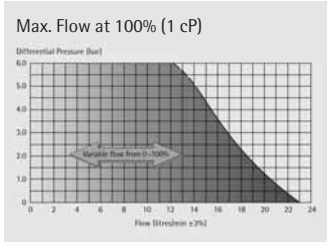
17521---001	Sartocon Slice holding device (without accessories) for up to three Sartocon Slice Cassettes
17521---002	Sartocon Slice holding device (without accessories) for up to five Sartocon Slice Cassettes
17521---101	Sartocon Slice set with accessories for microfiltration
17521---102	Sartocon Slice 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
3051860601O--SG	Hydrosart, 0.45 µm open channel
3051860701O--SG	Hydrosart, 0.2 µm open channel
3051545801W--SG	Polyethersulfone, 0.1 µm pore size
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
3051463901E--SG	Polyethersulfone, 10,000 MWCO
3051463401E--SG	Polyethersulfone, 8,000 MWCO
3051462901E--SG	Polyethersulfone, 5,000 MWCO
3051460901E--SG	Polyethersulfone, 1,000 MWCO
3051441901E--SG	Hydrosart, 2,000 MWCO
3051442901E--SG	Hydrosart, 5,000 MWCO
3051443901E--SG	Hydrosart, 10,000 MWCO
3051445901E--SG	Hydrosart, 30,000 MWCO
3051446801E--SG	Hydrosart, 100,000 MWCO

Special data sheets available on request. Order no. SPC2039-e, SPC2032-e

SartoJet Pump. Four-piston Diaphragm Pump for Sartocon® Slice Crossflow Filtration System



The Sartojet 4-piston diaphragm pump is a powerful positive displacement pump for all biopharmaceutical down stream processing applications in process development and small scale production.

Applications
- Transfer of biopharmaceutical solutions and suspensions
- Feedpump for crossflow and cartridge filtration applications
- Dosing and mixing pump for chromatography systems
- Feedpump for centrifuges, separators and homogenizers

The pump design is especially suited for:
- Protein solutions
- Polymer solutions
- Cell and cell debris suspensions
- Mammalian and insect cell suspensions
- Vaccines
- Monoclonal antibodies

The unique pump technology ensures high reliability and very low energy uptake even at high flow rates with shear sensitive cell suspensions. Therefore, in cell harvest crossflow applications no cooling of the suspension is necessary. The pump is self priming and can be combined with severall different accessories.

The pump is easy to operate. Pump and control pad are mounted in an easy-to-clean stainless steel cabinet.

A special designed Sartocon® Slice crossflow set fits directly to the feed adapter of the pump. All pressurized parts of the system are hard piped and connected via sanitary Tri Clamp adapters. This system supplies up to five Sartocon® Slice Cassettes with 0.1 m^2 filter area each.

An optional pressure switch with local digital pressure read out shuts the pump down when a predefined pressure is triggered. This accessory protects the user and the process by shutting down the pump automatically when the maximum operation pressure of a cartridge or a crossflow system is obtained. The pressure switch is easily programmed by the user.

Additional control is achieved by using an inductive level sensor. This small sensor is placed outside of a glass or plastic vessel and is not in contact with the product. It switches the pump off when a predefined level of liquid in the vessel is detected.

Features
- Easy to clean, no shaft seals
- Can run dry, self priming
- Low noise, constant flow
- Compact
- Adjustable flow up to 1,380 l/h
- Pressure up to 6.0 bar | 90 psi, 5.0 bar | 75 psi in permanent use
- Temperature up to 60°C, CIP up to 90°C (short time), SIP up to 135°C

Specifications

Product wetted components

Pump head	AISI 316L stainless steel
Surface finish	Ra < 0.8 µm
Diaphragm	Santoprene®
Valves & O-Ring	EPDM & BUNA
Valve chamber & pistons	Polypropylene
Ports	Tri-Clamp ¾" O.D.

3.1B material certificates, surface finish protocol, pump performance chart and FDA conformity documents are supplied with the pump.

Specifications

Drive	
Motor	24 V DC
Variable speed	0 – 3,000 rpm
Torque	0.59 Nm at 3,000 rpm
Motor power	185 Watt, 8.7 Amp.

Electrical details	
Power supply	115 – 240 V, AC, 50 Hz or 60 Hz
Controls voltage	24 V, DC
Controls (ON | OFF)	Touch Pad 0 – 100%
Connector 1	Electronic pressure switch
Connector 2	Inductive level switch
Dimensions (L × W × H)	415 × 300 × 385 mm

Ordering informations and accessories	
17521---110	SartoJet 4-piston diaphragm pump
17521---111	Pressure switch with local digital display for SartoJet
17521---112	Level Switch for SartoJet
17521---113	Drain Valve
17521---105	Sartocon® Slice Microfiltration Set for SartoJet
17521---106	Sartocon® Slice Ultrafiltration Set for SartoJet

Sartocon® Slice 200. The Low Hold-Up Volume Crossflow Cassette Filter for Low Volume Applications

Sartocon Slice 200
Sartocon Slice 200 Crossflow filters are designed for low volume applications.

Target use
– product discovery
– pre-clinical trials
– small-scale clinical trials
– membrane screening

The cassettes are available with Polyethersulfone and Hydrosart membrane types in both MF and UF formats.

The Polyethersulfone membrane
The robust polyethersulfone membrane (PESU) is a polymer –which is stable within a broad pH (1–14) and temperature range – that is well established and widely accepted in the biotechnological and pharmaceutical industries. Membrane regeneration and depyrogenation is accomplished by using (1N) NaOH at elevated temperatures as required. Cassettes are stored in 0.1N NaOH.

The Hydrosart® membrane
Hydrosart is a stabilized cellulose-based membrane that has been optimized for use in the biotechnological and pharmaceutical industries. The Hydrosart membrane is a stable polymer (created by a Sartorius patented process) which is compatible with a wide range of chemical agents and stable within a broad pH range. It is also an extremely hydrophilic and neutral membrane, making it non-protein binding and virtually non-fouling. It exhibits extremely high and consistent flux rates. Membrane regeneration, and depyrogenation is accomplished by using (1N) NaOH at elevated temperatures as required. Cassettes are stored in 0.1N NaOH.

Product profile
Hydrosart cassettes exhibit no adsorption of proteins, viruses, etc. Membrane retention is unaffected by repeated use. The Hydrosart ultrafiltration cassette can be re-used without any loss of integrity or performance. "Out-of-the-box" performance is maintained with multiple uses. These features make the PESU and Hydrosart membrane ideally suited to the biotechnological industry.

Feature	Benefits
Low hold-up volume	Minimized working volume.
Low protein-binding	High product yield; Easily cleaned.
Wide pH and a wide variety of temperature range	Chemicals can be used for the removal of foulants.
High flow rates	Economical filtration runs.
Silicone sealing compound	No glues etc. Self Sealing.
Identical flow geometry and hydraulic dimensions as larger scale-up devices.	Straight line, scale-up.

Ordering information
Available Slice 200 types and order numbers

Cut off | Pore size	Hydrosart 200 cm^2 filter area	Polyethersulfone 200 cm^2 filter area
1 kD		3081460902E--SG
2 kD	3081441902E--SG	
5 kD	3081442902E—SG	3081462902E--SG
8 kD		3081463402E--SG
10 kD	3081443902E--SG	3081463902E--SG
30 kD	3081445902E--SG	3081465902E--SG
50 kD		3081465002E--SG
100 kD	3081446802E--SG	3081466802E--SG
300 kD		3081467902E--SG
0.1 µm		3081545802W--SG
0.2 µm	3081860702W--SG	
0.45 µm	3081860602W--SG	

Sartocon® Slice 200 Stainless Steel Holder. Low Hold-up Volume Crossflow Holder for Sartocon Slice 200 Cassettes

Sartocon Slice 200 holder
The Sartocon Slice 200 stainless steel holder is optimized for the use of up to two Slice 200 Crossflow cassettes (max. 0.04 m^2). It is designed for low volume applications from 100 ml to 5 l.

Target use
– product discovery
– pre-clinical trials
– small pilot lots

The Slice 200 holder uses female stainless steel luer lock connectors. This ensures a safe and reliable connection to additional equipment. The stainless steel luer lock thread even allows the use of polypropylene adapters without the risk of damaging. The feed and retentate ports and the two filtrate ports are located on one side. In combination with the small footprint design, this provides a compact system with low minimum working volume. The adjustable feet guarantee a firm stand of the holder on the bench.

The bores of the ports are widened up to the cassette side to avoid air locks and to ensure proper cleaning of the Slice 200 system.

Technical data

Holder Hold-up volume Feed | Retentate ports	<2 ml
Holder Hold-up volume permeate ports	<2 ml
Maximum number of cassettes	2 Slice 200 cassettes (200 cm^2 each)
Dimensions (L × W × H)	160 × 120 × 275 mm
Weight	5.8 kg

Ordering informations and accessories

17525--01	Slice 200 stainless steel holder
17521---023	Torque wrench
17521---022	Hexagon nut
17525---001	Pressure gauge, 0-6 bar, oil damped
17525---002	Luer lock adapter kit

Sartoflow® Slice 200 Benchtop Crossflow System

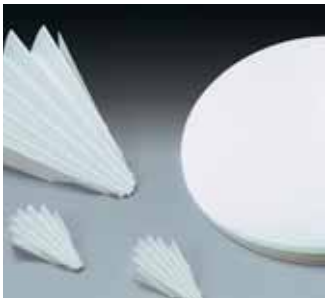
Design description
The Family of Sartorius benchtop crossflow systems feature the latest advances in crossflow technology from Sartorius.
The Sartoflow Slice 200 benchtop system is designed around our Sartocon Slice 200 (filter area: 200 cm^2) cassette and is perfectly suited for R&D, process development, pre-clinical and small pilot lots.

The Sartoflow Slice 200 benchtop features:
- Sartocon Slice 200 cassette holder which fits up to two Sartocon Slice 200 filter cassettes
- 500 ml feed reservoir with sealed cap
- 900 rpm magnetic stirrer
- Peristaltic pump
- Three pressure transmitters
- Display of process parameters (pressures, TMP, flow rates, volume)
- 3 modes of operation (manual | TMP control | constant flow)
- 5 built-in independent alarms
- Win Wedge PC interface software with custom Excel macros for data logging process analysis complete with graphs.

Ordering information

17525SYS-BT1	Sartoflow Slice 200 benchtop system (120V)
17525SYS-BT2	Sartoflow Slice 200 benchtop system (220V)
17525SP-01	3 Pack of pressure transmitters
17525SP-02	Spare parts kit (replacement leur valves and fittings)

Filter Papers



Introduction

Generally filter papers are used for separating substances of different physical states.

They are absorbent, porous fiber materials. The fibrous structure of filter papers forms a capillary system. The intercapillary spaces depend, according to their size and number, on the raw materials used and may be influenced by the beating in the hollander and the way the paper machine works.

We use natural and synthetic, organic and non-organic fibers. In order to obtain special properties, they are partly treated chemically and are impregnated with synthetic resins.

Sartorius filter papers are made to a great extent from pulps of pine or spruce wood, but also of birch, beech and eucalyptus wood, cotton linters and viscose pulp.

These raw materials are refined to different filter papers with graded properties by wet beating in hollanders and sheet formation on specially modified paper machines.

Ashless filter papers

These filter papers are used for quantitative analysis. They are made of refined pulp and linters with over 95% alpha-cellulose content. Moreover, these filter papers are guaranteed to be free of any residual acids that are used in a few production methods. Another advantage is their extremely low percentage of ash content. As a result, these filters are virtually ash-free.

Sartorius Ashless Filter Papers, with the grade Numbers 388, 389, 389F, 390, 391, 392 and 393, are characterized by high wet strength and high purity, classified according to their separating capacity.

These papers are especially suitable for quantitative analysis, Buechner funnels, pressure or vacuum filtration and are available in different formats as in rolls, sheets, discs, and folded filters.

Qualitative filter papers

Like our ashless filter papers, these filter papers are made of refined pulp and linters with an alpha-cellulose content of more than 95%. This gives them a variety of filter properties to meet the needs of different applications. The ash content of these filter papers is approx. <0.1%, and they are mainly used for qualitative analyses.

Sartorius offers two categories of qualitative filter paper: standard strength and various grades of wet strength. These filter papers are available as rolls, sheets, disks and folded filters.

288 and 1288

289 and 1289

290 and 1290

291 and 1291

292 and 1292

292a | 293

Qualitative and technical filter papers

Sartorius offers a selection of filter papers that are used for analytical and technical purposes.

Absorptive filter papers and boards

These papers are used for the filtration of cooking and transformer oils and galvanic baths, for absorption of human serum or of water for germination tests, as base paper for further impregnation with specific reagents and for protection of laboratory surfaces. They are available as reels, sheets or disks, including large diameter formats with a center hole, and in special cuts and shapes, e.g., for use in filter presses.

Extraction thimbles
Extraction thimbles are used for quantification of single components in food products, plastic materials, pesticides, dust or air. Sartorius extraction thimbles have an excellent reputation for purity and consistent high quality. The standard grades are manufactured from high-alpha cellulose cotton linters to give a high purity thimble which is mechanically strong and has excellent retention.

Glass and quartz microfiber filters
Glass microfiber filters are made of 100% borosilicate. No binders are used in their production, which makes them ideal for critical analyses that preclude the use of filters that release impurities. They continue to perform efficiently for long periods, unlike cellulosic filters whose rate of filtration drops off rapidly as they become increasingly loaded with particles. Glass microfiber filters are temperature resistant up to 500°C.

Quartz microfiber filters have properties that are similar to those of glass microfiber filters. However, quartz microfiber filters are resistant to even higher temperatures up to 900–950°C, have only minimal traces of metal impurities, feature excellent weight and dimensional stability, and can be used for analysis of hot, acidic gases (except for HF), particularly for emission testing procedures.

Glass and quartz microfiber filters are suitable for measurement and analysis of air and water pollutants, use as general-purpose membrane prefilters, and for clarification of buffer and reagent solutions, especially in spectrophotometry. The filters are available as disks, sheets or thimbles.

Various densities and thickness of the materials define the specific filtration characteristics of each of the following grades:

MGA, MGB, MGC, MGD, MGF, 40, T293

Blotting and chromatography papers
These filter products are made of high-purity cotton linters with an alpha-cellulose content of over 97%. We offer these papers in 16 grades, which differ in basis weight and travel velocity. You can choose from eleven grades with normal ash content and eight grades with reduced ash content.

Chromatography papers with normal ash content are grades FN 1 through FN 8, FN 30, and FN 100; papers with reduced ash content, FN 11 through FN 18. The long side is the direction of travel of the substances being tested. These papers can also be supplied as round filters for circular technology, as strips, or as sheets for special techniques.

Beyond these formats, we also offer papers for buffer wicking and transport or for covering the gel and the transfer membrane on both sides in a blotting tank to accommodate various transfer blotting techniques.

BF 1, BF 2, BF 3, BF 4 and FN 100
are for use as blotting or chromatography papers.

Indicator papers
Sartorius offers a comprehensive assortment of ready-to-use pH and indicator papers as reels or strips. These are used for quick and exact determination of colored, turbid, clear or aqueous solutions within the entire pH range.

Moreover, we offer ultrapure papers specially designed to be coating with pH indicators or other test reagents. In addition, we supply reels and sheet formats customized to meet your specifications.

Special brochure available on request.
Order no. S--1502-e

Chemical Compatibility
1. Filter Materials and Mini Cartridges

	Cellulose acetate	Cellulose nitrate	Reg. Cellulose	PTFE	Poly-amide	Glass fiber	Polycar-bonate	Poly-ether-sulfone	Sartobran P cartridge	Sartofluor cartridge
Solvents	**111**	**113**	**184**	**118**	**250**	**134**	**230**	**154**		
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
Perchloroethylene	•	•	•	•	•	•	•	?	V	V
Pyridine	–	–	•	•	•	•	–	–	–	–
Carbon tetrachloride	○	•	•	•	•	•	?	•	–	?
Tetrahydrofuran	–	–	•	•	•	•	–	–	–	–
Toluene	•	•	•	•	•	•	?	•	–	–

Key to symbols see next page.

	Cellulose acetate	Cellulose nitrate	Reg. Cellulose	PTFE	Poly-amide	Glass fiber	Polycar-bonate	Poly-ether-sulfone	Sartobran P cartridge	Sartofluor cartridge
Solvents	**111**	**113**	**184**	**118**	**250**	**134**	**230**	**154**		
Trichloroethane	○	•	•	•	?	•	?	?	–	?
Trichloroethylene	•	•	•	•	•	•	–	•	–	?
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
○ = limited compatibility
– = not compatible
? = 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.

2. 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	Viton O-ring
Solvents									
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	•	•	•	•	•	–	•	–	•
Perchloroethylene	•	–	○	•	•	–	•	–	•
Pyridine	•	–	○	•	•	–	•	–	–
Carbon tetrachloride	•	–	○	•	•	–	•	–	•
Tetrahydrofuran	•	–	○	•	•	–	•	–	–
Toluene	•	–	•	•	•	–	•	–	○

Key to symbols see next page.

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless steel	EPDM O-ring	PTFE O-ring	Silicone O-ring	Viton O-ring
Solvents									
Trichloroethane	•	–	?	•	•	–	•	–	•
Trichloroethylene	•	–	–	•	•	–	•	–	•
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.

3. Ready-to-Connect Filtration Units

	Midisart 2000	Minisart	Minisart HY	Minisart RC	Minisart SRP	Sartobran 300	Sartobran P Capsule	Sartofluor Capsule	Sartolab P20
Solvents									
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	●	●	●	●	●	●	●	●	●
Perchloroethylene	●	○	○	?	●	○	○	●	–
Pyridine	●	–	–	?	●	–	–	●	–
Carbon tetrachloride	●	○	○	?	●	○	○	●	–
Tetrahydrofuran	●	–	–	●	●	–	–	○	–
Toluene	●	–	–	●	●	●	●	●	–

Key to symbols see next page.

	Midisart 2000	Minisart	Minisart HY	Minisart RC	Minisart SRP	Sarto-bran 300	Sartobran P Capsule	Sartofluor Capsule	Sartolab P20
Solvents									
Trichloroethane	•	○	○	•	•	?	?	•	–
Trichloroethylene	○	?	?	?	○	–	–	–	–
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%	•	•	•	?	•	•	•	•	•

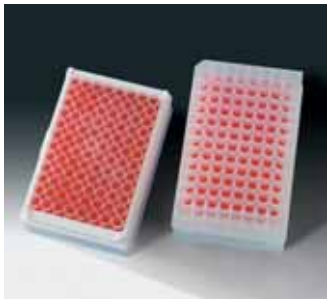
Key to symbols

• = 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.

Membrane Chroma-tography

The Vivapure Range of Membrane Adsorber-Based Spin Columns for Rapid Protein Separation and Purification



Vivapure Anti-HSA Kit

Vivapure C18 Micro spin columns

Vivapure spin columns are available with a variety of different membrane adsorber chemistries.
Vivapure ion exchange spin columns come in either strong or weak cation or anion charged membrane matrices. With these ion exchange membrane devices, protein binding, elution, and concentration is made almost as simple as filtration.

There are two different sizes and capacities of Vivapure devices:

A. Vivapure Maxi – 19/20 ml
Binding capacities:
High – H (60-80 mg)
Medium – M (15-20 mg)

B. Vivapure Mini – 400/500 ml
Binding capacities:
High – H (4 mg)
Medium – M (1 mg)
Low – L (0.02 mg)

Vivapure membrane adsorbers are also available as Vivawell 96-well and Vivawell 8-strip devices for increased throughput and robotic applications.

Vivapure Anti-HSA Kit for Human Albumin Depletion
Kit including 5 ml Anti-HSA affinity resin, clarification spin columns and buffers. The Vivapure Anti-HSA Kit utilizes unique antibody fragments for specific, fast and reproducible depletion of highly abundant human albumin from serum and plasma samples. The resolution of 2D-PAGE is significantly improved by this simple, 20-minute, spin column-based protocol.

Order No.: VS-SP08HAR
Literature: SLU2011-e; SLU1506-e

Vivapure Anti-HSA/IgG Kit for Human Albumin and IgG Depletion
Kit including 5.5 ml Anti-HSA/IgG affinity resin, clarification spin columns and buffers. The Vivapure Anti-HSA/IgG resin utilizes unique antibody fragments and protein G for specific, fast and reproducible depletion of high abundant human albumin and IgG from serum and plasma samples. The resolution of 2D-PAGE is significantly improved by the simple, 20 minute, spin column-based protocol.

Order No.: VS-SP08HAIGG
Literature: SLU2013-e; SLU-1506-e

Vivapure Anti-HSA Affinity resin for Human Albumin Depletion
50 ml Anti-HSA affinity resin utilizing unique antibody fragments for specific, fast and reproducible depletion of high abundant human albumin from serum and plasma samples. The resin can flexibly be filled in columns or spin columns. The resolution of 2D-PAGE is significantly improved by the simple, 20 minute protocol.

Order No.: VS-SP50HAR
Literature: SLU1505-e; SLU-1506-e

Vivapure C18 Micro spin columns
Including 24 spin columns for preparation of samples prior to mass spectrometry, e.g. MALDI, MALDI-TOF and ESI. All steps are performed in the centrifuge offering high sample volume capacity (200 µl) and minimal hands-on time.

Order no.: VS-RP218L24
Literature: SL2020-e; SL-1042-e

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

These kits are offered in 4 different versions with three different volume and virus purification capacities.

Vivapure AdenoPACK 20
Vivapure AdenoPACK 20 is the downscale kit in the AdenoPACK series, purifying up to 1×10^{12} viral particles from 20 ml cell culture. Especially when testing new constructs, parallel and fast purifications of different adenoviruses are essential. This kit allows the rapid, simple and affordable spin column based purification of 6 different samples in parallel and bridges a gap in the CsCl density gradient method – for the first time adenovirus can efficiently be purified from less than 100 ml cell culture volume!

Order No.: VS-AVPQ020
Literature: SL-6512-e; SLU-1518-e


Vivapure AdenePACK 100


Vivawell Metal Chelate 8-Strip Plates


Vivapure Epoxy protein coupling kit


Vivapure Protein A mini spin columns


Vivapure DNA removal kit

Vivapure AdenoPACK 100
Vivapure AdenoPACK 100 is optimally suited for adenovirus purification from up to 200 ml cell culture for in vitro transfection. This flexible kit contains two AdenoPACK 100 units, which can be either used in tandem for the purification of up to 200 ml cell culture for recovering 1×10^{13} viral particles or individually for purifying 1×10^{12} viral particles from up to 60 ml cell culture. The purification is pursued manually with a syringe optimally attached to a retort stand. However, for even more convenience, protocols are provided for optionally running the virus purification with a peristaltic pump or with an infusion pump, in additional to detailed instructions for a manual operation supplied with the Kit. The accessories needed for the operation with a pump are supplied as individual products.

Order No.: VS-AVPQ101
Literature: SLU2012-e; SLU-1518-e

Vivapure AdenoPACK 100RT
Vivapure AdenoPACK 100RT is identical to Vivapure AdenoPACK 100, however does not contain Benzonase® Nuclease*, which allow longer storage times of the kit at room temperature.

Order No.: VS-AVPQ102
Literature: SLU2016-e; SLU-1518-e

Vivapure AdenoPACK 500
Vivapure AdenoPACK 500 is the direct upscale kit to the AdenoPACK 100, for adenovirus purification. In only 2 hours up to 3×10^{13} adenovirus particles are purified and concentrated from 500 ml cell culture. This completely ready-to-use kit is conveniently operated by a laboratory pump, offering optimal flow control and minimal hands-on time. This easy to use product replaces lengthy and inefficient cesium chloride density gradient methods.

Order No.: VS-AVPQ020
Literature: SLU2015-e; SLU-1518-e

* Benzonase® Nuclease is manufactured by Merck KGaA, Darmstadt, Germany and is covered by US Patent 5,173,418 and EP Patent 0,229,866. Nycomed Pharma A/S (Denmark) claims worldwide patent rights to Benzonase® Nuclease, which are licensed exclusively to Merck KGaA, Darmstadt, Germany. Benzonase® is a registered trademark of Merck KGaA, Darmstadt, Germany.

Purification results from preparations with Ad5 GFP-constructs

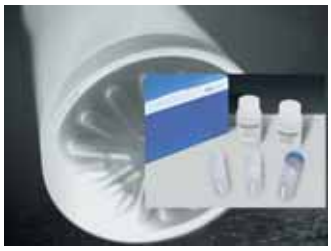
Purification method	Process time	Eluate	Recovery***	Viral Particles
AdenoPACK 20 | 20 ml culture	1 hour	1 ml	65–70 %	$1 \times 10^{11-12}$
AdenoPACK 100 | 60 ml culture	1–2 hours	1 ml	65%	$1–3 \times 10^{12}$
AdenoPACK 100 | 200 ml culture	2 hours	1 ml	80%	1×10^{13}
AdenoPACK 500 | 500 ml culture	2 hours	1 ml	80%	$1–3 \times 10^{13}$
500 ml CsCl density gradient	24–48 hours	1–2 ml**	60–70%	$1 \times 10^{11-12}$

** after dialysis
*** before buffer exchange

Ordering information

Vivapure Kits

VS-AVPQ020	AdenoPACK 20 Adenovirus Purification Kit from 6×20 ml cell culture
VS-AVPQ101	AdenoPACK 100 Adenovirus Purification Kit from 200 ml cell culture
VS-AVPQ102	AdenoPACK 100RT Adenovirus Purification Kit from 200 ml cell culture – product does not contain BenzonaseR Nuclease*
VS-AVPQ501	AdenoPACK 500 Adenovirus Purification Kit from 500 ml cell culture



Vivapure acidic protein purification kit
Vivapure basic protein purification kit

Vivapure Micro Spin Columns, up to 0.2 ml, pack of 24

VS-RP218L24	C18, reverse phase

Vivapure Mini Spin Columns, up to 0.5 ml, pack of 24

VS-IX01CH24	Carboxyl, weak cation exchanger
VS-IX01DH24	Diethylamine, weak anion exchanger
VS-IX01QH24	Quaternary ammonium, strong anion exchanger
VS-IX01SH24	Sulfonic acid, strong cation exchanger
VS-IX01ST16	Starter kit (4 of each)

Vivapure Maxi, up to 20 ml, pack of 8

VS-IX20CH08	Carboxyl, weak cation
VS-IX20DH08	Diethylamine, weak anion
VS-IX20QH08	Quaternary ammonium, strong anion
VS-IX20SH08	Sulfonic acid, strong cation

Vivawell 96-Well Plates, up to 500 µl, pack of 2

VW96IC02	Carboxyl, weak cation exchanger
VW96ID02	Diethylamine, weak anion exchanger
VW96IQ02	Quaternary ammonium, strong anion exchanger
VW96IS02	Sulfonic acid, strong cation exchanger

Vivawell 8-Strips, up to 300 µl, pack of 2

VW08IC02	Carboxyl, weak cation exchanger
VW08ID02	Diethylamine, weak anion exchanger
VW08IQ02	Quaternary ammonium, strong anion exchanger
VW08IS02	Sulfonic acid, strong cation exchanger
VW08MC02	Metal Chelate

AdenoPACK Accessories

VS-AVPA001	Pump tubing set for Vivapure AdenoPACK 100

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

Special brochures available on request. Order no. SL-1037-e, SL-1038-e,
SL-1510-e, SL-1028-e

Sartobind®
The Pace Maker in Membrane Adsorber Technology

Unique microporous structure
Sartobind Membrane Adsorbers display a microporous structure with a pore size of 0.45 or > 3 µm. These orders of magnitudes are larger than conventional chromatographic gel matrices. Molecules are transported by convective flow to ligands.

Characteristics of Membrane Adsorbers (MA)
- Ready-to-use units
- Simple handling with a syringe or with a pump
- Pore sizes > 3 and 0.45 µm
- Negligible diffusion limitation
- Low bed heights between 0.3 and 4 mm
- Scalable to process dimension with Sartobind SingleSep disposable capsules and Sartobind MultiSep reusable modules
- Flow starts already at 10 kPa
- Robust high performance separations
- No bed cracking, channeling or air entrapment
- 1 m^2 membrane ≅ 100 m^2 internal surface
- Flow rate of ion exchange membranes > 80 ml/min 0.1 MPa (linear flow rate: > 4,800 cm/h)
- Chemistries: strong and weak ion exchange, coupling, affinity and metal chelate ligands

Low unspecific adsorption
The basis for all Sartobind membranes is a stabilized reinforced cellulose. It is made from regenerated cellulose and during the production to Sartobind it runs through a number of stabilization and grafting steps until a chromatographic matrix is formed on the cellulose backbone. Principally any ligands known from conventional chromatography can be covalently bound on the matrix.

Speed up 100 times
In a simple experiment using a Sartobind ion exchange unit with 5 cm^2 membrane area and a luer lock syringe, you can achieve a flow rate of about 10 ml per 0.5 second by hand which corresponds to a linear flow rate of more than 14,000 cm/h. Even under these conditions, you'll attain complete capture of the protein. Just try it (sample: cytochrome c, buffer: 10 mM sodium phosphate pH 7.0, unit: Sartobind S 5).

Sartobind membrane types
- Sartobind S, Q, C and D ion exchange
- Sartobind IDA (iminodiacetic acid) metal chelate
- Sartobind aldehyde-activated
- Sartobind epoxy-activated
- Sartobind Protein A (recombinant)

Sartobind applications
Purification and concentration
- Proteins, viruses, viral particles, monoclonal antibodies, oligonucleotides

Contaminant removal
- DNA, endotoxins, viruses, host cell, proteins

... for Robust Separations

Sartobind MAs may be used by hand or with a chromatographic system via Luer Lock adapters.

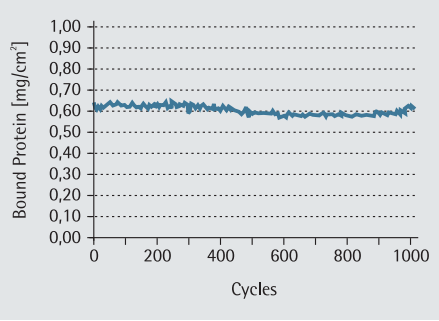
Sartobind MA units for laboratory applications

Constant capacity
The robustness of Sartobind Membrane Adsorbers in ion exchange and affinity chromatography has been tested in consecutive runs of 1000 or 100 chromatographic cycles, respectively. Sartobind can be reused many times, and affinity membranes maintain their binding capacity over many cycles reflecting the chemical stability and low "bleeding" of the ligand.

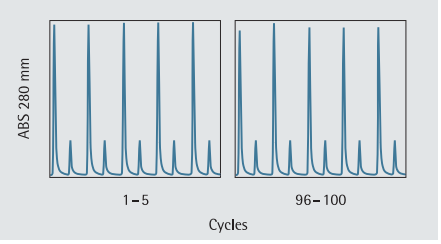
Laboratory units: Sartobind MA
You may use Sartobind Membrane Adsorbers for any ion exchange or affinity chromatography which require high speed and simple operation. Four sizes of laboratory units can be chosen. Sartobind MA 5 (1 membrane layer) are for principle tests and should be disposed after use. If you have to work with larger mg quantities, please choose Sartobind MA 15 (3 layers), MA 75 (15 layers) or MA 100 (5 layers). These may be reused hundreds of times.

Chemical compatibility
The material of Sartobind MA 5 housing is MBS (methyl methacrylate butadiene styrene) copolymer and is intended for single use only. The housing of Sartobind MA 15, 75 and 100 is polysulfone, which is stable to many standard solvents applied in chromatography.

Sartobind ion exchange membranes are compatible with alcohols such as ethanol, isopropanol, glycerol, and denaturing solvents such as 8 M urea and 8 M guanidine HCl. They resist strong acids and alkaline solutions such as 1 M hydrochloric and sulfuric acid, and 1 N sodium hydroxide.



Purification cycles of bovine serum albumin on Sartobind Q 75 strong anion exchanger repeated 1000 times. Flow rate: 120 cm/h, cycle time: 10 min, equilibration buffer: 20 mM phosphate buffer pH 7.0, sample: 5 ml bovine serum diluted 1:20 with equilibration buffer, elution buffer: 20 mM phosphate buffer pH 7.0 + 1 N NaCl, regeneration after each 100 cycles with 1 N NaOH



Purification cycles of IgG on Sartobind recombinant protein A (3 layer unit) repeated 100 times. Elution pattern of cycles 1–5 (left) and 96–100. Flow rate: 193 cm/h , cycle time: 7 min. equilibration and washing buffer: PBS 1 x, sample: human plasma, elution buffer: glycine 0.1 M, pH 2.3. The first peak of each cycle is the flow through of unbound proteins, mainly HSA (human serum albumin), second peak represents the eluted IgG fraction.

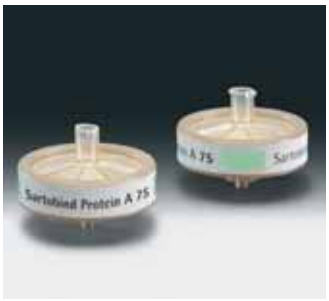
Technical data Sartobind MA ion exchange units

	MA 5	MA 15	MA 75	MA 100
Membrane material	Stabilized reinforced cellulose			
Application for	Principle tests only, single use	Purification, reusable	Purification, downscale for production, reusable	Purification, reusable
Adsorption area [cm²]	5	15	75	100
Number of layers	1	3	15	5
Bed height [mm]	0.275	0.8	4.0	1.4
Bed volume* [ml]	0.14	0.41	2.1	2.8
Menbrane diameter [mm]	25	25	25	50
Housing material	MBS copolymer	Polysulfone	Polysulfone	Polysulfone
Inlet connector	Female Luer Lock	Female Luer Lock	Female Luer Lock	Female Luer Lock
Outlet connector	Male Luer Lock	Male Luer Lock	Male Luer Lock	Male Luer Lock
Minimum static protein binding capacity [mg/unit] (with lysouome for S/C, BSA for Q/D)	4 / S 5 4 / Q 5 3 / C 5 3 / D 5	12 / S 15 12 / Q 15 9 / C 15 9 / D 15	60 / S 75 60 / Q 75 45 / C 75 45 / D 75	80 / S 100 80 / Q 100 60 / C 100 60 / D 100
Flow rate** at 0.1 MPa (1 bar | 14.5 psi) [ml/min]	>150	>50	>25	>75
Dead volume [ml]	0.8	1.0	1.3	4.2
Maximum pressure [MPa]	0.4	0.6	0.6	0.6
pH stability of housing	–	2–13	2–13	2–13
Storage before use at	Room temperature	Room temperature	Room temperature	Room temperature

pH Stability for MA15, 75 and 100

	S	Q	C	D
short term	3–14	2–14	2–14	2–14
long term	4–13	2–12	4–13	2–12

MA units are supplied as non sterile
* 1 ml membrane volume is equal to 36.4 cm² membrane area
** Ion exchange



Technical data Sartobind MA affinity units

Data common for all membrane types

Membrane material	Stabilized reinforced cellulose
Number of layers	15
Bed height	4.0 mm
Bed volume	2.1 ml
Membrane diameter	25 mm
Adsorption area	75 cm^2
Dead volume	1.3 ml
Maximum pressure	0.6 MPa (6 bar, 87 psi)
Housing material	Polysulfone
Inlet connector	Female luer lock
Outlet connector	Male luer lock
Chemical stability	Stable in all common chromatography buffers except peroxide and other oxidizing or reactive reagents

Data according to affinity type

Membrane type	**Protein A 75**	**IDA 75**	**Epoxy 75**
Ligand	Recombinant protein A	Iminodiacetic acid (IDA)	Epoxy
Binding capacity Test proteins	6 mg/unit polyclonal human IgG	7.5 mg/unit His_6-tagged protein* depending on sample	2–11 mg/unit proteins**
Recommended ions for coupling	–	Ni^{2+}, Co^{2+}, Cu^{2+} or Zn^{2+}	–
Flow rate at 0.1 MPa (1 bar, 14.5 psi)	> 10 ml/min	> 10 ml/min	> 10 ml/min
Recommended flow rate	5–10 ml/min	50 ml/min	5–10 ml/min
pH stability (long term)	3–9	2–12	2–12
pH stability (short term)	2–10	1–14	1–14
Storage before use	+ 4°C	Dry at room temperature	Dry at room temperature

* protected by patents of third parties
** proteins ranging from 12.5 to 600 kD under standard conditions

Product and ordering information

Sartobind Membrane	Description	Pore size (µm)	Capacity (µg/cm²)*	Sartobind MA 5	Sartobind MA 15	Sartobind MA 75	Sartobind MA 100	Sartobind SingleSep	Sartobind System
S	Strong acidic cation exchanger sulfonic acid	>3	800	•	•	•	•	•	•
Q	Strong basic anion exchanger quaternary ammonium	>3	800	•	•	•	•	•	•
C	Weak acidic cation exchanger carboxylic acid	>3	600	•	•	•	•		•
D	Weak basic anion exchanger diethylamine	>3	600	•	•	•	•		(•)
Protein A	Recombinant protein A affinity	0.45	80			•			(•)
IDA	Iminodiacetic acid metal chelate	>3	100			•			(•)
Epoxy	Epoxy-activated membrane	0.45	30			•			(•)

* Minimum static capacity for standard or target protein, • available; (•) available as special product

Order No.	Description	Quantity
S5F	Sartobind S 5 strong cation exchanger	15
Q5F	Sartobind Q 5 strong anion exchanger	15
C5F	Sartobind C 5 weak cation exchanger	15
D5F	Sartobind D 5 weak anion exchanger	15
S15X	Sartobind S 15 strong cation exchanger	2
Q15X	Sartobind Q 15 strong anion exchanger	2
C15X	Sartobind C 15 weak cation exchanger	2
D15X	Sartobind D 15 weak anion exchanger	2
Q75X	Sartobind Q 75, strong anion exchanger	2
S75X	Sartobind S 75, strong cation exchanger	2
C75X	Sartobind C 75, weak cation exchanger	2
D75X	Sartobind D 75, weak anion exchanger	2
S100X	Sartobind S 100 strong cation exchanger	1
Q100X	Sartobind Q 100 strong anion exchanger	1
C100X	Sartobind C 100 weak cation exchanger	1
D100X	Sartobind D 100 weak anion exchanger	1
93PR-A06DB-12--V	Sartobind Protein A 75, recombinant protein A	2
93IDA-42DB-12--V	Sartobind IDA 75, iminodiacetic acid	2
93EPOX06DB-12--V	Sartobind Epoxy 75, epoxy activated	2
17002---140	Pair of Luer Lock adapters black Tefzel to connect MA 5, 15, 75 and 100 to a liquid chromatography system	2

Sartobind® SingleSep

Sartobind SingleSep ion exchange capsules are designed to remove contaminants at accelerated flow rates. This is a direct result of negligible mass transfer effects and is made possible by the >3 µm macroporous membrane. The design allows for robust chromatographic separations and drastically reduced validation costs. SingleSep capsules are used for DNA removal from therapeutic proteins, host cell protein removal and viral clearance.

- Ready-to-use format
- Simple and fast set-up
- No trouble with air entrapment, channeling or bed cracking
- Membrane pore size of > 3 µm allows purification of large biomolecules and viruses
- Low unspecific adsorption = less product loss
- Reduced validation costs
- Autoclaving at 121 °C for 30 min, one cycle

Technical data Sartobind SingleSep capsules

Membrane	Base material Membrane thickness Membranes	Stabilized reinforced cellulose 275 µm – strong cation exchanger S (sulfonic acid) - strong anion exchanger Q (quaternary amine)
Capsule	Design Bed height Material Capsule	cylindric, nominal number of layer: 15 4 mm Polypropylene
Operation	Max. pressure	0.4 MPa (4 bar | 58 psi)

Technical Data

Order number capsules	Description	Connector	Nominal protein binding capacity [g]	Bed volume [ml]	Quantity
92IEXQ42D4-00—A	Sartobind Q SingleSep mini capsule	Hose barb	0.2	7	4
92IEXS42D4-00—A	Sartobind S SingleSep mini capsule	Hose barb	0.2	7	4
92IEXQ42D4-SS—A	Sartobind Q SingleSep mini capsule	Sanitary	0.2	7	4
92IEXS42D4-SS—A	Sartobind S SingleSep mini capsules	Sanitary	0.2	7	4
92IEXQ42D9-00—A	Sartobind Q SingleSep 5" capsules	Hose barb	2	70	4
92IEXS42D9-00—A	Sartobind S SingleSep 5" capsules	Hose barb	2	70	4
92IEXQ42D9-SS—A	Sartobind Q SingleSep 5" capsule	Sanitary	2	70	4
92IEXS42D9-SS—A	Sartobind S SingleSep 5" capsules	Sanitary	2	70	4

Minimum static binding capacity was measured with bovine serum albumin and hen egg lysozyme: 0.8 mg/cm^2 for Q and S membranes.

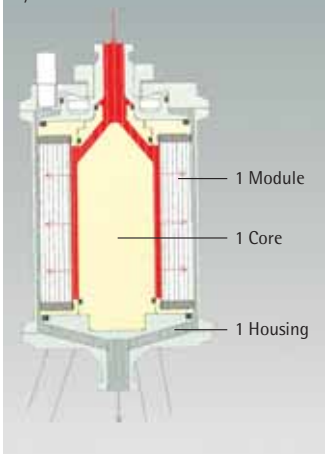
For further scale-up, please request the Sartobind SingleSep brochure. Order no. SL-1521-e.

Sartobind® System

Sartobind System is a membrane chromatography platform for the purification of biomolecules in the pharmaceutical and biotech industries. The technology combines the advantages of conventional chromatography columns in terms of separation power and capacity with membrane technology regarding negligible mass transfer, high throughput and robustness. Sartorius Membrane Adsorbers are used e.g. for the purification of therapeutic proteins, antibodies, viruses, DNA, oligonucleotides and blood coagulation factors.

- Simple set up
- High chemical stability (sanitisation in 1 N NaOH, storage in 20% Ethanol in binding buffer)
- Robust: no trouble with air entrapment, channeling or bed cracking
- Membrane pore size of >3 µm allows separation of large biomolecules and even viruses
- Short set-up and take-down times
- 20–100 times faster than conventional columns without sacrificing capacity
- Short cycle times = less product loss
- Reusable
- Validation and Extractables Guides available
- Scalable

For a complete MultiSep system you need:



Order number modules	Order number cores	Order number housings*	Flow rate [l/min × 100 kPa]	Nominal protein binding capacity [g]	Bed volume [ml]
91-X-01K-15-03	90-CR-PO15-03	90-HS-PO - - - 03	0.4–0.6	0.7–1	35
91-X-02K-15-06	90-CR-PO15-06	90-HS-PO - - - 06	0.8–1.3	1.5–2	70

Height of module in cm
Nominal number of layers 15 (4 mm), 30 (8 mm) , 60 (16 mm bed height)
Nominal adsorption area in $cm^2 \times 1000$
X=ion exchanger type S, Q, C or D

Minimum static binding capacity was measured with bovine serum albumin and hen egg lysozyme:
0.6 mg/cm^2 for D = Diethylamine, C = Carboxylic acid, and 0.8 mg/cm^2 for Q = Quaternary amine, S = Sulfonic acid.

* Instead of PO (Polyoxymethylene) use SD when ordering stainless steel housings.

For further scale-up, please request the Sartobind System data sheet. Order no. SL-2014-e.


sartorius
Manual
Prg 1/1
Speed
100
24.08.06
15:54:47
0:00
Mem
0.1%
00:10
Speed
Menu
Esc
Sterisart® Universal


Volume 25L
F-rate 50.0L/m

Microbiological Analysis

MD8 airscan® Air Sampler for Critical Applications

The system consists of the MD8 airscan air sampler and disposable gelatine filter units. The system is routinely used for the quantitative detection of air-borne organisms, mainly at filling lines in sterile areas of class A (classification according to "EU Guide for GMP"), isolators, or blow-fill-seal machines.

The exceptionally high air flow rate of 8 m^3/h enables isokinetic sampling at flow rates that are usual in laminar flow as well as filtration of 1 m^3 air very quickly (less than 8 minutes). The filter unit can be placed separately from the air sampler for remote sampling.

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 gelatine filter can be placed directly on the agar culture medium for incubation and colony growth.

Specifications for the MD8 airscan air sampler

Air flow rate	2.0 m^3/h – 8 m^3/h adjustable in 100-liter steps
Timer	1–99 minutes, adjustable in 1-minute steps
Max. deviation	±5% in a temperature range of 15°–35°C
Noise level	For gelatine membrane filters, max. 62 dB (A)
Weight	Approx. 6.5 kg
Dimensions (L×W×H)	375×242×228 mm
Correction of the air flow rate setting	When the entered air flow rate cannot be attained, the display shows the max. attainable flow rate for a corresponding new setting below this value.

Ordering information for the MD8 airscan air sampler

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

Each version can be switched from 50 to 60 Hz and back.

Accessories for the MD8 airscan air sampler

Order number	
17801	Holder for disposable gelatine filter units

Ordering information for consumables
Disposable gelatine units, sterile, pack of 10

Order number	
17528--80----ACD	Individually packed in 1 polyethylene bag each
17528--80----BZD	Individually packed in 3 polyethylene bags each
17528--80----VPD	Individually packed in 3 polyethylene bags each, but label on innermost bag

Special brochures available on request. Order no. SLF3001-e | SM-3011-e

AirPort MD8
Battery-Powered 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 work safety.

AirPort MD8 offers the following benefits
- Battery-powered and portable for universal use.
- Battery power level clearly indicated so constant performance during sampling is guaranteed.
- Ergonomic design and easy to clean.
- Flexible adjustment possibilities of the volume flow and the sample volume.
- User-friendly prompting with the option of five languages; English, French, German, Italian and Spanish.
- Parameters last used stored even after automatic shut-off.
- The device can be calibrated locally.

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

Specifications for AirPort MD8

Volume flow regulation	By an integrated impeller wheel.
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 liters. In addition, the sample volume can be chosen manually in 5-liter steps.
Operational life with one battery charge	Approx. 4.5 hours
Noise level	For gelatine membrane filters 48 dB (A)
Weight	Approx. 2.5 kg
Dimensions (L×W×H)	300×135×165 mm

Power supply

Battery	NiMH 16.8 Volt/3800 mAh
Battery charger input	100–240 V/47–63 Hz/600 mA
Battery charger output	24 V/1000 mA
Charging time	Approx. 4.5 hours for empty battery

Ordering information for the AirPort MD8

Order number	
16757	AirPort MD8, complete with holder (17801) for gelatine disposable units and battery charger (69898525).

Accessories for the AirPort MD8

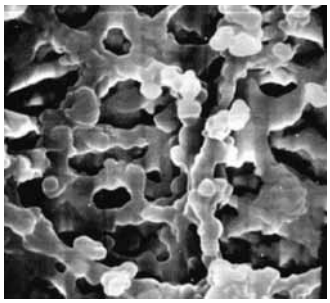
Order number	
17801	Adapter for disposable gelatine filter units.
69898525	Battery charger

Ordering information for consumables
Disposable gelatine units, sterile, pack of 10

Order number	
17528--80----ACD	Individually packed in 1 Polyethylene bag each
17528--80----BZD	Individually packed in 3 Polyethylene bags each
17528--80----VPD	Individually packed in 3 Polyethylene bags each, but label on innermost bag

Special brochure available on request. Order no. SM-1502-e

Gelatine Membrane Filters



Gelatine filters in conjunction with the MD8 air samplers (gelatine filter method) are used for collecting of airborne microbes and viruses. Gelatine filter disposables are individually packed, presterilized and ready-to-connect units, each consisting of a gelatine membrane filter and a holder. Gelatine membrane filters are still available as filter discs, suitable for the filter holder 17655 (80 mm diameter) supplied with the MD8 airscan air samplers, as well as in smaller diameters.

Gelatine filters in conjunction with the MD8 air samplers offer the following features and benefits:

- "Absolute" retention rate (99.9995% for Bac. sub. niger spores, 99.94% for T3 phages).
- The filter maintains the viability of collected microorganisms for a relevant and meaningful sampling time.
- Gelatine filters are completely water-soluble. Therefore, microbes in one sample can be cultivated in | on different nutrient media or low and high bacteria counts can be measured. The sample is not affected by inhibitors.
- The solubility of the gelatine filter is a prerequisite for virus sampling.

Specifications of gelatine filters

Gelatine filters	Water soluble, pore size 3 µm, 80 mm diameter, thickness approx. 250 µm
Thermal resistance	Max. 60°C
Residual dampness content	46-49%
Air flow rate	Approx. 2.7 l/min./cm² at ΔP = 0.05 bar
Retention rates	1. Bac. subtilis niger spores 99.9995% at 0.25 m/s inlet velocity. 2. 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. humidity.
Filtration area	38.5 cm²
Conditions for use	Room temperature, max. 30°C, max. air humidity 85%
Sterilization	Supplied presterilized by gamma irradiation

Disposable gelatine units, sterile, pack of 10

Order number	
17528--80----ACD	Individually packed in 1 polyethylene bag each
17528--80----BZD	Individually packed in 3 polyethylene bags each
17528--80----VPD	Individually packed in 3 polyethylene bags each, but label on innermost bag

Gelatine disc filter, sterile, sealed in units of five each in a polyethylene bag

Order number	Diameter	Package size
12602--80----ALK	80 mm	50
12602--50----ALN	50 mm	100
12602--50----ALK	50 mm	50
12602--47----ALN	47 mm	100
12602--47----ALK	47 mm	50
12602--37----ALK	37 mm	50

Special brochure available on request. Order no. SLF3001-e | SM-3011-e

Accessories for the MD8 Air Samplers

New calibration unit
The user can calibrate the MD 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). The calibration unit is supplied complete with battery charger | power supply unit (specific for the country in which it is used), filter holder, connectors set and connection tube (PVC, 2 m).

* 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

Specifications for calibration unit

Dimensions	Length, 300 mm (without filter holder), Width, 390 mm with handles Height, 182 mm min., 200 mm max. (adjustable feet)
Connectors	Quick locks (bayonet principle)
Operational life with full battery	Approx. 4 hours
Charge time for empty battery	Approx. 10 hours
Measuring range	1–16 m^3/h
Max. error	1–16 m^3/h, ±2%
Type of protection	IP 40
Allowable ambient temperature	Min. 0°C, max. 40°C
Weight	Approx. 11 kg

Special brochure available on request.
Order no. SL-2028-e

Tubing and connectors set
If the disposable gelatine filter unit is not placed directly at the MD8 airscan, but at a distance from it, a flexible plastic hose (2 m or 5 m), a connectors set and, if not available, a holder (tripod 16970, double socket 16976, clamp 17037) are necessary for the connection between filter and MD8 airscan. The autoclavable silicone hose is used instead of the flexible plastic hose, if the MD8 airscan has to be used in sterile rooms, operating rooms, isolators, blow-fill-seal machines, etc. With this hose attached to the air outlet connector (exhaust), the waste air can be led off into another room.

Case
A stable case for the transport and the storage of a MD 8 airscan, incl. accessories.

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 cleanbench). The prepared filter holders are put on one 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 unused filter holders are separated from each other.

Accessories for isolator application
For the monitoring of isolators with MD8 airscan, we recommend using stainless steel accessories such as adapters 17016 (DN25) or 17030 (DN30), clamps 17033 for sanitary flanges, connector 17659---001 or 17659---003 (for tri clamp) and the filter holder for gelatine filter disposables 17801---001 as well as a Sartofluor capsule with PTFE membrane and sanitary flange inlet and outlet, for sterile air filtration inserted between the MD8 airscan and isolator. This construction makes it possible that the MD8 air sampler remains outside the critical work area (the barrier function between different clean-room classes is maintained).

Accessories for remote control function
Users of the MD8 airscan now have the possibility of operating this air sampler from a distance, using either of two remote control configurations:
a) Via a PC (with Microsoft 95/98 or higher) with MD8 airscan dialog system and cable connection to the MD8 airscan (1ZE---0004).
b) Via a PLC interface unit (1ZE---0003).

Gelatine membrane filter, 80 mm, sterile, pack of 50 for use with stack
Gelatine membrane filters are still available as 80 mm filter discs, suitable for the filter holder supplied with the MD8 airscan. The filters are sterile-supplied, but the filter holders have to be sterilized by dry heat (180°C, 2h) and then equipped with the filters under sterile conditions. For performing routine check-ups, a stack is recommended in this case.

Further consumables for air monitoring
If gelatine filters cannot be used (high humidity, high temperature), it is recommended to use cellulose nitrate filters.

Accessories for the MD8 air samplers

Order numbers	
16756	Calibration unit for the MD8 air samplers
17208	Case for MD8 airscan
17656	Aluminium stack for MD8 air samplers

Replacement parts for the stack

Order numbers	
17655	Individual filter holders for gelatine filter type 12602--80----ALK
17660	Middle part
17661	End cap

Tubing and connectors set

Order numbers	
17085	Flexible PVC hose with reinforced ends (2 m)
17088	Flexible PVC hose with reinforced ends (5 m)
17662	Silicone tubing, sterilizable (1 m, state length required)
17657	Set of connectors (consisting of 17658 and 17659), aluminium
17658	Connector (air sampler inlet to flexible hose), aluminium
17659	Connector (flexible hose to filter holder | adapter), aluminium

Accessories for isolator application

Order numbers	
17016	Adapter (DN 25 hose barb to 1" – 1 1/2" sanitary flange) to connect MD8 airscan to an isolator via silicone tubing and a filter capsule, stainless steel
17030	Adapter (DN 30 hose barb to 1" – 1 1/2" sanitary flange) to connect MD8 airscan to an isolator via flexible PVC hose and filter capsule, stainless steel
17033	Clamp for 1" – 1 1/2" sanitary flanges, stainless steel
17659---001	Connector (flexible hose to filter holder | adapter), hose nipple, stainless steel
17659---003	Connector (flexible hose to filter holder | adapter), tri clamp, stainless steel
17801---001	Adapter for gelatine filter disposables, stainless steel
5181307T9-----SS	Sartofluor Capsule with PTFE membrane and sanitary flange inlet and outlet, for sterile air filtration inserted between the MD8 airscan and isolator

Accessories for remote control function

Order numbers	
1ZE---0003	Remote control (Interface) for MD8 airscan designed for PLC units
1ZE---0004	Remote control for MD8 airscan for use with PC (dialog system software)

Consumables used with stack
Gelatine disc filters, 3 µm pore size, 80 mm, 50 pieces/pack

Order numbers	
12602-080 ALK	Gelatine disc filter, sterile, sealed in units of five each in a polyethylene bag

Further consumables for air monitoring
Cellulose nitrate membrane filters, 80 mm diameter, 100 pieces/pack

Order numbers	
11404--80----ALN	Cellulose nitrate membrane filters, 0.8 µm, white with black grid, presterilized in bags of 5
13004--80----ALN	Cellulose nitrate membrane filters, 0.8 µm, gray with white grid, presterilized in bags of 5
11301--80----ALN	Cellulose nitrate membrane filters, 8 µm, white no grid, presterilized in bags of 5

Gridded Membrane Filters from Cellulose Nitrate (Cellulose Ester) acc. to ISO Standards, Sterile and Individually Packaged, 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 presterilized 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 conform with GLP, having filter identification and lot number printed on each individual envelope.

The increasing demand on these filters required the construction of a new packaging machine with ultra-modern stamping. Each membrane is checked to ensure it is not damaged in any way, is positioned correctly with no slippage under the edge seal, has perfect grid printing and is free of particles. Each envelope is checked for readable lettering. Quality control par excellence!

These membrane filters are in accordance with the following norms: ISO 7704, ISO 7899-2, ISO 8199, ISO 9308-1 and EN 12780. In addition to this they have been manufactured for use especially at the same time with Sartorius Nutrient Pads in accordance with the AFNOR (French Standards), the American Petroleum Institute, the American Society for Microbiology, the APHA Standard Methods, the Association of Official Analytical Chemists, the British Drinking Water Guideline, the British Standards, the DGHM (German Association of Hygiene and Microbiology), the DIN Guidelines (German Standards), the European Brewery Community, the European Drinking Water Guideline 98/83, the European Pharmacopoeia, the German Pharmacopoeia, the International Commission for Uniform Methods of Sugar Analysis, the International Dairy Federation, the International Fruit Juice Producers, the ISO Guidelines, the LMBG (German food law), the method described by Lanaridris & Lafon-Lafourcade, the method described in the journal of Food Protection, the method described in the journal of the Institute of Brewing, the methods of the Central European Brewery Commission, the MNO (Mineral|Table Water Guideline), the National Canners Association, the testing procedures for packaging stuff, the U.S. Environmental Protection Agency, the United States Pharmacopoeia, the US Department of Agriculture, the VLB (German Institute of Brewery), the Zentralblatt für Hygiene (Journal of Hygiene), the US Federal Drug Administration and Internal Standard Operation Procedures.

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 with a size of 3.1 × 3.1 mm makes the counting easier, especially for higher bacteria counts and for microcolonies, but does not influence the growth. The various filter colors allow the best contrast to the colonies and particles.

High flow membranes
The standard membrane filter for microbiological analysis is an 0.45 µm filter. One special variant is the High Flow membrane. It provides 30% higher flow rates in comparison to traditional 0.45 µm membranes. The special pore structure of the new 0.45 µm HighFlow membrane filters allows shorter filtration times due to higher flow rates and throughputs. As every Sartorius 0.45 µm membrane filter lot, these membranes are also tested and released according to ISO 7704.

Additional membrane filters
Cellulose nitrate (cellulose ester) membrane filters, gridded, non-sterile package (page 150).
Cellulose nitrate (cellulose ester) and cellulose acetate membrane filters, white, individually, sterile packaged (page 152).
Hydrophobic edge membranes are used mainly in the sterility testing of solutions containing antibiotics (page 154).

Microsart™ e.motion Dispenser

Fully automated membrane filter dispenser for individually sterile cellulose nitrate filter discs.

The membrane filters are automatically removed from their sterile package – either in a touch-free mode via an optical sensor or at the touch of a button. A pedal switch can be optionally connected to the dispenser. Thanks to their new motorized traction roller, each filter is quickly and reliably dispensed. Membranes that accidentally slide out of their packaging or that even get damaged in the process are now problems of the past.

The controller specially developed for the Microsart™ e.motion prevents unwanted dispensing of several membrane filters at a time – it's simple, "fail-safe," and fast.

The clear, compact design of the dispenser allows quick and easy cleaning. The Microsart™ e.motion has an interface port available so that other sensor systems can be connected to control the dispenser. The dispenser's low weight makes it easy to transport. Both its functions and design are ideal, giving you the versatility and flexibility you need in your lab.

Applications
Membrane filters for colony count, Particle testing and microscopy

Some of the advantages you will benefit from when using the Microsart™ e.motion dispenser:
- Fully automated membrane filter dispenser
- Works hands-free by an optical sensor
- Works by touch button
- Compact design
- Rapid and reliable transport due to sprocket feed roll technology
- Easy insertion of the filter band
- Easy-to-clean

Specifications of the Microsart™ e.motion dispenser

Dimensions (L×H×W) in mm	204×213×165
Weight	2.9 kg
Operating voltage	110 V/230 V optional
Frequency	50–60 Hz
Max. power	Consumption 10 W
Dispensing speed	0.5 sec
Dispenser delay	5 sec
Certificates	CE Mark and EMC Directive, European Standards EN 50081-1 and –2, EN 50082-1 and -2, EN 61010

Order number for Microsart™ e.motion dispenser

16712	Microsart™ e.motion dispenser, fully automated membrane filter dispenser. Not available in the U.S. and Canada
1ZE---0028	Pedal (foot switch) for Microsart™ e.motion dispenser

Microsart™ e.motion Membrane Filters

The membrane filter band specially designed for the Microsart™ e.motion can be conveniently inserted, and changed easily and rapidly as needed, even without having to completely use up a complete package quantity. Each box contains 100 membrane filters individually sealed on a special pleated band, and is designed so that it is easy to open and seal for storage. Microsart™ e.motion – reliable help in your lab.

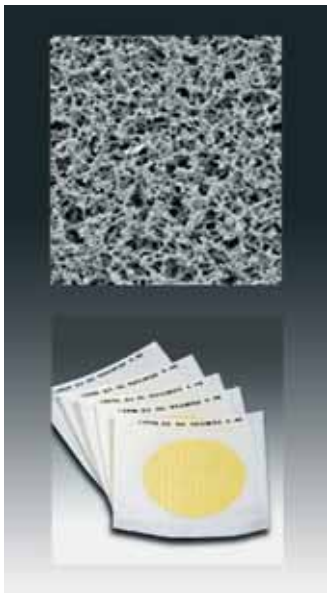
Some of the advantages you will benefit from when using the Microsart™ e.motion membrane filters:
- Outstanding recovery rates for microorganisms
- 0.45 µm are acc. to ISO 7704
- Multi-fit: Fits into various dispensers
- Protective paper-free
- Packaged on a special pleated band
- Product data are printed on
- High Flow membranes available
- Gamma irradiated, 25kGray

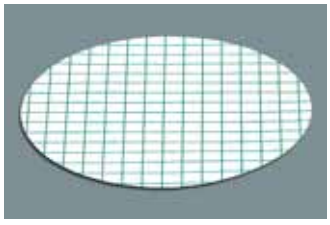
Specifications
Please refer to the membrane type: Cellulose nitrate (cellulose ester), gridded, individually, sterile packaged

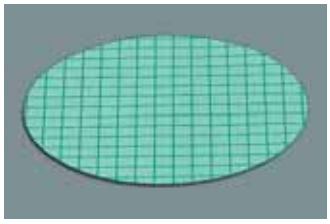
Order numbers for Microsart™ e.motion Membrane Filters
Diameter 47 mm or 50 mm, in pack of 3×100 membranes, individually, sterile packaged, without protective paper

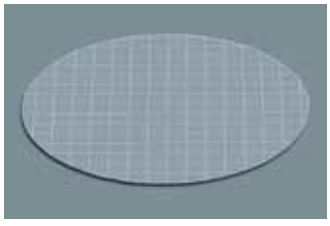
White | black	11407Z-47----SCM	0.2 µm
White | black	11407Z-50----SCM	0.2 µm
White | black	114H6Z-47----SCM	0.45 µm High Flow
White | black	114H6Z-50----SCM	0.45 µm High Flow
White | green	139H6Z-47----SCM	0.45 µm High Flow
White | black	11406Z-50----SCM	0.45 µm
White | black	11403Z-47----SCM	1.2 µm
White | black	11403Z-50----SCM	1.2 µm
White | black	11406Z-47----SCM	0.45 µm
White | green	13906Z-47----SCM	0.45 µm
White | green	13906Z-50----SCM	0.45 µm
Green | dark green	13806Z-47----SCM	0.45 µm
Green | dark green	13806Z-50----SCM	0.45 µm
Gray | white	13006Z-47----SCM	0.45 µm
Gray | white	13006Z-50----SCM	0.45 µm
Gray | white	13005Z-47----SCM	0.65 µm
Gray | white	13005Z-50----SCM	0.65 µm
Gray | white	13004Z-47----SCM	0.8 µm
Gray | white	13004Z-50----SCM	0.8 µm

Cellulose Nitrate (Cellulose Ester) Membrane Filters, Gridded, Individually, Sterile Packaged









Applications
Membrane filters for colony count, particle testing and microscopy

Some of the advantages you will benefit from when using this type of membrane filter:
- Outstanding recovery rates for microorganisms
- 0.45 µm are acc. to ISO 7704
- High Flow membranes available
- Three different colors available
- Certified quality
- Gamma irradiated, 25kGray

Specifications

Design	47 or 50 mm in diameter, white, grey or green and gridded
Growth Promotion Test acc. to ISO 7704	– No enhancement or inhibition by the grid lines – No enhancement or inhibition due to chemical extractables – No enhancement or inhibition by the sterilization process
Sterility test	Sterile
Thermal resistance	130°C max.
Thickness acc. to DIN 53105	115–145 µm
Chemical compatibility	Aqueous solutions (pH 4-8), hydrocarbons and several other organic solvents. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113 (page 119).

Typical performance rates for various pore sizes

Pore size		0.2 µm*	0.45 µm**	0.45 µm High Flow**	0.65 µm
Flow rate for water per cm^2 at 1 bar acc. to DIN 58355	in ml/min	20	70	100	130
Coliform retention	in %	100	100	100	n. a.
Recovery rate lot-released acc. to ISO 7704	in %	≥ 90	≥ 90	≥ 90	≥ 90

*) Pore size determined by quantitative retention of Brevundimonas diminuta in accordance with the ASTM Document F 838-83 (1993) Standard test method for determining bacterial retention of membrane filters utilized for liquid filtration.

**) Pore size determined by quantitative retention of Serratia marcescens in accordance with the Standard Methods of Water and Waste Water

White membrane with black grid, for detection of bacteria with dyed media, particle count & microscopy, type 114, individually, sterile packaged

Pore size	Order No.	Diameter	Pack size
0.2 µm	11407--47----ACN	47 mm	100
	11407--47----ACR	47 mm	1,000
	11407--50----ACN	50 mm	100
	11407--50----ACR	50 mm	1,000
0.45 µm	11406--47----ACN	47 mm	100
	11406--47----ACR	47 mm	1,000
	11406--50----ACN	50 mm	100
	11406--50----ACR	50 mm	1,000
0.45 µm High Flow*	114H6--47----ACN	47 mm	100
	114H6--47----ACR	47 mm	1,000
	114H6--50----ACN	50 mm	100
	114H6--50----ACR	50 mm	1,000
0.65 µm	11405--47----ACN	47 mm	100
	11405--50----ACN	50 mm	100
0.8 µm	11404--47----ACN	47 mm	100
	11404--47----ACR	47 mm	1,000
	11404--50----ACN	50 mm	100
1.2 µm	11403--47----ACN	47 mm	100
	11403--47----ACR	47 mm	1,000
	11403--50----ACN	50 mm	100
	11403--50----ACR	50 mm	1,000

White membrane with green grid, for detection of bacteria with dyed media, particle count and microscopy, type 139, individually, sterile packaged

0.45 µm	13906--47----ACN	47 mm	100
	13906--47----ACR	47 mm	1,000
	13906--50----ACN	50 mm	100
	13906--50----ACR	50 mm	1,000
0.45 µm High Flow*	139H6--47----ACN	47 mm	100
	139H6--47----ACR	47 mm	1,000
	139H6--50----ACN	50 mm	100
0.65 µm	13905--47----ACN	47 mm	100
1.2 µm	13903--47----ACN	47 mm	100

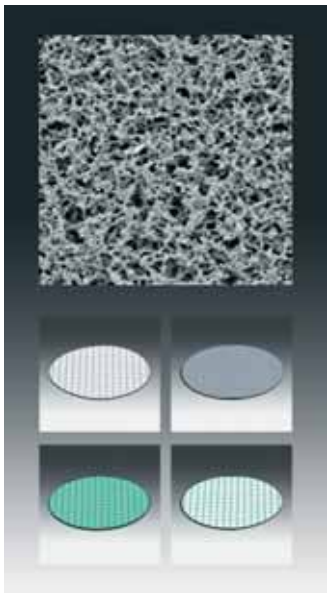
Green membrane with dark-green grid, providing optimal contrast to light-colored or transparent bacteria colonies, type 138, individually, sterile packaged

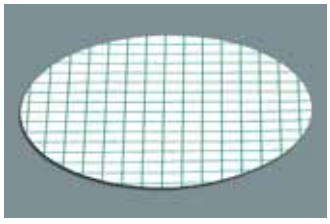
0.45 µm	13806--47----ACN	47 mm	100
	13806--47----ACR	47 mm	1,000
	13806--50----ACN	50 mm	100
	13806--50----ACR	50 mm	1,000

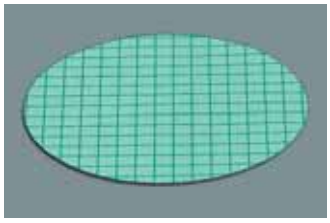
Gray membrane (after wetting, black) with white grid, for detection of yeasts and molds, particle count and microscopy, type 130, individually, sterile packaged

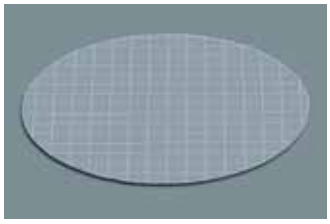
0.45 µm	13006--47----ACN	47 mm	100
	13006--47----ACR	47 mm	1,000
	13006--50----ACN	50 mm	100
	13006--50----ACR	50 mm	1,000
0.65 µm	13005--47----ACN	47 mm	100
	13005--50----ACN	50 mm	100
	13005--50----ACR	50 mm	1,000
0.8 µm	13004--47----ACN	47 mm	100
	13004--47----ACR	47 mm	1,000
	13004--50----ACN	50 mm	100

Cellulose Nitrate (Cellulose Ester) Membrane Filters, Gridded, Non-Sterile Packaged









Applications
Membrane filters for colony count, particle testing and microscopy

Some of the advantages you will benefit from when using this type of membrane filter:
- Outstanding recovery rates for microorganisms
- 0.45 µm are acc. to ISO 7704
- Three different colors available

Specifications

Design	25, 47 or 50 mm in diameter, white, grey or green and gridded
Growth Promotion Test acc. to ISO 7704	– No enhancement or inhibition by the grid lines – No enhancement or inhibition due to chemical extractables
Thermal resistance	130°C max.
Thickness acc. to DIN 53105	115–145 µm
Chemical compatibility	Aqueous solutions (pH 4-8), hydrocarbons and several other organic solvents. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113 (page 119).

Typical performance rates for various pore sizes

Pore size		0.2 µm*	0.45 µm**	0.65 µm
Flow rate for water per cm^2 at 1 bar acc. to DIN 58355	in ml/min	20	70	130
Coliform retention	in %	100	100	n. a.
Recovery rate lot-released acc. to ISO 7704	in %	≥ 90	≥ 90	≥ 90

*) Pore size determined by quantitative retention of Brevundimonas diminuta in accordance with the ASTM Document F 838-83 (1993) Standard test method for determining bacterial retention of membrane filters utilized for liquid filtration.

**) Pore size determined by quantitative retention of Serratia marcescens in accordance with the Standard Methods of Water and Waste Water

White membrane with black grid, for detection of bacteria with dyed media, particle count & microscopy, type 114, non-sterile

Pore size	Order No.	Diameter	Pack size
0.2 µm	11407--25------N	25 mm	100
	11407--47------N	47 mm	100
	11407--47------R	47 mm	1,000
	11407--50------N	50 mm	100
0.45 µm	11406--25------N	25 mm	100
	11406--47------N	47 mm	100
	11406--47------R	47 mm	1,000
	11406--50------N	50 mm	100
	11406--50------R	50 mm	1,000
0.65 µm	11405--47------N	47 mm	100
0.8 µm	11404--25------N	25 mm	100
	11404--47------N	47 mm	100
	11404--50------N	50 mm	100
1.2 µm	11403--25------N	25 mm	100
	11403--47------N	47 mm	100
	11403--50------N	50 mm	100

White membrane with green grid, for detection of bacteria with dyed media, particle count and microscopy, type 139, non-sterile

0.45 µm	13906--47------N	47 mm	100
	13906--47------R	47 mm	1,000
	13906--50------N	50 mm	100
	13906--50------R	50 mm	1,000

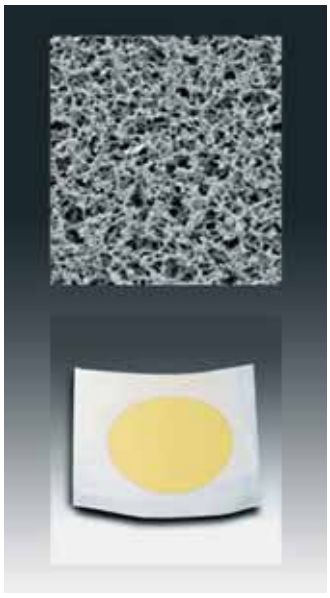
Green membrane with dark-green grid, providing optimal contrast to light-colored or transparent bacteria colonies, type 138, non-sterile

0.45 µm	13806--47------N	47 mm	100
	13806--47------R	47 mm	1,000
	13806--50------N	50 mm	100
	13806--50------R	50 mm	1,000

Gray membrane (after wetting, black) with white grid, for detection of yeasts and molds, particle count and microscopy, type 130, non-sterile

0.45 µm	13006--25------N	25 mm	100
	13006--47------N	47 mm	100
	13006--47------R	47 mm	1,000
	13006--50------N	50 mm	100
0.65 µm	13005--47------N	47 mm	100
	13005--50------N	50 mm	100
0.8 µm	13004--47------N	47 mm	100
	13004--50------N	50 mm	100

Cellulose Nitrate (Cellulose Ester) and Cellulose Acetate Membrane Filters, White, Individually, Sterile Packaged



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

Materials
The membranes are made of even cellulose nitrate (cellulose ester), a material which assures effective retention with high flow rates and optimum colony growth or cellulose acetate, a material which combines high flow rates and thermal stability with very low adsorption characteristics.

Additional applications
11301, a white CN membrane filter with a pore size of 8 µm is used as a prefilter in a special prefilter attachment (16807) for bacteriological analyses. It retains the coarse suspended particles, whereas it allows microorganisms to pass through. These microbes are trapped on the surface of the underlying bacteria-retentive membrane filter (e. g. 0.45 µm).

11107, a white CA membrane filter with a pore size of 0.2 µm is the filter of choice for sterile filtration, such as nutrient media, buffer and sera. This membrane is validated by the Bacteria Challenge Test.

Applications
Membrane filters for colony count, sterility testing, particle testing and microscopy

Some of the advantages you will benefit from when using this type of membrane filter:
- Outstanding recovery rates for microorganisms
- Defined particle retention
- 0.45 µm are acc. to ISO 7704
- 0.2 µm are validated by BCT
- Certified quality
- Gamma-irradiated, 25kGray

Specifications

Design	47 or 50 mm in diameter, white
Growth Promotion Test acc. to ISO 7704	– No enhancement or inhibition by the sterilization process – No enhancement or inhibition due to chemical extractables
Sterility test	Sterile
Thermal resistance	CN: 130°C max. | CA: 180°C max.
Thickness acc. to DIN 53105	CN: 115 – 145 µm | CA: 120 µm (average value)
Chemical compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113 and Cellulose Acetate type 111 (page 119).

Cellulose nitrate membrane filters, white, for colony count, sterility testing, particle count & microscopy, type 113, individually, sterile packaged

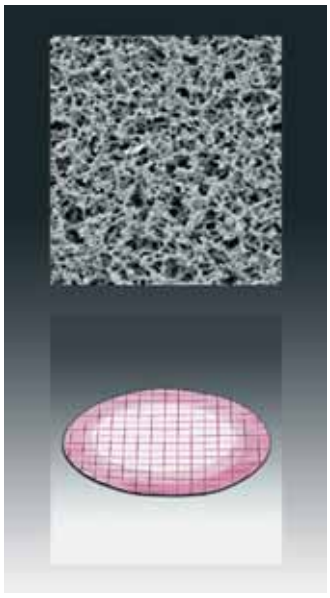
Pore size	Order No.	Diameter	Pack size
0.45 µm	11306--47----ACN	47 mm	100
	11306--50----ACN	50 mm	100
0.65 µm	11305--47----ACN	47 mm	100
	11305--50----ACN	50 mm	100
0.8 µm	11304--47----ACN	47 mm	100
	11304--50----ACN	50 mm	100
1.2 µm	11303--47----ACN	47 mm	100
	11303--50----ACN	50 mm	100
3 µm	11302--47----ACN	47 mm	100
	11302--50----ACN	50 mm	100
8 µm	11301--47----ACN	47 mm	100
	11301--50----ACN	50 mm	100

Cellulose acetate membrane filters, white, for colony count, sterility testing, particle count & microscopy*, type 111, individually, sterile packaged

0.2 µm	11107--47----ACN	47 mm	100
	11107--50----ACN	50 mm	100
0.45 µm	11106--47----ACN	47 mm	100
	11106--50----ACN	50 mm	100

* If cellulose nitrate is not compatible

Hydrophobic Edged Cellulose Nitrate (Cellulose Ester) and Cellulose Acetate Membrane Filters, Individually, Sterile Packaged & Non-Sterile



Hydrophobic edge membranes are used mainly for colony count and sterility testing of solutions containing substances with antibiotic characteristics. The hydrophobic edge avoids the penetration of any growth-inhibitory substance into the membrane clamp zone wherefrom it could not be rinsed out and the substance could inhibit microbial growth during incubation.

Materials
The membranes are made of even cellulose nitrate (cellulose ester), a material which assures effective retention with high flow rates and optimum colony growth or cellulose acetate, a material which combines high flow rates and thermal stability with very low adsorption characteristics.

Applications
Membrane filters for colony count and sterility testing

Some of the advantages you will benefit from when using this type of membrane filter:
- Outstanding retention rates for microorganisms
- 0.45 µm are acc. to ISO 7704
- 0.2 µm are validated by BCT
- Certified quality

Specifications

Design	25, 47 or 50 mm in diameter, white or white with black grid
Growth Promotion Test acc. to ISO 7704	– No enhancement or inhibition by the grid lines – No enhancement or inhibition due to chemical extractables – No enhancement or inhibition by the sterilization process
Sterility test	Sterile
Thermal resistance	CN: 130°C max. | CA: 180°C max.
Thickness acc. to DIN 53105	CN: 115–145 µm | CA: 120 µm (average value)
Chemical compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113 and Cellulose Acetate type 111 (page 119).

Cellulose nitrate membrane filters, white with black grid, 3 mm hydrophobic edge, for colony count & sterility testing, type 131, individually, sterile packaged

Pore size	Order No.	Diameter	Pack size
0.2 µm	13107--47----ACN	47 mm	100
	13107--50----ACN	50 mm	100
0.45 µm	13106--47----ACN	47 mm	100
	13106--50----ACN	50 mm	100

Cellulose nitrate membrane filters, white with black grid, 6 mm hydrophobic edge, for colony count & sterility testing, type 131, individually, sterile packaged

0.45 µm	13106--47----HEN	47 mm	100

Cellulose nitrate membrane filters, white with black grid, 3 mm hydrophobic edge, for colony count & sterility testing, type 131, non-sterile

0.2 µm	13107--25------N	25 mm	100
	13107--47------N	47 mm	100
	13107--50------N	50 mm	100
0.45 µm	13106--25------N	25 mm	100
	13106--47------N	47 mm	100
	13106--50------N	50 mm	100
8 µm	13101--47------N	47 mm	100
	13101--50------N	50 mm	100

Cellulose nitrate membrane filters, white, 3 mm hydrophobic edge, for colony count & sterility testing, type 131, non-sterile

8 µm	13101--50----AHN	50 mm	100

Cellulose nitrate membrane filters, white with black grid, 6 mm hydrophobic edge, for colony count & sterility testing, type 131, non-sterile

0.2 µm	13107--47----HCN	47 mm	100
0.45 µm	13106--47----HCN	47 mm	100

Cellulose acetate membrane filters, white with black grid, 3 mm hydrophobic edge, for colony count & sterility testing*, type 135, individually, sterile packaged

0.2 µm	13507--47----ACN	47 mm	100
0.45 µm	13506--47----ACN	47 mm	100
	13506--50----ACN	50 mm	100

Cellulose acetate membrane filters, white with black grid, 3 mm hydrophobic edge, for colony count & sterility testing*, type 135, sterile, packaged of 10 discs per sleeve

0.45 µm	13506--47----ALS	47 mm	100

Cellulose acetate membrane filters, white with black grid, 3 mm hydrophobic edge, for colony count & sterility testing*, type 135, non-sterile

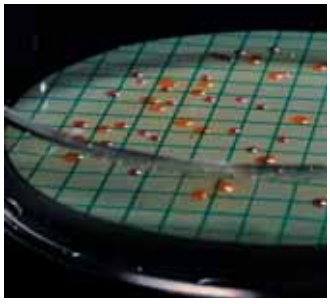
0.2 µm	13507--47------N	47 mm	100
0.45 µm	13506--47------N	47 mm	100

Cellulose acetate membrane filters, white with black grid, 6 mm hydrophobic edge, for colony count & sterility testing*, type 135, non-sterile

0.45 µm	13506--47----HCN	47 mm	100

* If cellulose nitrate is not compatible

Nutrient Pad Sets – Dehydrated Media Pads in Petri Dishes, with Matching Membrane Filters for Economical, Time-saving Microbiological Quality Control



Sartorius Nutrient Pad Sets have been used successfully in the membrane filter method for 20 years. Practical and easy to handle, they reduce labor and simplify many microbiological testing procedures.

Nutrient pads are sterile, dehydrated culture media. Once they are moistened with 3.0–3.5 ml of sterile and demineralized (or distilled) water they are ready to use immediately.

Ready-to-use up to 24 months
The standard NPS box contains 100 sterile nutrient pads, each of which is individually inserted in a petri dish and sterilized. Ten each of these petri dishes are sealed in an aluminum bag. This special packaging in bags protects the sensitive formula constituents of the nutrient pads during transport and storage from fluctuations in humidity and temperature. As a result, it guarantees the high quality of our NPS throughout their entire shelf life ranging from 18 to 24 months. This makes the Sartorius Nutrient Pads Sets unique: No other ready-to-use nutrient media around the globe assures consistent high quality and reproducible results up to 24 months.

Compliance with International Standards
Currently, Sartorius offers more than 30 different Nutrient Pad Set types to meet the diverse objectives of microbiological analysis. Aside from the European drinking water directive, they comply with other international regulations and recommendations: international pharmacopoeias, DIN and ISO standards, the American Standards for Water and Foods, mineral water regulations, brewery guidelines, such as MEBAC or EBC, and recommendations of the food industry, such as LMBG, NCA and ICUMSA, etc.

By-packed membranes
All Nutrient Pad Set types are supplied with the appropriate membrane filters, which are also presterilized and individually packaged. The membrane filters tailored to meet the special requirements of microbial detection are available with 47 mm or 50 mm diameters.

Benefits for the user

Economy
No time-consuming and labor-intensive preparation of the nutrient media (sterilization, cleaning, etc.).

Easy handling
Nutrient Pad Sets can also be used in laboratories without comprehensive microbiological equipment.

Consistent quality
During the production, each nutrient pad set batch is compared with the corresponding 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 warehouse, between 18 and 24 months depending on the type.

Order numbers for nutrient pad sets in petri dishes

Nutrient Pad Sets for total colony count, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

Determination of	NPS type*	Order No.**
Total count	Caso (1)	14063--47------N
Total count	R2A (1)	14084--47------N
Total count	Standard TTC (1)	14055--47------N
Total count	Standard TTC I mod. (1)***	14085--47------N
Total count	Standard (1)	14064--47------N
Total count	TGE (1) | Tryptone Celucose extract	14076--47------N
Total count	Yeast extract (1)	14090--47------N

Nutrient Pad Sets for E. coli, coliforms and enterobacteria, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

E. E. coli and coliforms	Chromocult (7)	14087--47------N
E. coli	ECD (2)	14082--47------N
E. coli and coliforms	Endo (2)	14053--47------N
Enterobacteria, E. coli	MacConkey (2)	14097--47------N
E. coli and coliforms	m FC (2)	14068--47------N
E. coli and coliforms	Teepol | Lauryl Sulphate (2)	14067--47------N
E. coli and coliforms	Tergitol TTC (2)	14056--47------N

Nutrient Pad Sets for other faecal bacteria, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

Enterococci	Azide (1) | KF Strep	14051--47------N
Salmonellae	Bismuth Sulfite (1)	14057--47------N

Nutrient Pad Sets for non-faecal, pathogenic bacteria, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

Pseudomonas aeruginosa	Cetrimide (2)	14075--47------N
Staphylococci, Staph. aureus	Chapman (2)	14074--47------N

Nutrient Pad Sets for yeasts and molds, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

Determination of	NPS type*	Order No.**
Wild yeasts	Lysine (3)	14061--47------N
Yeasts and molds	Malt extract (8)***	14086--47----CCN
Yeasts and molds	Malt extract (6)***	14086--47------N
Yeasts and molds	Sabouraud (3)	14069--47------N
Yeasts and molds	Schaufus Pottinger | m green yeast and mold (4)	14070--47------N
Yeasts and molds	Schaufus Pottinger | m green yeast and mold (5)	14072--47------N
Yeasts and molds	Schaufus Pottinger | m green yeast and mold (6)	14080--47------N
Yeasts and molds	Schaufus Pottinger | m green yeast and mold (3)	14083--47------N
Yeasts and molds and bacteria	Wallerstein | WL nutrient (2)	14089--47------N
Yeasts and molds	Wort (3)	14058--47------N

Nutrient Pad Sets for product-spoiling microorganisms, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

Thermophilic spore formers and mesophilic bacteria	Glucose tryptone (2)	14066--47------N
Leuconostoc oenos and other wine-spoiling organ.	Jus de tomate | tomato juice (1)	14079--47------N
Acid-tolerant microorganisms	Orange Serum | pH 5.5 (1)	14062--47------N
Acid-tolerant microorganisms	Orange Serum | pH 3.2 (1)	14096--47------N
Lactobacilli and Pediococci and other beer-spoiling microorganisms	VLB-S7-S (2)	14059--47------N
Mesophilic slime-forming bacteria esp. Leu. mesenteroides	Weman (1)	14065--47------N

Nutrient Pad Sets starter kit, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm membrane filters

E. coli and coliforms, total count, yeasts and molds	Mixed types: endo, standard, wort (1, 2, 3)***	14095--47------N

Order numbers for nutrient pad sets in PE bags

Nutrient Pads and 47 mm membrane filters, sterile packaged in polyethylene bags, 50 per box

Determination of	NPS type*	Order No.**
E. coli and coliforms	Endo (2)	14003--47------K
Total count	Standard TTC (1)	14005--47------K
E. coli and coliforms	Tergitol TTC (2)	14006--47------K
Yeasts and molds	Wort (3)****	14008--50------K

Sterile water in ampoules, for moistening NPS, 3.5 ml each, 100 per box	
100 ampoules with sterile water	1ZZ—K0001

Special brochure available on request f.o.c. Order no. SM-4017-e.

* The membrane filters are selected for optimum growth, together 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) = Gray (after wetting black) with white grid, 0.65 µm pore size
(4) = White with green grid, 0.65 µm pore size
(5) = White with green grid, 1.2 µm pore size
(6) = Gray (after wetting black) with white grid, 0.8 µm pore size
(7) = White with black grid, 0.45 µm pore size
(8) = Gray (after wetting black) with white 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 --47------N replaced by --50------N.

*** This NPS type is only available with 47 mm membranes.

**** This NPS type is only available with 50 mm membranes.

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 obtain this poster free of charge. Order no. SM-0001-e.

Culture Media in Bottles and Tubes Absorbent Pads and Petri Dishes

Agar Media
The traditional culture media for microorganisms is agar media. This can be used for the membrane filtration method or for direct incubation. There are two different forms available: Agar media in tubes are for pouring agar plates. The content of one tube is sufficient for two 90 mm or three 60 mm petri dishes. Agar media in bottles are the cost-effective alternative for casting plates.

Liquid broth media
Liquid culture media broth for direct incubation or for wetting an absorbent pad before a membrane filter is placed on it. They are available in tubes and in bottles.

Absorbent pads
Sartorius 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 magazines, which fit onto the Sartorius manual dispensing device. The absorbent pads are available in two diameters:
– 47 mm with approx. 3 ml absorption capacity and
– 50 mm with approx. 3.5 ml absorption capacity.

Agar Media in 250 ml bottles, 4 bottles per box

Determination of	Agar type	Order No.
Total count	Nutrient	14144----------A
E. coli and coliforms	Endo	14156----------A
Yeasts and molds	Sabouraud	14166----------A
Yeasts and molds	Wort	14157----------A
Wild yeasts	Lysine	14143----------A
Lactobacilli and Pediococci and other beer-spoiling organisms	VLB-S7-S	14148----------A

Agar Media in 20 ml tubes, 50 tubes per box

Determination of	Agar type	Order No.
Total count	Nutrient	14137----------K
Total count	Standard	14131----------K
E. coli and coliforms	Endo	14158----------K
Yeasts and molds	Malt extract	14135----------K
Yeasts and molds	Wort	14138----------K
Acid-tolerant microorganisms	Orange serum	14130----------K
Leuconostoc oenos and other wine-spoiling organ.	Jus de tomate (tomato juice)	14140----------K

Broth media in 250 ml bottles, 50 bottles per box

Determination of	Broth type	Order No.
Total count	Caso (0.45 µm)	14162----------K

Lactose broth media, bottled concentrate, for drinking water analysis

Concentration factor	Packaging	Order No.
Two times concentrated	4 bottles à 100 ml	14155----------A
Three times concentrated	1 bottles à 1,000 ml	14160

Broth media in 20 ml tubes, 50 tubes per box

Determination of	Broth type	Order No.
Total count	Nutrient	14132----------K
Lactobacilli and Pediococci and other beer-spoiling organisms	VLB-S7-S	14127----------K

Absorbent Pads, 47 mm, sterile packaged in 10 magazines, each with 100 pads

Description	Packaging	Order No.
Absorbent Pads, 10 × 100 pads	1,000 per box, incl. one dispenser	15410--47----ALR
Absorbent Pad Set, 10 × 100 pads plus 1,000 membrane filters (0.45 µm, white | green)	1,000 per box, incl. two dispensers	13906--47----APR

Absorbent Pads, 50 mm, sterile-packaged in 10 magazines, each with 100 pads

Description	Packaging	Order No.
Absorbent Pads, 10 × 100 pads	1,000 per box, incl. one dispenser	15410--50----ALR

Absorbent Pads, 50 mm, sterile-packaged in petri dishes

Description	Packaging	Order No.
Absorbent Pad Set, 100 pads in petri dishes, sterile packaged	100 per box	15400--50------N
Absorbent Pad Set, 100 pads in petri dishes plus 100 membrane filters (0.45 µm, green | dark green)	100 per box	15400--50----FRN

Disposable petri dishes, auto-sterile, 100 per box

Diameter	Order No.
60 mm	14311--60------N
90 mm	14311--90------N

Biosart® 100 Monitors

The membrane filtration method is the suitable technique for microbiological analysis of pharmaceuticals, water, cosmetics, foods and beverages. The use of ready-to-use disposable units is optimal for these applications.

Biosart® 100 Monitors
Biosart® 100 Monitors have been specifically designed for the detection and enumeration of microorganisms in pharmaceuticals, cosmetics, food, beverages, water and other liquids. These sterile disposables with an incorporated membrane filter and cellulose pad are ready to use. After filtration, just remove the 100 ml funnel to convert the Monitor into a petri dish eliminating the need for membrane manipulation. Culture media for wetting the pad are available in individually sterilized, convenient plastic ampoules. Biosart® 100 Monitors are ready-to-use filter units designed to be placed onto the bases of a vacuum manifold, eliminating the cleaning and sterilization required of reusable funnels.

Compliance with International Standards
The membrane filter method is worldwide accepted and the preferred method of choice for the analysis of microbial contamination in liquid samples. Biosart® 100 Monitors and Media are in compliance with the membrane filtration procedures referenced in the:
- European drinking water directive (Council Directive 98/83/EC on the quality of water)
- Standard Methods for the Examination of Water and Waste Water, 20th edition
- U.S. Environmental Protection Agency, 600/8-78-017.
- ISO Standard's microbiological methods, such as ISO 7704, ISO 9308-1, ISO 12780, ISO 8199
- WHO Guidelines for Drinking Water Quality, 1997
- International Pharmacopoeia, such as the current editions of the USP and EP

High Flow membranes
Biosart® 100 Monitors are also available with the new 0.45 µm High Flow membranes. The special pore structure allows shorter filtration times due to 30% higher flow rates.

Applications
Colony count, particle testing and microscopy

Some of the advantages you will benefit from when using Biosart® 100 Monitors:

Superior performance
- High flow rate
- High total throughput

Safe & reliable
- Sterile or individually, sterile packaged
- Consistent recovery
- Membranes meet ISO 7704
- Membranes available in various colors
- Without any hydrophobic adhesive areas

Economical
- Ready to connect and easy to use
- Minimal amount of equipment needed

Specifications

Housing	Polystyrene
Membrane filter	Cellulose nitrate (cellulose ester): choice of white, green or grey, with grid; Regenerated cellulose: white; can be used as documentation
Plug and adapter	Polyethylene
Pad	Cellulose
Capacity	100 ml, 10 ml graduations
Pore size	0.2 µm, 0.45 µm or 0.8 µm
Filter diameter	47 mm
Filtration area	14.5 cm^2
Max. operating pressure	Vacuum only
Outlet	6.5 × 1.5 mm
Lot certificates	Recovery rate, sterility and specifications

Biosart® 100 Monitors, 100 ml, 47 mm, individually packaged, sterile, 48 units

Pore size	Membrane filter* color | grid color	Order No.
0.2 µm	CN white | black	16401-47-07--ACK
0.45 µm	CN white | black	16401-47-06--ACK
0.45 µm	CN green | dark green	16402-47-06--ACK
0.45 µm	CN gray | white**	16403-47-06--ACK

Biosart® 100 Monitors, 100 ml, 47 mm, packaged in trays, sterile, 48 units

0.45 µm High Flow	CN white | black	16401-47-H6----K
0.45 µm	CN white | black	16401-47-06----K
0.45 µm	CN green | dark green	16402-47-06----K
0.45 µm	CN gray | white**	16403-47-06----K
0.8 µm	CN gray | white**	16403-47-04----K
0.45 µm	RC white	16404-47-06----K

Biosart® 100 Monitors, 100 ml, 47 mm, sterile, 48 units

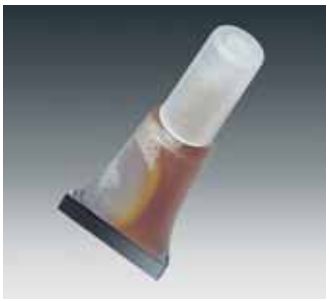
0.45 µm High Flow	CN white | black	16401-47-H6-V--K
0.45 µm	CN white | black	16401-47-06-V--K
0.45 µm	CN gray | white**	16403-47-06-V--K

* CN = Cellulose Nitrate (Cellulose ester)
RC = Regenerate Cellulose
** Gray membranes after wetting black

Biosart® 100 Monitor Adapters and Membrane Lifter

Description	Adaptation	Order No.
Biosart® 100 Adapter, silicone	Biosart® 100 Monitor onto Sartorius stainless steel frits e. g. 16840 (Combisart® base support) or onto 16841 (individual base)	16414
Biosart® 100 Adapter, polypropylene	Biosart® 100 Monitor onto 50 mm supports	16415
Biosart® 100 Adapter, polypropylene	Biosart® 100 Monitor onto 56 mm supports and vacuum pumps	16416
Biosart® 100 Membrane Lifter, ABS	for easy transfer of the membrane onto agar	16417

Biosart® 100 Nutrient Media



Application
Colony count

Some of the advantages you will benefit from when using Biosart® 100 Media:

Superior performance
– High flow rate
– High total throughput

Safe & reliable
– Presterilized media
– Certificate of Quality for every batch
– In compliance with international standards
– Consistent recovery

Economical
– Ready-to-use
– Long shelf life

Biosart® 100 Nutrient Media, 2.5 ml, individually, sterile-packaged in ampoules, 50 units

Determination of	Media type	Order No.*
Total count	Caso (acc. USP)	16400-02----CA-K
Total count	R2A (acc. EP)	16400-02----RA-K
Total count	TGE | Total Count	16400-02----TC-K
Total count	Total Count TTC	16400-02----TZ-K
E. coli and coliforms	m Endo	16400-02----EN-K
E. coli and coliforms	m FC	16400-02----MF-K
E. coli and coliforms	Lauryl Sulfate | Teepol	16400-02----LS-K
E. coli and coliforms	Tergitol TTC	16400-02----TT-K
Enterococci	KF Strep | Azide	16400-02----KF-K
Pseudomonas aeruginosa	Cetrimide	16400-02----CE-K
Yeasts and molds	Sabouraud (acc. USP)	16400-02----SB-K
Yeasts and molds	m Green yeast and mold | Schaufus Pottinger	16400-02----MG-K
Yeasts and molds	m Green yeast and mold selective	16400-02----GS-K
Yeasts and molds and bacteria	WL Nutrient | Wallerstein Nutrient	16400-02----WN-K
Bacteria in fermentation processes	WL Differential | Wallerstein Differential	16400-02----WL-K
Acid-tolerant microorganisms	Orange Serum	16400-02----OS-K

Biosart® 250 Funnels

In microbiological quality control, sterility of the equipment used for processing samples is a necessary basic requirement. The re-useable funnels made of stainless steel or other materials which are used for membrane filtration are usually sanitized between samples by flaming or with hot water. Both of these methods can be insufficiently reliable when not properly performed. Alternatively, the funnels could be sterilized by autoclaving, but this is too laborious for routine use. A disposable sterile funnel in a certified quality is the ideal solution.

Description
The Biosart® 250 Funnel has been specifically designed for microbiological and analytical quality assurance. Biosart® 250 are sterile funnels which allows for fast filtration required in the routine testing of pharmaceutical and cosmetic products, water, food and beverages and other liquids. A Sartorius gridded membrane is placed on a stainless steel filter support. A Biosart® 250 Funnel is simply fitted on and the sample is filtered. The funnel is made of polypropylene and is sufficiently elastic for optimal sealing with a bayonet-type closure. Graduations are marked at 50, 100, 150, 200 and 250 ml for exact sample volumes. The large inner diameter ensures a high flow rate. The conical form allows a thorough rinsing of the system subsequent to filtration. No liquid is retained in the filter funnel.

Applications
Colony count, particle testing and microscopy

Some of the advantages you will benefit from when using Biosart® 250 Funnels:

Superior performance
- High flow rate
- High total throughput

Safe & reliable
- Sterile or individually, sterile packaged
- No risk of cross contaminations
- No leakages due to proven closure technique
- No holding of hot funnels
- Visibility of the complete filtration

Economical
- Ready to connect and easy to use
- Minimal amount of equipment needed
- Autoclavable (to a limited extend)

Specifications

Material	Polypropylene
Capacity	250 ml, 50 ml graduations
Filter diameter	47 mm (or 50 mm), prefilter 40 mm
Filtration area	12.5 cm^2
Max. operating pressure	Vacuum only
Sterilization	Ethylene oxide
Lot certificates	Sterility and performance tests

Biosart® 250 Funnels, ready to use filter funnels, 250 ml, 50 units

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

Further information available on request f.o.c. Order no. SL-3017-e

Combisart® – The Sterile Vented Filter Station
Individual and Multi-Branch Systems

The Sartorius Combisart®, system enables you to select the optimal hardware and consumables for your needs in microbiological analysis or particle count in quality assurance. Combisart® features a modular design and field-proven standard accessories to make your choice easier.

Description
At the heart of the Combisart® system is a high-grade stainless steel manifold or individual system designed to accommodate all types of filter holders and funnels such as:
- Ready-to-use units like Biosart® 100 Monitors and Biosart® 250 Funnels
- Flammable units such as stainless steel funnels for colony counting
- Autoclavable reusable funnels made of glass or polycarbonate

The low height of the manifold ports is particularly advantageous for working on a clean bench. For low number of samples, we recommend the use of the 1-branch manifold 16844 or the individual base 16841 on the top of a suction flask. For large number of samples, we recommend the 3- or 6-branch manifolds.

Sterile venting
A special feature of the Combisart® system is the stainless steel three-way valve (tap). They allows the vacuum for each filter holder to be individually controlled and each filter station to be sterilely vented. This rules out secondary contamination of the underside of the filter.

Sterilization
The system is compliant with ISO 8199 with regards to the sterilization methods of the equipment described in the "General Guide to enumeration of micro-organisms by culture". Since the most reliable sterilization method is autoclaving, the Combisart® design offers a unique advantage for this method. After inserting the membrane filters in the filter holders, you can simply unscrew them as an entire unit from each workstation and autoclaved them. This method increases reliability and saves sterilization capacity.

The right equipment for your application
In connection with the single base 16840 the manifolds are flexible to adapt disposable Biosart 250 or stainless steel funnels. The stainless steel filter support of the single base 16840 allows a homogenous distribution of the residues on the membrane filter surface.

The Biosart® 100 adapter 16414 ensures that the Monitors are positioned perfectly, minimizing the risk of contamination during filtration.

3 or 6 polycarbonate holders of the type 16511 can be screwed onto the manifold directly.

Glass units (16306 or 16307) can be fitted by using corresponding adapter-|stopper-combinations.

Maximum flexibility
The screwable base support 16840 features additional advantages you will benefit from:
- You can pour out a non-filterable sample from each unit
- Filtration equally easy for left- or right handed users in your laboratory, because funnels can be positioned to suit the individual user

Some of the advantages you will benefit from when using the Combisart® System:

Safe & reliable
- Sterile venting of each membraneafter filtration
- Sterilization acc. to ISO 8199
- Special polished stainless steel surfaces allow easy cleaning & rinsing
- Low height is advantageous for working on a clean bench

Saves time
- Filtration of 3 or 6 samples in parallel
- Easy pouring out of non-filterable samples
- Equally easy for right- and left-handed users

Economical
- Maximum flexibility due to different set-ups
- Space-saving in the autoclave
- Stainless steel 304 – long lifecycle

Combisart® hardware-setups
Filtration systems fast and easy completed at www.sartorius.com/microbio

Specifications

Stainless steel quality	High-grade stainless steel: B.S. 304S31 | AISI 304
Dimensions in mm (L | H | D)	3-branch manifold: 435 | 103 | 120 6-branch manifold: 910 | 103 | 120
Max. operating pressure	Vacuum only
Sterilization	By autoclaving (max. 134°C), By dry heat (max. 180°C), By flaming, By other methods acc. to ISO 8199
Parts and materials	Lid, funnel, base part, filter support, clamp and tap made of stainless steel. Silicone flat gasket. Silicone lid seal
Flow rate per filter station for water at 90% vacuum	200 ml/min with 0.2 µm membrane filter 600 ml/min with 0.45 µm membrane filter
Filtration area	12.5 cm^2 (if using stainless steel funnels)
Suitable membrane filter diameter	50 mm (47 mm, if using a 47 mm frit 6980103)
Outlet spouts (individual system)	10 mm outside diameter
Inlets (branches only)	Female threads, TR 20 × 2
Outlet (branches only)	Hose nipple, DN 10

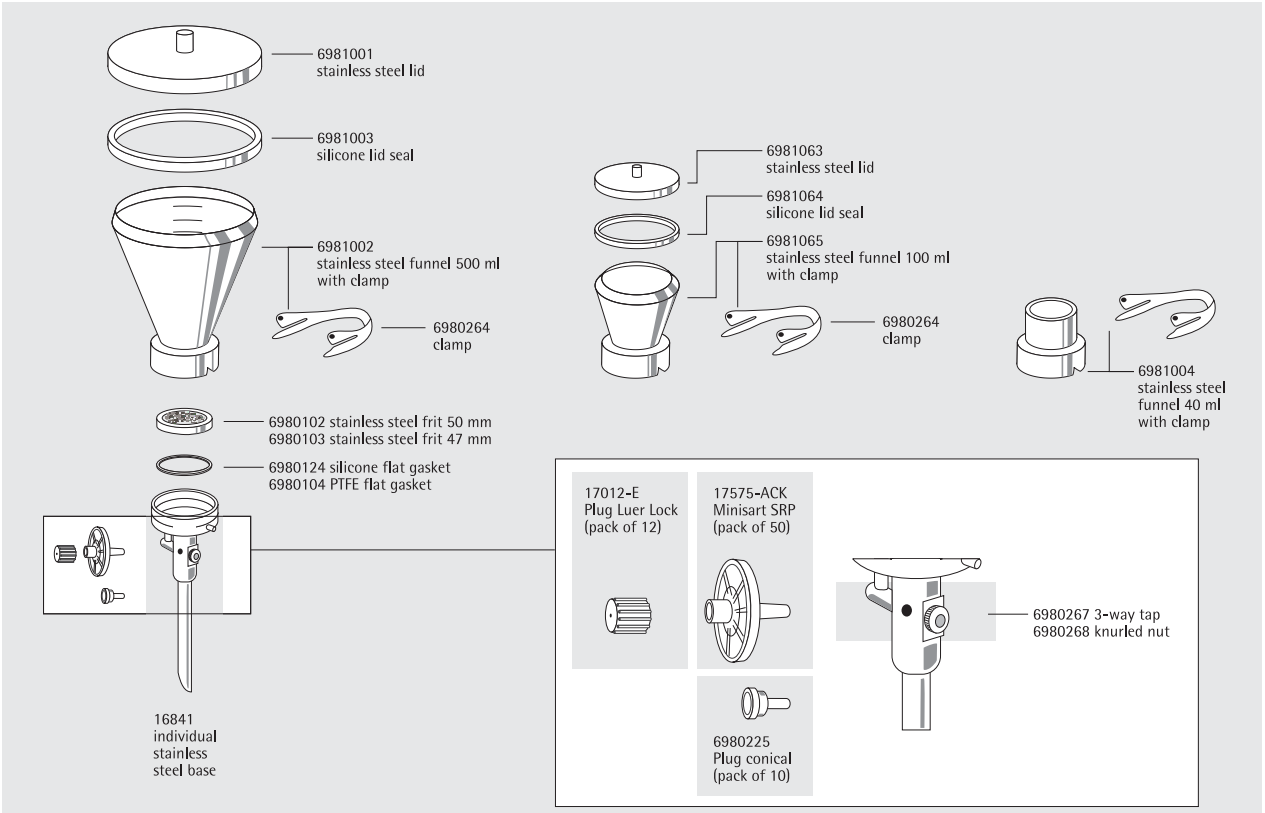
Combisart® individual system and multi-branch manifolds, made of high-grade stainless steel, pre-assembled with stainless steel funnels and lids

Description	Capacity	Order No.
Combisart® individual filter holder, stainless steel, 100 ml	1 × 100 ml	16219-CS
Combisart® individual filter holder, stainless steel, 500 ml	1 × 500 ml	16201-CS
Combisart® 3-branch stainless steel manifold 100 ml	3 × 100 ml	16824-CS
Combisart® 3-branch stainless steel manifold 500 ml	3 × 500 ml	16828-CS
Combisart® 6-branch stainless steel manifold 100 ml	6 × 100 ml	16832-CS
Combisart® 6-branch stainless steel manifold 500 ml	6 × 500 ml	16831-CS

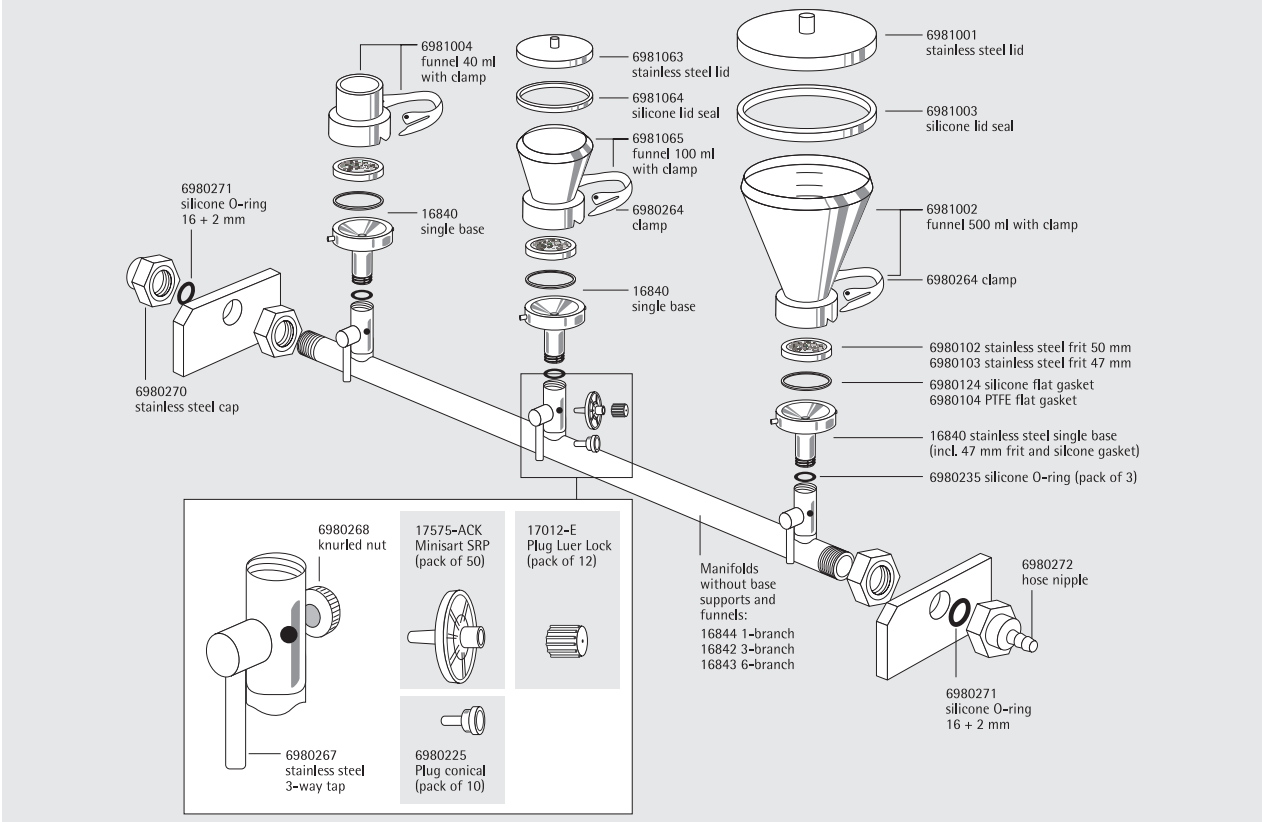
Combisart® individual and multi-branch bases, made of high-grade stainless steel, without funnels and lids, to accommodate various funnel types

Description	Order No.
Combisart® individual base, stainless steel, with frit, to accommodate stainless steel funnels and Biosart® 100 | 250	16841
Combisart® 1-branch stainless steel manifold, without frit	16844
Combisart® 3-branch stainless steel manifold, without frits	16842
Combisart® 6-branch stainless steel manifold, without frits	16843
Combisart® base support with frit, stainless steel, accommodate stainless steel funnels and Biosart® 100 | 250	16840

Replacement parts for Combisart® individual filter holders



Replacement parts for Combisart® manifolds



Accessories and replacement parts for the Combisart® System

Description	Quantity	Order No.
Minisart SRP25, sterile filter for venting, 0.2 µm, individually sterile-packaged, could be autoclaved 5 times.	50	17575--------ACK
Plug luer lock, to close the Minisart inlet, if sterile venting is not required	12	17012----------E
Plug, conical, to close the venting hole beside the 3-way-valve, if sterile venting is not required	10	6980225
Silicone O-ring for base support 16840 male thread	3	6980274
Silicone O-ring for manifold female threads	3	6980235
Silicone flat gasket underneath the frit	1	6980124
PTFE flat gasket underneath the frit	1	6980104
Stainless steel frit, 50 mm diameter	1	6980102
Stainless steel frit, 47 mm diameter	1	6980103

Funnels, lids, seals and filter holders to connect on the Combisart® system

Description	Capacity	Membrane filter diameter	Order No.
Stainless steel funnel with closure clamp	100 ml	47 | 50 mm	6981065
Lid, stainless steel	for 100 ml funnel		6981063
Lid seal, silicone	for 100 ml funnel		6981064
Stainless steel funnel with closure clamp	500 ml	47 | 50 mm	6981002
Lid, stainless steel	for 500 ml funnel		6981001
Lid seal, silicone	for 500 ml funnel		6981003
Stainless steel funnel with closure clamp	40 ml	47 | 50 mm	6981004
Polycarbonate filter holder, complete with filter support and funnel	250 ml	47 mm	16511
Glass filter holder, complete with filter support, funnel and metal clamp	30 ml	25 mm	16306
Glass filter holder, complete with filter support, funnel and metal clamp	250 ml	47 | 50 mm	16307

Combisart® Adapter, to accommodate various funnel types

Description	Adaptation	Order No.
Biosart® 100 Adapter, silicone	Biosart® 100 Monitors onto 16840 (Combisart® base support) or onto 16841 (individual base)	16414
Biosart® 100 Adapter, stainless steel with silicone stopper	Biosart® 100 Monitors onto Combisart® manifolds 16842 and 16843	16835
Glass funnel Adapter, stainless steel with silicone stopper	16306 | 15 (glass funnel, 30 ml) onto Combisart® manifolds 16842 and 16843	16836
Glass funnel Adapter, stainless steel with silicone stopper	16307 (glass funnel, 250 ml) onto Combisart® manifolds 16842 and 16843	16837

Traditional Multi-Branch Manifolds and Individual Filter Holders Made of Stainless Steel, Glass and Polycarbonate

Individual filter holders
The three stainless steel 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. Simple handling is very important regarding routine examinations. Stainless steel taps in the base allow the vacuum to be turned on and off. The special closure clamps simplify the addition or removal of the funnels adding to the ease of use.

Multi-branch manifolds
The manifold systems are available with 100 ml or 500 ml capacity funnels. The three or six separate filter holders save time when mass examinations have to be carried out. Due to the stainless steel taps on the manifold ports, the vacuum for each holder can be turned on and off individually. The stainless steel frit allows homogenous distribution of the residues on the membrane filter surface. Funnel and filter support can be disinfected by flaming.

Glass filter holders
These filter holders are available for the filtration of small volumes with a 30 ml top part and for larger volumes with a 250 ml top part. They can be sterilized by autoclaving (max. 134°C) or by dry heat (max. 180°C). The glass frit ensures uniform distribution of retained residue.

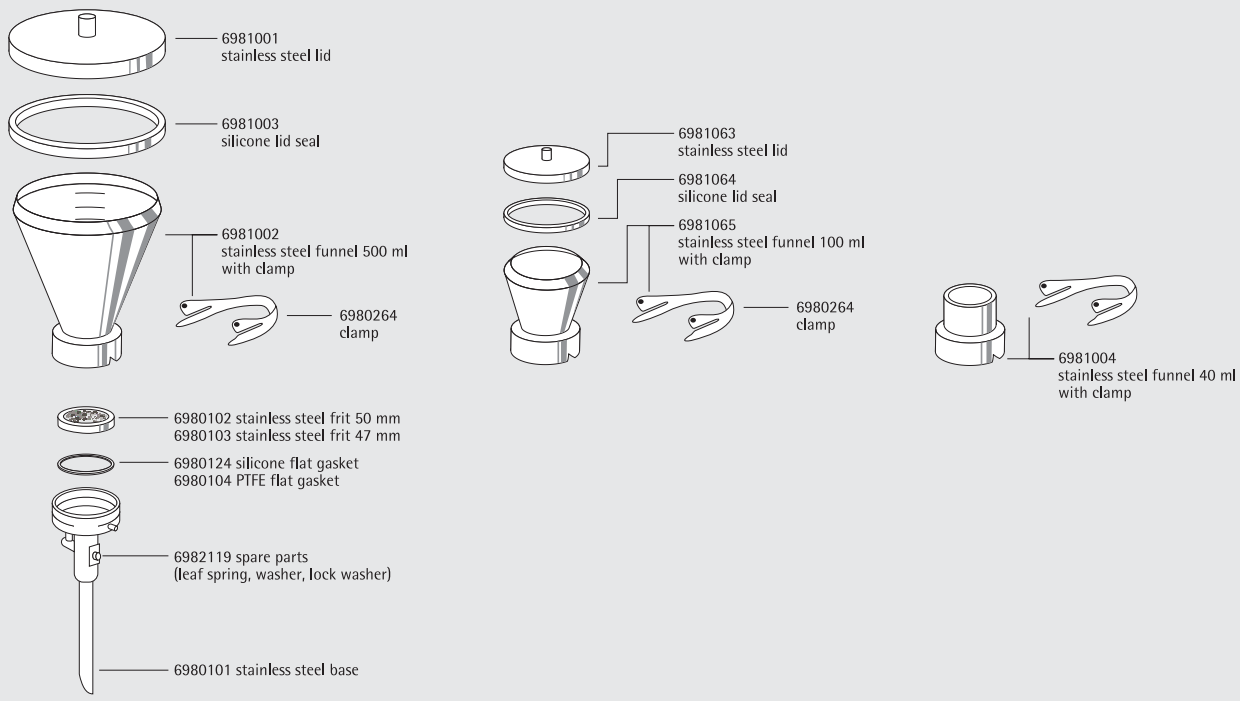
Polycarbonate filter holders
Type 16510 is complete with receiver flask, and can be operated with vacuum as well as with slight overpressure (0.5 bar is recommended for highest standing times). Type 16511 is like 16510, but without receiver flask. It is used on a suction flask or a vacuum manifold e. g. Combisart® systems. Both devices can be sterilized by autoclaving (max. 121°C).

Specifications

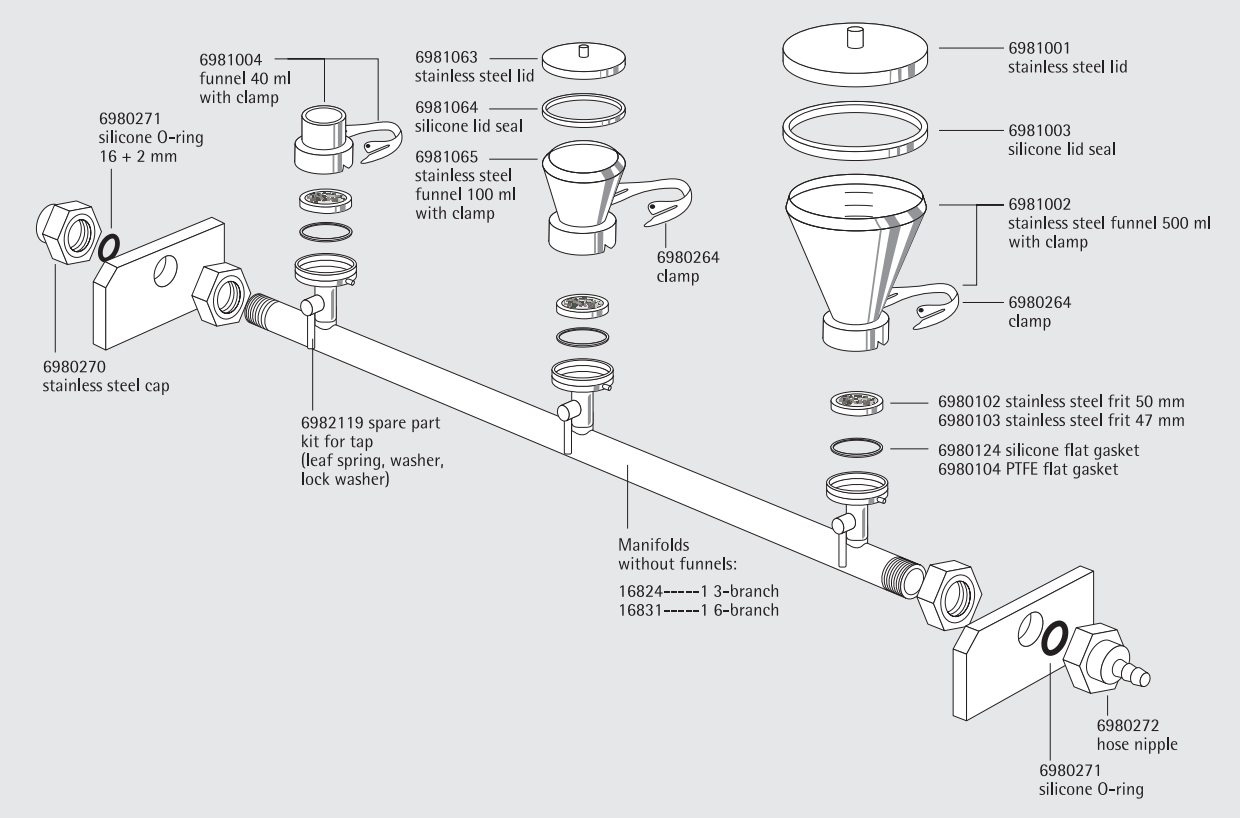
Stainless steel multi-branch manifolds and individual filter holders

Stainless steel quality	High-grade stainless steel: B.S. 304S31 | AISI 304
Dimensions in mm (W | H | D)	3-branch manifold: 3 × 100 ml: 432 | 184 | 120 3 × 500 ml: 442 | 262 | 132 6-branch manifold: 6 × 100 ml: 906 | 268 | 120 6 × 500 ml: 916 | 329 | 132
Max. operating pressure	Vacuum or max. 2 bar pressure (29 psi)
Sterilization	By autoclaving (max. 134°C), By dry heat (max. 180°C), By flaming, By other methods acc. to ISO 8199
Parts and materials	Lid, funnel, base part, – filter support, clamp and tap made of stainless steel. Silicone flat gasket. Silicone lid seal
Flow rate per filter station for water at 90% vacuum	200 ml/min with 0.2 µm membrane filter 600 ml/min with 0.45 µm membrane filter
Filtration area	12.5 cm^2
Suitable membrane filter diameter	50 mm (47 mm, if using a 47 mm frit filter support 6980103)
Outlet spouts (individual system)	10 mm outside diameter
Outlet (branches only)	Hose nipple, DN 10

Replacement parts for traditional individual filter holders



Replacement parts for traditional manifolds



Individual stainless steel filter holders, pre-assembled with stainless steel funnels and lids

Description	Capacity	Order No.
Individual stainless steel filter holder, 100 ml	1 × 100 ml	16219
Individual stainless steel filter holder, 500 ml	1 × 500 ml	16201
Individual stainless steel filter holder without lid, 40 ml	1 × 40 ml	16220

Multi-branch manifolds, stainless steel, with stainless steel funnels and lids

Description	Capacity	Order No.
3-branch stainless steel manifold, 100 ml	3 × 100 ml	16824
3-branch stainless steel manifold, 500 ml	3 × 500 ml	16828
6-branch stainless steel manifold, 100 ml	6 × 100 ml	16832
6-branch stainless steel manifold, 500 ml	6 × 500 ml	16831

Glass filter holders

Description	Capacity	Membrane filter diameter	Order No.
Glass filter holder, complete with filter support, funnel and metal clamp	30 ml	25 mm	16306
Glass filter holder, complete with filter support, funnel and metal clamp	250 ml	47 | 50 mm	16307

Polycarbonate filter holder

Description	Capacity	Membrane filter diameter	Order No.
Polycarbonate filter holder, with 250 ml top part and receiver flask, for vacuum or pressure filtration	250 ml	47 mm	16510
Polycarbonate filter holder, with 250 ml top part, for vacuum filtration only	250 ml	47 mm	16511

Accessories for Vacuum Filter Holders and Manifold Systems

Suction flasks and stoppers

Suction flask, 2 liter capacity
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.

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

Order numbers for Suction flasks

Description	Order No.
Suction flask, 5 liters acc. to DIN 12476, incl. stopper and glass tube	16672-----1
Suction flask, 2 liters acc. to DIN 12476, without stopper	16672
Tube connector for connecting a Combisart® stainless steel manifold to a suction flask 1 or 2 liters	17204
Suction flask, 1 liter (not available in countries which have safety restrictions on glass hose nipples)	16606

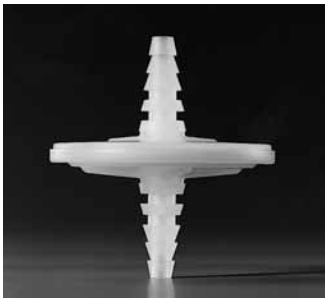
Order numbers for bored stoppers for suction flask 2 liters 16672

Description	Adaptation	Order No.
Silicone stopper	Combisart® individual base 16841 or other individual stainless steel filter holders (16201, 16219, 16220) onto the suction flask 16672	17173
Silicone stopper	16307 (glass funnel, 250 ml) onto the suction flask 16672	17174
Silicone stopper	16306 | 15 (glass funnels, 30 ml) onto the suction flask 16672	17175

Order numbers for bored stoppers for suction flask 1 liter 16606

Description	Adaptation	Order No.
Silicone stopper	Combisart® individual base 16841 or other individual stainless steel filter holders (16201, 16219, 16220) onto the suction flask 16606	17004
Silicone stopper	16307 | 16 (glass funnel, 250 ml) onto the suction flask 16606	17005
Silicone stopper	16306 | 15 (glass funnels, 30 ml) onto the suction flask 16606	17006

Water traps
Used between suction flask and vacuum source, in order to prevent overflow of filtrate into an electric vacuum pump



Vacusart®
Vacusart® is a ready-to-connect filtration unit, consisting of a polypropylene housing and a hydrophobic, but air-permeable PTFE membrane with a pore size of 0.45 µm. Vacusart® is perfectly suitable for the protection of vacuum pumps.

Description	Order No.
Vacusart® water trap, pack of 3	17804----------M

Woulff's bottle, 500 ml
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.

Description	Order No.
Woulff's bottle, 500 ml	16610

Rubber vacuum hose (1 meter)
Thick-walled rubber hose for connecting the system components, e. g. suction flasks, vacuum pumps, etc. When ordering, please state length required in meters.

Description	Order No.
Rubber vacuum hose (1 meter)	16623

Electric vacuum pumps
Neoprene membrane pumps with low noise level, oil- and maintenance-free; reliable sources of vacuum.

The new vacuum pump series provides up to date technology for daily use in the Microbiology laboratory environment.

The vacuum produced by the new pumps is controlled and can be easily adjusted to your specifications. Thus damageable cells (e.g. bacteria) are concentrated on the surface or a membrane filter under better conditions, which results in decreased sub lethals, higher recovery rates and shorter incubation times.

Specifications of electric vacuum pumps

	16694-2-50-22 16694-1-60-22	**16694-2-50-06 16694-1-60-06**
Delivery	22 l/min	6 l/min
Ultimate Vacuum	100 mbar	100 mbar
Operating Pressure	1 bar	2.5 bar
Connectors for Tube (mm)	ID 9	ID 4
Ambient Temperature	5…40°C	5…40°C
Mains	16694-2-50-22: 230 V | 50 Hz 16694-1-60-22: 115 V | 60 Hz	16694-2-50-06: 230 V | 50 Hz 16694-1-60-06: 115 V | 60 Hz
Motor Protection	IP 44	IP 20
Power P1	130 W	65 W
Operating Current	0.9 A	0.63 A
Weight	7.1 kg	1.9 kg
Dimensions W | H | D (mm)	261 | 204 | 110	164 | 141 | 90
Recommended application	Multiple filtration runs with multi-branch manifolds	Single filtration run with individual filter station

Order numbers electric vacuum pumps

Description	**Order No.**
Multiple filtration runs: 100 mbar final vacuum, 22 l/min max., 230 V, 50 Hz	16694-2-50-22
Multiple filtration runs: 100 mbar final vacuum, 22 l/min max., 115 V, 60 Hz	16694-1-60-22
Individual filtration run: 100 mbar final vacuum, 6 l/min max., 230 V, 50 Hz	16694-2-50-06
Individual filtration run: 100 mbar final vacuum, 6 l/min max., 115 V, 60 Hz	16694-1-60-06

Replacement parts	**Order No.**
Replacement kit for 16694-2-50-22 and -1-60-22, set of one membrane, two valve springs and two head seals	1ED---0055
Replacement kit for 16694-2-50-06 and -1-60-06, set of one membrane, two valve springs and two head seals	1ED---0054
Sound absorber for 16694-2-50-22 and -1-60-22	1EH---0002
Sound absorber for 16694-2-50-06 and -1-60-06	1EH---0001
Fine adjustment head for 16694-2-50-22 and -1-60-22	1EV---0002
Fine adjustment head for 16694-2-50-06 and -1-60-06	1EV---0001

Order numbers traditional pumps

Description	Order No.
Multiple filtration runs: 13 mbar final vacuum, 26 l/min max., 220 V, 50 Hz	16612
Multiple filtration runs: 13 mbar final vacuum, 26 l/min max., 110 V, 60 Hz	16615
Individual filtration run: 100 mbar final vacuum, 20 l/min max., 220 V, 50 Hz	16692
Individual filtration run: 100 mbar final vacuum, 20 l/min max., 110V, 60 Hz	16695

Replacement parts	Order No.
Set of two neoprene membranes, four valve springs and two neoprene head seals for 16612/16615	6986017
Set of one neoprene membrane, two valve springs and one neoprene head seal for 16692/16695	6986105

Water jet pump
Simple vacuum source. For connection to a water tap with G3/4 male thread.

Description	Order No.
Water jet pump, with G 3/4 male thread	16611

Hand-operated vacuum pump
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.

Description	Order No.
Hand-operated vacuum pump with gauge	16673

Dosing Syringe
The most convenient way to moisten the NPS with water is to use a dosing syringe with an adapted Minisart syringe filter. Simultaneous sterilization and dispensing of demineralized water in 3.5 ml steps is easily done by dropping the sinker at the end of the suction tubing into the water, then filling the dosing syringe and dispensing sterile water by operating the twigger automatically.

Description	Order No.
Dosing syringe, 0.5–5 ml	16685-2
Minisart®, 0.2 µm, individually, sterile-packaged	17597----------K

Colony counter
Compact, handy 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.

Description	Order No.
Colony counter	17649
Replacement part: Black marker refill	6981540

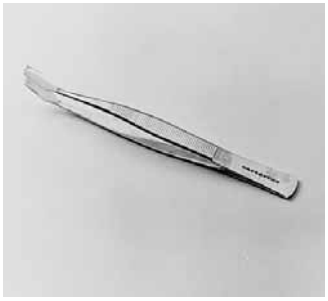
Incubator
Compact, space-saving incubator for the incubation of membrane filters on nutrient pads or other nutrient media. The incubator has a capacity of 15 liters and is designed to hold the following numbers and sizes of petri dishes: 200×47 mm or 160×56 mm | 60 mm or 72×90 mm.

The swing-up cover and removable insertion plate simplify loading and unloading. The cover is opaque, avoiding light penetration into the chamber.

Specifications Incubator

Incubator	18113
Voltage	230 V
Frequency	50 | 60 Hz
Rated power	0.2 kW
Weight	5.5 kg (12 lbs)
Max. load for insertion plate	5 kg (12 lbs)
Dimensions W | H | D (mm)	Inner 270 | 205 | 288 Outer 340 | 270 | 431
Temperature range	20°C (or 5°C above room temperature) to 50°C
Temperature deviation	Less than ±0.2°C (at 37°C and RT 20°C)
Spacial temperature deviation	Less than ±0.8°C
Capacity	approx. 15 liters

Description	Order No.
Incubator	18113



Stainless steel tweezers
Membrane filters should only be handled with suitable tweezers to avoid contamination which can result from hand contact. Sartorius stainless steel tweezers can be flamed and they are autoclavable. They have blunt-edged tips for a careful, firm hold of the membrane filter.

Description	Order No.
Stainless steel tweezers	16625

Stainless steel prefilter attachment
The stainless steel prefilter holder allows the removal of coarse, solid particles from samples for microbiological analysis before and during the actual bacteria retentive filtration. The device is clipped between funnel and base of the stainless steel vacuum filter holders. It can be autoclaved and flamed. 11301, a white cellulose nitrate (cellulose ester) membrane filter with a pore size of 8 µm is used as the prefilter and it retains the coarse suspended particles from the sample, whereas it allows microorganisms to pass through. These microbes are trapped on the surface of the underlying bacteria-retentive membrane filter (e. g. 0.45 µm). After filtration is complete, 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.

Description	Order No.
Stainless steel prefilter attachment	16807
Cellulose nitrate membranes with 50 mm diameter and 8 µm pore size for the prefilter holder, pack of 100, individually, sterile packaged	11301--50----ACN
Replacement part: support plate, autoclavable, flammable	6981139

Container for anaerobic incubation
Stainless steel container with 11.8 cm inner diameter, 10.7 cm depth and a 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.

Description	Order No.
Anaerobic container	16671

School Kit for Microbiological Experiments

Complete kit
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 all the equipment necessary 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, air, and 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 vacuum, which is necessary for the filtration, is created with help of a syringe and a 3-way valve.

Contents

Parts supplied	
Aluminium case	
Stainless steel tweezers	16625
Filtration system for samples	Device 16510. 3-way valve 16639. Adapter 17108D. Syringe 16647. Glass fiber filter 13400-013S.
Filtration system for sterile water	Filter holder 16517E. Syringe 16647. Membrane filter 11307-025N.
Inoculation loop	17109
Culture media (nutrient broth)	14132----------K
Wort nutrient pad sets	14058
Standard nutrient pad sets	14055
Endo nutrient pad sets	14053

Order number	
24002	School kit for microbiological experiments, in a lockable aluminium case

Sterility Test Systems
Sterisart® NF

International pharmacopeias require the complete sterility of pharmaceutical products that are injected into the blood stream or that otherwise enter the body below the skin surface. As a manufacturer of such products, you are required to supply proof of sterility of the final product batch.

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

Special brochures available on request.
Order no. SLD1002-e, SLD1001-e, SL-2019-e, SLD2006-e, SLD2005-e, SLD2007-e, S--2019-e, SL-2025-e

Sterisart® NF offers the following features and benefits

- Reliable, Sartochem membrane:
  - High retention of microbes
  - Low adsorption
  - High mechanical stability
- Easy to use:
  - Pre-installed color-coded tube clamps
  - Easy-to-read graduated marks
  - User-friendly, several practical adapters available
  - Product- | lot number identification
- Secure:
  - Gas-impermeable packaging for protection against sterilants

Specifications

Technical specifications for Sterisart® NF

Pore size of the Sartochem membrane filter	0.45 µm, tested with Serratia marcescens
Filter area	15.7 cm^2 in each Sterisart container
Flow rate (for water)	500 ml/min at 1 bar (approx. 15 psi)
Pore size of the air filters	0.2 µm PTFE, validated acc. to HIMA for the retention of B. diminuta
Sample container capacity	120 ml (graduation marks at 50, 75 and 100 ml)
Max. operating pressure	3 bar (approx. 44 psi) at 20°C
Max. operating temperature	50°C
Sterilization	ETO (ethylene oxid gas) or gamma irradiation

Technical specifications for Sterisart® Universal pump

Pump flow rate	70–650 ml/min
Power requirements	100–240 VAC
Frequency	50–60 Hz
Power consumption	100 W
Dimensions Pump	 approx. 336×260×210 mm (with lever) (W×D×H)
Pump with holding ring for bottles, container	approx. 440×365×485 mm (W×D×H)
Weight Basic version 16419 Upgraded version 16420 with display and user software	 approx. 13.5 kg approx. 14.6 kg

Order no. for universal pump	Description
16419	Sterisart® Universal pump, basic version
16420	Sterisart® Universal pump, upgraded version with display | user software

Further accessories are available on request.

Recommended disposable sterility test units for use with pump

Order no. for Sterisart® NF	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).
16468--------ACD	Sterisart® NF alpha, system for medical devices with luer or luer lock connectors (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 gamma sterilized, double-packed, optimal for use in isolators).
16467--------GBD	Sterisart® NF gamma, 6 cm metal needle for open containers (box of 10, individually gamma sterilized, double-packed, optimal for use in isolators).
16468--------GBD	Sterisart® NF gamma, system for medical devices with luer or luer lock connectors (box of 10, individually gamma-sterilized, double-packed, optimal for use in isolators).
16469--------GBD	Sterisart® NF gamma, system with adapter for prefilled syringes (box of 10, individually gamma-sterilized, double-packed, optimal for use in isolators).
16470--------GBD	Sterisart® NF gamma, system for difficult-to-dissolve powders in unvented vials (box of 10, individually gamma-sterilized, single-packed, optimal for use in isolators).
16475--------GBD	Sterisart® NF gamma, system for lyophilized or soluble powders in unvented vials (box of 10, individually gamma-sterilized, double-packed, optimal for use in isolators).
16476--------GBD	Sterisart® NF gamma, system with short dual-needle metal spike for closed containers (box of 10, individually gamma-sterilized, double-packed, optimal for use in isolators).
16596----------HNK	Venting needle for ampoules, collapsible bags and vials, gamma-sterilized (box of 50).
Further units on request	16464ACD, 16464GBD

Reusable Sterility Test System

Reusable sterility test system for the sterility testing of injection and infusion solutions. The filter holders are easy to clean, dishwatersafe and autoclavable. The system can be designed according to the needs of the user, and the membrane filter can be chosen according to requirements.

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, 40.5x 3.5 mm (6980574)
Filter diameter	47 mm
Filtration area	12.5 cm^2
Capacity	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

General accessories for the reusable sterility test system

Order numbers	Description
16523	Filter holder with 130 ml capacity
16826	Stainless steel manifold
17756	Stainless-steel adapter
16966	T-distributor for 2 filter holders
16967	Filling cap with filling needle
16968	Silicone adapter
16696	Peristaltic pump
16699	Silicone tubing, 4 × 1.5 mm
16974	Holding rod for inlet tube/needle
16975	Incubation rack
16978	Tube clamps (tubing clips)
17574----------K	Venting filters, 50 pieces

Additional accessories for reusable sterility test system (for ampoule testing)

Order numbers	Description
16963	Inlet tube
16973	Holding tongs
16969	Ampoule breaker
16976	Clamp holder
16970	Support stand

Additional accessories for reusable sterility testing system (for testing infusion solutions in bottles)

Order numbers	Description
16964	Inlet needle (long)
16964-----3	Inlet needle (short)

Consumables (membrane filters, 47 mm, 100 pieces/pack) for the reusable sterility test system

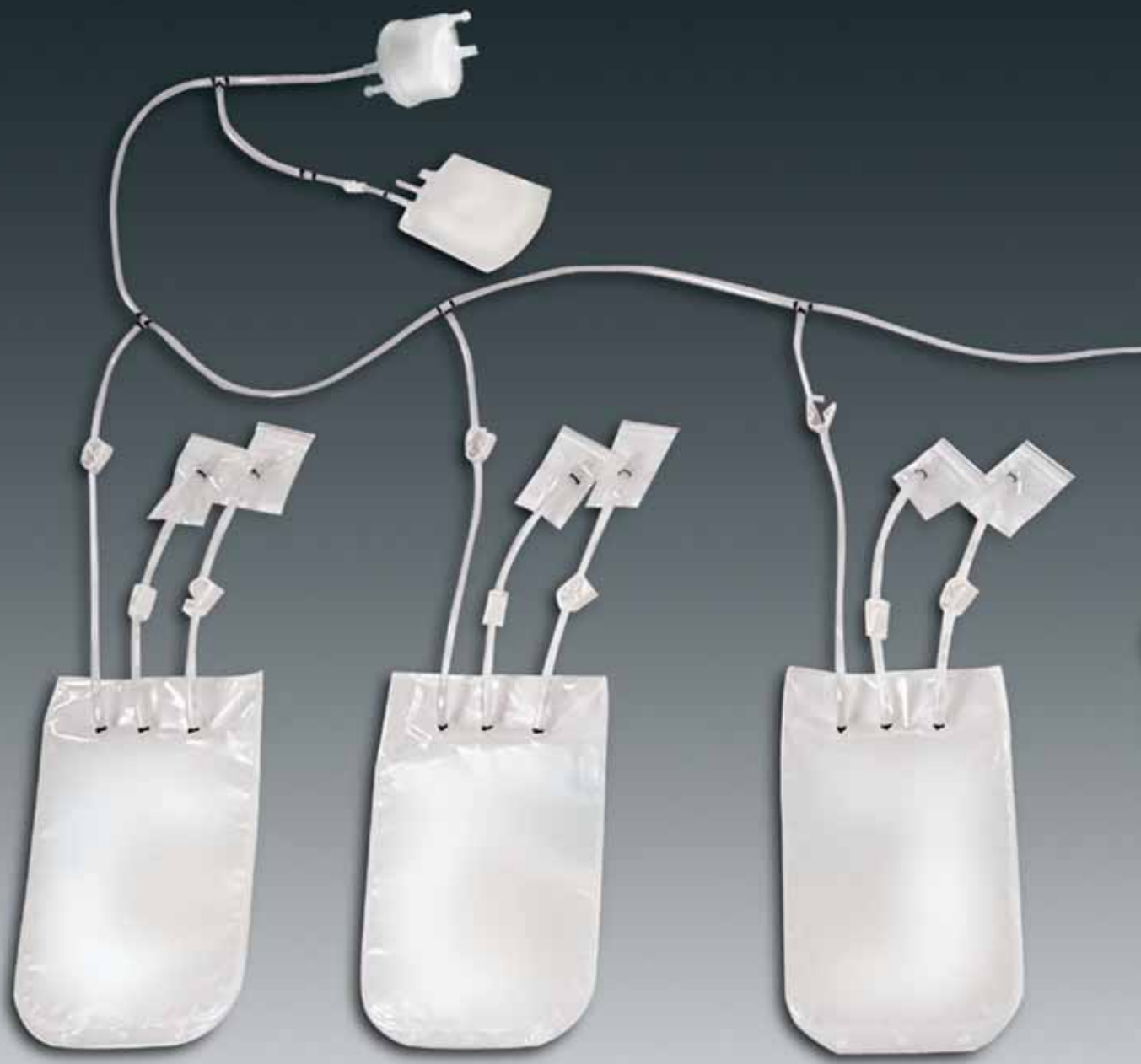
Order numbers	Pore size	Description	Application
11306--47------N	0.45 µm	Cellulose nitrate membrane filter	pH 4-8, most hydrocarbons
13106--47----HCN	0.45 µm	Cellulose nitrate membrane filter with hydrophobic edge	pH 4-8, most hydrocarbons
11106--47------N	0.45 µm	Cellulose acetate membrane filter	pH 4-8, most alcohols, hydrocarbons and oils
13506--47----HCN	0.45 µm	Cellulose acetate membrane filter with hydrophobic edge	pH 4-8, most alcohols, hydrocarbons and oils
18406--47------N	0.45 µm	Regenerated cellulose membrane filter	pH 3-12, solvent-resistant
11407--47------N	0.45 µm	Cellulose nitrate membrane filter	pH 4-8, most hydrocarbons
13107--47----HCN	0.45 µm	Cellulose nitrate membrane filter with hydrophobic edge	pH 4-8, most hydrocarbons
11107--47------N	0.45 µm	Cellulose acetate membrane filter	pH 4-8, most alcohols, hydrocarbons and oils
13507--47----HCN	0.45 µm	Cellulose acetate membrane filter with hydrophobic edge	pH 4-8, most alcohols, hydrocarbons and oils
18407--47------N	0.45 µm	Regenerated cellulose membrane filter	pH 3-12, solvent-resistant

Peristaltic pump

Specifications

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

Order number
16696



Bags for Fluid Handling

Sterile Fluid Handling Bags: 60 ml, 300 ml, 1 Liter, 2 Liter

Our 60 ml, 300 ml, 1 liter and 2 liter sterile fluid handling bags are ideal for small volume bench-top work. Typical applications include specialty media dispensing and final product storage. Well suited for QC sampling in a manifold system. Hanger port facilitates complete drainage. May be frozen to -80°C. Consult TC Tech|Sartorius for recommendations on handling frozen bags.

Available with Sartopore 2 sterilizing grade filters.

Specifications for sterile fluid handling bags

1 liter, 2 liter standard	LDPE fluid contact surface Septum injection port 2 lines C-Flex formulation 082 – 6" 1/4" ID 2 QDC coupling inserts 2 tube ratchet clamps 2 port covers Provided sterile via 25 kGy – 40 kGy gamma Individually packaged
1 Liter, 2 Liter SCD®	LDPE fluid contact surface Septum injection port 1 line C-Flex formulation 082 – 3' length – 1/8" ID 1 line C-Flex formulation 082 – 6' length – 1/4" ID 1 QDC coupling insert 2 tube ratchet clamps 1 male luer with female luer plug 1 tube port cover Provided sterile via 25 kGy – 40 kGy gamma Individually packaged

Options

Fittings	QDC sealing cap QDC coupling body | sealing plug Sanitary fitting Male | female luer with plug Hose barb Female luer for syringe connection
Tubing	Platinum cured silicone Peroxide cured silicone Pharmed® PVC C-Flex® formulation 001, 050, 072
Other	Sterilizing filter Manifold system specifications item

Order numbers for sterile fluid handling bags

Item number	Item description	Quantity
TC-110050-AF	Storage bag, 60 ml standard	50 per case
TC-110150-AF	Storage bag, 300 ml standard	50 per case
TC-110125-AF	Storage bag, 1 Liter standard	25 per case
TC-111225-AF	Storage bag, 1 Liter SCD	25 per case
TC-110225-AF	Storage bag, 2 Liter standard	25 per case
TC-110425-AF	Storage bag, 2 Liter SCD	25 per case

Call for custom design consultation.

Sterile Fluid Handling Bags: 5 Liter, 10 Liter, 20 Liter

The 5 liter, 10 liter and 20 liter sterile fluid handling bags accommodate fluid volumes commonly associated with bench-top and pilot plant work. Typical applications include buffer storage and harvest collection. Hanger ports facilitate complete drainage. May be frozen to -80°C. Consult TC Tech|Sartorius for recommendations on handling frozen bags.

Available with Sartopore 2 sterilizing grade filters

Specifications for sterile fluid handling bags

Standard	LDPE fluid contact surface Septum injection port 1 line C-Flex formulation 082 – 6" length – 1/4" ID 1 line C-Flex formulation 082 – 6" length – 3/8" ID 2 QDC coupling inserts 2 tube ratchet clamps 2 port covers Provided sterile via 25 kGy – 40 kGy gamma Individually packaged
SCD®	LDPE fluid contact surface Septum injection port 1 line C-Flex formulation 082 – 3' length – 1/8" ID 1 line C-Flex formulation 082 – 6' length – 3/8" ID 1 QDC coupling insert 1 male luer with female luer plug 2 tube ratchet clamps 1 tube port cover Provided sterile via 25 kGy – 40 kGy gamma Individually packaged

Options

Fittings	QDC sealing cap QDC coupling body | sealing plug Sanitary fitting Male | female luer with plug Hose barb Female luer for syringe connection
Tubing	Platinum cured silicone Peroxide cured silicone Pharmed® PVC C-Flex® formulation 001, 050, 072
Other	Sterilizing filter Manifold system Steam-in-place bag connector

Order numbers for sterile fluid handling bags

Item number	Item description	Quantity
TC-111320-AF	Storage bag, 5 liter standard	20 per case
TC-111420-AF	Storage bag, 5 liter SCD	20 per case
TC-112320-AF	Storage bag, 10 liter standard	20 per case
TC-112420-AF	Storage bag, 10 liter SCD	20 per case
TC-113315-AF	Storage bag, 20 liter standard	15 per case
TC-113415-AF	Storage bag, 5 liter SCD	15 per case

Call for custom design consultation.

Films

Sterile fluid handling bags and tank liners are constructed of multi-layer film(s). Each film layer has been specifically engineered to maximize overall performance of the bag. The following materials are utilized in the manufacture of multi-layer films for TC Tech|Sartorius bags.

Fluid contact layer –
Low density polyethylene (LDPE)
Offers excellent biocompatibility as well as chemical compatibility with a wide range of solutions. This material is used as the fluid contact layer throughout the product line, thereby facilitating full product line validation.

Gas barrier layer –
Ethyl vinyl alcohol (EVOH)
Provides outstanding performance as a barrier to atmospheric gases.

Strength layer – Nylon
Offers excellent strength properties for bags that have the potential to be used or manipulated outside a cylindrical tank or tote.

Tie layer – Linear low density polyethylene
Materials provide outstanding layer fusion. Materials contribute to overall bag strength and gas barrier properties. USP <88> Class VI materials.

Laboratory Water Systems

arium® Water Tower – Integrated Reverse Osmosis and Ultrapure Water System

Description
arium® steel self supporting stand designed to incorporate an arium® 61316 reverse osmosis system, an arium® 611 ultrapure water system, a 30 liter pressurized tank and a TOC analyser in one laboratory working station.

The unique design of the tower only requires inlet connections to power, suitable water source and one discharge connection to the drain. No additional fittings or connections are required.

Applications
- To provide high quality water, where space is limited
- RO water for rinsing glassware and to feed laboratory equipment, like humidifier, autoclaves or dishwasher
- Ultrapure water (ASTM Type 1) for media preparation, chromatography and life science applications

Features
- All in one working station with built-in 61316® reverse osmosis system, ultrapure (ASTM Type 1) water system, TOC analyser and tank to save bench space
- Easy to place according to your individual lab needs, mounted on 4 easy roll wheels
- Ergonomically designed to save bench space
- Maximum stability even under the most severe conditions
- Easy accessibility of all parts, making routine maintenance and cartridge changes of the arium® systems effortless.
- Tap for direct use of RO water e.g. for rinsing glassware.

arium® tower 6193VF-15TOC2 is comprised of the following components:

- Stand-alone tower, order no. 619ATO2
- Reverse osmosis system, order no. 61316
- Pressure tank, 30-l capacity, order no. 613APV31
- Ultrapure water system incl. UV lamp and ultrafilter, order no. 611VF
- TOC Instrument, order no. 611ATOC1
- Set of 2 pretreatment cartridges for reverse osmosis system, order no. 613CPF05-------V
- Set of 2× RO modules, order no. 613CPM2--------V
- Set of ultrapure water cartridges (1× pretreatment cartridge, 1 polishing cartridge), order no. 611CKRU

The individual components of the tower may be purchased separately to accommodate specific requirements.

Specifications

Unit dimensions

Width	668 mm (26.3")
Height	1907 mm (75.1")
Depth	583 mm (22.9")

Weight

Complete system weight (packaging included)	216 kg (476 lbs)
System weight in operation	202 kg (445 lbs)

Electrical power requirements
100–240 V AC 50–60 Hz single phase

Inlet feed water requirements
Potable tap water feed only (Feed water to meet drinking water standards of the U.S., European Union or Japan)

Minimum inlet pressure	1 bar | 15 psi
Maximum inlet pressure	6.8 bar | 100 psi
Temperature	5°C–30°C (41°F–86°F)
Hardness (max ppm $CaCO_3$)	360 or softened water
Silt density index	< 3
Free chlorine	0.1 ppm
Turbidity	< 1 NTU
Iron (Total as Fe)	< 0.1 ppm

Ambient temperature & humidity

Operation	5°C–30°C (41°F–86°F) 80% relative humidity
Storage	5°C–45°C (41°F–113°F) 80% relative humidity

Ultrapure water system, 611VF

Product water quality

Resistivity (MΩ × cm)	18.2
TOC (ppb)* < 100 ppb feed water	< 1
TOC (ppb)* < 1000 ppb feed water	< 10
Absorbance units (AUFS@ 210 nm)	< 0.005
Endotoxin (EU/ml)	< 0.001
Particles (@ 0.2 µm)	< 1/ml
Bacteria (CFU/1000 ml)	< 1
Flow rate (l/min)**	up to 1.5

* Depends on inlet water quality
** Inlet pressure of 2 bar, without final filter

Reverse osmosis system, 61316

Product water quality

Rejection rates	Monovalent Ions	Up to 98%
	Polyvalent Ions	Up to 99%
	Particles	> 99%
	Microorganisms	> 99%
	Dissolved organics (>300 MW)	> 99%
Product flow rate [l/h]* (+/- 20% at 25 °C)		16
Maximum recovery rate*		Approx. 55%

* Depends on feed water quality and temperature

Pressure tank, 613APV31

Capacity @ 2.5 bar	30 litres (7.9 gallons)
Height	57 cm (23")
Diameter	41 cm (16")
Weight, empty	11 kg (24 lbs)
Weight, full	41 kg (90 lbs)

arium® RO 61316 – Reverse Osmosis System

Description
The compact arium® RO 61316 laboratory water purification system is designed to produce RO-Water for general laboratory applications.

With production volumes up to 16 l/h and up to 99% rejection rate of ions, bacteria, organics and viruses, automated RO-membrane back-flushing, and a constant flow rate, the arium® 61316 is the ideal choice for daily laboratory applications.

The efficient RO-membranes reduce water wastage and provide excellent product water quality, whilst ensuring high retention rates of the water impurities.

By the use of an optional closed pressurized tank (30, 70, 100 liter) the RO product water will be distributed with up to 3.5 bar to the point of use. This unique feature provides a pressurized product-water flow for all your lab applications. There is no need for an additional distribution pump.

Applications
- Feed water for ultrapure water systems
- Rinsing glassware and laboratory vessels
- Feed water for humidifiers, autoclaves and dish washer

Features
- Four line alphanumerical display
- Simple menu navigation
- Displaying conductivity, rejection rate, tank-level, temperature etc.
- Typical conductivity < 20 µS × cm
- Production capacity up to 380 liter per day
- Easy to change pre-treatment cartridge and RO-modules
- Automatic RO-membrane-back-flush with RO-permeat
- Constant flow rate
- Several alarm functions
- Product water storage in open gravity or closed pressurized tank
- Serial interface RS-232
- PLC interface for external communication

Specifications

Unit dimensions	Width Height Depth	43 cm (16.85") 48 cm (19") 33.4 cm (13.15")
System weight	15 kg (33 lbs)	
Operation weight	22 kg (49 lbs)	
Electrical power requirements	100-240 V AC 50-60 Hz single phase	

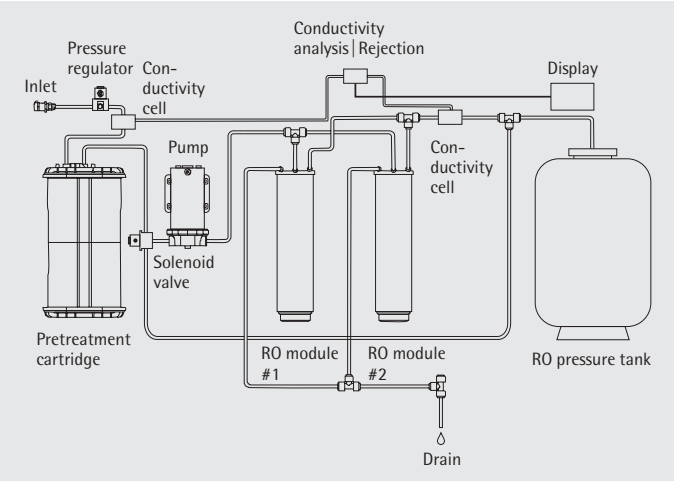
Inlet feed water requirements
Potable tap water feed only (feed water to meet drinking water standards of the U.S., European Union or Japan)

Minimum inlet pressure	1 bar | 15 psi
Maximum inlet pressure	6.8 bar | 100 psi
Temperature	5°C–30°C (41°F–86°F)
Hardness (max $CaCO_3$)	360 ppm or softened water
Silt density index	< 3
Free chlorine	0.1 ppm
Turbidity	< 1 NTU
Iron (total as Fe)	< 0.1 ppm

Ambient temperature & humidity

Operation	5°C–30°C (41°F–86°F) 80% relative humidity
Storage	5°C–45°C (41°F–113°F) 80% relative humidity

RO system schematic



Product water quality

Rejection rates	Monovalent ions	Up to 98%
	Polyvalent ions	Up to 99%
	Particles	> 99%
	Microorganisms	> 99%
	Dissolved organics (>300 MW)	> 99%
Product flow rate [l/h]* (± 20% at 25°C)	16	
Maximum recovery rate*	Approx. 55%	

* Depends on feed water quality and temperature

Ordering information

61316	arium® RO system
613CPF05-------V	2× pretreatment cartridges
613CPM2-------V	2× RO modules
611CDS2	Sanitization kit for the tank (2 syringes)
61316CDS2	Sanitization kit for the RO modules (2 syringes)
613AMDG1	Dispense gun for tank
613APV31	30-liter tank**
613APV70	70-liter tank**
613APV100	100-liter tank**
61316030F05M1A	Complete Reverse Osmosis System with a tank capacity of 30 litres** (includes arium® 61316, tank, 2× RO modules, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61316070F05M1A	Complete Reverse Osmosis System with a tank capacity of 70 litres** (includes arium® 61316, tank, 2× RO modules, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61316100F05M1A	Complete Reverse Osmosis System with a tank capacity of 100 litres** (includes arium® 61316, tank, 2× RO modules, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).

** at 2.5 bar inlet pressure

arium® 613L – Reverse Osmosis System

Features
- Complete reverse osmosis system with integrated 100 liter tank
- Easy to place where space is limited
- Made of high-quality products including Grundfos pump and Danfoss valve
- Fully assembled control panel – no extra electrical installations
- Flow meter and manometer for simple control of the permeate and pressure
- In case of a pressure drop the internal pressure switch will automatically stop operation of the system
- High performance membranes
- Optional UV-Lamp and conductivity meter

Function
Reverse osmosis is a membrane separation process which uses high water pressure to separate water molecules from the dissolved salt solution (ions). The dissolved salts are removed by almost 100% and the pores of the membranes are so small that even microorganisms like bacteria cannot penetrate. The treated water (the permeate) is collected in the reservoir tank of the system, from where it is pumped to the point of use. Concentrate is led to the drain.

Pressure
Model 613L includes a pump which supplies a stable pressure, e.g. 2 m^3/hour at 3.7 bar pressure.

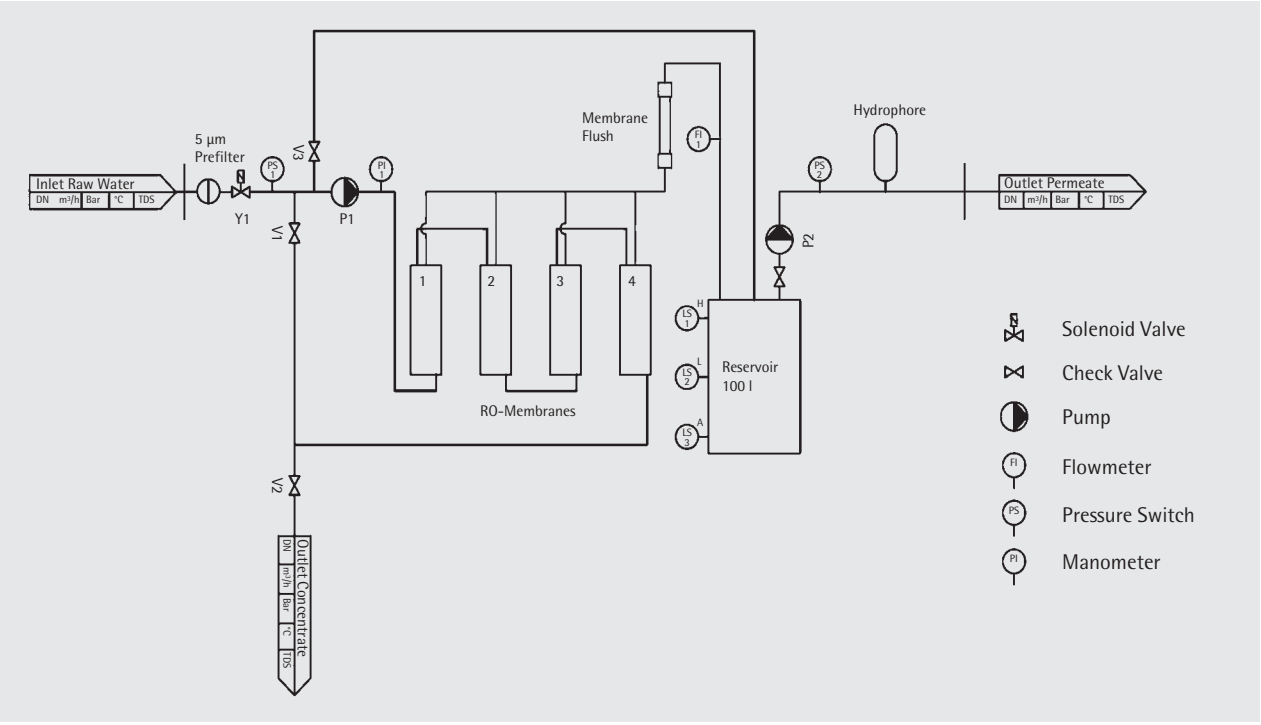
Quality
The purity of the permeate depends upon the feed water that is to be treated. If the feed water is normal drinking water, the conductivity of the treated water will typically be between 10–20 µS/cm. A conductivity meter is available as an accessory.

Specifications

	613L050	613L100	613L150	613L200
Capacity l/h*	50	100	150	200
Max recovery rate %*	40–80	40–80	40–80	40–80
Rejection rates*				
Monovalent ions	Up to 98%			
Polyvalent ions	Up to 99%			
Particles	> 99%			
Microorganisms	> 99%			
Dissolved organics (> 300 MW)	> 99%			
Conductivity, µS/cm*	< 20	< 20	< 20	< 20
Storage reservoir l	100	100	100	100
Max. inlet water temperature	25°	25°	25°	25°
Max. water pressure	7 bar	7 bar	7 bar	7 bar
Min. water pressure	2 bar	2 bar	2 bar	2 bar
Number of membranes	1	2	3	4
Height, cm	85	85	85	85
Width, cm	58	58	58	58
Iron (total as Fe)	< 0.1 ppm			

* Depends on feed water quality

Flow chart



Ordering information

Order No.	Electrical connection	Description
613L050 613L050B	(240 Volt, 50 Hz) (115 Volt, 60 Hz)	Complete arium® RO system, 50 l/h, including 5 µm Prefilter, RO-Membrane, 100 l Tank, Pump
613L100 613L100B	(240 Volt, 50 Hz) (115 Volt, 60 Hz)	Complete arium® RO system, 100 l/h, including 5 µm Prefilter, 2 RO-Membranes, 100 l Tank, Pump
613L150 613L150B	(240 Volt, 50 Hz) (115 Volt, 60 Hz)	Complete arium® RO system, 150 l/h, including 5 µm Prefilter, 3 RO-Membranes, 100 l Tank, Pump
613L200 613L200B	(240 Volt, 50 Hz) (115 Volt, 60 Hz)	Complete arium® RO system, 200 l/h, including 5 µm Prefilter, 4 RO-Membranes, 100 l Tank, Pump
613L-AE002		Conductivity Meter
613L-AE003		UV lamp
613L-CH001		5 µm Prefilter
613L-CH002		RO-Membrane

arium® 611 – Ultrapure Water Systems

Description
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 display
Continuously indicates water quality in MΩ×cm or µS/cm with compensated or non-compensated temperature.
A self diagnostic control feature monitors and displays the system status.

Removable display and dispense element
Enables high quality water to be provided at the point of use up to two meters from the system's installation location.

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

Timed (Volume) dispenser
Automated dispensing included.

Quality
Inert materials used for all wetted parts guarantee the highest water purity.

Security
The 0.2 µm PESU membrane filter capsule ensures a bacteria-free filtrate.

Specifications for arium® 611 ultrapure water systems

Unit dimensions	Width	43 cm (16.85")
	Height	48 cm (19")
	Depth	33.4 cm (13.15")
Removable display | Dispense unit	Width	30.2 cm (11.91")
	Height	11.3 cm (4.44")
	Depth	15.7 cm (6.21")
System weight	611DI	15.6 kg (33 lbs)
	611UF	16.3 kg (36 lbs)
	611UV	16.8 kg (37 lbs)
	611VF	17.4 kg (38 lbs)
Operation weight	611DI	23.6 kg (52 lbs)
	611UF	24.8 kg (55 lbs)
	611UV	25.3 kg (56 lbs)
	611VF	26.4 kg (58 lbs)
Clearances	Side	17 cm (7") for handling
	Top	5 cm (2") for ventilation
	Front	35 cm (14") for door opening
Electrical power requirements	100–240 V AC 50–60 Hz single phase	
Interface	RS-232 serial port PLC-Port arium® TOC-Port	

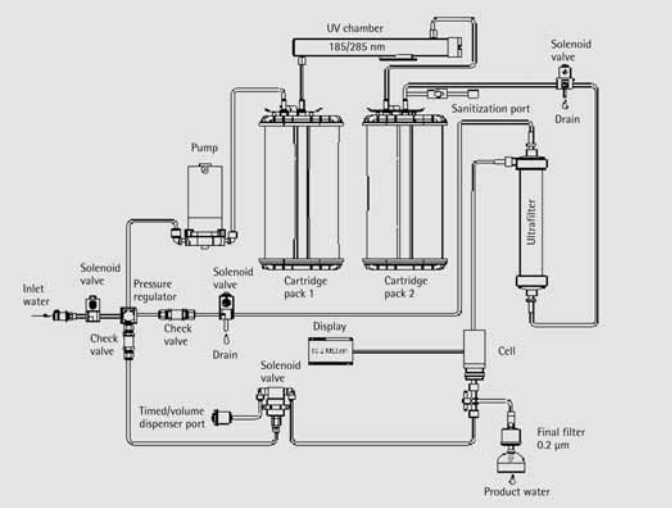
Inlet feed water requirements

Specific resistivity	RO water	20 KΩ×cm (50 µS/cm)
	Distilled water	250 KΩ×cm (4 µS/cm)
	Deionized water	50 KΩ×cm (20 µS/cm)
TOC	< 1000 ppb	
Turbidity	< 1 NTU	
Silica	< 1000 ppb	
Minimum inlet pressure	Gravity	
Maximum inlet pressure	7 bar | 103 psi	

Ambient temperature and humidity

Operation	5°C–30°C (41°F–86°F) 80% relative humidity non condensing
Storage	5°C–45°C (41°F–113°F) 80% relative humidity non condensing

Flow diagram



Product water quality	611DI	611UV	611UF	611VF
Resistivity (MΩ×cm)	18.2	18.2	18.2	18.2
TOC (ppb)* @100 ppb feed water	< 4	< 1	< 4	< 1
TOC (ppb)* @1000 ppb feed water	< 20	< 10	< 20	< 10
Absorbance units (AUFS @ 210 nm)	n.a.	< 0.005	n.a.	< 0.005
Endotoxin (EU/ml)	n.a.	n.a.	< 0.001	< 0.001
Particles (@ 0.2 µm)	< 1/ml	< 1/ml	< 1/ml	< 1/ml
Bacteria (CFU/ml)	< 1	< 1	< 1	< 1
Flow rate (l/min)**	up to 2	up to 2	up to 1.5	up to 1.5

* Depends on inlet water quality
** At a pressure of 2 bar, without final filter

Ordering information for arium® 611 ultrapure water systems

Systems	
611DI	arium® basic system
611UF	arium® system with ultrafilter
611UV	arium® system with UV lamp
611VF	arium® system with ultrafilter & UV lamp

Consumables and accessories	
5441307H4--NO--B	Sartopore 2 150 (5 final filters)
611CDS2	Sanitization kit (2 syringes)
611CDS6	Sanitization kit (6 syringes)
611CEL1	UV lamp
611CDU5	UF hollow fiber filter
611AEC1	Calibration resistor
611AMDG1	Remote dispenser (dispense gun)
611AKD1	Removable display & dispense unit, complete with wall bracket
611APR1	Printer for data collection
Cartridge Kit	See page 204-205

Sartorius TOC Instrument – Electronic Analyzer for Determination of the TOC Content of Ultrapure Water

Description

The arium® 611 TOC instrument is a stand-alone analyzer for exact determination of the TOC content of ultrapure water from one or more sources.

Measuring range

The measuring range of the TOC instrument is 1 to 300 ppb TOC. The instrument has three operational modes:

- **Automatic measurement**
  The instrument performs and displays measurements continuously.
- **Manual measurement**
  The instrument performs and displays three measurements in succession and then switches to standby to reduce water consumption.
- **Standby mode**
  The unit is switched on, but performs no measurements; no water passes through the unit. The last measured value remains on the display.

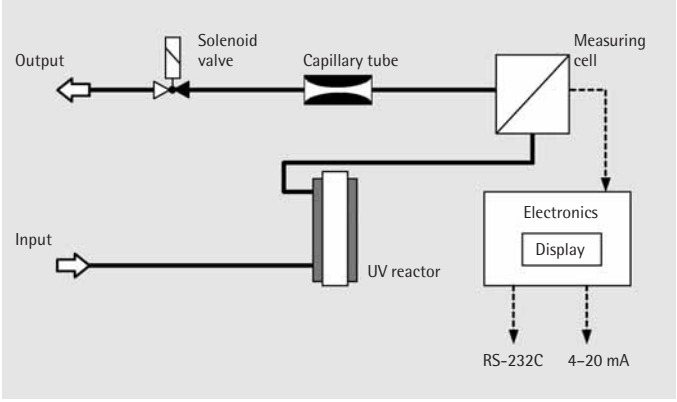
Easy handling

The TOC instrument features a display indicating current measured data and the software functions that you can select using two function keys.

RS-232C Interface|Analog Current Loop Interface (4–20 mA)

The TOC instrument is equipped with two output ports: RS-232C and 4–20 mA.
Using an RS-232C interface, you can output measured values to a PC or printer for further processing or documentation. To view the values on a PC, we recommend you use the HyperTerminal program integrated in the Windows operating system. The TOC value is printed with the date and time of the measurement.

Flow chart



Specifications

Requirements for feed water

Inlet pressure	1–4 bar max.
Temperature	5–30°C
Resistance	> 5 MΩ × cm
Electr. conductivity	< 0.2 µS/cm

Performance

Working range	1–300 ppb TOC
Display	0.5 increment for: 1–9.5 ppb 1 increment for >10 ppb
Accuracy	>15 MΩ × cm feed water: ± 15% or ± 1 ppb >5–15 MΩ × cm feed water: ± 20% or ± 3 ppb
Reproducibility	± 5% (for feed water >15 MΩ × cm) ± 10% (for feed water 5–15 MΩ × cm)
Operational requirements	unpressurized
Power supply	100–240 V~, 47–63 Hz
Operating voltage	12 volts
Power consumption (typical)	approx. 2.4 VA
UV lamp	Low-pressure mercury lamp with reflective measuring chamber
Operating temperature	10–30°C
Storage temperature	2–50°C
Dimensions	120 × 200 × 60 mm (H × W × D)
Total weight	1 kg

Ordering information

611ATOC1	TOC instrument with accessories, incl. 2 Minisart filters
6ZE---0001	Interface cable for connection to a PC or printer
16555-----K	Consumables Minisart filter, pore size 0.45 µm, pack of 50 filters

arium® Pressure Tanks – Product Water Storage Tanks for Reverse Osmosis System 61316 and Type 2 Water System 61215

Description
The arium® pressure tanks are designed to store water produced by the arium® 61316 reverse osmosis system and the 61215 Type 2 water system.

Each of these vessels is a completely enclosed pressure tank incorporating an internal diaphragm, which expands and contracts relative to the preset tank pressure and the volume of water in storage. An FDA-approved double butyl diaphragm isolates the product water within the pressure tank, ensuring water purity is maintained during storage.

Several benefits are gained by the use of a closed pressure tank:

- Contamination by airborne bacteria and gases is reduced.
- Tanks can be mounted in any position for delivery of water to optimize space and storage location.
- The pressurized reservoir is capable of delivering RO water directly to ultrapure water systems and other laboratory equipment without the need of an additional pump.

Specifications

Materials of construction	Exterior Reservoir Plumbing	Two part polyurethane | epoxy primed paint Patended double butyl diaphragm PE and PP
Operating pressure	Tank Standard precharge	0–10 bar | 0–146 psi max. 0–2.6 bar | 0–38 psi ± 0.3 bar | 5 psi
Operating temperature	5 °C–90 °C (41 °F–200 °F) Not to exceed 60 °C (140 °F) ambient	
Connectors	Inlet Outlet	6 mm (1/4") John Guest 9 mm (3/8") quick connect, 6 mm (1/4") NPT for optional pressure switch or outlet
Pressure gauge	0–700 kPa | 0–100 psi	
Shutoff valves	Manual ball valve and quick-disconnect shutoff valve included	
Certification	The arium® tanks meet CE and NSF [58] standards	

Order number

	Capacity @ 2.5 bar	Height	Diameter	Weight empty	Weight full
613APV31	30 litres 8 gallons	57 cm 23"	41 cm 16"	11 kg 24 lbs	41 kg 90 lbs
613APV70	70 litres 19 gallons	111 cm 44"	41 cm 16"	21 kg 46 lbs	91 kg 201 lbs
613APV100	100 litres 26 gallons	94 cm 37"	53 cm 21"	26 kg 57 lbs	126 kg 278 lbs

Optional accessory

Order no. 611APS1	Pressure switch to connect pressure tank to arium® 611 systems

arium® 613CPF05-------V – Reverse Osmosis Pretreatment Cartridge

Description
The Sartorius arium® 613CPF05-------V is an encapsulated cartridge, containing pretreatment media and a 5 µm depth filter as a convenient, one-piece disposable. Designed for installation within the arium® 61315 RO, the pretreatment cartridge removes free chlorine and particulate matter from the system's feed water to protect the RO membranes located downstream.

Features and benefits
Pretreatment packs utilize a patented design to encapsulate the treatment media and filter. This design simplifies installation and removal, reducing downtime to a minimum.

Water entering the pretreatment pack flows through the purification media bed before passing to a 5 µm depth filter. Down-flow operation over the media bed helps to remove larger particles and thus increase the service life of the particle-removing filter.

Special high-quality 20 × 50 mesh activated carbons are used to remove oxidizing agents. The small, particle-size carbons permit fast diffusion of contaminants and efficient adsorption or surface reaction. The small carbon particle size also allows more activated carbon mass, which results in longer service life.

A combination of proprietary catalytic media is an integral part of the pretreatment mix. The catalytic media are extremely efficient at removing free chlorine and less susceptible to the temperature and pH limits associated with activated carbon. The catalyst ensures optimum chlorine removal from low temperature and | or high pH feed waters. Added benefits of the catalyst include limited fouling, scale prevention and bacterial control. The catalytic action reduces hardness scale (calcium and magnesium) buildup on the membrane.

Specifications

Materials of construction	Housing Purification media	Virgin unfilled polypropylene – 20 × 50 mesh granular activated carbon – Chlorine	hardness catalyst – 5 µm [nominal] PP filter cartridge
Unit dimensions	Width Height Depth	18 cm (7") 26 cm (10.2") 11 cm (4.3")
Operation weight	3.5 kg	

Inlet feed water requirements
Potable tap water feed only

Minimum inlet pressure	1 bar	15 psi
Maximum inlet pressure	6.8 bar	100 psi
Hardness (max ppm $CaCO_3$)	360
Silt density index	< 5%
Turbidity	< 1 NTU
Iron (total as Fe)	< 0.1 ppm

Ambient temperature and humidity

Operation	5 °C - 28 °C (41 °F – 82.4 °F) 80% relative humidity
Storage	5 °C - 28 °C (41 °F – 82.4 °F) 80% relative humidity

Ordering information

Order number	Quantity
613CPF05-------V	2 cartridges

arium® 613CPM2--------V – Reverse Osmosis Membrane Modules

Description
The Sartorius arium® 613CPM2--------V reverse osmosis membrane modules are designed for installation within the arium® 61316 RO system. The arium® RO modules consist of two self-contained membrane-housings engineered for easy installation and reliable service. Each module contains a low energy thin film composite RO membrane (TFC) enclosed in a polypropylene housing. Each housing contains feed, permeate and concentrate water connections with internal flow control for membrane rinsing.

Features and Benefits
The arium® RO modules are designed to produce up to 380 liters per day of RO permeate water. The low-energy TFC membranes require less energy (pressure) to produce a higher quantity of water/hour than comparable membranes of the same size. This reduces running cost by consuming less electric power.

The RO modules typically produce greater than 50% permeate recovery, which conserves water while still providing 99% or greater salt rejection.

Each time the RO system shuts down with a full tank, the RO membranes are back-flushed with permeate water. Back-flushing with RO permeate water removes particles and potential scale forming salts from the membrane surface, promoting longer service life and reducing system maintenance. This back-flushing operation allows the RO membranes to be stored in RO permeate water instead of feed or mains water between service operations, which extends the service life of the membrane. At startup, the RO system will produce higher quality permeate water as compared to conventional systems that store membranes in feed water.

Reverse osmosis permeate or product water is ideally suited for use as feed water to a Type 1 lab water system (e.g. arium® 611) or other device requiring pretreated water.

Specifications

RO membranes	low-energy polyamide thin-film composite	
Housing	Polypropylene	
Unit dimensions	Height Diameter	30.8 cm (12.13") 7.8 cm (3.07")
Operation weight	468 g (1.03 lbs) each	
Feed pressure	Min Max	1 bar | 15 psi 6.8 bar | 100 psi
Temperature	5°C–30°C (41°F–86°F)	
Silt density index	< 3	
Iron (total as Fe)	< 0.1 ppm	
Hardness (max $CaCO_3$)	360 ppm or softened water	
Output	380 liters per day* (16 liters per hour) at 25 °C ± 20%	

* Depends on feed water quality and temperature

Ordering information

Order number	Quantity
613CPM2--------V	2 modules

arium® 611 Cartridge Kits – Disposables for Ultrapure Water

Description
The Sartorius arium® 611 cartridge kits are designed to be installed in the arium® 611 laboratory water purification systems. Each cartridge kit utilizes Sartorius patented technologies to provide ultrapure water that exceeds the ASTM Type 1 Reagent Grade Water Standards. Kits are designed to produce 18.2 MΩ×cm ultrapure water with a low TOC content. All cartridge kits contain 1 pretreatment pack, 1 polishing pack and 2 final filters.

Features and benefits
The cartridge packs are designed for down-flow operation to promote efficient purification kinetics and to prevent media separation. Inner tube diameters and volumes are engineered to cross-sectional fluid velocity and media bed contact standards.

The packs contain the highest quality granular and catalytic activated carbons. Only new semiconductor (electronics) grade, mixed-bed ion exchange resin is utilized in the cartridge kits. These kits have some of the highest ion exchange capacities in the industry, resulting in low operating costs.

Application specific media design
Each unique cartridge kit is designed for a specific feed water source and arium® model to provide the highest product water quality available. Special kits are engineered for the different and variable feed water characteristics expected from deionized, reverse osmosis or tap (mains) feed water sources. Purification media recipes are also specifically designed for arium® systems, utilizing ultraviolet (UV) radiation technology for the lowest total organic carbon (TOC) content. Ultraviolet systems can produce peroxides and ozone that can damage ion exchange resins.
A special catalytic material is used to remove peroxide and ozone downstream from the UV chamber. Kits for low TOC without the UV chamber and high capacity ion exchange are also available.

Specifications for arium® 611 cartridge kits

Materials of construction	Housing Connecting screws	Virgin unfilled polypropylene Stainless steel
Purification media	20×50 mesh granular activated and catalytic activated carbons. Semiconductor-grade ultrapure mixed bed ion exchange resin.	

Cartridge kit order number description

6	1	1	C	K	R	U

6 1 1 = arium® product line
C K = Consumables kit

R = Pretreatment pack (Pack 1)
- R = RO and distilled feed water
- D = Deionized | EDI feed water
- H = RO, distilled, deionized | EDI feed water, high capacity ion exchange
- T = Tap feed water

U = Polishing pack (Pack 2)
- I = Low inorganic application
- O = Low organic application for 611DI & 611UF systems
- U = Low organic application for 611UV & 611VF systems

Cartridge kit for 611DI and 611UF systems

Order no.	Feed water source	Grain capacity to 1.0 MΩ×cm as $CaCO_3$	Grain capacity to 10 MΩ×cm as $CaCO_3$	eq (val)
611CKDI	Deionized | EDI	1470	1323	67.4
611CKDO	Deionized | EDI	1260	1134	57.8
611CKRI	RO and distilled	1470	1323	67.4
611CKRO	RO and distilled	1260	1134	57.8
611CKHI	RO, distilled, deionized | EDI	1630	1467	74.8
611CKTI	Tap | mains	1470	1323	67.4
611CKTO	Tap | mains	1260	1134	57.8

Cartridge kit for 611UV and 611VF systems

Order no.	Feed water source	Grain capacity to 1.0 MΩ×cm as $CaCO_3$	Grain capacity to 10 MΩ×cm as $CaCO_3$	eq (val)
611CKDU	Deionized | EDI	1140	1026	52.3
611CKRU	RO and distilled	1140	1026	52.3
611CKTU	Tap | mains	1140	1026	52.3


Overlay
Sparger
4
3
2 L
SCHOTT
DURAN
500 ml

Cell Cultivation Systems

CERTOMAT® Benchtop Shakers

CERTOMAT® benchtop shakers, originally engineered by Sartorius BBI Systems, have proven their value for long-term use in microbiology, cell biology, pharmacology and chemistry laboratories world-wide.

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 for CERTOMAT® benchtop shakers
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

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

Order numbers for CERTOMAT® benchtop shakers

		230 V/50 Hz	115 V/60 Hz
CERTOMAT® MO II	12.5 mm	BBI-8860858	convertible
	25 mm	BBI-8860866	convertible
CERTOMAT® S II	25 mm	BBI-8862524	BBI-8862532
	50 mm	BBI-8862621	BBI-8862631
CERTOMAT® RM	25 mm	BBI-8862320	BBI-8862338
	50 mm	BBI-8862427	BBI-8862435
CERTOMAT® R	25 mm	BBI-8863024	BBI-8860130
CERTOMAT® U	25 mm	BBI-8863121	BBI-8860238
CERTOMAT® H	heating	BBI-8863202	convertible
CERTOMAT® HK	heat | cool	BBI-8863245	convertible

Literature for CERTOMAT® benchtop shakers

CERTOMAT® MO II	SB-1020-e
CERTOMAT® S II	SB-1005-e
CERTOMAT® RM	SB-1013-e
CERTOMAT® R	SB-1016-e
CERTOMAT® U	SB-1017-e
CERTOMAT® H/HK	SB-1024-e

CERTOMAT® Incubation Shakers

CERTOMAT® incubation shakers, originally engineered by Sartorius BBI Systems, 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 and a pre-step can be stored and protected with a password. Safety features include the memory function that stores the last set points and re-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 a 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 be run independently, at full speed.

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 for CERTOMAT® incubation shakers

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, 5×18 W fluorescent tubes

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

Order numbers for CERTOMAT® incubation shakers

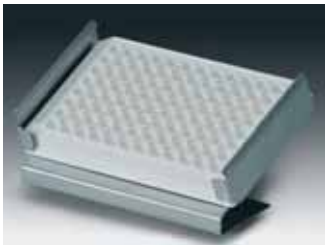
			230 V/50 Hz	115 V/60 Hz
CERTOMAT® IS	25 mm	heating	BBI-8864829	BBI-8864837
		heat|cool	BBI-8864845	BBI-8864853
	50 mm	heating	BBI-8864926	BBI-8864934
		heat|cool	BBI-8864942	BBI-8864953
CERTOMAT® BS-1	25 mm	heating	BBI-8865027	BBI-8865035
		heat|cool	BBI-8865221	BBI-8865230
	50 mm	heating	BBI-8865124	BBI-8865132
		heat|cool	BBI-8865329	BBI-8865337
CERTOMAT® BS-T	25 mm	heating	BBI-8865426	BBI-8865434
		heat|cool	BBI-8865620	BBI-8865639
	50 mm	heating	BBI-8865523	BBI-8865531
		heat|cool	BBI-8865728	BBI-8865736

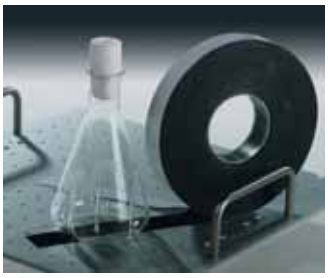
Literature for CERTOMAT® incubation shakers

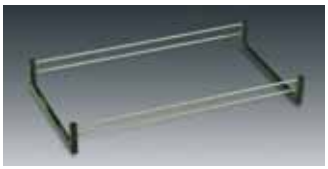
CERTOMAT® IS	SB-1019-e
CERTOMAT® BS-I	SB-1015-e
CERTOMAT® BS-T	SB-1014-e

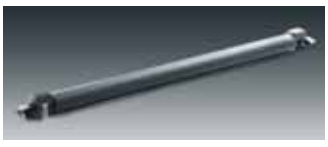
Accessories

Reference	Description
BBI-886 1455	Illumination unit for CERTOMAT® BS-1, 5×18 W, individually activated, programmable, only in combination with cooling
BBI-886 1463	Illumination unit for CERTOMAT® BS-T, 5×18 W, individually activated, programmable, only in combination with cooling
BBI-886 4489	Support frame for CERTOMAT® BS-T or two CERTOMAT® BS-1, welded sectional frame construction, height-adjustable feet
BBI-886 1471	Grid for Petri dishes, stainless steel, adjustable height, for use in CERTOMAT® BS-1
BBI-885 4416	Installation set for reference thermometer (Pt100), for CERTOMAT® BS-1 and CERTOMAT® BS-T
	Universal trays
BBI-885 3002	Type EU, 420×420 mm, for all CERTOMAT® shakers
BBI-885 3037	Type FU, 800×420 mm, for CERTOMAT® S II, RM, R, U, and CERTOMAT® BS-1 and BS-T
	Type E trays (420×420 mm) equipped with stainless steel clamps for Erlenmeyer flasks
BBI-885 3533	39 clamps for 100 ml flasks
BBI-885 3568	20 clamps for 250 ml flasks
BBI-885 3584	14 clamps for 500 ml flasks
BBI-885 3606	9 clamps for 1000 ml flasks
	Type E trays (420×420 mm) equipped with plastic clamps for Erlenmeyer flasks
BBI-885 3688	39 clamps for 100 ml flasks
BBI-885 3666	19 clamps for 250 ml flasks
BBI-885 3677	14 clamps for 500 ml flasks
	Type F trays (800×420 mm) equipped with stainless steel clamps for Erlenmeyer flasks
BBI-885 3738	74 clamps for 100 ml flasks
BBI-885 3762	40 clamps for 250 ml flasks
BBI-885 3789	26 clamps for 500 ml flasks
BBI-885 3800	15 clamps for 1000 ml flasks
	Stainless steel clamps for Erlenmeyer flasks, capacity for universal trays
BBI-885 4505	for 25 ml flasks, type EU max. 49 clamps, type FU max. 98 clamps
BBI-885 4513	for 50 ml flasks, type EU max. 48 clamps, type FU max. 96 clamps
BBI-885 4521	for 100 ml flasks, type EU max. 24 clamps, type FU max. 48 clamps
BBI-885 4556	for 250 ml flasks, type EU max. 17 clamps, type FU max. 39 clamps
BBI-885 4572	for 500 ml flasks, type EU max. 12 clamps, type FU max. 26 clamps
BBI-885 4599	for 1000 ml flasks, type EU max. 8 clamps, type FU max. 17 clamps
BBI-885 4610	for 2000 ml flasks, type EU max. 4 clamps, type FU max. 9 clamps
BBI-885 4629	for 3000 ml flasks, type EU max. 4 clamps, type FU max. 8 clamps
BBI-885 4637	for 5000 ml flasks, type EU max. 2 clamps, type FU max. 6 clamps
	Reinforced plastic clamps for Erlenmeyer flasks, capacity for universal trays
BBI-885 4700	for 100 ml flasks, type EU max. 20 clamps, type FU max. 58 clamps
BBI-885 4711	for 250 ml flasks, type EU max. 20 clamps, type FU max. 40 clamps
BBI-885 4722	for 500 ml flasks, type EU max. 16 clamps, type FU max. 26 clamps
BBI-885 4733	for 1000 ml flasks, type EU max. 9 clamps, type FU max. 15 clamps
	Stainless steel clamps for Fernbach flasks, capacity for universal tray
BBI-885 4564	for 450 ml flasks, type EU max. 6 clamps, type FU max. 15 clamps
BBI-885 4600	for 1800 ml flasks, type EU max. 1 clamp, type FU max. 6 clamps
BBI-885 4640	for 2800 ml flasks, type EU max. 1 clamp, type FU max. 6 clamps



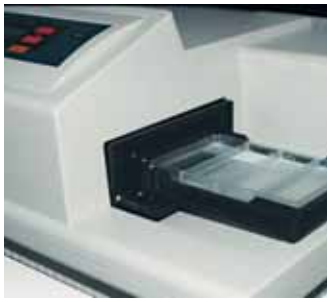


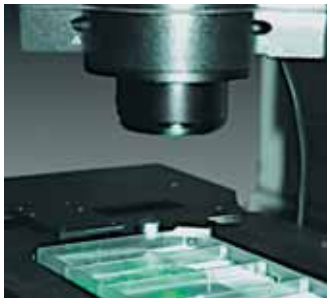


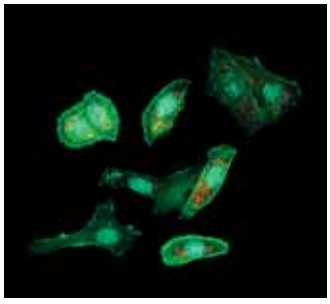


Reference	Description
	Hinged racks for test tubes, stainless steel, max. 4 racks on EU tray, 8 racks on FU tray
BBI-885 3134	for 64 test tubes 14 mm ∅
BBI-885 3142	for 42 test tubes 16 mm ∅
BBI-885 3150	for 36 test tubes 18 mm ∅
BBI-885 3169	for 33 test tubes 20 mm ∅
BBI-885 3185	for 18 test tubes 25 mm ∅
BBI-885 3177	for 16 test tubes 30 mm ∅
	Hinged racks, low built version for centrifuge tubes, max. 4 racks on EU tray, 8 racks on FU tray
BBI-885 3088	for 42 centrifuge tubes 16 mm ∅
BBI-885 3096	for 36 centrifuge tubes 18 mm ∅
BBI-885 3193	for 33 centrifuge tubes 20 mm ∅
BBI-885 3240	for 16 centrifuge tubes 30 mm ∅
	Holders for microtiter plates, stainless steel
BBI-885 0321	for 1 standard 96-well plate or deepwell plate standard plates: max. 12 holders on EU tray, 21 holders on FU tray deepwell plates: max. 9 holders on EU tray, 18 holders on FU tray
	Sticky tape for universal trays
BBI-886 4497	Standard, roll of 50 m, 30 × 1 mm
BBI-886 0416	Premium, roll of 10 m, 30 × 1 mm, repeated use
BBI-886 4470	Anti-skid layer,380 × 450 mm, for individual cut
	Universal mounting system
BBI-885 4238	Basic element type B-2 for EU tray
BBI-885 4246	Basic element type B-3 for FU tray
BBI-885 4254	Clamping rod type U max. 4 rods on basic element B-2, 7 rods on basic element B-3
	Shaking flasks, DURAN glass, Erlenmeyer type, straight rim for metal caps, with 3 baffles
BBI-886 1005	300 ml flasks, max. diameter 87 mm, height 161 mm, pack of 10
BBI-886 1013	500 ml flasks, max. diameter 105 mm, height 183 mm, pack of 10
BBI-886 1021	1000 ml flasks, max. diameter 131 mm, height 232 mm, pack of 10
BBI-886 1022	2000 ml flasks, max. diameter 166 mm, height 305 mm, pack of 10
	Metal caps for shaking flasks
BBI-886 1099	Aluminium caps, pack of 10
BBI-886 1102	Stainless steel caps, pack of 10
	Shaking flasks, DURAN glass, Erlenmeyer type, narrow neck for plugs, with 3 baffles
BBI-886 0998	500 ml flasks, max. diameter 131 mm, height 232 mm, pack of 10

Vivadish, a Versatile Plate for Multiwell Cell Culture and for Parallel Handling of Glass Slides







Vivadish is a tiny lab helper with four parallel chambers that enable multiple simultaneous cell culture experiments or a series of cell fixation and staining steps to be performed in one plate.

Two surface qualities for multiwell cell culture
Vivadish is available with two different surfaces: microbiological grade polystyrene for non-adherent cell culture, or tissue culture grade surface to support growth of adherent cells. The dishes therefore serve as single-use multiwell cell culture plates. The excellent optical quality of both Vivadish base and lid allows the microscopic inspection of the cells during culture as well as in situ examination by fluorescence-based assays after their staining.

Four parallel chambers to accommodate standard microscope slides
A variety of cell-based laboratory techniques, like karyotyping, cytotoxicity assays and FISH, require parallel sample processing onto glass slides. Vivadish microbiological grade serves as the all-in-one solution for the simultaneous preparation of four slide mounts and their subsequent analysis by high resolution microscopy. Each of the four Vivadish chambers features a V-shaped indentation to facilitate easy handling and removal of the slides. Vivadish is also suitable for experiments employing glass-slide arrays.

Standard format for convenient handling
Vivadish outer dimensions comply with the standards of the Society of Biomolecular Screening (SBS). The plate fits into standard plate readers, microscope stage adapters for multiwell plates and automated plate handling devices.

An optimal surface-to-volume ratio assures minimal space consumption when Vivadish is stacked in standard cell culture incubators. Vivadish is supplied in 10-unit sterile packs (gamma-irradiated) and is certified DNase-free, RNase-free and non-pyrogenic.

Specifications

	Microbiological grade	Cell culture grade
Material (dish and lid)	Crystal grade polystyrene	Crystal grade polystyrene
Surface quality	Hydrophobic (contact angle 90-95°)	Glow discharge treated (contact angle 55-65°)
Outer dimensions W×L×H (mm)	85.5×127.5×13.5	85.5×127.5×13.5
Single chamber dimensions W×L×H (mm)	28×78×7.2	28×78×7.2
Suggested working volume per chamber (ml)	7 (with slide) * 10 (without slide) *	5
Maximal working volume per chamber (ml)	7 (with slide) 10 (without slide)	10

* for identical volume level

Ordering information

Order numbers	Vivadish Rectangular 4-chamber dish with lid, crystal grade polystyrene	Pack size
VS-CC102161101	microbiological grade	1×10
VS-CC102161104	microbiological grade	4×10
VS-CC102161120	microbiological grade	20×10
VS-CC102163101	tissue culture quality	1×10
VS-CC102163104	tissue culture quality	4×10
VS-CC102163120	tissue culture quality	20×10

SuperSpinner – Disposable Membrane Aeration
SuperSpinner S – Suspension Cultivation

The SuperSpinner is the next generation of incubator-based cell cultivation devices. Advanced technology, ease of operation and low cost make the SuperSpinner ideal for cell culture experiments. University, hospital and biopharmaceutical research laboratories can use the SuperSpinner for the production of biologicals, including monoclonal antibodies. Sartorius BBI Systems (BBI) has developed a new polycarbonate membrane holder with an integrated magnet.

Functional principles and application
The SuperSpinner is equipped with a patented bubble-free aeration system that also functions as a stirrer. This aeration technology has been proven for several years in various stirred tank bioreactors. The increased efficiency and improved productivity make the SuperSpinner the logical choice for replacing roller bottles and spinner flasks as well as mouse ascites techniques.

Configuration of the SuperSpinner S
The SuperSpinner consists of a 1 liter glass bottle. In addition, a setup with a 0,5 L glass bottle is also available. The center port contains the membrane aeration stirrer (MAS) and additional ports for feed, sampling and | or harvest connections. The SuperSpinner mounts on a magnetic drive platform.

The membrane aeration stirrer is the highlight of the system. It consists of a frame wrapped with polypropylene (OXYPHAN®) tubing. Gas is pumped through the tubing via an air pump. Exhaust gas passes through a wash bottle. Temperature, dissolved oxygen and pH in the SuperSpinner are controlled by the incubator´s controlled environment.

Mode of operation
The complete setup is sterilized in an autoclave. Once cooled, the SuperSpinner is filled with medium. If necessary, this operation may be performed outside of a laminar flow hood using one of the ports in the center of the SuperSpinner and a pair of optional sterile connectors (female connector, Part no. BB-08809410, male connector, Part no. BB-08809402).

Inoculation can be conducted in the same manner using the same sterile connectors. The SuperSpinner is then placed in an incubator on a magnetic drive platform. Aeration is initiated by switching on the air pump.

Benefits of the new SuperSpinner disposable membrane aeration
- Tested and proven
- Easy to change
- Disposable
- No cleaning of aeration system necessary
- Constant quality
- FDA certificate included

Material
10 m (segmented) aeration membrane made of Polypropylene, hydrophobic, d_a 380 µm, d_i 280 µm, pore size 0.2 µm

Ordering information SuperSpinner S

8824503	SuperSpinner S 500
8824562	Membrane aeration system S 05 disposable
8824511	SuperSpinner S 1000
8824843	Membrane aeration system S 10 disposable
8810079	Air inlet | Exhaust filter, Midisart® 2000

SuperSpinner – Disposable Membrane Aeration Combined with Microcarrier Application SuperSpinner C

The SuperSpinner C is the next step into microcarrier application. This technology makes the SuperSpinner ideal for experiments with microcarriers. Various types of microcarriers can be used. Sartorius BBI Systems (BBI) has developed a new polycarbonate membrane holder with an integrated magnet and an insert for microcarriers. The aeration membrane is wound around the insert for microcarriers. The holder for the microcarriers is made of polyester, the mesh size is 100 µm. The insert can be filled with various types of microcarriers which are applicable and commercially available.

Functional principles and application
The mode of operation of the SuperSpinner C is similar to the operation of the SuperSpinner S. Once the microcarriers are filled into the module, they can be inoculated with surface dependent cells. After a period of gentle mixing, cells attach to the microcarriers and grow under very smooth conditions protected in the module. The polyester mesh, which separates the cells attached to the microcarriers and the medium, is 100% permeable for nutrients. Cell derived products, free-suspended cells, oxygen and carbon dioxide can easily pass the polyester mesh. Due to the tumbling movement of the insert, cells are sufficiently supplied with all necessary medium components and oxygen.

This technology has been proven for several years in various types of fixed bed and fluid-bed bed bioreactors.

Configuration of the SuperSpinner C
The SuperSpinner C consists of a 1 liter glass bottle. The center port contains the insert for microcarriers, which is horizontally wound with aeration tubing. Additional ports for feed, sampling and | or harvest connections are also included. The SuperSpinner mounts on a magnetic drive platform.

Mode of operation
The bottom plate of the microcarrier insert is fixed by a screw and can be dismantled. The bottom plate can be removed and the microcarrier suspension can be filled into the chamber.

The complete setup is sterilized in an autoclave. Once cooled, the SuperSpinner is filled with medium. If necessary, this operation may be performed outside of a laminar flow hood using one of the ports in the center of the SuperSpinner and a pair of optional sterile connectors (female connector, Part no. BB-08809410, male connector, Part no. BB-08809402).

Inoculation can be conducted in the same manner using the same sterile connectors. The SuperSpinner is then placed in an incubator on a magnetic drive platform. Aeration is initiated by switching on the air pump.

Ordering information SuperSpinner C

8824570	SuperSpinner C 1000
8824546	Membrane aeration system C 10 disposable
8810079	Air inlet | Exhaust filter, Midisart® 2000

Additional equipment for the SuperSpinner S and C

8824720	Membrane pump for aeration
8824827	Magnetic drive for SuperSpinner
8809410	STT-Connector half, female 2 mm
8809402	STT-Connector half, male 2 mm
8809267	Slot membranes for STT connectors
39971082	Silicone tubing 1.6 × 1.6 mm

For operation under cGMP-conditions

8824703	Magnetic drive with remote control
8824711	Remote control Biomodule 40 B

Biostat®A plus... plug in and grow
The BIOSTAT®A plus is a compact, autoclavable fermentor | bioreactor system specially designed for educational use and preliminary or investigational R&D applications. The single housing design concept with integrated measurement and control hardware, pumps, temperature, gassing and motor systems, saves valuable laboratory bench space.

The application-driven, configured packages for microbial and cell culture include everything needed for to get started immediately. The BIOSTAT®A plus is available with 1 L, 2 L, or 5 L working volume single wall culture vessel. Just select the size that meets your needs today – it can be interchanged for another vessel, if needed. Each system also includes a powerful Notebook PC with local control software, as well as our MFCS/DA software package for simultaneous control and data collection.

The BIOSTAT®A plus is ideal for:
- Microbial culture – growth of bacteria, yeast and fungi
- Cell culture – growth of animal, insect and plant cells
- Transition from shake or tissue culture flasks
- Small-scale protein expression
- For education and research

Features
- Ready-to-use packages for microbial or cell culture applications
- Inclusive Notebook PC for operation
- Control of temperature, pH, DO, stirrer speed, gas mixing, Foam | Level and substrate
- Configurable 2-stage DO controller via stirrer speed, gas mixing or substrate
- In-line pH calibration
- Trend display
- 4-gas mixing system with individual gas flow path for cell culture packages
- Oxygen enrichment capability for microbial packages
- Interchangeable culture vessels with 1 L, 2 L or 5 L working volume
- Industry proven hardware
- Powerful PC operating software – capable of handling up to four units
- MFCS/DA data storage and plotting software package
- Easy to follow step by step installation and user guide

Technical specifications

Basic housing (dimensions W × H × D [mm])	210 × 455 × 425 mm (8½ × 18¼ × 17 in)	
Space requirements per culture vessel (inner autoclave dimension Diameter × Height)	1 L	220 × 500* mm (9 × 20* in)
	2 L	250 × 550* mm (10 × 22* in)
	5 L	280 × 700* mm (11¼ × 28* in)

Utilities

Power supply	120 VAC or 230 VAC
Gases	Controlled @ 1.5 barg; dry, particle and oil-free
Water	Controlled @ 2 barg
Drain	gravity drain with zero backpressure required

* Optional flexible adaptor for the exhaust cooler (8844593) is available to reduce autoclave height requirement

Ordering information

Description	BIOSTAT®A plus Microbial packages			BIOSTAT®A plus Cell culture packages		
Culture vessel	1 L	2 L	5 L	1 L	2 L	5 L
Cat. No. 120 VAC	8843815	8843817	8843819	8843823	8843825	8843827
Cat. No. 230 VAC	8843814	8843816	8843818	8843822	8843824	8843826
Culture Vessel						
Total volume [L]	1.6	3.0	6.6	1.6	3.0	6.6
Working volume [L]	0.4–1.0	0.6–2.0	0.4–5.0	0.4–1.0	0.6–2.0	0.4–5
Culture vessel tripod	•	•	•	•	•	•
Stirrer shaft with sealing	•	•	•	•	•	•
6-blade disk impeller (Rushton impeller)	2	2	2	–	–	–
3-blade pitched impeller (Marine type)	–	–	–	1	1	1
Agitation [rpm]	20–1200	20–1200	20–800	20–1200	20–1200	20–800
Baffle cage	8846375	8846812	8846820	8846375	8846812	8846820
Storage bottle 250 mL	3	3	1	3	3	1
Storage bottle 500 mL	–	–	2	–	–	2
Bottle rack	8846464	8847428	8847436	8846464	8847428	8847436
Air inlet and exhaust filter	2	2	2	3	3	3
Aeration tube with ring-sparger	•	•	•	–	–	–
Aeration tube with µ-sparger	–	–	–	•	•	•
Inoculation port	•	•	•	•	•	•
Exhaust cooler	•	•	•	•	•	•
4-way addition fitting	•	•	•	•	•	•
Fitting for overlay aeration	–	–	–	•	•	•
Sample|Harvest pipe	•	•	•	•	•	•
Manual sampler	•	•	•	•	•	•
Cooling finger	•	•	•	8846456	8847819	8847827
Heating blanket	•	•	•	•	•	•
pH Electrode, cable	•	•	•	•	•	•
DO Electrode, cable	•	•	•	•	•	•
Temperature sensor with pocket	•	•	•	•	•	•
Foam | Level probe, cable	•	•	•	•	•	•
Spare parts kit	34090422	34090424	34090426	34090422	34090424	34090426
Basic unit						
Digital controller	•	•	•	•	•	•
Control capabilities for temperature, pH, DO (2 stage cascade), stirrer speed, combined Level | Foam controller, substrate*	•	•	•	–	–	–
Rotameter for air [l/min]	0.16–1.6	0.42–4.2	1.3–13	–	–	–
O2 Enrichment	•	•	•	•	•	•
Gassing with individual gas flow path, control valve and rotameter; N2 without automatic control valve						
Air & N2 [ml/min]	–	–	–	16–166	33–333	50–500
O2 & CO2 [ml/min]	–	–	–	3.3–33	16–166	33–333
Peristaltic pumps (integrated)	3	3	3	3	3	3
Balance for weight measurement of culture vessel	8843513	8843513	8843513	8843513	8843513	8843513
Tubing, O-Ring spare set	•	•	•	•	•	•
Control PC and Software						
Notebook PC for operation	•	•	•	•	•	•
PC operation software package	•	•	•	•	•	•
SCADA Software MFCS/DA	•	•	•	•	•	•

• = included, – = not included, Cat. No. = option
* Functionality only with optional system extensions


RPM

Homogenizers and Centrifuges

Homogenizers

Laboratory work often requires that a sample is prepared for subsequent analysis by homogenization. This may simply mean mixing liquids, but more often it means destroying the structure of biological materials 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 must be treated with different homogenizers. For this reason, Sartorius offers a wide range of homogenizers for different applications.

The laboratory ball mills, Mikro-Dismembrator U and S, are widely used for disruption of brittle materials such as hair or bone, but also of frozen tissue samples e.g. from biopsies. The Mikro-Dismembrator S, recently redesigned for high-performance applications, is particularly suited for rapid and complete sample homogenization with a maximum shaking frequency of 3,000 min^{-1}. For operation, a shaking flask and grinding balls or glass beads are required.

The Potter S is known world-wide as a tool for disruption of soft tissues and cells. Due to its gentle action it even can be applied for isolation of intact cell nuclei. It also can be used for disaggregation of bacterial colonies in the course of testing of surface disinfectants. Homogenization cylinders and pestles for sample volumes between 2 ml and 60 ml are available. An integrated cooling vessel allows to control sample temperature during homogenization.

The LABSONIC® homogenizers are applied for disintegration of all kinds of cells by ultrasound, but also for shearing of macromolecules such as DNA. The instruments combine all required components in one unit – a unique concept that saves valuable bench space. Sonication amplitude and duty cycles can be set continuously. The titanium sonotrodes are monitored automatically for their length, and the frequency is adjusted for optimum power output, which allows for longer service life of the probes.

The LABSONIC® M is a convenient, handheld instrument for fast sonication with up to 100 W output. Due to its innovative design, probes as small as 0.5 mm diameter can be used for sonication of very small volumes e.g. in microcaps. The maximum sample volume is about 750 ml, larger samples can be processed in a flow cell.

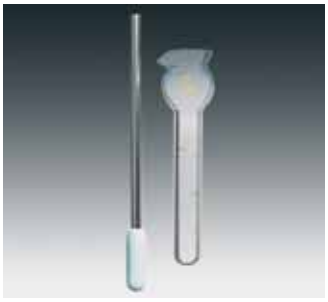
The LABSONIC® P with a maximum output of 400 W allows processing of samples up to 4 Liters or even 50 L/hr using a flow cell. At the same time, organisms resistant to many other treatments, such as Pichia pastoris, can be reliably disintegrated.

A large variety of sonotrodes is available for both LABSONIC® instruments as well as autoclavable flow cells and a sonication cup for indirect sonication. Although the working frequency is well above hearing level, use of a sound dampening box can be considered for increased user comfort. Both LABSONIC® homogenizers can be connected to a PC via the PC control cards for recording of power output and temperature.

Hand homogenizers are frequently used for simple sample preparation such as tissue disruption. A range of Dounce type models from 1 ml to 60 ml is available with wide or narrow gap.

Order numbers for homogenizers

	230 V, 50–60 Hz	115 V, 50–60 Hz
Mikro-Dismembrator U	BBI-8531722	BBI-8531730
Mikro-Dismembrator S	BBI-8531609	convertible
Homogenizer Potter S	BBI-8533024	BBI-8533032
LABSONIC® M, 100 W	BBI-8535027	BBI-8535035
LABSONIC® P, 400 W	BBI-8535108	BBI-8535116



Accessories for homogenizers

Mikro-Dismembrator U | S	Shaking flasks made of PTFE or stainless steel, 3 ml to 20 ml, with cap or screw plug, containers for disposable tubes. Grinding balls made of chromium steel or Tungsten carbide ∅ 3 mm to 10 mm. Glass beads ∅ 0.1 mm to 1 mm.
Potter S	Homogenizer vessels made of borosilicate glass, complete with glass plungers, 2 ml to 60 ml. Glass cylinders and PTFE plungers, 2 ml to 60 ml.
LABSONIC® M	Probes made of Titanium, ∅ 0,5 mm to 10 mm. Flow-through cell with cooling connection. Sound-dampening chamber Timer PC-Control for recording of output or output|temperature
LABSONIC® P	Probes made of Titanium, ∅ 3 mm to 40 mm Flow-through cell with cooling connection Sonicator cup for indirect sonication Sound-dampening chamber Timer PC-Control for recording of output or output|temperature

For further information, please contact your local sales representative.

Literature for Homogenizers	
Mikro-Dismembrator U | S	SB-1001-e
Potter S	SB-1022-e
Labsonic M | P	SB-1021-e
Hand Homogenizers	SB-1025-e

Laboratory Centrifuges

Sartorius offers a comprehensive line of centrifuges ranging from small centrifuges for reaction vials to floor-standing models with a capacity of up to 12 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 tracks and displays the time spent for this run. This makes it 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 makes it possible to define and store individual centrifuge runs.

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

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 inquire with your local representative for details, and for our comprehensive catalogue. Instruments for 115 V/60 Hz are available on request.

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

Guide on selection of centrifuge models

Model	Refrig.	Max. speed angle rotor	Max. speed swing out rotor	Suitable tubes (ml)
1-14	no	14,800	13,000	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	4,000	4,000	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
3-18	no	18,000	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
8K	yes	10,500	5,100	0.2 to 1000, microtiter, blood bags

n.a. = not applicable

Special brochure available on request. Order no. SL-1512-a

Filter Integrity Testing Systems

Sartocheck® Junior BP plus
The Battery-Operated Diffusion and Bubble Point Tester

This automatic, microprocessor-controlled 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
- Documentation of the data measured via printer
- Battery-operated (one charge of the batteries is sufficient to run at least 20 tests)
- Special program 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.....:     2004.01.10
Time.....:     01.52 PM W

Test record
===========

Operator.....:Miller.....
Product......:Inf.2.....
Prod. batch no.:23a.....
Filter type....:S-bran.....
Filter lot no..:490005.....
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%

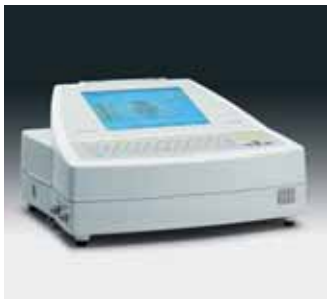
Type of protection against splashes of water: IP 54.
An example of a test record is seen on the left. In order to increase the test transparency and to ensure the detectability of the results, net inlet volumes, test pressure (actual value), pressure drop value and test time are also documented.

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 liter reference tank. Color ribbon cassette. Paper roll. Operating instructions. Test certificate. Calibration certificate.

Special data sheet available on request. Order no. SPI2003-e

Sartocheck® 4
A Touch of Real Class



Description
Sartocheck 4 is the further development of the most successful filter integrity tester of its class, the Sartocheck 3. Based on the straightforward operator concept that distinguished its predecessor, Sartocheck 4's user-friendliness has been improved even more thanks to the following features:
- Touch screen
  Rapid and direct program selection and data entry on the display
- Large, color TFT display
  Clear and easy-to-read display data
- Standard PC keyboard design
  Familiar keyboard design
- Online assistance
  Immediate and direct help available in the display
- Straightforward menu guidance
  Quick and reliable handling
- External Pressure transducer and external valves
  Flexible operation
- Easy to clean
  Cleaning and drying of the internal valve block and internal reference vessel

Sartocheck 4 performs the following tests:
- Bubble point test
- Diffusion test
- Bubble point and diffusion (combination test)
- Pressure drop test
- Water intrusion test (WIT)
- Water flow test (WFT)
- Multipoint diffusion test

In compliance with 21 CFR part 11
The electronic archiving of processing data is currently one of the most critical subjects. Serving full justice to this topical issue, Sartocheck 4 complies with 21 CFR Part 11 in all relevant points:
- User management
- Data security
- Audit trail

Qualification
Sartocheck 4 qualification ensures that integrity tests to be conducted are carried out with high precision and accurate reproducibility. Our comprehensive Sartocheck 4 validation documentation provides the necessary support for the user. Our technical support specialists are additionally available to help on-site.

Technical specification

Power requirements	100 – 240 V AC, 50/60 Hz	
Maximum power input	74 watts	
Maximum operating pressure	9999 mbar | 145 psi	
Minimum inlet pressure	4000 mbar | 58 psi	
Dimensions (W × D × H1 × H2)	460 × 390 × 140 × 245	
Measuring ranges	Test pressure Pressure drop System inlet volume – with internal ref. Vessel – with external ref. Vessel	100-8000 mbar | 1,5-116 psi 1-2000 mbar | 0,01-29 psi 9000 ml max. 100 l
Measuring accuracy	Pressure Pressure drop Volume determination Diffusion Water intrusion Bubble point	± 0,1 % full scale ± 9,5 mbar ± 1 mbar ± 4 % ± 5 % ± 5 % ± 50 mbar | ± 0,7 psi
Operating conditions	Ambient temperature Rel. humidity	+15 °C to +35 °C 10 – 80 %
Touch Screen	Size	10.4" TFT, features 256 colors
Communication Ports	Serial Port TU Serial Port MU PLC Port Network	RS232 RS485 binary signals 12 pins RJ45
Language option	English, German, French, Spanish, Italian	
Equipment supplied	Sartocheck 4 Tubing for compressed gas inlet Tubing for compressed gas outlet Ribbon cassette Rolls of printer paper Sartocontrol CD, Test certificate, Calibration certificate, Installation and operating instructions, Mains lead (country specific)	16288 18104 18103 6982141 6982142

Special brochure available on request. Order no. SPI1503-e

Sartocheck 4 MultiUnit
Next Generation of Filter Integrity Testing

Description
The Sartocheck 4 MultiUnit has been developed to enable parallel integrity testing of multiple filters in the biopharmaceutical industry. The MultiUnit is an identical copy of the Sartocheck 4, without the user interface and the data management system. Each MultiUnit connected to a Sartocheck 4 is operated and controlled by this Sartocheck 4 via a RS485 connection.

Efficiency
Up to 4 MultiUnits can be connected to one Sartocheck 4 allowing to integrity test up to 5 different filter systems in parallel including the testing capabilities of the Sartocheck 4 itself. Testing up to 5 filters in parallel allows to reduce the time required for filter integrity testing in bio-pharmaceutical production significantly and increases the efficiency of your production process.

Flexibility
There is no relevant distance limitation between the Sartocheck 4 and the connected MultiUnits. The MulitUnits can be placed all over your production facility and are centrally controlled and operated by the Sartocheck 4. A printout of the test results of the MultiUnit is made by the printer of the Sartocheck 4 and the test data can be transferred to a network for review and achiving.

Data transfer security
The Sartocheck 4 MultiUnit is an independent test unit with its own power supply, electronics and pneumatics. It will maintain the test results even if switched off or if the connection is lost until the handshake communication with the Sartocheck 4 confirms that the test results have been transferred successfully. If the MultiUnit is switched off during the test it will transfer a corresponding error message as soon as the communication has been automatically reestablished.

Traceability
The Sartocheck 4 test result printout contains the serial number of the MultiUnit, the user name (log-on identity), a unique file name and all the information that has been entered in the batch protocol. The included software, Sartocontrol, can be used to print the test results on an external printer in A4 format.

Patent pending thermal insulation
The Sartocheck 4 and its Multiunit feature a unique, patent pending separation of the electronic components and the temperature sensitive pneumatics in addition to the efficient vent fan. This superior solution avoids any thermal influence on the integrity test measurement from the unit itself.

Clean room venting adapter
The Sartocheck 4 and its MultiUnit can be equipped with an optional venting fan adapter that allows to contain the out coming air in order to avoid any dispersion of particles in a clean room.

Sartorius Validation Package
The MultiUnit is delivered with a comprehensive validation package including an IQ & OQ protocol that can be accomplished by qualified Sartorius personnel. Assistance for PQ can also be provided from the Sartorius Technical Support team.

Technical specifications

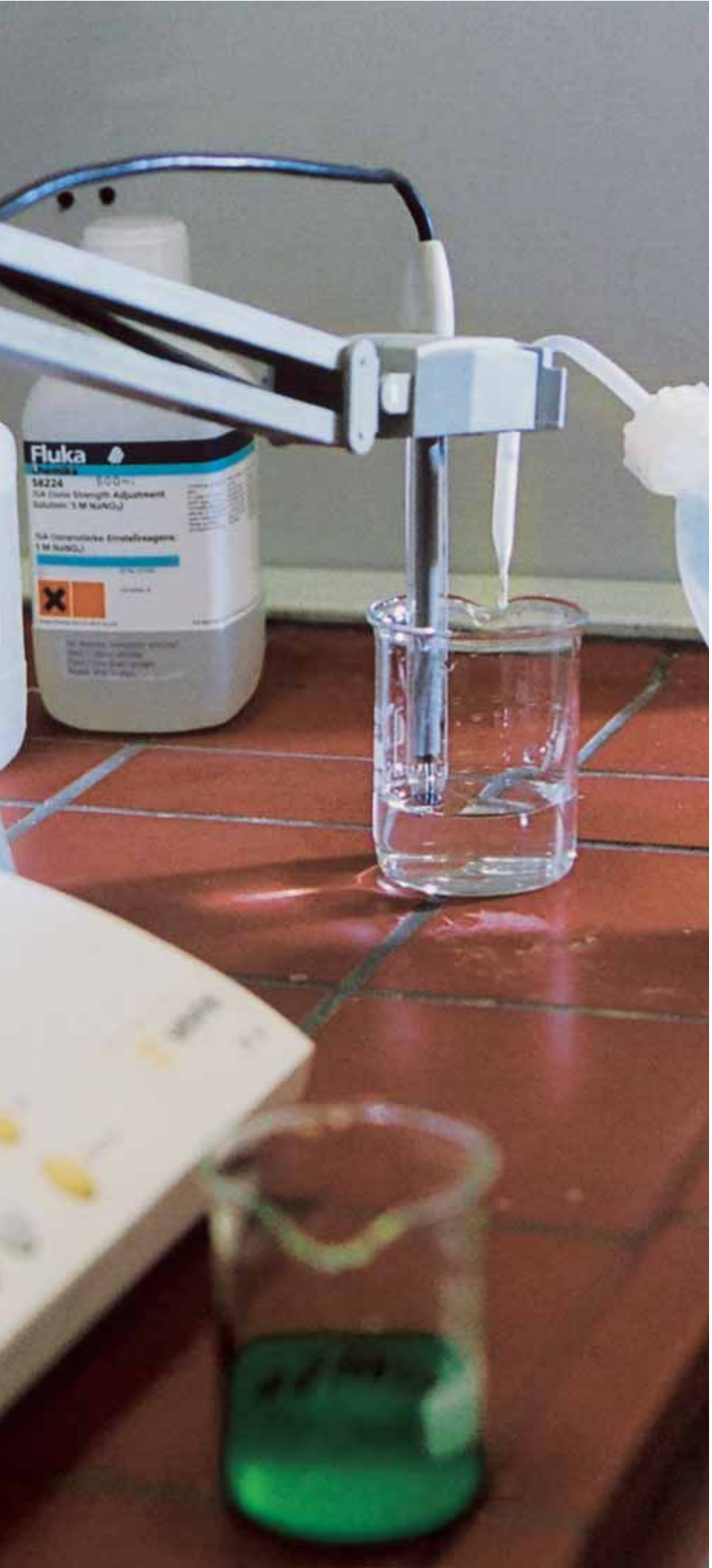
Power requirements	100 – 240 V AC 50/60 Hz	
Maximum operating pressure	9999 mbar | 145 psi	
Minimum inlet pressure	4000 mbar | 58 psi	
Measuring ranges	Test pressure Pressure drop System net volume – with internal ref. vessel – with external ref. vessel	100 – 8000 mbar | 1.5 – 116 psi 1 – 2000 mbar | 0.01 – 29 psi 9000 ml 100 l
Measuring accuracy	Pressure Pressure drop Volume determination Diffusion Water intrusion Bubble point	± 0.1% full scale ± 9.5 mbar ± 1 mbar ± 4% ± 5% ± 5% ± 50 mbar | 0.7 psi
Operating conditions	Ambient temperature Relative humidity Max distance between SC4 and multiunit (RS485)	+15 to + 35°C 10 – 80% 100 m
Equipment supplied	MultiUnit Tubing for compressed gas inlet Tubing for test gas Test certificate Calibration certificate Installation and operating instructions Validation package Mains lead (country specific)	16288---TU 18104 18103 16288---VP

Accessories

External pressure Transducer	1ZE---0018
Valve kit for ext. venting (1 valve)	1ZE---0025
Valve kit for WIT and | or external pressure sensor (3 valves)	1ZE---0026
Cleaning kit	16288---CK
Clean room venting adapter	1ZE---0021

Order information

Order number	16288---TU



Laboratory Equipment for Electrochemical Analysis

Sartorius DocuClip® & Docu-pH$_{Meter}$
The New Standard for Reliability in Electrochemical Analysis

Reliability starts with easy and comprehensible operation. With the newly developed Docu-pH$_{Meter}$ instruments, Sartorius is setting new standards in the determination and management of measured values. Equipped with a graphic display and easy-to-use soft keys, all Docu-pH$_{Meter}$ models are practical meters that make even complex laboratory tasks simple.

You can choose between "intelligent" electrodes connected to DocuClip® and standard electrodes with a BNC connector.

Comprehensive features – simple results

Graphical display and soft keys

Easy-to-understand menu-driven prompts in plain language

Defined function keys for the most common applications; no double-assigned keys

Fast mode for rapid results

Automatic recognition of DocuClip®

Automatic recognition of a variety of temperature probes

Serial interface for data transfer to computer or printer (Docu-pH+)

Memory capacity for 500 data records (Docu-pH+)

Give each of your electrodes their own identity. DocuClip® is a unique device that makes an electrode uniquely identifiable, in just seconds. Equipped with built-in memory for calibration data, DocuClip® works together with the Sartorius Docu-pH$_{Meter}$ to store essential electrode specifications over its entire service life.

Electrode data is automatically logged 100% at each measurement, and can be sent to a printer or exported to a computer for further processing.

Specifications

Temperature Measurement	**Docu-pH$_{Meter}$**	**Docu-pH$^{+}_{Meter}$**
Temperature range in °C	–5° to 105°C (23 to 221°F)	
Readability in °C	0.1	
Accuracy in °C	± 0.2	
Temperature compensation	Automatic or manual from –5° to 105°C	
Buffer recognition	Automatic: technical buffers, DIN | NIST buffers	
Calibration points, max.	3	
Date | time battery-supplied	–	×
Sample IDs	–	×
Calibration reminder	–	×
Complete GLP-compliant record/printout	–	×
Memory for measurement data	–	×
Communication with DocuClip®	×	×
Input for pH combination electrodes	BNC	BNC
Input for temperature probe:		
ATC 10 kΩ, ATC 30 kΩ, Pt1000	2.5 mm phone plug	2.5 mm phone plug
RS-232C interface	–	×
Dimensions in mm	89 × 229 × 145	
Weight in kg	1	

Specifications

pH Measurement	Docu-pH$_{Meter}$	Docu-pH$^{+}_{Meter}$
Measuring range	–2.000 to 20.000	–2.000 to 20.000
Readability	0.001 | 0.01 | 0.1 configurable	0.001 | 0.01 | 0.1 configurable
Accuracy	± 0.005	± 0.005

mV Measurement		
Measurement range in mV	–2,000 to 2,000	–2,000 to 2,000
Readability in mV	0.1 | 1 configurable	0.1 | 1 configurable
Accuracy in mV	± 0.2 < | 1,000 | ± 1 > | 1,000 |	± 0.2 < | 1,000 | ± 1 > | 1,000 |

Choice of Standard Features

Docu-pH$_{Meter}$	Order Number	
Measuring instrument incl. technical buffer, power supply, operating instructions	Docu-pH	Docu-pH+
...with electrodes and DocuClip® for unique, 100% traceable data recording		
pH electrodes with:		
Plastic body, refillable, fiber junction, ATC 10 kΩ	Docu-pH/PT10doc	Docu-pH+/PT10doc
Glass body, refillable, platinum junction, ATC 10 kΩ		Docu-pH+/P11doc
Plastic body, gel-filled, fiber junction, ATC 10 kΩ	Docu-pH/P12doc	Docu-pH+/P12doc
Plastic body, gel-filled, fiber junction	Docu-pH/P20doc	Docu-pH+/P20doc
Glass body, refillable, platinum junction		Docu-pH+/P11doc
...with conventional electrodes		
pH electrodes with:		
Plastic body, refillable, fiber junction, ATC 10 kΩ	Docu-pH/P10	Docu-pH+/P10
Glass body, refillable, platinum junction, ATC 10 kΩ		Docu-pH+/P11
Plastic body, gel-filled, fiber junction, ATC 10 kΩ	Docu-pH/P12	Docu-pH+/P12
Plastic body, gel-filled, fiber junction	Docu-pH/P20	Docu-pH+/P20
Glass body, refillable, platinum junction		Docu-pH+/P11
DocuClip® ...for unique, 100% traceable documentation of calibration for any pH electrodes; initialization by the user with Docu-pH$_{Meter}$ (Docu-pH+) required	DocuClip®	

Professional Meters – Multi-talented Instruments for the Most Sophisticated Measurement Tasks

pH | mV meters, ion meters, conductivity meters. Four models – with all options to meet the highest requirements.

Large, backlit multifunction graphical VGA 5.7" display

Measuring accuracy down to ± 0.1 mV

Automatic temperature compensation

Menu-driven operation with plain language prompts

Automatic recognition of 26 standard buffers (NIST and DIN, among others)

Automatic checking of your combination electrode

Automatic calibration reminder

Stability icon: stability parameters can be adapted to the measuring task at hand

Alarm alerts user to out-of-tolerance values

Help function always available by soft keys

Clear functions – clear advantages
Simultaneous display of a measured value and the temperature, also for parallel measurements of the pH and conductivity, for example

Research-grade – i.e., the highest – accuracy covering a broad range of concentrations

Excellent reliability and repeatability of the measured results

GLP | GMP | ISO-compliant documentation of the calibrations and results

Interface port for connecting a printer or a PC

PP-15 | pH meter for pH and ORP measurements
High resolution ensures even greater accuracy in electrochemical analysis.

PP-20 | pH and conductivity meter
In addition to pH measurement, the high-end PP-20 Professional Meter offers research-grade conductivity measurements.

PP-25 | pH and ion-selective meter
In addition to convenient pH measurement, the PP-25 features the added capability of research-grade ion-selective analysis for a wide range of concentrations.

PP-50 | pH meter, ion-selective meter and conductivity meter all in one unit
The fully professional PP-50 combines all features of the models presented in this catalogue. This convenient Professional Meter is designed for use in a broad range of applications in the field of potentiometric analysis.

Specifications

pH measurement	PP-15	PP-20	PP-25	PP-50
Measuring range	-2.000 ... 20.000	-2.000 ... 20.000	-2.000 ... 20.000	-2.000 ... 20.000
Calibration standards, max. number	5	5	5	5
mV measurement				
Measuring range in mV	±2,000	±2,000	±2,000	±2,000
Temperature measurement				
Measuring range in °C	–5 ... +105	–5 ... +105	–5 ... +105	–5 ... +105
Ion-selective analysis				
Measuring range	–	–	$1.00 \cdot 10^{-9}$ ... $9.99 \cdot 10^{9}$	
Direct potentiometric measurement and incremental modes	–	–	×	×
Calibration standards, max. number	–	–	7	7
Conductivity measurement*				
Measuring range in µS/cm	–	0.5 ... 20,000	–	0.5 ... 20,000
Specific electrical resistivity Measuring range in Ω · cm	–	50 ... $2.0 \cdot 10^{6}$	–	50 ... $2.0 \cdot 10^{6}$
Salinity Measuring range in ppt	–	0.01 ... 42.0	–	0.01 ... 42.0
NaCl concent Measuring range in ppt	–	0.01 ... 70.0	–	0.01 ... 70.0
TDS Measuring range in mg/l	–	0.005 ... 300,000	–	0.005 ... 300,000
Calibration standards, max. number	–	5	–	5
Manual temperature entry	×	×	×	×
Inputs for pH combination and ion-selective electrodes	BNC	BNC	2 BNC	2 BNC
Input for conductivity cells	–	DIN	–	DIN
Date & time stamp, non-volatile memory	×	×	×	×
Data memories	620	620	620	620
Meter dimensions in mm	265 × 200 × 100			

* Specifications based on a cell constant of 2.54 cm

pH/mV Meters – Reliable in All Applications

Basic Meter –
A strong basis featuring Sartorius quality
Four buttons do it all!

The user-friendly prompts and messages guide you fast and reliably through laboratory routines.

PB-11 Basic Meter
Easy 1-key calibration of 1, 2 or 3 calibration standards

Automatic buffer recognition

Automatic electrode test during calibration

Automatic temperature compensation

Easy-to-understand symbols and icons for reliable readings

Two kits are available with a choice of different equipment:

Meter with electrode holding arm, technical buffers, AC adapter and operating instructions plus

- Refillable pH electrode, PY-P10, with plastic body and integrated temperature sensor PB-11-P10
- Low maintenance pH electrode, PY-P20, with gel electrolyte PB-11-P20

Portable Meter –
Compact design – solid performance
It's easy to operate anywhere in the field where you need accurate measurements on the spot.

PT-10 Portable Meter
Independent of AC line current thanks to 9-volt battery operation (AC adapter optionally available)

Waterproof in conformance with IP65

Easy 1-key calibration of 1, 2 or 3 calibration standards

Automatic buffer recognition

Automatic electrode test during calibration

Automatic temperature compensation

Easy-to-understand symbols and clear liquid-crystal display ensure error-free reading

Weighs only 270 g

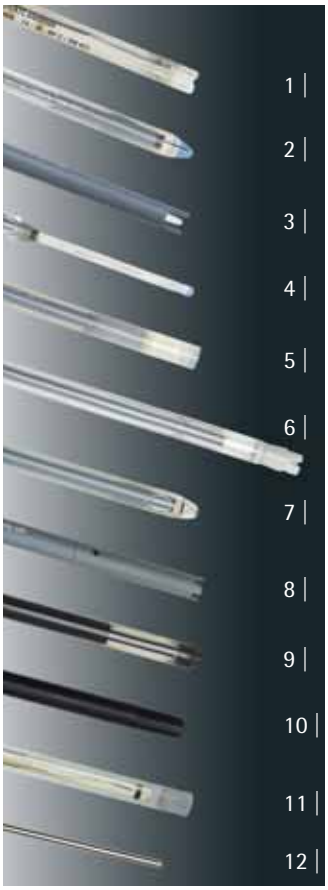
Two kits are available with a choice of different equipment:

Meter in a carrying case with 9-volt DC battery, technical buffers (90 ml with pH 7 and 90 ml with pH 4), 2 plastic sample containers, each with 60 ml, as well as

- With low maintenance combination electrode, PY-P12, gel-filled, fiber junction, built-in temperature sensor PT-10P
- With low-maintenance electrode, PY-P20, gel-filled, fiber junction PT-10-P20

Specifications

pH measurement	**Basic Meter PB-11**	**Portable Meter PT-10**
Measuring range	–1.99 ... 19.99	0.00 ... 14.00
Calibration standards, maximum number	3	3
mV measurement		
Measuring range in mV	–1,800 ... +1,800	–1,800 ... +1,800
Temperature measurement		
Measuring range in °C	–5 ... +105	–5 ... +105
Inputs for pH combination electrodes	BNC	BNC
Power source	AC adapter	9-volt battery or AC adapter
Meter dimensions in mm	230 × 120 × 80	165 × 95 × 33
Weight	1,390 g	270 g incl. battery



pH | ATC combination electrodes – glass membrane electrodes
All pH combination electrodes have an Ag | AgCl reference. The electrodes are supplied with a fixed cable and BNC connector; electrodes with a built-in temperature sensor additionally have a 2.5 mm phone plug.

Figure number	Order number	Construction	Built-in temperature sensor	pH range	Application
1	PY-P10	Plastic body; electrolyte: KCl 3 mol/l; free of silver ions; fiber junction	Yes	0 ... 14	Simple standard applications
2	PY-P11	Glass body; electrolyte: KCl 3 mol/l; free of silver ions; platinum junction; toughened, low-resistance glass	Yes	0 ... 14	All standard applications; TRIS-compatible
3	PY-P12	Plastic body, gel-filled, fiber junction	Yes	0 ... 14	Simple standard applications
3	PY-P20	Plastic body; gel-filled; fiber junction	No	0 ... 14	Simple standard applications
2	PY-P21	Glass body; electrolyte: KCl 3 mol/l; free of silver ions; platinum junction; toughened, low-resistance glass	No	0 ... 14	All standard applications; TRIS-compatible
4	PY-P22	Micro electrode (length 110 mm, diameter 5 mm); electrolyte: KCl 3 mol/l; free of silver ions; platinum junction; low-resistance glass	No	0 ... 14	Small sample quantity
5	PY-P23	Flat membrane electrode; glass body; gel-filled; annular gap junction; low-resistance glass	No	2 ... 13	Surface measurements; low sample quantity
6	PY-P24	High-performance electrode; glass body; electrolyte: KCl 3 mol/l, free of silver ions; adjustable sleeve junction for control of the flow rate of the KCl solution; low-resistance glass membrane	No	0 ... 14	Samples with a low ionic concentration; emulsions, suspensions with extreme pH values

ORP combination (redox) electrodes
This type of electrode has an Ag | AgCl reference. It is supplied with a permanently attached cable and a BNC connector.

Figure number	Order number	Construction	Built-in temperature sensor	pH range
7	PY-R01	Glass body; porous ceramic reference junction; platinum disc sensing element (4 mm diameter); electrolyte: KCl 3mol/l; free of silver ions	No	0 ... 14

Conductivity cells and multi-sense cell (pH, conductivity, temperature)
The conductivity cells are supplied with a permanently attached cord and an 8-pin DIN connector.

Figure number	Order number	Recommended measuring range	Construction	Built-in temperature sensor
8	PY-C01	0.5 µS/cm ... 2,000 µS/cm	4-band conductivity cell (platinum)	Yes
8	PY-C02	0.01 mS/cm ... 5 mS/cm	4-band conductivity cell (platinum)	Yes
8	PY-C03	1 mS/cm ... 200 mS/cm	4-band conductivity cell (platinum)	Yes
	PY-C12	1 µS/cm ... 300,000 µS/cm	4-band conductivity cell (graphite)	Yes
3	PY-PC1	0.01 mS/cm ... 5 mS/cm pH 0 ... 14	Combination electrode, 2-band cell (platinum); pH electrode with gel-filled electrode; temperature sensor; 12 mm diameter; 120 mm length	Yes

Ion-selective pH combination electrodes
All ion-selective electrodes are combination electrodes. They are supplied with a permanently attached cord and BNC connector.

Figure number	Order number	Ion	Measuring range in ppm	pH range
9	PY-I01	Fluoride (F^-)	0.05 ... 500	5 ... 5.5
10	PY-I02	Ammonia (NH_3)	0.02 ... 17,000	~ 8.5
11	PY-I03	Sodium (Na^+)	0.02 ... saturated solution	9 ... 12
9	PY-I04	Chloride (Cl^-)	1.8 ... 35,000	2 ... 12
9	PY-I05	Nitrate (NO_3^-)	0.4 ... 62,000	2.5 ... 11
9	PY-I06	Potassium (K^+)	0.04 ... 39,000	2 ... 12
9	PY-I07	Calcium (Ca^{2+})	0.2 ... 40,000	2.5 ... 11
9	PY-I08	Silver/sulfide (Ag^+/S^{2-})	0.003 ... 32,000 S^{2-} | 0.01 ... 108,000 Ag^+	>12 S^{2-} | 2 ... 8 Ag^+

Temperature compensating probe
NTC 10 kΩ stainless steel sensor with permanently attached cord and a 2.5 mm phone plug.

Figure number	Order number	Recommended for	Construction
12	PY-T01	Temperature measurement and automatic temperature compensation – for use with all electrodes without a built-in temperature sensor	Stainless steel body; 4.7 mm diameter; 120 mm length

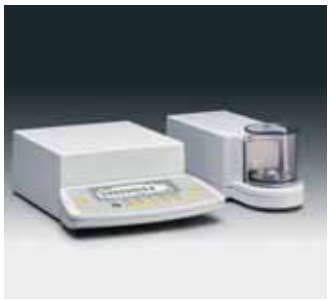
Accessories

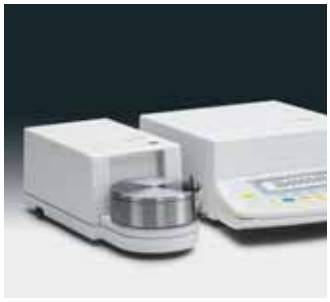
	Order number
Printer for Professional Meter and Docu-pH$_{Meter}$, Docu-pH+	YDP05-PH
Rolls of paper, set of 5, each with 50 m	6906937
Ink ribbon cassette	6906918
pH buffers	
50 capsules per pkg.; dissolve contents of each capsule in 100 ml of distilled water	
pH = 4.01 ±0.02 at 25°C	PY-Y01
pH = 7.00 ±0.02 at 25°C	PY-Y02
pH = 9.00 ±0.02 at 25°C	PY-Y03
pH = 10.00 ±0.02 at 25°C	PY-Y04
Color-coded buffer solution in a twin-neck bottle; eliminates the need for using a beaker during calibration; traceable to NIST standards	
pH = 4.00 ±0.01 at 25°C, 500 ml	PY-Y21
pH = 4.00 ±0.01 at 25°C, 6×90 ml	PY-Y21-6
pH = 7.00 ±0.01 at 25°C, 500 ml	PY-Y22
pH = 7.00 ±0.01 at 25°C, 6×90 ml	PY-Y22-6
pH = 10.00 ±0.01 at 25°C, 500 ml	PY-Y23
Storage solution, for pH combination electrodes, 500 ml	PY-Y05
Cleaning solution, pepsin | hydrochloric acid, 500 ml	PY-Y06
Electrolyte solution, KCl (3 mol/l), free of silver ions, 500 ml	PY-Y07
Conductivity standards, traceable to NIST Standards	
0.084 mS/cm ±1.0% at 25°C (KCl 0.0001 mol/l), 500 ml	PY-Y10
0.147 mS/cm ±1.0% at 25°C, (KCl 0.001 mol/l), 500 ml	PY-Y11
1.413 mS/cm ±1.0% at 25°C, (KCl 0.01 mol/l), 500 ml	PY-Y12
12.88 mS/cm ±1.0% at 25°C, (KCl 0.1 mol/l), 500 ml	PY-Y13
Equipment Qualification – IQ | OQ | PQ	
pH Meter Qualification (IQ|OQ)	8407pH
For each additional parameter	8407Para

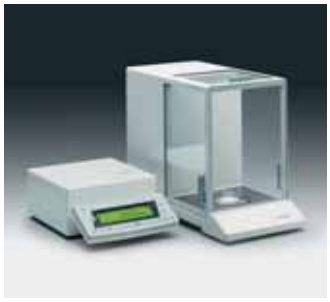

Max 410 g
0 %
370.0000 g
Tare
ABC
Setup
CF
1
2
3
4
5
6
7

Weighing Equipment for the Laboratory

Premium Ultra-micro- and Microbalances: SE2, ME5 and ME36S
Maximum Accuracy – Even for Minimum Sample Quantities







Sartorius premium microbalances meet the highest requirements when it's a matter of obtaining fast and exceptionally accurate results. These balances offer maximum support when used as inspection, measuring and test equipment within a quality system. The following performance features make your quality assurance procedures much easier:

SQmin function displays the allowable minimum sample weight according to the United States Pharmacopeia (can be activated by Sartorius Service)

Fully automatic calibration and adjustment feature, isoCAL

ISO | GLP-compliant recording

Input capability for alphanumeric sample IDs

All-glass draft shield
The motorized draft shield on the SE2 and ME5 is exclusively made of glass without any frame construction to obstruct your view of the weighing chamber. A special coating on the glass inside the chamber eliminates interfering factors – such as those caused by electrostatically charged objects.

Cleaning as easy as 1-2-3
In just one easy step, you can completely remove the draft shield. The weighing chamber base plate features smooth, easy-to-clean surfaces. Design features that really pay for themselves whenever absolute cleanliness is the No. 1 priority.

Easy to operate
The generously sized opening of the draft shield moves to any position desired – you can choose to operate the draft shield at the press of an ergonomic key using the ball of your hand, a foot switch (optional) or an external computer.

Fast results
With stabilization times of only 10 seconds, the SE2 and ME5 will save you valuable time during each weighing operation.

Bright display
The weight readouts are exceptionally easy to read on the backlit, high-contrast graphical display. Text prompts in plain English (and your choice of other languages) guide you quickly and confidently in configuring the balance, whenever you'd like to "do quite a bit more than just weigh."

Flexible
Each ultra-micro- and microbalance has 14 built-in application programs as standard features, such as:

Air buoyancy correction

Differential weighing program for up to 999 samples

Statistical evaluation

Featuring a readability of 1 µg, the new ME36S offers an exceptionally wide weighing range up to a capacity of 31 g, along with outstanding metrological specifications. As a result, it is ideal for highly accurate microweighing and for weighing micro-quantities into heavy tare containers, such as in ashing processes.

All balance-generated data can be logged via the standard RS-232C interface port.

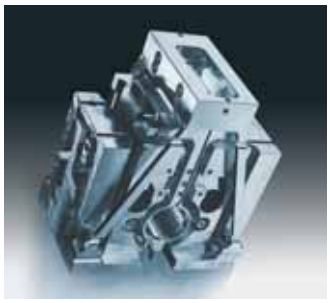
Filter weighing
Models ME5-F and SE2-F have been specially designed for weighing filters of up to 90 mm in diameter. The draft shield specifically constructed for this application is made completely of metal, thereby minimizing the interfering effects of static electricity.

Specifications

Model		SE2***	ME5***	ME36S***	SE2-F Filter balance	ME5-F Filter balance
Weighing capacity	g	2.1	5.1	31	2.1	5.1
Readability	µg	0.1	1	1	0.1	1
Repeatability (±)	µg	0.25	1	2	0.25*	1**
Max. linearity (≤ ±)	µg	0.9	4	10	0.9*	4**
Response time (average)	s	10	10	14–18	10*	10**
Weighing pan diameter	mm	20	30	30	50 or 20 (75 and 90 optional)	50 or 30 (75 and 90 optional)
Design		1	1	3	2	2

* with standard weighing pan 20 mm ∅
** with standard weighing pan 30 mm ∅
*** Models SE2, ME5 and ME36S are available in verified versions for use in legal metrology in the European Economic Area

Premium Semi-micro- and Analytical Balances: ME Series
When Results Count



Incomparably fast
An outstanding feature of the Sartorius ME series is speed: stable readouts with five decimal places in just eight seconds.

Operation of the ME draft shield is also designed for fast weighing. Controlled by palm-operable keys or by custom programming, the draft shield closes quietly, precisely and quickly. Its opening and closing position can be adapted to every weighing situation.

Incomparably stable accuracy
Repeatability of the weights measured is an additional strength of the Sartorius ME. Plus, the results are just as stable as the robotically etched 21st century weigh cell in the ME. For accuracy every time, all the time.

The Sartorius ME is amazingly impervious to the surrounding environment. Interfering static electricity on samples and tare containers can be neutralized at the touch of a key.

Incomparably reliable
Sartorius ME stands for reliability, year in, year out. That's why we are offering a three-year warranty, which we will extend on request for up to a total of five years.

Facts, and more facts
Exceptionally fast, rugged monolithic weigh cell

Three-part, motorized draft shield system

User-friendly palm-activated keys for draft shield operation; foot switch optional for applications where you need your hands free

Neutralizes static electricity

Prompts in clear English for operator guidance

Alphanumeric input capability for sample IDs

Software support for use in quality management systems

SQmin function displays the minimum allowable sample quantity in accordance with the United States Pharmacopeia (can be activated by Sartorius Service)

Display of the uncertainty of measurement according to the German Calibration Service (DKD)

ISO|GLP-compliant, user-configurable records|printouts

Built-in applications
Built-in software supports all key laboratory weighing applications. As a result, this ensures smooth, time-saving lab procedures and reliable results.

Density determination

Calculation of weights using a definable factor or equation

Statistical evaluation

Differential weighing

Air buoyancy correction

Air density determination

Specifications

Model	ME235S	ME235P	ME614S	ME414S	ME254S	ME235P-SD*
Weighing capacity (g)	230	60|110|230	610	410	250	60|110|230
Readability (mg)	0.01	0.01|0.02|0.05	0.1	0.1	0.1	0.01|0.02|0.05
Repeatability (≤mg)	0.015 (0–60 g) 0.025 (60–230 g)	0.015 (0–60 g) 0.040 (60–110 g) 0.040 (110–230 g)	0.1	0.1	0.07	0.015 (0–60 g) 0.040 (60–110 g) 0.040 (110–230 g)
Max. linearity (≤mg)	0.1	0.15	0.4	0.3	0.15	0.15
Response time (≤s)	8	8	3	2.5	2.5	8
Off-center load at ½ max. capacity (≤mg) (Positions acc. to OIML R76)	0.15	0.2	0.6	0.4	0.3	0.2
Weighing pan diameter (mm)	90	90	90	90	90	90
Clearance above weighing pan (mm)	253	253	253	253	253	195

All models can be supplied in verified versions for use in legal metrology in the European Economic Area (except for *)
* with short-design draft shield and pipette opening, 60 mm ∅, with cover

Premium Analytical and Precision Balances: LA Reference Series Get What's Really Important

The next generation succeeding the legendary Master^{pro} LA series of lab balances is aptly named: the new LA Reference. Building upon the reputation of the former series that have become bywords for reliability in many laboratories throughout the world, this new series is The Reference when it comes to accomplishing lab weighing tasks proficiently.

Reliability spelled in capital letters
The LA Reference offers reliability without any compromises. This means there is no room for error, either during operation or display of the results thanks to a range of features. These extend from the error-free input capability of data and parameters to user-friendly, tactile keys, to the clear, high-contrast graphical display. Plain-text prompts in a choice of languages for all settings make it easy to quickly select the functions needed.

For use in regulated areas and quality management systems, the new LA offers a complete range of functions that you can rely on. For example, the fully automatic function, isoCAL, makes sure that calibration and adjustment are performed at regular intervals as required. ISO/GLP-compliant data logging and printers provide ideal support in ensuring that you meet documentation requirements. The printout can be individually customized to fulfill your application-specific demands.

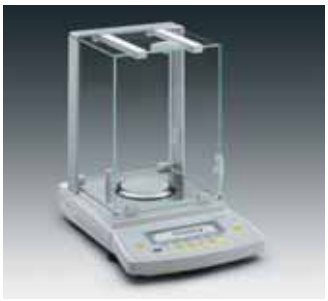
Ruggedness and high-tech design – not a contradiction!
Just once glance, and you can tell that the LA Reference offers the highest quality and resistance. The sleek metal housing, the robotically etched monolithic weigh cell technology and the high-grade keypad overlay give the balance the level of ruggedness it needs to stand up to tough daily use in the lab.

Precise manufacturing processes for the highest accuracy in the lab
The LA Reference provides you with the same maximum, consistent precision for their measurements that goes into the manufacture of the balance itself at Sartorius. The balance's highly innovative monolithic weigh cell together with cutting-edge microprocessor technology ensures the most accurate – and on top of this – the fastest weight readouts anytime, all the time.

LA Reference – The Reference in standard features as well
The pan and weighing chamber base plate are made of high-grade stainless steel. As a result, they are chemically resistant and easy to clean. The especially large-sized draft shield chamber offers ample space for accommodating tall laboratory containers and for placing samples next to the pan to acclimatize them to the temperature inside. The display and operating unit that can be set up separately offers additional flexibility for special weighing tasks, such as below-balance weighing.

The standard built-in application software provides practically all programs ever needed for accomplishing weighing tasks reliably and accurately in the lab; e.g., density determination of solid and liquid substances; differential weighing of up to 999 samples with convenient management of the data measured; statistics; and time-controlled functions to mention just a few.

The SQmin function for displaying the allowable minimum sample weight according to the United States Pharmacopeia and the S.U.R.E. function for continuously displaying the measurement uncertainty ensure ideal dependability for use of the balance in regulated areas.



Specifications

Model	Read-ability (mg)	Weighing capacity (g)	Pan size (mm)	Response time (average) (≤ s)	Repeat-ability (≤ ± mg)	Linearity (≤ ± mg)	Design
Analytical balances							
LA120S*	0.1	120	∅ 90	2	0.1	0.2	1
LA230S*	0.1	230	∅ 90	2	0.1	0.2	1
LA230P*	0.1|0.2|0.5	60|120|230	∅ 90	2	0.1|0.2|0.5	0.2|0.2|0.5	1
LA310S*	0.1	310	∅ 90	2	0.2	0.3	1
LA130S-F	0.1	150	208×264	4	0.2	0.2	5
Precision balances							
LA1200S*	1	1,200	∅ 130	1.5	1	2	2
LA620S*	1	620	∅ 130	1.5	1	2	2
LA220S*	1	220	∅ 130	1.5	1	2	2
LA2000P*	1|10	1010|2000	∅ 130	1.5	1|10	2|10	2
LA620P	1|2|5	120|240|620	∅ 130	1.5	1|1|3	2|2|5	2
LA5200D	1|10	1010|5200	∅ 130	2.5	1|10	2|10	2
LA3200D	1|10	1,000|3,200	∅ 130	1.5	1|10	2|10	2
LA8200S	10	8,200	216×200	2	10	20	3
LA6200S*	10	6,200	216×200	1.5	10	20	3
LA4200S*	10	4,200	216×200	1.5	10	20	3
LA2200S*	10	2,200	216×200	1.5	10	20	3
LA820*	10	820	216×200	1.5	10	10	3
LA420	10	420	216×200	1.5	10	10	3
LA2200P*	10|20|50	400|800|2,200	216×200	1.5	10|20|30	20|20|50	3
LA5200P*	10|20|50|100	1,200|2,400|3,800|5,200	216×200	1.5	10|20|50|50	20|20|50|100	3
LA8200P*	10|20|50	2,000|4,000|8,200	216×200	2	10|10|30	20|20|50	3
LA64001S	100	64,000	400×300	1.5	100	500	4
LA34001S*	100	34,000	400×300	1.5	100	200	4
LA16001S*	100	16,000	400×300	1.5	100	200	4
LA12000S*	100	12,000	216×200	1	50	100	3
LA6200*	100	6,200	216×200	1	50	100	3
LA4200	100	4,200	216×200	1	50	100	3
LA2200*	100	2,200	216×200	1	50	100	3
LA34001P*	100|200|500	8,000|16,000 34,000	400×300	1.5	50|100|100	200|200|500	4
LA12000P*	100|200|500	3,000|6,000 12,000	216×200	1	100|100|300	100|200|500	3
LA34000*	1,000	34,000	400×300	1	500	500	4

* These models can also be supplied in versions already verified at the factory.

Premium Micro-, Semi-micro, Analytical and Precision Balances: Expert Series
Weighing Technology – Perfect Price | Performance

The new models make a great first impression with their high-quality, attractive design, which is based on the successful concept of the Sartorius Competence series. And when you look a little closer, the "internal virtues" and amazing price | performance ratio of these balances will impress you as well.

Technical highlights of the new Sartorius Expert series:

LE26P: the microbalance with a continuous fine range of 5 g readable to 2 µg and a maximum weighing capacity of 21 g; ideal for minimum sample quantities between 5 and 10 mg for compliance with USP. Large round weighing pan (50 mm ∅) for secure positioning of samples.

LE225D: the semi-microbalance with the unusually broad fine range of 100 g and 0.01-mg readability

LE1003S: 1,010 g capacity with 0.001-g readability – superb technology becomes the standard

LE6202S: the top model in the 0.01-g class. 6,200-g capacity with uncompromising accuracy.

The "mechanical heart" of each LE model is a patented, monolithic weigh cell that provides for reliable and extremely accurate weighing results.

Of course, the name "premium" also stands for outstanding product quality and long-lasting reliability.

LE models are excellent for use as testing and measuring instruments in well-known quality systems, such as GLP | GMP, ISO9000:2000 or EN17025.

Featuring the isoCAL automatic calibration and adjustment function
All models are equipped with the isoCAL internal calibration and adjustment function. If a certain level of temperature difference is detected in the environment following a factory-set interval, this function independently calibrates and subsequently adjusts the balance. This feature provides two decisive advantages for use in the laboratory:

1. It ensures regular calibration and adjustment, which are requirements when these balances are used in quality systems. In addition, performance of these procedures is ensured "fully automatically."
2. The balances always operate at the same high level of accuracy.

The balance can also be internally calibrated or adjusted whenever necessary at the simple touch of a key.

ISO | GLP-compliant recording
In addition to measurement data and raw data, every calibration and adjustment that is performed on the balance is automatically recorded, either by an optional printer to which data are transferred via the data interface or by a PC. These records include all required IDs, such as date, time, balance model, serial number and signature block for the operator.

Brilliant readability
The eye-catching display provides unmistakable readouts. It is high-contrast, has large digits (16.5 mm), and is clear and easy to read under all lighting conditions thanks to blue backlighting (except for LE225D and LE26P models). And here's a unique feature: the intensity of the backlighting can be adjusted to the operator's individual requirements at the weighing location.

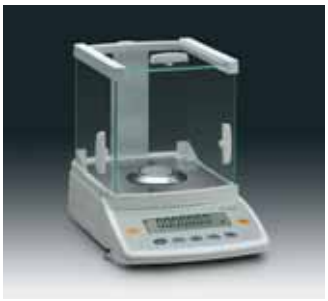
Flexible draft shield design
The draft shield on the semi-microbalance and analytical balances is made entirely of glass and features wide-opening doors for optimal access to the weighing pan. The spacious weighing chamber enables any type of sample to be placed quickly and securely onto the weighing pan. For easy cleaning of the draft shield, all parts of the weighing chamber base can simply be removed. If necessary, the entire draft shield can be lifted off.

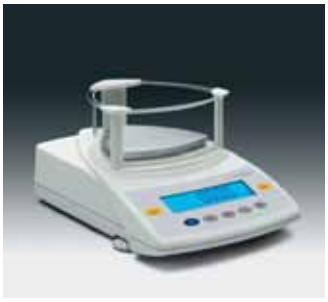
The triangular draft shield on models with 1-mg readability provides flexibility in working with these balances. The individually removable panels of the draft shield (left, right or front) ensure that both left-handed and right-handed users have excellent access to the weighing pan.

Weighing and more
Sartorius Expert balances are perfectly suited to all weighing applications. Moreover, their standard features make them flexible, enabling them to be adapted for extended requirements.

A bidirectional RS-232C data interface provides the ideal basis for communication.

The following, integrated application programs are available: weighing in percent, net-total formulation, dynamic weighing | animal weighing, toggling between two weight units.





Specifications

Model	Read-ability (mg)	Weighing capacity (g)	Pan size (mm)	Response time (average) (≤ s)	Repeat-ability (≤ ± mg)	Linearity (≤ ± mg)	Design
Microbalance							
LE26P	0.002|0.01	5|21	∅ 50	10	0.004	0.008	1
Semi-microbalance							
LE225D	0.01|0.01|0.1	40|100|220	∅ 80*	6|6|3	0.02|0.05|0.1	0.03|0.1|0.2	2
Analytical balances							
LE324S	0.1	320	∅ 80*	3	0.2	0.3	2
LE244S	0.1	240	∅ 80*	2	0.1	0.2	2
Precision balances							
LE1003S	1	1,010	∅ 110*	2	1	2	2
LE623S	1	620	∅ 110*	1.5	1	2	3
LE323S	1	320	∅ 110*	1.5	1	2	3
LE1003P	1|10	500|1,010	∅ 110*	2	1|2	1|2	2
LE623P	1|2|5	120|240|620	∅ 110*	1.5	1|1|3	2|2|5	3
LE6202S	10	6,200	190×204	1.5	10	20	4
LE5202S-DS**	10	5,200	∅ 130	1.5	10	20	2
LE4202S	10	4,200	190×204	1.5	10	20	4
LE2202S	10	2,200	190×204	1.5	10	20	4
LE2202S-DS*	10	2,200	∅ 130	1.5	10	20	2
LE6202P	10|20|50	1,500|3,000|6,200	190×204	1.5	10|10|30	20|20|50	4
LE10001	100	10,000	190×204	1	100	200	4
LE5201	100	5,200	190×204	1	100	200	4
LE34001S	100	34,000	400×300	2	100	200	5
LE34001P	100|200|500	8,000|16,000|34,000	400×300	1.5	100|200|500	300|300|300	5
LE16001S	100	16,000	400×300	1.5	100	200	5

All models can also be supplied in versions already verified at the factory.

* Triangular weighing pan shape; ∅ = diameter of the inner circle;
** Analytical balances come standard with an all-glass draft shield chamber.

Standard Micro-, Semi-micro-, Analytical and Precision Balances: Competence Series
Innovative Product Variety for Today's Laboratory Needs

The Sartorius Competence Series – CP for short – is the widest array of basic balances for professional lab use in the world.

Twenty-five models – from 0.001 mg to 34 kg – offer high value for a variety of laboratory weighing applications. They provide an excellent return on your investment all down the line.

Just one glance tells you that the bold design of the balance provides the highest level of user-friendliness. For instance, the unique new triangular weighing pan on many CP models features a space-age design with down-to-earth usefulness. That means it provides more space than most common pan shapes.

All models feature 21st century weighing technology.

Competence for more convenience
We developed the functional design for the real world to ensure easy and reliable operation.

The highly practical draft shield on the 0.01-mg and 0.1-mg models allows easy access for rapidly loading and unloading any sample because the smooth-action doors open extremely wide. All parts of the draft shield are simple to remove for especially easy cleaning.

The draft shield on the 0.001-mg model has been designed for especially user-friendly weighing of the smallest sample quantities.

For weighing filters, the Competence series offers a new microbalance with a draft shield specially designed for this application.

The draft shield on the 1-mg models features a new design for high flexibility during weighing. The hinged cover attached on one side ensures optimal loading of samples. The removable side panels provide easy access to the pan from the sides.

The backlit display with its exceptionally large digits is especially easy to read (CP2P, CP2P-F and CP225D without backlighting).

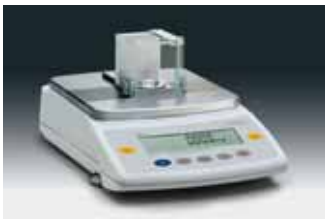
Activated at the touch of a key, the built-in motorized calibration weight in the 0.001-mg, 0.01-mg and 0.1-mg models ensures the highest weighing accuracy at any time.

Competence in the variety of applications
The standard features and accessories provide the flexibility you need as your requirements change.

All CP balances have an RS-232C port for communication with a PC, an analytical instrument or a robot.

All balance-generated data can be recorded or printed out in compliance with ISO | GLP protocols so that the CP can be used in a quality management system.

For additional applications, such as weighing in %, net-total formulation, dynamic weighing or animal weighing, mass unit conversion by toggling, and counting, the CP offers these easy-to-run application programs as standard features.



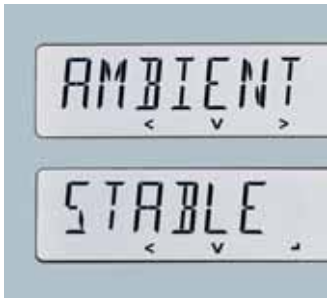
Specifications and accessories

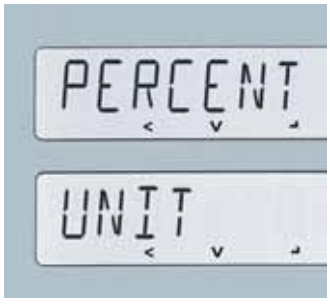
Model	Read-ability (mg)	Weighing capacity (g)	Pan size (mm)	Response time (average) (≤ s)	Repeat-ability (≤ ± mg)	Linearity (≤ ± mg)	Design
Microbalances							
CP2P**	0.001 | 0.002 | 0.005	0.5 | 1 | 2	∅ 20	10	0.001 | 0.002 | 0.003	0.002 | 0.004 | 0.005	1
CP2P-F**	0.001 | 0.002 | 0.005	0.5 | 1 | 2	∅ 20 ∅ 125 Filter pan	10	0.002 | 0.003 | 0.004	0.002 | 0.004 0.005	2
Semi-microbalance							
CP225D	0.01 | 0.01 | 0.1	40 | 80 | 220	∅ 80*	12 | 12 | 3	0.02 | 0.05 | 0.1	0.03 | 0.1 | 0.2	3
Analytical balances							
CP324S	0.1	320	∅ 80*	3	0.2	0.3	3
CP224S	0.1	220	∅ 80*	2	0.1	0.2	3
CP124S	0.1	120	∅ 80*	2	0.1	0.2	3
CP64	0.1	64	∅ 80*	2	0.1	0.2	3
Precision balances							
CP423S	0.001	420	∅ 110*	1.5	0.001	0.002	4
CP323S	0.001	320	∅ 110*	1.5	0.001	0.002	4
CP323P	0.001 | 0.002 | 0.005	80 | 160 | 320	∅ 110*	1.5	0.001 | 0.001 | 0.003	0.002 | 0.002 | 0.005	4
CP153	0.001	150	∅ 110*	1.5	0.001	0.001	4
CP4202S	0.01	4,200	190×204	1.5	0.01	0.02	5
CP3202S	0.01	3,200	190×204	1.5	0.01	0.02	5
CP3202P	0.01 | 0.02 | 0.05	800 | 1,600 | 3,200	190×204	1.5	0.01 | 0.01 | 0.03	0.02 | 0.02 | 0.05	5
CP2202S	0.01	2,200	190×204	1.5	0.01	0.02	5
CP622***	0.01	620	∅ 154*	1	0.01	0.02	6
CP8201	0.1	8,200	190×204	1	0.1	0.2	5
CP6201	0.1	6,200	190×204	1	0.1	0.2	5
CP4201**	0.1	4,200	190×204	1	0.1	0.2	5
CP2201	0.1	2,200	190×204	1	0.1	0.2	5
CP34001S	0.1	34,000	400×300	2	0.1	0.2	7
CP34001P	0.1 | 0.2 | 0.5	8,000 | 16,000 | 34,000	400×300	1.5	0.1 | 0.2 | 0.5	0.3 | 0.3 | 0.3	7
CP16001S	0.1	16,000	400×300	1.5	0.1	0.2	7
CP12001S	0.1	12,000	400×300	1.5	0.1	0.2	7
CP34000	1	34,000	400×300	1.5	0.5	1	7

All models can be supplied in verified versions for use in legal metrology in the European Economic Area (except for **).

* Triangular weighing pan shape; ∅ = diameter of the inner circle;
*** Pan size on verified models 190×204 mm

Standard Analytical and Precision Balances: Extend Series
The New Achievers for Your Lab





If you compare the specifications of many lab balances on paper, they all look the same – if you've seen one, you've seen them all. But in the real world there is more to a lab balance than just its technical specifications.

The new Sartorius Extend series has been specially designed for effective and reliable weighing in daily lab routines. This is where more powerful technology and application-oriented operation and features make all the difference.

The latest technology
More versatility in high resolution applications: 1 mg to 620 g and 10 mg to 6,200 g. Sartorius makes top-of-the-line technology available at a reasonable price.

Sartorius utilizes 21st century technology, such as the unique robotically etched monolithic weigh cell, which ensures long-term high accuracy.

The Extend series features the latest powerful microprocessor technology, shortening response times for faster results. Reliable weighing results are achieved all of the time – even under less than ideal ambient conditions, thanks to the Extend´s highly sophisticated digital compensation algorithms.

Ease of use
When you need to get a heavy workload of repetitive applications done fast and reliably, day in and day out, the last thing you need is a lab balance so complicated that it causes operating errors and wastes your valuable time as a result.

Welcome to your new Extend balance comfort zone: a simple, easy-to-understand control panel, key function assignments and the easy-to-read display are ideal for efficient weighing in your lab.

User-friendly operation: short, plain-English text prompts and cursor keys for navigation make it simple for you to configure the balance to meet your individual requirements.

Outstanding readouts thanks to the backlit and high-contrast display (height of digits: 15 mm).

The level indicator is positioned conveniently right next to the display so that checking whether the balance is level becomes "second nature" to the operator.

The range of features
Add up all features of the new Sartorius Extend, and you'll find all the advantages that only a genuine Sartorius lab balance can offer: features that pay for themselves, time and again.

A built-in, motorized calibration weight is standard in all precision balances with the –CW suffix and in all analytical balances. Applied at a touch of a key it ensures the highest weighing accuracy at any time.

Whenever you need ISO | GLP-compliant printouts of raw data and | or calibration and adjustment data, the Sartorius Extend balance will generate them – at the touch of a key when connected to a data printer, the YDP03-0CE.

The draft shield chamber on the analytical balances provides optimal lighting conditions inside, thanks to its nearly frameless all-glass design.

The following additional built-in application programs come standard:
Weighing in %, net-total formulation, animal weighing | dynamic weighing, mass unit conversion by toggling, calculation (multiplication and division).

Specifications

Model	Read-ability (g)	Weighing capacity (g)	Pan size (mm)	Repeat-ability (g)	Linearity (g)	Response time (avg., sec.)	Design
Analytical balances							
ED224S	0.0001	220	∅90	0.0001	0.0002	2.5	1
ED124S	0.0001	120	∅90	0.0001	0.0002	2.5	1
Precision balances and scales							
ED153	0.001	150	∅115	0.001	0.002	1.3	2
ED153-CW	0.001	150	∅115	0.001	0.002	1.3	2
ED323S	0.001	320	∅115	0.001	0.002	1	2
ED323S-CW	0.001	320	∅115	0.001	0.002	1	2
ED423S	0.001	420	∅115	0.001	0.002	1	2
ED423S-CW	0.001	420	∅115	0.001	0.002	1	2
ED623S	0.001	620	∅115	0.001	0.002	1	2
ED623S-CW	0.001	620	∅115	0.001	0.002	1	2
ED822	0.01	820	∅150	0.01	0.02	1	2
ED822-CW	0.01	820	∅150	0.01	0.02	1	3
ED2202S	0.01	2,200	180 × 180	0.01	0.02	1.1	3
ED2202S-CW	0.01	2,200	180 × 180	0.01	0.02	1.1	4
ED3202S	0.01	3,200	180 × 180	0.01	0.02	1.1	4
ED3202S-CW	0.01	3,200	180 × 180	0.01	0.02	1.1	4
ED4202S	0.01	4,200	180 × 180	0.01	0.02	1.1	4
ED4202S-CW	0.01	4,200	180 × 180	0.01	0.02	1.1	4
ED6202S	0.01	6,200	180 × 180	0.01	0.02	1.1	4
ED6202S-CW	0.01	6,200	180 × 180	0.01	0.02	1.1	4
ED2201	0.1	2,200	180 × 180	0.1	0.1	1	4
ED2201-CW	0.1	2,200	180 × 180	0.1	0.1	1	4
ED5201	0.1	5,200	180 × 180	0.1	0.1	1	4
ED5201-CW	0.1	5,200	180 × 180	0.1	0.1	1	4
ED8201	0.1	8,200	180 × 180	0.1	0.1	1	4
ED8201-CW	0.1	8,200	180 × 180	0.1	0.1	1	4

Budget Class Analytical and Precision Balances: Talent Series
The Affordable Way to Enter the World of Sartorius Weighing Technology

Sartorius Talent series balances are the alternative for all your simple weighing operations: economically priced yet with an uncompromisingly high degree of quality, reliability and sophisticated weighing technology. Whether you need to operate a balance in the lab, at school or a university, or in the field using the battery function, a balance from the Sartorius Talent series will always be the No. 1 choice.

Nineteen models – one design
The right weighing capacity for every application and every budget? No problem with the Talent series. It offers you 3 analytical balances with weighing capacities of 60 g, 120 g and 210 g, respectively, and a total of 16 precision balances – ranging from the top-of-the-line model with a 3,100-g weighing capacity and 0.01-g readability to the high-capacity model featuring a 12-kg capacity accurate to one gram.

Easy to operate for reliable results
When it comes to strictly weighing, easy operation is top priority. The balances of the new series prove to be particularly talented in this area: just set up the balance, turn it on, and you'll be "on your weigh." It couldn't be any easier than this! The clarity of the display and the "one-key-to-a-function" design of the keypad ensure error-free operation.

Dependable and accurate
The innovative weigh cell technology, the rugged construction of the balance housing, the sleek stainless steel weighing pan and the keypad sealed by a membrane overlay assure high dependability and accuracy, even during frequent use.

Portability is standard
Many of the Talent series balances are also battery-operable, providing an alternative to line current operation. The built-in "power-saver" feature extends the life of the battery, whether it's non-rechargeable or rechargeable. This function will automatically shut off the balance if a key has not been pressed after 2 minutes. An added benefit of this portable application: the balance is compact and lightweight.

Built-in application software
Talent series balances offer various application programs as standard features to make routine work easy: weighing in percent, net-total formulation, weigh averaging | dynamic weighing, counting of small parts and mass unit conversion by toggling between two weight units.

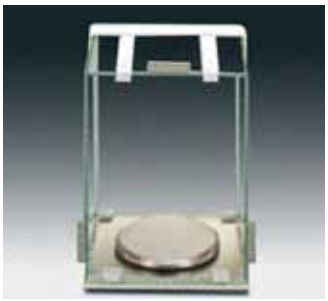
RS-232C interface port
Each model comes standard with a bidirectional RS-232C interface port. This means no extra cost if you need to log the balance-generated results on an optional printer or connect a remote display for use in the educational sector.

Specifications

Model	Read-ability (g)	Weighing capacity (g)	Pan size (mm)	Response time average (s)	Repeat-ability (≤ ± g)	Linearity (≤ ± g)	Design
Analytical balances							
TE214S	0.0001	210	∅ 90	3	0.0001	0.0002	1
TE124S	0.0001	120	∅ 90	3	0.0001	0.0002	1
TE64	0.0001	60	∅ 90	3	0.0001	0.0002	1
Precision balances							
TE313S	0.001	310	∅ 100	2.5	0.001	0.002	2
TE313S-DS	0.001	310	∅ 100	2.5	0.001	0.002	1
TE153S	0.001	150	∅ 100	2.5	0.0015	0.003	2
TE153S-DS	0.001	150	∅ 100	2.5	0.0015	0.003	1
TE3102S	0.01	3,100	174 × 143	2.5	0.01	0.02	4
TE1502S	0.01	1,500	174 × 143	2.5	0.015	0.03	4
TE612	0.01	610	∅ 116	2	0.01	0.02	3
TE412	0.01	410	∅ 116	2	0.01	0.02	3
TE212	0.01	210	∅ 116	2	0.01	0.02	3
TE6101	0.1	6,100	174 × 143	2	0.1	0.2	4
TE4101	0.1	4,100	174 × 143	2	0.1	0.2	4
TE2101	0.1	2,100	174 × 143	1.5	0.1	0.2	4
TE601	0.1	610	174 × 143	1.5	0.1	0.2	4
TE12000	1	12,000	174 × 143	1.5	1	2	4
TE6100	1	6,100	174 × 143	1.5	1	2	4
TE4100	1	4,100	174 × 143	1.5	1	2	4

Accessories

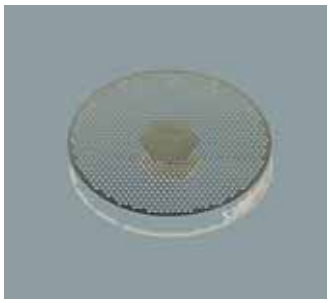
Accessories for All ME, SE, LA, LE, CP, ED and TE Models	Order No.
Data printer, suitable for use in legal metrology; with date, time, statistics and transaction counter functions	YDP03-0CE
Paper rolls, for YDP03-0CE; 5 units, each with 50 m	6906937
Ink ribbon cartridge, for YDP03-0CE	6906918
SartoConnect, data transfer software; for direct transfer of weights to an application (e.g., Excel) with RS-232C connecting cable, length 1 m with RS-232C connecting cable, length 5 m with RS-232C connecting cable, length 15 m	 YSC01L YSC01L5 YSC01L15
Balance table, for precise, reliable weighing operations	YWT01
Balance table, cast stone, with vibration dampeners	YWT03
Wall console	YWT04
Remote displays: LCD; height of digits: 13 mm; reflective	 YRD12Z
Hand switch, incl. T-connector	YHS02
Foot switch, incl. T-connector	YFS01
Ionizing blower, for electrostatically charged samples, 220 V	YIB01-0DR
Ionizing blower, for electrostatically charged samples, 110 V	YIB01-0UR
Stat-Pen ionizing probe for neutralization of electrostatic charges on samples	YSTP01
T-connector for connecting 2 peripherals	YTC01
RS-232C|USB interface cable, for connecting the balance to a PC with USB port; length 1.5 m	YCC01-USBM2
RS-232C interface cable, for connecting the balance to a PC with a 25-pin COM port; length approx. 1.5 m	7357312
RS-232C interface cable, for connecting the balance to a PC with a 9-pin COM port; length approx. 1.5 m	7357314
Standard Operating Procedure (SOP)	YSL01E



Accessories for ME and SE2 Models	Order No.
Rechargeable battery pack, external, with battery level indicator for SE2, ME5 and all ME models	YRB05Z
Anti-static weighing pan for electrostatically charged samples for ME235S, ME235P, ME254S, ME414S and ME614S for ME5	YWP01ME YWP01MC
Density determination kit, for ME235S, ME235P, ME254S, ME414S and ME614S	YDK01
Glass plate support, for conditioning samples inside the weighing chamber, for all models (except ME5)	YGS01ME
Weighing scoop made of chrome-nickel steel, 90 mm × 32 mm × 8 mm	641214
Foot switch, incl. T-connector; for all ME models and SE2	YPE01RC
Bar code scanner, for all ME models and SE2 (YCC01-0024M01 required)	YBR02FC
Cable with T-connector, for connecting a bar code scanner	YCC01-0024M01
RS-232C adapter with *Bluetooth*® wireless technology and external antenna; for point-to-point connection only*	YBT01
USB adapter with *Bluetooth*® wireless technology for point-to-multipoint connections*	YBT02

* The equipment may be used only in the following countries: Austria, Belgium, Denmark, Finland, France (indoor use only), Germany, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, Norway, Portugal, Spain, Sweden, Switzerland, The Netherlands, United Kingdom.

Accessories



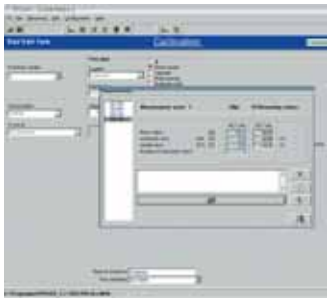
Accessories for LA Models	Order No.
Carrying case for all LA models up to 12.1 kg	YDB01LP
Anti-static weighing pan, for LA120S, LA230P, LA310S	YWP01LA
Extension cord, weighing platform to remote display and control unit (length 2.7 m) for LA models up to 64 kg	YCC01-19M3
3-segment checkweighing display Red-green-red, for over-under checkweighing, incl. T-connector	YRD11Z
Column display holder (post for raised mounting of display and control unit)	
for models with a weighing capacity up to 12 kg	YDH01LP
for models with a weighing capacity from 16 kg and up	YDH02LP
Bar code scanner, for all LA models (YCCC01-0024M01 required)	YBR02FC
Cable with T-connector, for connecting a bar code scanner	YCC01-0024M01
Rechargeable battery pack, external, with battery level indicator	YRB06Z
Analytical draft shield chamber for all LA models with 1 mg readability	YDS01LP
Protective in-use dust covers	
for LA models with a round weighing pan	6960LP01
for LA models with a rectangular weighing pan, up to 12.1 kg	6960LP02
Weighing bowls | pans | trays made of chrome-nickel steel	
For all balances with a weighing capacity > 400 g; bowl capacity 1,000 ml	641211
Capacity 500 ml	641212
Capacity 3,000 ml	641213
Weighing scoop made of chrome-nickel steel, 90 mm × 32 mm × 8 mm	641214
Density determination kit	
for all 1-mg LA models	YDK01LP
for all 0.1-mg LA models	YDK01
RS-232C adapter with *Bluetooth*® wireless technology and external antenna; for point-to-point connection only*	YBT01
USB adapter with *Bluetooth*® wireless technology for point-to-multipoint connections*	YBT02

* The equipment may be used only in the following countries: Austria, Belgium, Denmark, Finland, France (indoor use only), Germany, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, Norway, Portugal, Spain, Sweden, Switzerland, The Netherlands, United Kingdom.

Accessories for LE, CP and ED Models	Order No.
Rechargeable battery pack, external, with battery level indicator	
for models with a weighing capacity of up to 10 kg	YRB05Z
for models with a weighing capacity from 16 kg to 34 kg	YRB06Z
Analytical draft shield chamber	
for LE323S, LE623S, LE623P, CP423S, CP323S, CP323P, CP153	YDS01CP
Anti-static weighing pan	
for LE225D, LE324S, LE244S, CP225D, CP324S, CP224S, CP124S, CP64	YWP01CP
Density determination kit	
for LE225D, CP225D	YDK01
for LE324S, LE244S, CP324S, CP224S, CP124S, ED224S, ED124S	YDK01LP
Draft shield cover with opening (30 mm ∅)	
for LE623S, LE323S, LE623P, CP423S, CP323S, CP323P, CP153	YDS02CP
Hanger for below-balance weighing, threaded fitting	
for LE16001S, LE34001S, LE34001P, CP16001S, CP12001S, CP34000, CP34001S, CP34001P	69EA0040
RS-232C adapter with *Bluetooth*® wireless technology	
and external antenna; for point-to-point connection only*	YBT01
USB adapter with *Bluetooth*® wireless technology	
for point-to-multipoint connections*	YBT02
Accessories for TE Models	
Protective in-use dust covers	
for display unit TE214S, TE124S, TE64, TE313S-DS, TE153S-DS	6960TE01
for models TE313S, TE153S, TE612, TE412, TE212	6960TE02
for models TE3102S, TE1502S, TE601, TE6101, TE4101, TE2101, TE12000, TE6100, TE4100	6960TE03
Rechargeable battery pack	
(hours of operation: 20 or 40, depending on the model)	YRB08Z
Data printer	YDP04

* The equipment may be used only in the following countries: Austria, Belgium, Denmark, Finland, France (indoor use only), Germany, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, Norway, Portugal, Spain, Sweden, Switzerland, The Netherlands, United Kingdom.

Sartorius Pipette Calibration: Totally Accurate, Efficient and Independent – with the YCP03-1 Pipette Calibration Set



Save time and money
Pipettes are gauges used as inspection, measuring and test equipment. GLP standards and European Standards require pipettes to be tested at defined intervals to ensure their continued proper functioning. Quick testing must also be performed between these intervals. Having pipette calibration performed externally can be expensive and time-consuming. Reserve pipettes must also be available to maintain routine operations. The equipment for performing the required quick tests is not even available in many cases.

Now you can calibrate your pipettes yourself quickly and inexpensively with the YCP03-1 Pipette Calibration Set from Sartorius.

Procedure
The liquid taken up in the pipette is weighed on a balance. The volume of the liquid is calculated from its weight and density and compared with the nominal volume for the pipette. The evaporation trap maintains the humidity at 60–90%, thus preventing loss of liquid from the sampling chamber. The balance transmits the weight to the PC, where the Picaso software performs all the required calculations automatically. At the end of each measurement, the calibration results are printed out as a GLP-compliant report.

Performance features at a glance
Measurement data saved at a click of the mouse

Program includes specifications on more than 400 pipette types

Measurements in accordance with ASTM, British Standard and ISO 8655

Individual pipettes inventoried

Data records are GLP-compliant and include mean, (in)accuracy, (im)precision, and standard deviation

Statistics displayed in graphs

Time-controlled functions for monitoring calibration cycles

On-line help for all functions

Equipment supplied
CD with Picaso software

Evaporation trap

Balance adapter

Reduction fitting for 6-ml sampling chamber

Reduction fitting for 21-ml sampling chamber

Three 6-ml sampling chambers

Three 21-ml sampling chambers

Cable for connecting the balance to a PC

Centering disk for the evaporation trap

Carrying case

System requirements
Picaso requires a Windows® 95/98/NT/2000/XP compatible PC with two RS-232C interface ports for the mouse and interface cable, 64 MB RAM and at least 20 MB of free hard disk space.

Optimize your pipette calibration workstation
With the YCP03-1 Pipette Calibration Set, you can save time, money, and work. Of course, you need to choose the best balance for your needs to benefit from all these advantages.

If you need a balance for other uses as well...
...the Sartorius microbalances and semi-microbalances are the right answer for you. The evaporation trap can be installed quickly and easily, and just as conveniently removed again.

If your balance will mainly be used for pipette calibration...
...then you can have an ME series balance equipped at the factory with a top-opening, short-design draft shield.

For measuring the smallest volumes...
...Sartorius offers the ME5 microbalance, for calibrating pipettes with volumes <10 µl. For the first time, you can calibrate pipettes with the smallest volumes.

Specifications

Model	Weighing capacity (g)	Readability (mg)
ME235S*	230	0.01
ME235P*	60/110/230	0.01/0.02/0.05
ME235P-SD (with short-design draft shield)	60/110/230	0.01/0.02/0.05
ME414S*	410	0.1
CP225D*	80/220	0.01/0.1
ME5*	5	0.001

Accessories	Order number
Special draft shield and evaporation trap for ME5 balances	VF988
Short-design draft shield for CP225D	VF2396

* Models ME235S, ME235P, ME414S, CP225D and ME5 can also be supplied in versions verified for legal metrology.

Sartorius Density Determination
The Optimum Equipment for All Methods

Whether you use the buoyancy technique, the displacement principle or the pycnometer method for determining solid, powdery or liquid samples – Sartorius offers you the technical equipment for performing these applications simply, quickly and precisely.

This includes:
1. Micro-, analytical and precision balances.
2. The YDK01 or YDK01LP density kit
3. An integrated application program built into the balance for density determination (standard software in all ME and LA balances).

Easy to use
Nothing is more annoying in laboratory applications than complicated operating sequences with delicate and sensitive instruments. This is why our density kits have been built to be especially rugged and uncomplicated.

Perfected technology and practical accessories
Large and easily accessible sample holders are supplied so that you can perform measurements in air or in a medium causing buoyancy. The special design prevents air bubbles from adhering, which could otherwise distort your results.

If you weigh a substance with a density less than that of the liquid causing buoyancy – forget the extra work. The specially shaped sieve lets you immerse your sample effortlessly below the surface of the liquid.

And determination of the density of liquids couldn't be easier with our standardized glass plummet.

The integrated application software controls the measurements and evaluates them for you.
The application software integrated into the balances of the ME and LA series provides you with the ultimate in user convenience.

Just select your preferred method of measurement by menu, weigh your samples and the balance does all the number crunching for you. In the process, it automatically takes into account all important factors that influence the measurement. For example, after you have entered the temperature, the balance directly determines the density of the selected immersion medium.

Results in black and white
A record of your results is printed out on the interfaced data printer – if you wish, in compliance with ISO/GLP.

The printout shows data on:

Temperature and density of the medium causing buoyancy

Sample weight in air and in the medium

The volume and the density of the sample

Which density kit for which balance?
YDK01 density kit:

For ME models with 0.01-mg and 0.1-mg readability

For LA models with 0.1-mg readability

For LE225D and CP225D

YDK01LP density kit:

For LA models with 1-mg readability

For LE/CP/ED models with 0.1-mg readability

Bluetooth® Technology*
Wireless Weighing and Communication

Bluetooth® wireless technology, widely used for laptops and mobile telephones, offers real advantages for both measurement and data storage processes. With a range of up to 100 meters, wireless connection of measuring stations, PCs and peripheral devices is now completely feasible for laboratory use.

No more cables to trip over, no more cable ducts collecting dust, no more inconvenient restrictions when positioning devices that have to be connected to one another.

Not only for mobile weighing, but also for clean room conditions or contaminated environments, *Bluetooth*® wireless technology presents a real alternative that eliminates connection problems before they occur.

Another major advantage of *Bluetooth*® wireless technology is the ability to connect multiple weighing stations in individual networks.

Installation of Sartorius communication modules featuring *Bluetooth*® wireless technology is as easy as can be. This technology uses the 2.45 GHz ISM band (for industrial, scientific, and medical usage). No fees are charged for this frequency, which means no added recurring costs for the user.

Data security is a high priority in *Bluetooth*® wireless technology. Data communication in both directions is protected by the use of frequency hopping, and other encryption techniques are also available. Thus, even sensitive areas are reliably secured.

With the YBT01 module for connection to the RS-232C port on the weighing instrument, and the YBT02 module for connection to the computer's USB port, Sartorius presents a solution that meets the most sophisticated requirements, with the same high quality as our Premium balances designed for use in the chemical and pharmaceutical industries.

The communication module has a stainless steel housing for optimal observance of the strictest standards of cleanability. The data and data record transfer procedures will be familiar to anyone who has used RS-232C data interfaces.

So put the bite on cable spaghetti with *Bluetooth*® wireless technology. The YBT01 and YBT02 modules are perfect for use with any of our Premium balances series, Premium ME, Master^{pro} LA or Expert LE.

The equipment may be used only in the following countries: Austria, Belgium, Denmark, Finland, France (indoor use only), Germany, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, Norway, Portugal, Spain, Sweden, Switzerland, The Netherlands, United Kingdom.

Specifications

YBT01: RS-232C adapter with external antenna; for point-to-point connection only

Transmission power	In accordance with Class 1
Profiles supported	Serial port
Transmission speeds	1,200 to 115,000 bit/s (configured by Sartorius Service)
Temperature range	0 to +40°C (+32 to +104°F)
IP rating	IP65
Dimensions (L × W × H)	121 mm × 84 mm × 32 mm (without antenna, cable, wall bracket)

YBT02: USB adapter; for point-to-multipoint connections

Transmission power	In accordance with Class 1
Specification	*Bluetooth*® wireless technology V.1.1
Software	*Bluetooth*® device driver
Operating system	Windows® 98/2000, XP

* The brand name and logo for *Bluetooth*® wireless technology are owned by Bluetooth SIG Inc., USA. The use of this trademark by Sartorius is under license.

Equipment for Neutralizing Static Electricity Quickly and Reliably

Static electricity in the lab can block the entire sequence. When samples are weighed, particularly non-conductive samples, such as plastic, glass or porcelain, an electrostatic field may build up between the sample and the stationary parts of the balance. As a rule, this effect is seen when the digits of a weight readout seem to "race out of control." This makes reliable weighing, particularly in the analytical field, very difficult. By ionization of samples using the Sartorius StatFan or Stat-Pen ionizing blower, static electricity is neutralized within just a few seconds, making it unnecessary to increase the humidity of the air. Elimination of static electricity can be performed instantly wherever needed.

Sartorius ionizing blowers can be used anywhere undesirable electrostatic charges are generated, for example, in production areas and photography labs. The flow rate of the ionizing stream can be continuously adjusted. For StatPen, the flow rate is altered by moving it closer or further away from a sample.

Specifications

Model	Power requirements	AC adapter	Neutralization	Flow rate	Weight
Ionizing blower StatFan YIB01-0DR	230 V/50 Hz	18 V/50 Hz	Up to ± 20 V	Up to 1,000 ccm/min	Approx. 0.6 kg
Ionizing blower StatFan YIB01-0UR	110 V/50 Hz	18 V/50 Hz	Up to ± 20 V	Up to 1,000 ccm/min	Approx. 0.6 kg
StatPen YSTP01	100 V… 230 V 50… 60 Hz		Up to ± 30 V		Approx. 0.8 kg

Mass Comparators (CC...)

Weighing at the limits of technology – and beyond
Mass comparators and micro- and ultra-microbalances incorporate the most sophisticated weighing technology. Sartorius is one of the few manufacturers capable of designing and producing these instruments. Superb craftsmanship in mechanical and electronic engineering and expert knowledge of the parameters that can affect weight measurements are essential for weighing at the limits of technology.

Mass comparators
These are designed for determining the difference between weights (working standards) and known reference weights (mass standards). The instruments are commonly used at institutes of metrology (weights and measures offices) for standardization and calibration of weights. Beyond these applications, mass comparators are utilized in industrial manufacturing for highly accurate checkweighing of parts, such as those for combustion engines, or used in aeronautics or the manufacture of high-precision weights.

Weighing from 0.1 µg to 3,000 kg
Sartorius offers 4 groups of mass comparators as follows:
– Dissemination of the mass scale
– Analytical range up to 1 kg
– Universal range from 1 kg and up
– Research and testing range (up to 3,000 kg)

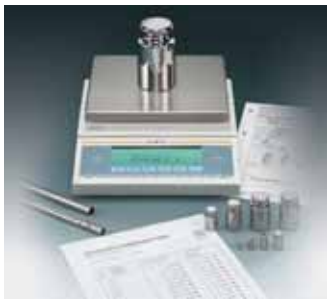
Our metrology experts will be happy to advise you, offering the best solution available to cover your needs. Just ask us!

Specifications

Model	Maximum capacity (g)	Readability (mg)	Average Repeatability (s in mg)*	A = automatic load alternator M = manual
Dissemination of the mass scale				
CCL1007	1,011	0.0001	0.0001	A 8 positions
CCE6	6.1	0.0001	0.00015	M
CC111	111	0.001	0.002	M
CC1000S-L	1,002	0.001	0.001	A 4 positions
CC10000U-L	10,050	0.01	0.02	A 4 positions
CC10000S-L	10,050	0.1	0.05	A 4 positions
CC20000S-L	20,050	0.1	0.1	A 4 positions
CC50001S-L	51,000	1	2	A 2 positions
Analytical range				
CCE36	31	0.001	0.001	M
CC50	51	0.001	0.001	M
CC310	310	0.01	0.01	M
CC500	505	0.01	0.01	M
Universal range				
CCE1004	1,200	0.1	0.05	M
CCE2004	2,500	0.1	0.1	M
CCE5004	5,100	0.2	0.3	M
CCE5003	5,100	1	0.5	M
CC10000S	10,050	0.1	0.1	M
CC10000	10,050	1	0.5	M
CC20000	20,050	1	1	M
CCE40K3	41,000	2	4	M
CCE60K3	61,000	2	5	M
CCE60K2	61,000	10	7	M
Research and testing range				
CC64K	64,000	50	150	M
CC150K	151,000	100	300	M
CC300K	303,000	1,000	500	M
CCS600K	605,000	1,000	2,000	M
CCS1000K	1,510,000	5,000	5,000	M
CCS3000K	3,010,000	10,000	10,000	M

* Repeatability is the standard deviation "s"; it is calculated from 6 ABA cycles (M) or ABBA cycles (A), after drift has been eliminated.

Metrological Weights and Weight Sets (YCW, YCS)



The complete line ranging from weights to certified testing services
Regular inspection and testing of weighing instruments are a must to ensure reliable weighing results.

Sartorius offers highly accurate metrological weights and weight sets with nominal mass values from 1 mg to 1,000 kg, special and test weights, as well as the accessories required for correct handling and storage of weights.

Sartorius weights and weight sets are calibrated by the DKD* and comply with the International Recommendation OIML-R111. Therefore, they are suitable for legal and general metrological applications in research and industry.

Sartorius weights meet the requirements for traceability to the national "kilogram" prototype in conformance with the International Standard ISO 9000 concerning the quality element "Inspection, measuring and test equipment." These weights help support your quality management and quality assurance systems, and fulfill GLP and GMP requirements.

Your DKD partner for mass units
Sartorius has DKD* laboratories for both weights and electronic laboratory balances and industrial scales. Sartorius calibration laboratories have been inspected and accredited for compliance with the regulations of the German calibration service, DKD, concerning mass units. These laboratories meet the international standard for testing laboratories, ISO IEC 17025, which has been adopted as a European Standard under EN ISO IEC 17025.

Recalibration for any brand names, manufacturers and designs
Depending on how frequently weights are used, they must be recalibrated on a regular basis so that they meet the requirements for reliable measuring, inspection and test equipment. Sartorius offers recalibration service along with DKD calibration certificates for all weights ranging from 1 mg to 50 kg, regardless of their design or brand name, and up to 500 kg for F2 and M1 weights.

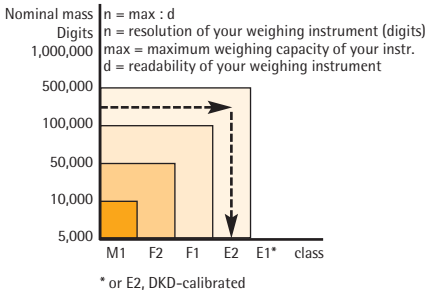
Here's how to find the right test weight
Just determine the number of digits specified for your weighing instrument's resolution, then read off the particular accuracy class that your test weight must have on the graph provided below.

The weight value of your test weight should be more than 80% of the maximum capacity of your weighing instrument.

Use the following chart to determine whether you need an individual weight or a weight set by comparing the nominal mass values.

Example: Suppose your weighing instrument has a capacity of 2,200 g and a readability of 0.01 g. This yields 220,000 digits, which correspond to a class E2 test weight. Since 80% of 2,200 g is 1,760 g, you need to round it to a weight value of 2,000 g.

* DKD= German Calibration Service whose certificates are officially recognized in all countries belonging to the Western European Calibration Cooperation (WECC), such as Denmark, Finland, Great Britain, Italy, the Netherlands, Sweden and Switzerland; Sartorius is accredited as a DKD calibration laboraory.



* or E2, DKD-calibrated

Weight Sets (YCS)

Features of Sartorius weight sets
The weights in Sartorius sets have the same features as do the individual weights of their corresponding class, which are described on the following page. Sartorius weight sets are supplied in a wooden case (except for service weights, which are in a plastic case), along with the matching accessories (gloves, forceps, brushes, etc.); please refer to our individual weights.

Class E1 and E2 weights sets with wire weights up to 500 mg

Class F1, F2 and M1 weights sets with leaf weights up to 500 mg

Nominal mass	E1	E2	F1
From 1 mg to 5 g	YCS011-351-0X	YCS011-352-0X	
From 1 mg to 100 g	YCS011-511-0X	YCS011-512-0X	YCS01-513-0X
From 1 mg to 200 g	YCS011-521-0X	YCS011-522-0X	YCS01-523-0X
From 1 mg to 1 kg	YCS011-611-0X	YCS011-612-0X	YCS01-613-0X
From 1 mg to 5 kg	YCS011-651-0X	YCS011-652-0X	YCS01-653-0X
From 1 g to 1 kg	YCS31-611-0X	YCS31-612-0X	YCS31-613-0X
From 1 g to 5 kg	YCS31-651-0X	YCS31-652-0X	YCS31-653-0X
From 1 g to 10 kg	YCS31-711-0X	YCS31-712-0X	YCS31-713-0X

Nominal mass	F2	M1
From 1 mg to 100 g	YCS01-514-0X	YCS01-515-0X
From 1 mg to 200 g	YCS01-524-0X	YCS01-525-0X
From 1 mg to 1 kg	YCS01-614-0X	YCS01-615-0X
From 1 mg to 5 kg	YCS01-654-0X	YCS01-655-0X
From 1 g to 1 kg	YCS31-614-0X	YCS31-615-0X
From 1 g to 5 kg	YCS31-654-0X	YCS31-655-0X
From 1 g to 10 kg	YCS31-714-0X	YCS31-715-0X

Service weight set	E2	F1
From 100 g to 5 kg	YSS5128-6528-0X	
From 1 g to 5 kg		YSS3138-6538-0X

Options:
X = 0: weights without DKD certificate
X = 2: weights with DKD certificate

Metrological Milligram Weights (YCW)

Features of Sartorius metrological weights

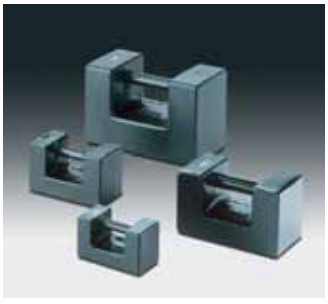
Class F1 leaf weights
(F2, M1 in weight sets)
1–5 mg aluminum; density 2.7 g/cm^3
10–500 mg nickel silver; density 8.7 g/cm^3

Class E1 and E2 wire weights
1-mg special steel, non-magnetizable
E1: density 8.0 g/cm^3
E2: density 7.9 g/cm^3

Nominal mass	Wire weights Class E1	Wire weights Class E2	Wire weights Class F1
1 mg	YCW0111-0X	YCW0121-0X	YCW013-0X
2 mg	YCW0211-0X	YCW0221-0X	YCW023-0X
5 mg	YCW0511-0X	YCW0521-0X	YCW053-0X
10 mg	YCW1111-0X	YCW1121-0X	YCW053-0X
20 mg	YCW1211-0X	YCW1221-0X	YCW123-0X
50 mg	YCW1511-0X	YCW1521-0X	YCW153-0X
100 mg	YCW2111-0X	YCW2121-0X	YCW213-0X
200 mg	YCW2211-0X	YCW2221-0X	YCW223-0X
500 mg	YCW2511-0X	YCW2521-0X	YCW253-0X

Options:
X = 0: weights without DKD certificate
X = 2: weights with DKD certificate

Metrological Weights (YCW)



Class E1, E2, F1 and F2 knob weights
1 g to 50 kg, special steel, non-magnetizable
E1; density: 8.0 g/cm³
E2, F1, F2: density: 7.9 g/cm³
M1: 1–10 kg, brass/galvanized, polished

Packaging of the weights:
Up to 20 g in a plastic case
From 50 g and up in a wooden case
From 1 kg and up additionally with glove

Knob weights
from 100 kg cylindrical weights

Nominal mass	E1 (1)	E2 (1)	F1 (1)	F2 (1)	M1 (2)	M2 (3)
1 g	YCW311-0X	YCW312-0X	YCW313-0X	YCW314-0X		YCW316-0X
2 g	YCW321-0X	YCW322-0X	YCW323-0X	YCW324-0X		YCW326-0X
5 g	YCW351-0X	YCW352-0X	YCW353-0X	YCW354-0X		YCW356-0X
10 g	YCW411-0X	YCW412-0X	YCW413-0X	YCW414-0X		YCW416-0X
20 g	YCW421-0X	YCW422-0X	YCW423-0X	YCW424-0X		YCW426-0X
50 g	YCW451-0X	YCW452-0X	YCW453-0X	YCW454-0X		YCW456-0X
100 g	YCW511-0X	YCW512-0X	YCW513-0X	YCW514-0X		YCW516-0X
200 g	YCW521-0X	YCW522-0X	YCW523-0X	YCW524-0X		YCW526-0X
500 g	YCW551-0X	YCW552-0X	YCW553-0X	YCW554-0X		YCW556-0X
1 kg	YCW611-0X	YCW612-0X	YCW613-0X	YCW614-0X	YCW615-0X	YCW616-0X
2 kg	YCW621-0X	YCW622-0X	YCW623-0X	YCW624-0X	YCW625-0X	YCW626-0X
5 kg	YCW651-0X	YCW652-0X	YCW653-0X	YCW654-0X	YCW655-0X	YCW656-0X
10 kg	YCW711-0X	YCW712-0X	YCW713-0X	YCW714-0X	YCW715-0X	YCW716-0X
20 kg	YCW721-0X	YCW722-0X	YCW723-0X	YCW724-0X		
50 kg	YCW751-0X	YCW752-0X	YCW753-0X	YCW754-0X		
100 kg*			YCW813-00	YCW814-0X		
200 kg*			YCW823-00	YCW824-0X		
500 kg*			YCW853-00	YCW854-0X		
1,000 kg*			YCW913-00	YCW914-00		

Nominal mass value	Rectangular bar weights (1) M1	Rectangular bar weights (4) M1	Cylindrical weights (4) M1
5 kg	YCW6554-0X	YCW6559-0X	
10 kg	YCW7154-0X	YCW7159-0X	
20 kg	YCW7254-0X	YCW7259-0X	
50 kg	YCW7554-0X	YCW7559-0X	
100 kg		YCW8159-0X	YCW8157-0X
200 kg**		YCW8259-0X	YCW8257-0X
500 kg**		YCW8559-0X	YCW8557-0X
1,000 kg**		YCW9159-00	YCW9157-00

* Weight with lug for crane
** Weight with lug for crane, stackable

Materials:
(1) stainless steel, (2) galvanized brass, (3) brass, precision lathed surface
(4) gray casting, painted black

Options:
X = 0: weights with DKD certificate issued to Sartorius (F1, E2, F2 up to 50 kg)
X = 2: weights with DKD certificate issued to the customer or company requesting certification

Test Weights (YCW...8)

Features of Sartorius test weights
Stainless steel, non-magnetizable, density 7.9 g/cm^3, polished; packaging of the weights: up to 1 kg, in a plastic case; from 2 kg and up, in a wooden case

Nominal mass	E2	F1	F2
1 g	YCW3128-0X	YCW3138-0X	
2 g	YCW3228-0X	YCW3238-0X	
5 g	YCW3528-0X	YCW3538-0X	
10 g	YCW4128-0X	YCW4138-0X	
20 g	YCW4228-0X	YCW4238-0X	
50 g	YCW4528-0X	YCW4538-0X	
100 g	YCW5128-0X	YCW5138-0X	YCW5148-0X
200 g	YCW5228-0X	YCW5238-0X	YCW5248-0X
500 g	YCW5528-0X	YCW5538-0X	YCW5548-0X
1 kg	YCW6128-0X	YCW6138-0X	YCW6148-0X
2 kg	YCW6228-0X	YCW6238-0X	YCW6248-0X
5 kg	YCW6528-0X	YCW6538-0X	YCW6548-0X
10 kg		YCW7138-0X	YCW7148-0X

Options:
X = 0: weights with DKD certificate issued to Sartorius
X = 2: weights with DKD certificate issued to the customer or company requesting certification

Accessories for Weights (YAW)

Accessories for Sartorius weights
Sartorius offers glass bell jars with a support plate, brushes, gloves, forceps with silicone-coated tips, weight forks, handles for lifting weights and a permeability indicator (for checking magnetic properties of weights of accuracy classes E1, E2, F1 and F2).

In addition, Sartorius supplies susceptometers for easy and convenient determination of the susceptibility and magnetization of weights in accordance with OIML R111, 2004.

Accessories		Order no.
Glass bell jar with support plate	For 1 mg – 5 g	YAW00
	For 1 mg – 50 g (100 g or 200 g)	YAW01
	For 100 g – 1 kg (2 kg)	YAW02
	For 2 kg – 5 kg	YAW03
	For 10 kg	YAW04
	For 20 kg	YAW05
	For 50 kg	YAW06
Brush	Small, 100 mm	YAW11
	Medium, 115 mm	YAW12
	Large, 150 mm	YAW13
	Extra-large, 250 mm	YAW14
Pair of gloves	Cotton	YAW21
	Fine leather	YAW22
Forceps with silicone-coated tips	115 mm for 1 mg – 5 g	YAW31
	160 mm for 1 g – 200 g	YAW32
	230 mm for 1 g – 1 kg	YAW33
Weight fork	For 500 g	YAW41
	For 1 kg	YAW42
	For 2 kg	YAW43
Handle for lifting weights	For 5 kg	YAW50
	For 10 kg	YAW51
	For 20 kg	YAW52
	For 50 kg	YAW53
Permeability indicator	For checking magnetic properties of weights of accuracy classes E1, E2, F1 and F2; supplied in a wooden case	YAW61
Susceptometer	For testing the magnetic properties of weights for accuracy classes E1, E2, F1 and F2 acc. to OIML R111.	
	Resolution: 10 µg	YSZ01C
	Resolution: 1 µg	YSZ02C
Reference susceptibility standard	1 kg	YSZ01RSC
Calibration set for susceptometer		YSZ01RMC

OEM Products

Sartorius offers components, such as load cells, electronic modules, keypads and indicators, which can be integrated into other equipment and/or connected to an instrument in which weighing is a necessary function to ensure its operability (OEM=original equipment manufacturer).

In manufacture, our OEM products are most commonly used in batching and filling systems, continuous checkweighers for checking foods, chemicals, tobacco and pharmaceutical products and tensiometers, thermogravimetric systems, magnetic suspension balances for quality assurance and research, etc.

To request a price quotation, just give Sartorius your specification, including, for example, the weighing capacity, resolution, repeatability, weight of installed equipment, operating temperature, sample throughput – for continuous checkweighers – and the number of units you plan to order.

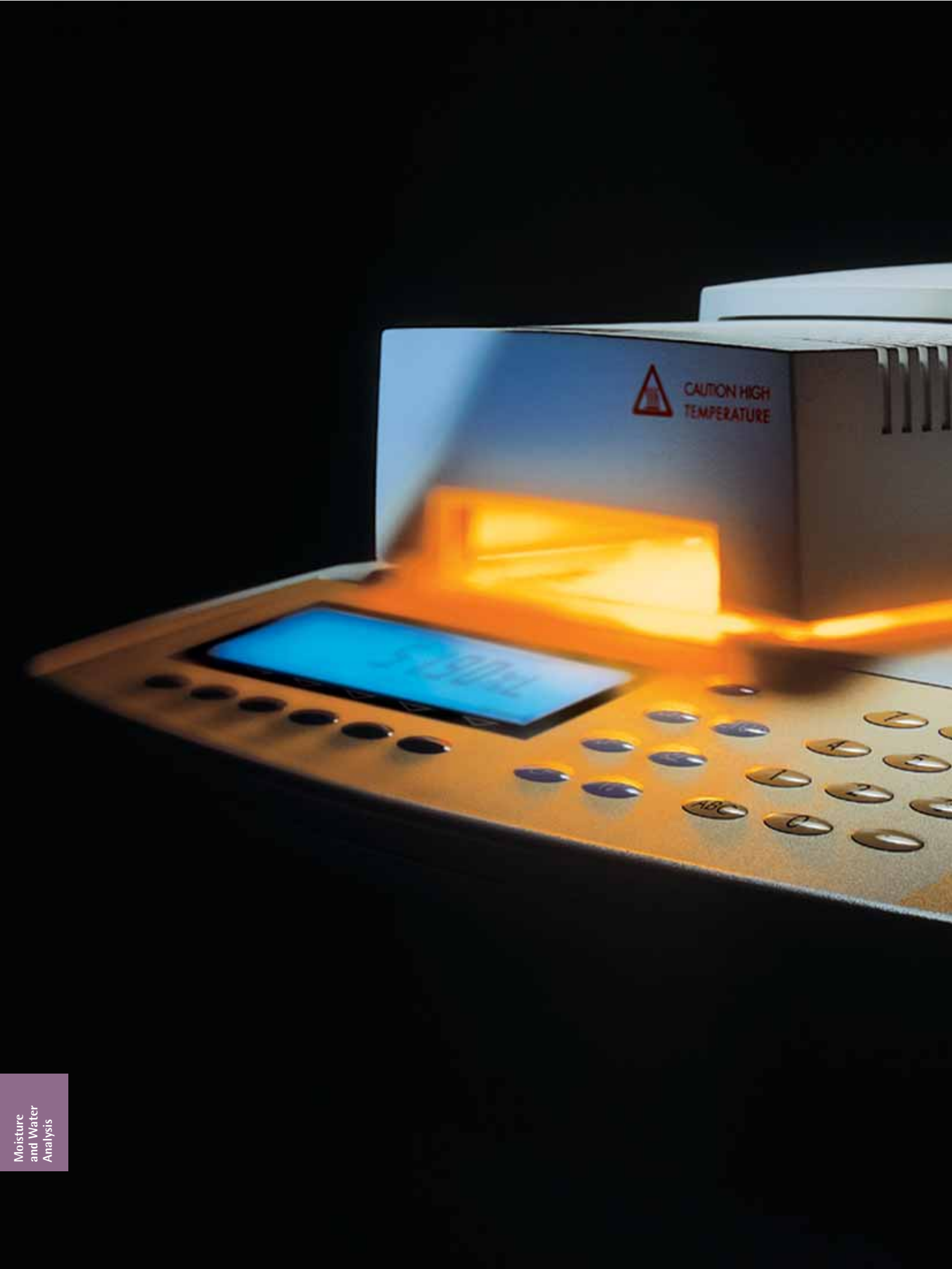
Specifications

Capacity (g)	Readability (mg)	Repeatability (mg)	Models					
			Individual components without CE mark	Encapsulated components with CE mark				Optional integrated calibration weight
						Explosion-protected		
				IP20	IP44	IP44	IP65	
0.5 ...2	0.001 ... 0.005	0.002 ... 0.004		WZ2P-CW				
80 | 210	0.01 | 0.1	0.02 | 0.1	WZ215-CW					
60	0.01	0.03		WZA65-CW				
220	0.01	0.03		WZA225-CW				
60	0.1	0.1	WZ64S					
60	0.1	0.1	WZ64-CW					
60	0.1	0.1			WZA64			...-CW
60	0.1	0.1				WZA64-X		
120	0.1	0.1	WZ124S					
120	0.1	0.1	WZ124-CW					
120	0.1	0.1			WZA124			...-CW
210	0.1	0.1	WZ214S					
220	0.1	0.1	WZ224-CW					
220	0.1	0.1			WZA224			...-CW
600	0.1	0.1		WZ614-CW				
320	1	1	WZ323		WZA323			...-CW
520	1	1	WZ523		WZA523			...-CW
620	1	1				WZA623-X		
1,000	10	20					WZG1	
1,200	1	1	WZ1203		WZA1203			...-CW
2,000	20	40					WZG2	
6,200	10	10				WZA6202-X		
8,200	10	10	WZ8202		WZA8202			...-CW
10,000	100	200					WZG10	
12,000	100	100	WZ12001		WZA12001	WZA12001-X		
20,000	200	400					WZG20	

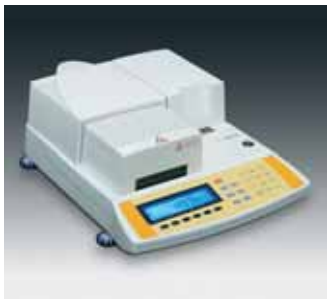
Examples of order number combinations

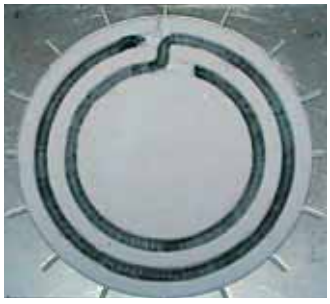
WZ523	Weigh cell with single components and without internal calibration weight
WZ523-CW	Weigh cell with single components and internal calibration weight
WZA523	Weigh cell with encapsulated components and without internal calibration weight
WZA523-CW	Weigh cell with encapsulated components and internal calibration weight

For more information on our weigh cells, visit our Sartorius home page:
http://www.sartorius.com/index.php?id=1215


CAUTION HIGH
TEMPERATURE

Moisture and Water Analysis





Infrared drying – fast and precise
Infrared dryers from the Sartorius Moisture Analyzer Series are increasingly used as a fast alternative to the classic oven drying method. These compact analyzers are designed for routine applications in production and incoming inspection. With the resolution of an analytical balance, they are also ideal for research and development. Whether you need an analyzer with an EC type-approval certificate or one tested for applications in legal metrology, Sartorius offers a customized solution for nearly every requirement. With their wide selection of infrared heat sources, including halogen lamp, CQR (coiled quartz radiator) or ceramic heating element, these moisture analyzers can be optimally adapted to the intended application.

Sartorius MA35
Easy... very easy!
The MA35 is the new basic model in the moisture analyzer series from Sartorius. Its performance functions and operating concept are geared toward daily routine processes, such as repetitive QC monitoring of samples as performed during in-process control and incoming goods inspection. To make the MA35 even more user-friendly, we have done away with seldom-used programming options without compromising flexibility or measurement accuracy.

Sartorius MA150
For routine operation
A rugged design with low space requirements and easy operation are the major features of these analyzers. Fully automatic drying of a sample until a constant weight is reached eliminates the need for programming an endpoint shutoff parameter. A total of 20 drying routines can be saved to give you the flexibility you need when measuring the moisture content of additional, out-of-the-ordinary samples.

Customizable and fast
Now you can choose between two different infrared analyzers that cover a diverse range of moisture measurement requirements. Whichever heat source you opt for, both analyzers deliver results within minutes. The ceramic heating element ensures especially gentle heating of temperature-sensitive samples. Alternately, the ultrafast CQR quartz-glass heater optimizes the analysis times even further.

Application-specific solutions
Practical accessories round off the entire lineup of Sartorius moisture analyzers: These include an in-use dust cover, supplied as standard equipment, and type approval for applications in legal metrology. Also available is a special moisture analyzer version without openly accessible glass components, making you compliant with the stringent FDA and HACCP requirements that ban the use of glass in production.

Sartorius MA100
As accurate as an analytical balance
The **MA100** is the only infrared dryer in the world that features a built-in weighing system with 0.1-mg resolution and an EC type-approval certificate. A motorized heating unit moves over the sample to open or close the sample chamber. This reduces interfering effects when a sample is placed on the pan or a measurement is started. The pacesetting design enables the MA100 to achieve a measuring accuracy well beyond that provided by conventional infrared dryers.

Automatic adaptation to reference values
The **MA100** features SPRM, or **S**wift **P**arameter Adjustment to a given **R**eference **M**ethod. This function enables the operating parameters of MA100 to be adapted to the results of an available reference method and saved as a drying routine. Optimization of operating parameters doesn't get any faster than this.

Flexible and modular
The Sartorius MA100 analyzers give you a choice of three different infrared heat sources: a halogen lamp for standard applications, a ceramic heating element for gentle heating of temperature-sensitive samples and a CQR quartz glass heater. The CQR combines the fast drying capability of a halogen lamp with the gentle heating capability of a ceramic heater for drying samples evenly over their entire surface. A printer that can be optionally integrated into the housing eliminates the familiar cable spaghetti of an external printer, while helping keep your work area tidy.

A clean solution
Did you accidentally spill a sample? Are there spatters of grease inside the sample chamber? No problem with the MA100! The Plug & Dry® feature lets you slide out the heater cover easily for thorough cleaning and without letting any dirt get inside the housing.

Specifications MA35 | MA100 | MA150

	MA35	MA100	MA150
Max. weighing capacity (g)	35	100	150
Accuracy of the weighing system (mg)	1	0.1	1
Weighing system with EC type-approval certificate		•	
Repeatability, average (%)			
for initial sample weight approx. ≥ 1 g	± 0.2	± 0.1	± 0.2
for initial sample weight approx. ≥ 5 g	± 0.05	± 0.02	± 0.05
Readability (%)	0.01	0.001	0.01
Display mode for results			
% moisture	•	•	•
% dry weight (solids)	•	•	•
% RATIO	•	•	•
g residue	•	•	•
g/kg residue		•	•
mg weight loss		•	
Calculated value (measured value × factor)		•	
Temperature range and settings			
– 30°C–230°C, adjustable in 1-degree increments		•	
– 40°C–220°C, adjustable in 1-degree increments			•
– 40°C–160°C, adjustable in 1-degree increments	•		
Heating mode			
– Standard drying	•	•	•
– Quick drying		•	
– Gentle drying		•	•
– Phase drying		3 × 0.1–999 min.	1 × 0.1–999 min.
– MA30-compatible		•	
Analysis mode			
– Fully automatic	•	•	•
– Semi-automatic		1–50 mg | 5–300 sec. 0.1–5.0% | 5–300 sec.	1–50 mg | 5–300 sec. 0.1–5.0% | 5–300 sec.
– Timer settings	1 × 0.1–99 min.	3 × 0.1–999 min.	
– Timer mode + fully | semi-automatic		2 × 0.1–999 min. + automatic	
SPRM mode for parameter recognition		•	
Optional heating unit			
– Ceramic IR heating element (infrared)		•	•
– Halogen lamp (infrared)		•	
– CQR heater (coiled quartz radiator)		•	•
– Infrared heating using metal tubular-shaped heating elements	•		
– Later exchange of the heating unit by Plug & Dry®*		•	
Access to the sample chamber			
– via hinged cover	•		•
– via motorized cover		•	
Optional version compliant with FDA/HACCP regulations** with aluminum panel inserts instead of glass panels	•		•
Built-in calibration weight		•	

* Does not apply to the CQR quartz heating element
** Not available with halogen or CQR quartz heating element

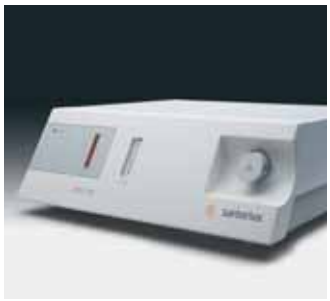
	MA35	MA100	MA150
Operator guidance features – Context-sensitive menu with alphanumeric interactive prompts and icons – Text input for sample identification using soft-key prompts – Numeric keypad for sample identification and parameter input – Parameter input using soft-key prompts	•	• • •	• •
reproTEST for determining the repeatability of the weighing system		•	
Number of program memories	1	30	20
Memory for data storage – Statistics of the last 9,999 measurements – End point up to the next moisture analysis run	•	• •	 •
Parameter settings password-protected against unauthorized access		•	•
Manual input of tare weights		•	
Data printer – Integratable (optionally retrofittable) – External (optional)	•	• •	 •
GLP-compliant printout – User-configurable – Inalterable standard configuration template – Short report	 • •	•	•
Data interface port – RS-232C unidirectional – RS-232C bidirectional	•	• •	•
Bar code scanner can be connected		•	
In-use dust cover for keypad		•	•
Housing dimensions (mm) Width × depth × height	224×366×191	350×453×156	213×320×180.5
Weight. approx. (kg)	5.8	8.0	5.5

Accessories MA35 | MA100 | MA150

Accessories	MA35	MA100	MA150
Disposable sample pans 80 units, aluminum, round, 90 mm ∅	6965542	6965542	6965542
Glass fiber filters for analysis of liquid, pasty and fatty samples, 80 units	6906940	6906940	6906940
Panel replacement set Aluminum panel inserts for replacing glass panels to meet FDA|HACCP regulations (conversion kit)	YDS05MA	YDS03MA	YDS04MA
Windows®-compatible software for data collection and for programming drying programs incl. interface cable, 9/25-pin		YMW02MA	YMW02MA
Carrying case		YDB03MA	YDB05MA
Data printer			
Integratable		YDP01MA	
External	YDP03-0CE	YDP03-0CE	YDP03-0CE
Ink ribbon cartridge for data printer	6906918	6906918	6906918
Paper rolls for data printer, 5 rolls, 50 m each	690693	690693	690693
External calibration weight			
1 × 30 g ± 0.3 mg	YSS43		
1 × 50 g (E2)		YCW452-00	
1 × 100 g (E2)			YCW512-00
Temperature adjustment set with manufacturer's certificate	YTM01MA	YTM03MA	YTM03MA
Standard operating procedure (SOP)	YSL02MA	YSL02MA	YSL02MA

Interested in receiving more information about our moisture analyzers? Visit www.sartorius.com/moisture. There you will find our applications database that contains plenty more information about which analyzer is suitable for which application and which operating parameters Sartorius recommends you use. Moreover, you will find many publications of technical articles that you can download as PDF files.

Water Detection System: WDS400
Selective Detection of Surface Water, Capillary Water and Water of Crystallization



Water, not moisture
Thermogravimetric methods, such as the oven-drying method, use the weight loss of a sample to determine the total content of all volatile components and not, however, the pure water content. As a rule, the latter task is performed using electrochemical techniques that are based on the principle of coulometry (coulomb = electric charge). The most commonly known methods are coulometric Karl Fisher titration for solid and liquid samples and the phosphorus pentoxide method for trace analysis of gases. However, both methods require complicated equipment; moreover, KF titration necessitates the use of additional chemicals in order to perform an analysis. The WDS 400 Water Detection System from Sartorius combines these three standard methods into a high-resolution and easy procedure for selective detection of water in solids and pastes.

Get all three in one
The WDS 400 adopts the principle of convection heating from the oven drying method in order to drive out the entire moisture from a sample.

A ceramic disc coated with extremely hygroscopic phosphorus pentoxide P_2O_5 completely absorbs the water from the resulting gas mixture and bonds water molecules to phosphoric acid H_3PO_4 on the disc surface in a chemical reaction. By coulometry, i.e., by an electric current generated at the ceramic disc, phosphoric acid is broken down into phosphorus pentoxide P_2O_5, hydrogen H and oxygen O. Based on Faraday's law, it is known how much current is necessary to split off all hydrogen atoms from a chemical compound. Thus, the WDS 400 uses the amount of electric current to calculate the quantity of water driven out of a sample.

Highly accurate and selective
This combination method works so accurately that it is even possible to detect one single microgram of water. Beyond that, the WDS 400 enables the water fractions to be differentiated according to surface water, capillary water and water of crystallization (the latter is chemically bound water).

Easy operation
All the user has to do is just weigh-in a sample. The WDS 400 does not require any complicated handling of detection reagents, many of which are toxic. Optionally, you can choose from the carrier gases nitrogen N_2 (Class 5.0) or room air, i.e. using an integrated air pump and drying filter.

Electrolysis of phosphoric acid

Cathode reaction:
$4H^+ + 4e^- \rightarrow 2H_2$

Anode reaction:
$P_4O_{12}^{4-} \rightarrow P_4O_{10} + O_2 + 4e^-$

Faraday's law:

The electrodeposited mass is proportional to the amount of charge "Q":
$M = A \cdot Q = A \cdot I \cdot t$

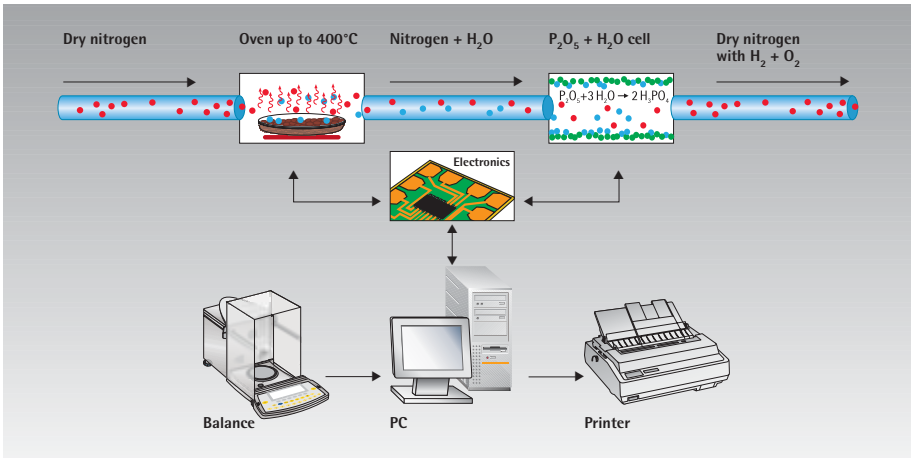
I: Impedance, t: time
A: Electrochemical equivalent

Electrochemical equivalent of water
"A" is the mass of the ions in grams which are liberated by the passage of 1 coulomb of electricity [C = As].

"Q" is the charge of 1 mol of water (18 g) with 2 electrons per water molecule.

$Q = 2 \cdot N_A \cdot e = 2 \cdot F$
(Faraday's constant F = 96487 C/valence)

$A = m/Q = 18\ g/2 \cdot F = 0.0933 mg/C$



Technical Specifications | Accessories
Water Detection System WDS400

Technical specifications

Moisture analysis method	Thermal analysis followed by coulometric measurement
Sample heating in the built-in stainless steel oven (convection heating)	From room temperature up to 400 °C; in increments of 1 °C
Detection limit	1 µg of water
Reproducibility	± 2% of the absolute water value measured (depends on sample)
Measuring range	1 ppm to approx. 40% water (depends on sample)
Sample weight, average	15–2,000 mg
Display	ppm, % and µg water, mA current
Analysis time	Average: 10–20 min | adjustable in increments of 1 min – 10 h
Operator guidance|Software	English, for PCs with Windows® 2000 | NT | XP
Data storage	On the hard drive of the interfaced PC
Number of measuring programs	Limited only by the PC's hard drive memory
Power requirements	230 V ± 10%
Frequency	50 ... 60 Hz
Carrier gas, choice of:	– Dry room air (using integrated air pump with molecular sieve) – Nitrogen, N_2 (Class 5.0) from a gas cylinder or supply line
Gas prepressure	1 bar (15 psi)
Gas consumption	100 – 200 ml/min
Power consumption	Standby 100 W | At full power 600 W
Dimensions (mm) W × D × H	500 × 500 × 180
Weight, approx.	20 kg

Accessories

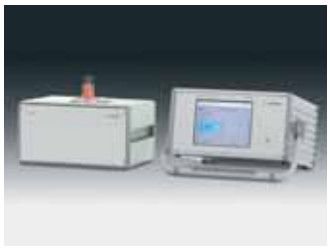
Regeneration kit for the electrolytic cell	69MA0224
Calibration standard	69MA0225
PTFE particle-removing filters up to serial no. 19070049	69MA0226
PTFE particle-removing filters starting from serial no. 19170000	69MA0292
Nickel scoop	69MA0228
Sensor, uncoated	69MA0232
Temperature adjustment set	6740-86
Molecular sieve for drying unit	69MA0293
Flexible gas tubing, stainless steel, for external gas supply	69MA0229

Recommended balance models

Semi-microbalances	**ME235S**	**ME235P**	**CP225D**
Weighing range structure	SuperRange	PolyRange	DualRange
Weighing capacity g	230	60 | 110 | 230	80 | 220
Readability mg	0.01	0.01 | 0.02 | 0.05	0.1 | 0.01 | 0.01

Microbalances	**SE2**	**ME5**	**ME36S**	**CP2P**	**LE26**
Weighing range structure	SuperRange	SuperRange	SuperRange	PolyRange	PolyRange
Weighing capactiy g	2.1	5.1	31	0.5 | 1 | 2	5 | 21 g
Readability µg	0.1	1	1	1 | 2 | 5	2 | 10 g

Sartorius LMA300P Laboratory Moisture Analyzer
Moisture Analysis Within a Split Second



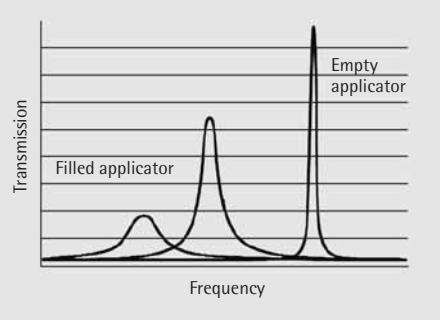
The **LMA300P** works with microwave resonance technology. In this indirect measurement method, a harmonic electromagnetic resonator field is built up by a microwave generator in a sensor (applicator). When the applicator is filled with a sample, the water in the sample interferes with the oscillation behavior (resonance) of the microwave, or interacts with the resonance field, changing the height and width of the resonance frequency peak.

Calibration
This change in resonance field is detected by a sensor, and the analyzer CPU calculates the moisture content of the sample based on the calibration previously carried out. The basic analyzer calibration required can be done by the classic oven drying method or, of course, using an infrared moisture analyzer from the Sartorius MA series.

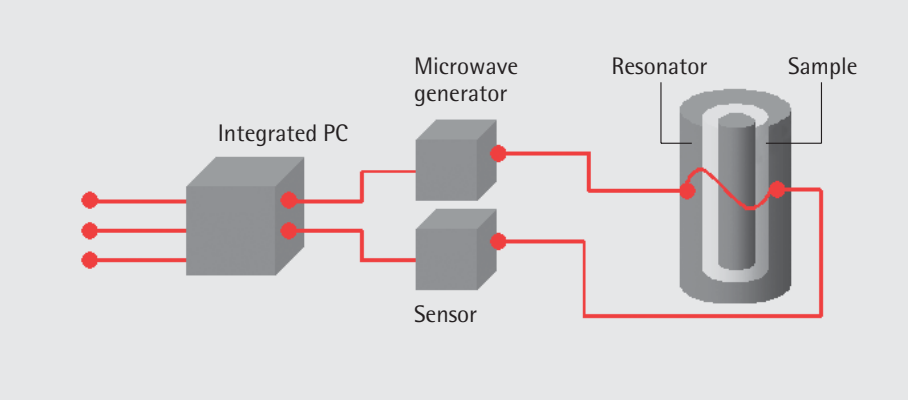
Measurement
The microwave resonance method offers the advantage of particularly fast measurement in under one second. At the same time, it is non-destructive, which means that samples can be further used for subsequent tests. Changes in the color and surface structure of the sample, as is frequently the case, for instance, in natural raw materials, does not have any effect on calibration or thus on the measured result, unlike near infrared spectroscopy. The microwave resonance method is not limited to measurement of the surface moisture; rather, it also determines the core moisture thanks to its operating principle.

Application areas
The **LMA300P** can be used for nearly all pourable and granulated products as well as viscous liquids, such as whitewash and other similar materials. The measuring range is between approx. 0.1–85% moisture. The prerequisite for operating the analyzer is to calibrate measurements on the basis of measurement procedure providing absolute accuracy. The major application area for the **LMA300P** is incoming and in-process quality control.

Design
The LMA300P is a modular-designed system consisting of a control and evaluation unit, **LMA300PA**, and a resonator module, **LMA300PR**. This type of modular design allows a different resonator type to be used (available on request), and enables the analyzer to be easily adapted to customer-specific applications.



Two-parameter measurement: shift of the resonance frequency peak (Δf) and decrease of magnitude (Δm)



Specifications*	
Measuring range (%)	Approx. 0.1–85
Readability (%)	0.01
Measuring accuracy (%) (depends on calibration and type of sample)	± 0.05
Measuring time (s)	<1
Display of measured value	% moisture, % dry weight (solids)
Measurement method	Microwave measurement technology
Allowable sample temperature (°C)	Approx. 0–70
Operator guidance	Touch screen with demand-driven menu based on alphanumeric prompts (dialogue text and symbols)
Memory for number of measurement programs	40 programs for articles
Data printer	External (option)
GLP-compliant report	Yes, with optionally available external printer, YDP03-0CE
Interface port	2 × RS-232C for printer and PC USB port + 128 MB USB memory stick
Housing dimensions (in mm) Control unit LMA300PA Sensor module LMA300PR	 Width 500, depth 430, height 200 Width 370, depth 390, height 280
Weight approx. (kg) Control unit LMA300PA Sensor module LMA300PR	 11.5 11.0

* In addition to the LMA300PR sensor module, other sensors are also available on request. Depending on the desired application, however, the technical specifications will have to be agreed on with a Sartorius applications technician.

Optional accessories	Order no.
Data printer for external connection	YDP03-0CE
Ink ribbon cassette for YDP03-0CE	6906918
Printer paper, 5 rolls, each with 50 m, for YDP03-0CE	6906939
Applicator, 60 mm	69MA0294
Applicator, 140 mm	69MA0295

FACTS®
Service
Progam

FACTS®
Service Progam

Added Value for Your Business

The Sartorius FACTS® program is a comprehensive services program designed to add value to our customers' processes through optimization, validation and training support. The FACTS® program is conveniety divided into the service segments:

COMPLETE – Installation | Maintenance | Repairs
DISCOVER® – Audits and surveys
INCREASE® – Process optimization
CONFIDENCE® – Validation services
EXPAND® – Technical training and seminars

COMPLETE – Installation | Maintenance | Repairs
By having your equipment and systems professionally installed and serviced, you can ensure that your equipment will run perfectly at all times and deliver optimal performance. Moreover, regular maintenance increases the life of your equipment and systems, and prevents unnecessary downtimes. As part of our Complete program, the Sartorius service team offers you the following services:
– Installation and commissioning
– Maintenance and service contracts
– Certificates
– Calibration service
– Repair and corrective maintenance
– Original spare parts
– Hotline and technical support

DISCOVER® – Audits and survey services
The Parmaceutical | Biotech industry is highly regulated and confronted with everchanging compliance parameters. In addition to complying with these regulations, companies must increase capacity and lower costs to remain competitive.

The first step of any improvement is a proper analysis of the current situation. Within the scope of our services segment DISCOVER®, the following subjects may be critically reviewed:
– Quality system
– LIMS validation
– 21 CFR Part 11 compliance
– Validation status
– Inspection readiness
– and more

These services are provided in collaboration with our BioPharm-Allicance partners.

For all details please contact:

discover.info@sartorius.com or
www.biopharmalliance.com

INCREASE® – Process optimization
Our customers' products are valuable, so every liter counts. The INCREASE process optimization program evaluates all aspects of a process and begins with the selection of the most appropriate filter material and combination.

Filter selection
The first step in filter selection is based primarily on published and calculated data. We review the filter membranes with emphasis on chemical and physical compatibility, particle retention, adsorption properties, required flow rate and total throughput.

Filterability studies
In order to help our customers select a filter or a compatible combination of filters, our specialists perform filterability trials using filter discs. Then, small pleated elements are used with the product under actual process conditions.

This allows customers to accurately make the necessary adjustments for full process scale-up. Sartorius has designed a filterability kit called the Zero-T. A highly refined software program generates a permanent report featuring throughput and scale-up analysis.

The ultimate goal of the study is to find the optimal process solution for each specific application. We believe that our flexibility is essential to good customer service. We understand that reduction of cost per liter and improvement of yield are the major success factors for our clients. In short, your success is our success.

For all details please contact:

increase.info@sartorius.com

30 days
commitment

CONFIDENCE® – Validation services
Within the scope of process validation, the Pharmaceutical | Biotech industry must prove that process components, e.g. filters, do not affect the product by removal of components from it or by release of substances into it. Further, with regard to sterilizing grade filtration, the filter's microbial retentivity must be validated.

The Sartorius CONFIDENCE® program supports regulatory and industry requirements by testing your product formulation with any filter you may be using. Our customized validation protocols are in accordance with the sterile filtration recommendations, established by the Parenteral Drug Administration (PDA) Technical Report No. 26, and the guidelines of the relevant national health authorities.

Using state-of-the-art validation laboratories the complete filter validation program typically includes:

Microbiological services
– Viability test
– Bacterial challenge test

Physico-chemical analysis
– Determination of integrity test parameters for product-wetted filter elements
– Chemical compatibility test
– Particle release test

Analytical services
– Adsorption analysis
– Filter and NON-filter* extractables | leachables (e.g. RP-HPLC, GC-MS, FT-IR)

* In response to growing concerns regarding extractable and leachable substances, Sartorius has expanded its analytical services to perform process specific validation studies for other polymer based devices like bags, tubing or containers.

Customized methodology and documentation will ensure regulatory compliance for the critical steps in your development or production process.

For all details please contact:

confidence.info@sartorius.com

NEW
Filter validation testing with cytotoxic substances

Expand® Your Mind – Training and Seminars

Continuing education has become a worldwide regulatory requirement for the pharmaceutical and food & beverages industries. To help our customers keep up-to-date with the latest standards, Sartorius offers the EXPAND® program. It comprises technical and communication training courses covering both theoretical and practical aspects, with a strong emphasis on hands-on, practical exercises.

The theoretical and practical aspects include:
- cGMP-compliant process control
- Validation
- Sterile production
- Downstream processing
- Quality assurance and quality management
- Communication

Communication training examples
Industry training are no longer just technical seminars. Due to desintegration and specialization, there is an increasing need for efficient communication with colleagues and partners.

 # 862005
Communication Training 1
"Basic Principles of Communication and Conversing Skills"
This captivating basic module deals with the fundamental aspects of communication, motivation and conversing skills, all of which are taught and tested in practical scenarios.

Topics
Brain structure and stress hormones, "the individual" and need-structures, need-identification, perception of "reality" and frustration, fight-and-flight reactions, mistakes and the search for a scapegoat, self-esteem, aspects of messaging, listening, communication levels, "I" messages, asking techniques, assumptions, objections, excuses, informative "no's" and decisive "no's", plus-and-minus situations, the "why" questions.

Total course time
2 days

Target group
All staff members who want to enhance their behavior to a more conscious and successful level when interacting with communication partners.

 # 862007
Communication Training 2
"Coping with Conflicts"
In interpersonal communication, the different needs and interests of the different individuals produce "naturally occurring conflicts." Does it help to sweep conflicts under the carpet, because we do not experience them objectively, but rather with feelings of anger, anxiety, hate, vindictiveness, superiority, inferiority or humiliation? Or does it make more sense to look at conflicts as challenges, as a chance to change things, to make a new start and achieve personal growth? If you agree with this, we would like to help you accomplish it.

Topics
Intra-individual conflicts ("the inner team"), the developmental square, inter-individual conflicts, personality types, life scripting, conflict traps, spontaneous reactions and reptilian brains, conflict recognition, conflict escalation, "winner and loser?", models for coping with conflicts, solving conflicts and conflict clarification, the principle of "de-escalation," communication exercises with video analyses, e.g. conversations with staff members, concrete and topical conflict situations.

Total course time
2 days

Target group
All staff members who have taken the "Communications Training 1" course (required) and who want to expand the knowledge and skills acquired in the first course to achieve personal and professional growth in their ability to actively cope with conflicts.

 # 862024
Sterilization and integrity testing of membrane filters
The participants in this training seminar on steaming-in-place and 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.

 # 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 current pharmacopoeias
- 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.

 # 862025
Implementation of PDA Technical Report 26
The main focus of this course is on the practical implementation of PDA Technical Report No. 26, according to which any filter validation must stand up to every audit.

Contents
- We will start by explaining the basic differences between depth filters and membrane filters and describe 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 cGMP idea with regard to handling sterile filter elements will create the groundwork for a more detailed interpretation of the PDA TR 26.
- Using the example of the CONFIDENCE Validation Service, the tests and analyzes to be conducted will be explained. Additionally we will describe 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 to solve problems.

Total course time
1 day

Target group
Staff working in the field of quality assurance, validation and production.

Biotechnology Workshop

 # 862023
High cell density cultivation (HCDC) of Escherichia coli and primary downstream processing (DSP)
Emphasis is placed in Part I on an efficient high cell density cultivation (HCDC), on the safe handling of bench-scale bioreactors, as well as on the avoidance of sterility problems. Consideration is given to both a sufficient oxygen supply and fundamentals of the genetics of Escherichia coli and suitable vectors. Part II provides an introduction to primary downstream processing techniques, e.g. primary steps to isolate the protein of interest, so-called product capturing.

Contents
- Bench-scale bioreactors: handling from preparation to cell harvest
- Sterility techniques, sterilization kinetics
- Composition of media for HCDCs
- Strategies for cultivation and analysis
- Escherichia coli and vectors
- Primary downstream processing
- Centrifugation
- Crossflow filtration (microfiltration and ultrafiltration)
- Cell disruption methods
- Expanded bed adsorption
- Qualification & validation

Target group
Attendees include biologists, biochemists, chemists, biotechnologists, engineers and technical assistants with basic knowledge of microbiology, cultivation of microorganisms and of molecular biology, and who are in charge of managing bioreactors or the downstream processing of bioprocess products or willing to do this in future.

 # 862008
The use of crossflow filtration in the pharmaceutial and biotech industry
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
- Determination of 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.

Training Examples for the F&B Industry

 # 862016
Microbiological quality assurance and plant hygiene in the food and beverage industry
This training course in advanced microbiology takes 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.

 # 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 sensory analysis.

Theoretical aspects include
- 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 sensory analysis according to DIN and ISO standards
- Drafting a profilogram

Practical exercises include
- Basic test (taste thresholds)
- Taste testing (paired comparison, triangular test, duo-trio test)
- Olfactory tests
- The practical section will conclude with a test of your personal performance in 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.

#862001
Microbiological principles of product safety and industrial hygiene

Theoretical aspects
- Introduction to the general microbiology and 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.

For more detailed information please ask for our EXPAND® Training brochure or contact:

expand.info@sartorius.com

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Index by Application | Product Name

For the purpose of product development we reserve the right to make changes without notice.

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