sartorius

Products and Solutions
for Science and Research

turning science into solutions

Products and Solutions
for Science and Research

About Sartorius

Sartorius 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.

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Major Filtration Applications

Filtration

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Major Filtration Applications

Sample Cleaning
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Direction of ultrafiltration

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Sample

Particles etc.

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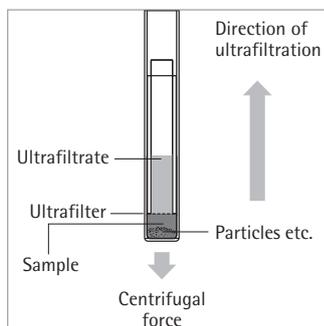
Samples for HPLC
Membrane filters have established themselves as the filters of choice for particle removing preparation of the small volume samples used for HPLC. The most commonly used pore size for this application is 0.45 µm, although 0.2 µm is preferred when the sample contains very fine particles.

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 27 and 88).

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 56).

Aqueous Solutions and Solvents
A 47 mm pressure holder (see page 87) 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 45).

Separation Ranges of Membrane Filters and Ultrafilters

| Coarse particles | | | Fine particles | | | Colloids | Liposomes | | |
| | Yeasts\|moulds | | | Bacteria | | | Viruses | | |
Cells							Proteins	Pyrogens	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		
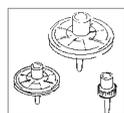
Minisart® RC and Minisart® SRP syringe units Pages 33 to 40

Glass filter holders: Pages 48 to 50

Centrisart® I and Vivaspin centrifugal units Pages 132 to 136
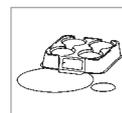
Membrane filters pages 20 to 31

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 ultra-filtration membranes which separate based on the size and low protein adsorption characteristics the volume exhibits.

Scale-up. Which Unit for which Volume?

Filtrations Unit	Filter Area	Typical Sample Volume
Vivaspin 500	0.50 cm²	0.5 ml
Vivaspin 2	1.20 cm²	2 ml
Centrisart® I	0.79 cm²	2,5 ml
Vivaspin 4	2.00 cm²	4 ml
Vivaspin 6	2.50 cm²	6 ml
Vivaspin 15	4.00 cm²	15 ml
Vivaspin 20	6.00 cm²	20 ml
Vivacell 70	20.00 cm²	70 ml
Vivacell 100	23.50 cm²	90 ml
Vivacell 250	40.00 cm²	250 ml
Vivaflow 50	50.00 cm²	1 l
Vivaflow 200	200.00 cm²	5 l
Sartocon® Slice 200	200.00 cm²	5 l
Sartocon® Slice	0.10–0.50 m²	50 l

Sterile Venting; Air|Gas Filtration; Clean Room Monitoring
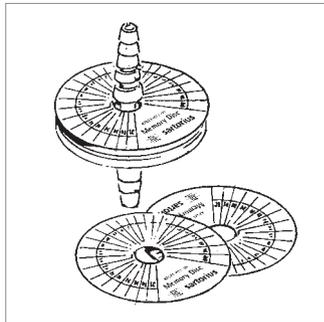
Sterile Venting and Air|Gas Filtration
The naturally hydrophobic PTFE membranes are the filters of choice for these applications. They are heat-resistant and can be repeatedly autoclaved or steam-sterilized, whether they are used as disc filters in stainless steel holders or ready-to-connect units, or 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 106) 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 104), 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 87), 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 m3 and 0.2 m^3. Air flow rates are shown in the diagram on page 107.

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 113.

Clean Room Monitoring
The effectiveness with which the gelatine membrane filters (page 200) 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.

■ Minisart-HY   □ Midisart 2000
■ 142 mm device +
   PTFE membrane filter
■ Sartofluor capsules 0.05 m²

Flow rate for air
(l/min at Δp = 0.1 bar)

				80
40				
30				
20				
10				
0	5.3 cm²	20 cm²	130 cm²	500 cm²

Filtration area

Colony count – Clean room class C

■ Slit sampler
■ MD 8

Colony count/m³

10			
8			
6			
4			
2			
0	1	2	3

Sample
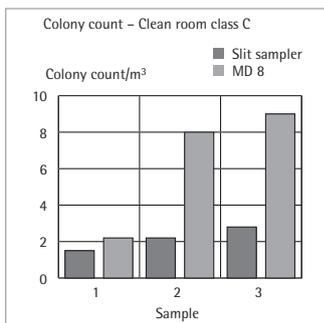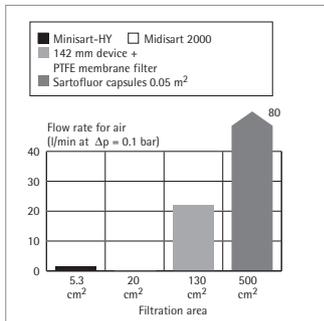
PTFE membrane filters
Page 27

Midisart® 2000
Page 104

Sartofluor® capsules
Page 107
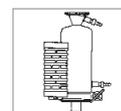
Sartofluor® Mini cartridges
Page 113

Sterilizing Filtration of Aqueous Solutions

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).

Comparison of the Adsorption of Various Filter Materials

1 = Nylon
2 = SFCA
3 = PVDF
4 = PES
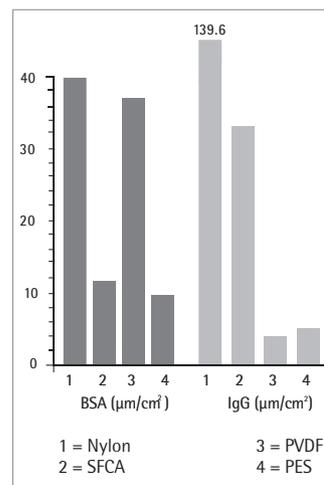
Which Unit for which Volume?

Filtration Unit	Filter Area	Typical Sample Volume
Minisart®	5.3 cm²	100 ml
Minisart® plus	5.3 cm²	200 ml
Sartolab® P20	20 cm²	5 l
Sartolab® P20 plus	20 cm²*	10 l
Sartobran® 150	150 cm²**	25 l
Sartobran® 300	300 cm²**	50 l
Sartobran® P	up to 0.45 m²**	200 l

*   = with integrated glass fiber prefilter
** = with heterogeneous double membrane
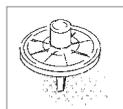
Standard Minisart® and Minisart® plus syringe units
Page 33

Sartolab® P20 and Sartolab® P20 plus units
Page 56
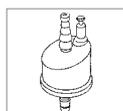
Sartobran® P 150 and 300 capsules
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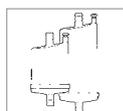
Sartobran® P capsules
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Microbiological Quality Control
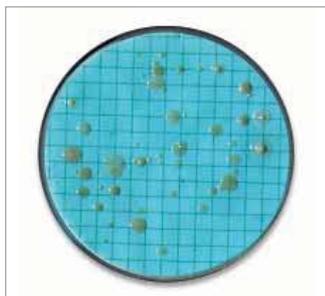
Colony Counting

Quantitative and reproducible detection of trace contamination or infection as well as the capability of performing efficient, costeffective testing procedures under routine conditions are the requirements placed on a practical microbiological testing method. The membrane filter method optimally meets these requirements, and Sartorius Stedim Biotech offers the ideal range of filters and equipment to carry out this method.

In the standard membrane filter method, a membrane filter with the appropriate pore size is placed in a filter holder and the sample is filtered. Any microorganisms present in the sample are retained by the pore structure on the surface of the membrane filter. The membrane filter is then placed on an appropriate culture medium and incubated to detect these microbes.

During incubation, the exchange of nutrients and metabolites takes place through the pore system of the membrane filter. The colonies that develop during incubation on the membrane filter surface are then counted and related to the filtered sample volume.

Sartorius Stedim Biotech specifically manufactures **individually packaged gridded membrane filters** for this application. These are ready to use and strictly quality controlled for colony growth.

Microsart®
The product family for innovative colony counting

The **Microsart® product family** consists of all the most recent products from SSB for microbiological analysis, which are especially characterized by innovation and clever design. Simple handling on less working area in comparison to conventional products that's it where Microsart® products have always stood out.

- Easy membrane removal
- Easy funnel removal
- All consumables are ready-to-use
- The hardware is intelligent and functional in design
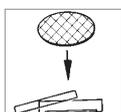
The fully automated Microsart® e.motion membrane filter dispenser releases gridded membranes from their individual, specially developed and sterile packaging that does not require any interleaving paper. Moreover, Sartorius Stedim Biotech also offers individually, sterile-packaged membrane filters in easy-to-open envelopes. Each one is clearly labeled with the product identification and lot number. Membranes with a 0.45 µm pore size are used on a standard basis for microbiological analysis.

Sartorius Stedim Biotech additionally supplies special membrane versions known as highflow membranes. They deliver 30% higher flow rates compared with conventional 0.45 µm pore size membranes. The specially designed pore structures of 0.45 µm pore size membranes enable faster filtration runs thanks to their high flow rate performance and throughput. Especially E. coli shows best growth promotion on High Flow Membranes. Just like every lot of Sartorius Stedim Biotech 0.45 µm membrane filters, the special high flow versions are tested and released in compliance with ISO 7704.

Microsart® @vance® –
Advance your Microbiological Control of Pharma-Biotech Products

A new product line within the successful Microsart® product family is aimed directly at microbiological applications in the pharmaceutical and biotech industry: Microsart® @vance®. @vance® stands for even more progress and intelligent design, enhanced safety and thus more reliable results.

Following the trend of using Single-use products, these products are delivered sterile, ready-to-use and can be disposed of in an environmentally friendly manner. The new Microsart® @vance® product line is being launched with the Microsart® @filter 100 and 250 filter units, a ready-to-use combination funnel and gridded membrane in one unit. The process of producing pharmaceuticals and bringing new drugs to the market is becoming an increasingly costly business. The pharmaceutical and biotech industries are driven by the need to optimize their work flows and increase efficiency without compromising their level of safety. Microsart® @filter not only saves time and labor costs but minimizes the risk of secondary contamination - that's advanced colony counting by Sartorius Stedim Biotech.

Nutrient pad sets
Page 217

Microsart® e.motion
membrane filter dispenser:
Page 206

Individually packed,
gridded membrane filters
Page 205

Nutrient Pad Sets (NPS) provide added convenience. These are dehydrated culture media that are already individually inserted in a petri dish and sterilized. After they have been moistened with 3.0–3.5 ml of demineralized, sterile water, they are ready to use immediately. To find out which colonies typically grow on which NPS, please refer to page 217. Our wide array of culture media covers all the types needed in the food and beverage industry and in the pharmaceutical industry as well as for water analysis.

NPS are continuously enhanced as part of our development program to adapt our products to changing application requirements. Besides the new NPS types, we also offer Nutrient Pads in a new packaging design. 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 Pad from fluctuations in humidity and temperature during transportation and storage. As a result, it guarantees the high quality of our NPS throughout their entire shelf life up to 24 months.

And this is precisely what makes the Sartorius Stedim Biotech Nutrient Pads Sets so unique: No other ready-to-use culture media around the globe assure such consistently high quality and reproducible results for up to 24 months.

Other Bacteriological Water Tests
A procedure for collecting Legionella organisms specifies polyamide membranes (diameter 142 mm), of the pore size 0.2 µm or 0.45 µm. For isolation of bacteriophages from water, Sartocon® cross-flow filter cassettes with polyether sulfone membrane (100,000 MWCO) deliver excellent results.

Airborne Bacteria and Viruses
Gelatin membrane filters are routinely used for quantitative sampling of airborne microbes in cleanroom and isolator monitoring. In addition, their effectiveness in collecting the smallest airborne viruses and bacteriophages has been proven. The reason: Gelatin appears to have a protective effect on the viruses collected and can be dissolved in buffer or a different medium for subsequent identification of the type of virus (page 200).

Gelatin membrane filters can also be used for routine monitoring of bacteriophages in the ambient air of dairies.

For Faster and More Convenient Filtration of Samples
Sterile Single-use funnels and preassembled Monitors can be used in place of stainless steel funnels and vacuum filters holders.

Biosart® 250 Funnels
The 250-ml Biosart® funnels eliminate time-consuming sterilization of one sample to the next. The large inner diameter of the funnel base ensures exceptionally fast filtration runs (page 230).

Biosart® 100 Monitors
These complete Monitors featuring a 100-ml capacity are available with incorporated filters in a choice of different pore sizes, filter colors and diameters. The completely sterile units need to be used in conjunction with various culture media. After pouring in an appropriate liquid culture medium to wet the interior cellulose pad, the lid and base of the Monitor can be easily converted into a petri dish (page 223).

Combisart® Systems
The Combisart® design enables equipment and consumables to be optimally combined to meet specific needs. Each filter station on the multi-branch manifold has an air filter for sterile venting.

Sterisart®
Sterisart® enables sterility testing to be performed in a completely closed system according to international pharmacopeias.

Biosart® 250 Funnels
Page 230
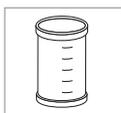
Biosart® 100 Monitors
Page 223

Gelatine membrane filters
Page 200

Filtration

19

Low Adsorption Cellulose Acetate Membrane Filters, Type 111, for the Filtration of Aqueous Solutions
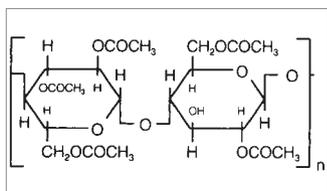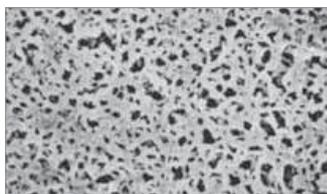
Cellulose acetate membranes combine high flow rates and thermal stability with very low adsorption characteristics, and are therefore excellently suited for use in pressure filtration devices. The 0.2 µm membrane is the filter of choice for sterile filtration of aqueous solutions, such as nutrient media, 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 ⊠p = 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 ⊠-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--13------N	0.8 µm, pack of 100
	11106--13------N	0.45 µm, pack of 100
	11107--13------N	0.2 µm, pack of 100
25 mm diameter	11104--25------N	0.8 µm, pack of 100
	11105--25------N	0.65 µm, pack of 100
	11106--25------N	0.45 µm, pack of 100
	11107--25------N	0.2 µm, pack of 100
30 mm diameter	11106--30------N	0.45 µm, pack of 100
	11107--30------N	0.2 µm, pack of 100
47 mm diameter	11104--47------N	0.8 µm, pack of 100
	11105--47------N	0.65 µm, pack of 100
	11106--47------N	0.45 µm, pack of 100
	11107--47------N	0.2 µm, pack of 100
50 mm diameter	11104--50------N	0.8 µm, pack of 100
	11105--50------N	0.65 µm, pack of 100
	11106--50------N	0.45 µm, pack of 100
	11107--50------N	0.2 µm, pack of 100
	11107--50----ACN	0.2 µm, pack of 100 individually, sterile packed
85 mm diameter	11106--85------N	0.45 µm, pack of 100
90 mm diameter	11106--90------G	0.45 µm, pack of 25
	11107--90------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
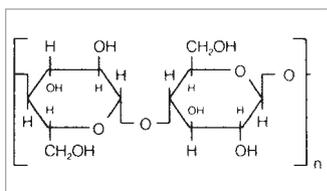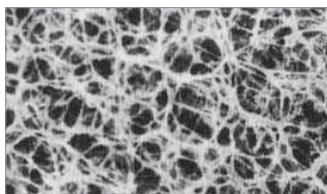
These solvent-resistant, hydrophilic membrane filters are excellently suited for their major application, particle removal from solvents.

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 50) 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/cm^2
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 cm^2 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	0.45 µm, pack of 100
	18407-013 N	0.2 µm, pack of 100
25 mm diameter	18407-025 N	0.2 µm, pack of 100
47 mm diameter	18406-047 N	0.45 µm, pack of 100
	18407-047 N	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	0.45 µm, pack of 25
	18407-142 G	0.2 µm, pack of 25
	18407-142 N	0.2 µm, pack of 100
293 mm diameter	18406-293 G	0.45 µm, pack of 25
	18407-293 G	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.
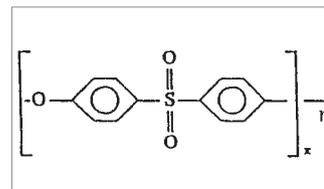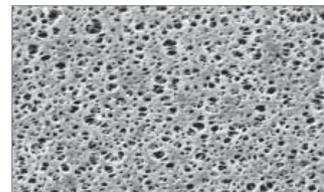
Typical Performance for Polyethersulfone Membrane Filters

Adsorption	10 μg/cm^2 for IgG, 5 μm/cm^2 for BSA, 1.9 μg/cm^2 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 cm^2 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--25------N 15407--25----MIN 15406--25------N	0.1 μm, pack of 100 0.2 μm, pack of 100 0.45 μm, pack of 100
47 mm diameter	15458--47------N 15407--47----MIN 15406--47------N	0.1 μm, pack of 100 0.2 μm, pack of 100 0.45 μm, pack of 100
50 mm diameter	15458--50------N 15407--50----MIN 15406--50------N	0.1 μm, pack of 100 0.2 μm, pack of 100 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
(Ɣ-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

Order Number	Description	<> µm	length [m]	width [cm]
11327------41BL	Nitrocellulose	0.22	3	30
11306------41BL	Nitrocellulose	0.45	3	30

Polyamide Membrane Filters, Type 250, for the Filtration of Alkaline Solutions and Organic Solvents
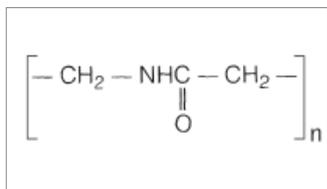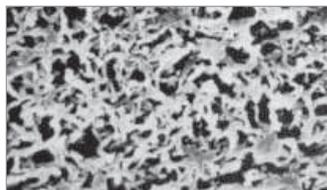
Polyamide membrane filters are hydrophilic and chemically resistant to alkaline solutions and organic solvents. They are therefore recommended for particle-removing filtration of water, aqueous solutions and solvents for analytical determination such as HPLC, as well as for the sterile filtration of 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 20, are recommended.

Typical Performance for Polyamide Membrane Filters

Adsorption	100 µg/cm^2 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 cm^2 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	0.45 µm, pack of 100
	25007-013 N	0.2 µm, pack of 100
25 mm diameter	25006-025 N	0.45 µm, pack of 100
	25007-025 N	0.2 µm, pack of 100
47 mm diameter	25006-047 N	0.45 µm, pack of 100
	25007-047 N	0.2 µm, pack of 100
50 mm diameter	25006-050 N	0.45 µm, pack of 100
	25007-050 N	0.2 µm, pack of 100
90 mm diameter	25006-090 G	0.45 µm, pack of 25
	25007-090 G	0.2 µm, pack of 25
142 mm diameter	25006-142 N	0.45 µm, pack of 100
	25007-142 N	0.2 µm, pack of 100
293 mm diameter	25006-293 N	0.45 µm, pack of 100
	25007-293 N	0.2 µm, pack of 100

Hydrophobic PTFE Membrane Filters, Type 118, for the Filtration 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.
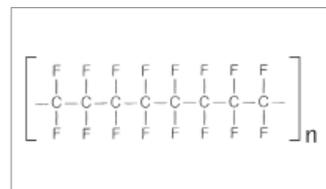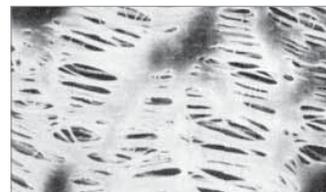
Typical Performance for PTFE Membrane Filters

Adsorption	8 µg/cm^2 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 cm^2 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.
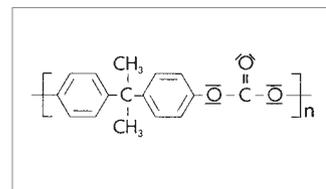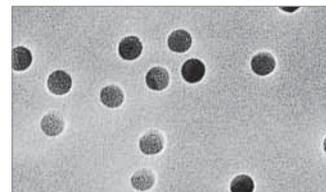
Typical Performance for Polycarbonate Membrane Filters

Bubble point acc. DIN 58355	Minimum value 0.2 µm > 4 bar/58 psi 0.4 µm > 2.2 bar/32 psi
Chemical compatibility	See table page 124
Extractables	Low
Flow rate for water	> 10 ml/min/cm² for 0.2 µm > 30 ml/min/cm² for 0.4 µm
Porosity	<15%
Material	Polycarbonate
Sterilization	By autoclaving at 121 °C
Thermal stability	Max. temperature 140 °C

Order Numbers for Polycarbonate Membrane Filters, Type 230

25 mm diameter	23007-25 N 23006-25 N	0.2 µm, pack of 100 0.4 µm, pack of 100
47 mm diameter	23007-47 N 23006-47 N	0.2 µm, pack of 100 0.4 µm, pack of 100
50 mm diameter	23007-50N	0.2 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 pre-filter 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/cm² for 13400
Materials	13400, glass fiber with acrylic latex binder.
Sterilization	By dry heat, at 180 ℃ or by autoclaving at 121 ℃ or 134 ℃.
Thermal stability	220 ℃ for 13400
Thickness	Ca. 0.55 mm for 13400

Order Numbers

a) Type 13400,	13400-013 S	13 mm, pack of 200
Standard Glass Fiber Filters	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,	13430-127 K	127 mm, pack of 50
Extra Thick Glass Fiber Filters	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,	13440-042 Q	42 mm, pack of 500
Binder–free Glass Fiber Filters	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

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 hydro-phillic 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/cm²
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/cm²
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/cm²
Protein retention	Cytochrome C	99%

Order numbers see next page.

Order Numbers for Polyethersulfone Membrane Filters, Type 146

25 mm diameter	14629—25------D	5,000 NMGT (MWCO), pack of 10
	14639—25------D	10,000 NMGT (MWCO), pack of 10
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
63 mm diameter	14629—63------D	5,000 NMGT (MWCO), pack of 10
	14639—63------D	10,000 NMGT (MWCO), pack of 10
	14659—63------D	30,000 NMGT (MWCO), pack of 10
	14668—63------D	100,000 NMGT (MWCO), pack of 10
76 mm diameterr	14629—76------D	5,000 NMGT (MWCO), pack of 10
	14639—76------D	10,000 NMGT (MWCO), pack of 10

Order Numbers for Cellulose Triacetate Membrane Filters, Type 145

43 mm diameter	14549—43------D	20,000 NMGT (MWCO), pack of 10
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
50 mm diameter	14539—50------D	10,000 NMGT (MWCO), pack of 10

Order Numbers for Regenerated Cellulose Membrane Filters, Type 144

25 mm diameter	14429—25------D	5,000 NMGT (MWCO), pack of 10
	14439—25------D	10,000 NMGT (MWCO), pack of 10
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
63 mm diameter	14429—63------D	5,000 NMGT (MWCO), pack of 10
	14439—63------D	10,000 NMGT (MWCO), pack of 10
	14459—63------D	30,000 NMGT (MWCO), pack of 10
76 mm diameter	14429—76------D	5,000 NMGT (MWCO), pack of 10
	14439—76------D	10,000 NMGT (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/cm² with RSA, 8–12 µg/cm² 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	28 mm
Filter area	6.2 cm²
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 ultra-cleaned. 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.
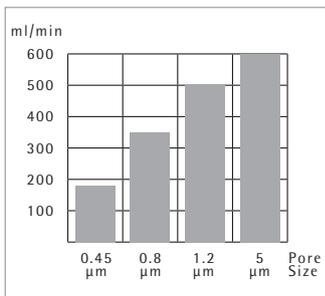
These flow rates contribute to user convenience by lowering the pressure required for filtration. Minisart® GF contains a glass fiber filter with a retention efficiency of 98% for 0.7 μm spherical particles. It is very useful when relatively dirty solutions are to be clarified, or when a prefilter is 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 50

Recommended accessories see page 46.

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 Δp = 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	28 mm
Filter area	6.2 cm²
Materials	Cellulose acetate membrane (except Minisart® GF). Glass fiber filter (Minisart® GF and Minisart® plus). MBS polymerisate.
Hold–up volume	0.15 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	Hexane
Acetonitrile	Isobutanol
Gasoline	Isopropanol
n–Butanol	Methanol
Cellosolve (ethyl)	Methylenechloride
Chloroform	Methylethylketone
Diethyl acetamide	Pentane
Dimethyl sulfoxide	Tetrahydrofuran
Dioxane	Toluene
Acetic acid (96%)	Trichloroacetic
Ethanol	acid (25%)
Ethyl acetate	Trichlorethane
Ethylene glycol	Water
Freon TF	Xylene

Specifications for Minisart® RC4, RC15 and RC25

Connectors	Female Luer Lock inlet. Luer slip outlet
Bubble point with water	> 2.0 bar (0.45 µm), > 3.4 bar (0.2 µm)
Flow rate for hexane at Δp = 1 bar|100 kPa|14.5 psi, Minisart® RC4 Minisart® RC15 Minisart® RC25	10 ml/min (0.45 µm), 3.5 ml/min (0.2 µm) 280 ml/min (0.45 µm), 140 ml/min (0.2 µm) 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 Minisart® RC15 Minisart® RC25	3.0 ml/min (0.45 µm), 1.5 ml/min (0.2 µm) 105 ml/min (0.45 µm), 55 ml/min (0.2 µm) 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 Minisart® RC15 Minisart® RC25	1.5 ml/min (0.45 µm), 0.5 ml/min (0.2 µm)/3 bar 30 ml/min (0.45 µm), 10 ml/min (0.2 µm) 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 cm² (RC4), 1.7 cm² (RC15), 4.8 cm² (RC25)
Filling volume	0.17 ml (RC4), 0.45 ml (RC15), ca. 1.0 ml (RC25)
Housing burst pressure	6 bar|600 kPa|87 psi and higher
Materials	Polypropylene housing, reg. 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), 30 µl (RC15), ca.100 µl (RC25)

Order Numbers for Minisart® RC4

17821 K	With 0.2 μm membrane, pack of 50
17821 Q	With 0.2 μm membrane, pack of 500
17822 K	With 0.45 μm membrane, pack of 50
17822 Q	With 0.45 μm membrane, pack of 500

Order Numbers for Minisart® RC15

17761 K	With 0.2 μm membrane, pack of 50
17761 ACK	With 0.2 μm membrane, pack of 50, sterile, individually packed
17761 Q	With 0.2 μm membrane, pack of 500
17762 K	With 0.45 μm membrane, pack of 50
17762 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® NY25 (Polyamide), NY15, NYXplus

Dead Volume	0.030 ml	
Connector, outlet	male Luer Slip	
Connector , inlet	female Luer Lock	
Pore size	0.2 µm	0.45 µm
Order number (50 units)	1776B-K	1776C-K
Order number (500 units)	1776B-Q	1776C-Q
Housing material	Polypropylene	Polypropylene
Membranes material	Polyamide	Polyamide
Membranes diameter	15 mm	15 mm
Membranes area	1.7 cm^2	1.7 cm^2
Filling volume	0.45 ml	0.45 ml
Burst pressure	6 bar|600 kPa	6 bar|600 kPa
Max. temperature (autoclave)	121 °C, 30 min	121 °C, 30 min
Flow rate for water	> 20 ml/min	> 40 ml/min

Dead Volume	0.144 ml	
Connector , outlet	Male Luer Slip	
Connector , inlet	Female Luer Lock	
Pore size	0.2 µm	0,45 µm
Order number (50 units)	1784B-K	1784C-K
Order number (500 units)	1784B-Q	1784C-K
Housing material	Polypropylene	Polypropylene
Membranes material	Polyamide + GF	Polyamid + GF
Membranes diameter	25 mm	25 mm
Membranes area	4.8 cm^2	4.8 cm^2
Filling volume	0.854 ml	0.854 ml
Burst pressure	6 bar|600 kPa	6 bar|600 kPa
Max. temperature (autoclave	121 °C, 30 min	121 °C, 30 min
Flow rate for water	> 75 ml/min	> 130 ml/min

Dead Volume	0.10 ml	
Connector, outlet	Male Luer Slip	
Connector , inlet	Female Luer Lock	
Pore size	0.2 µm	0.45 µm
Order number (50 units)	17845-ACK	17846-ACK
Order number (500 units)	17845-Q	17846-Q
Housing material	Polypropylene	Polypropylene
Membranes material	Polyamide	Polyamide
Membranes diameter	25 mm	25 mm
Membranes area	4.8 cm^2	4.8 cm^2
Filling volume	1.0 ml	1.0 ml
Burst pressure	6 bar|600 kPa	6 bar|600 kPa
Max. temperature (autoclave	121 °C, 30 min	121 °C, 30 min
Flow rate for water	> 50 ml/min	> 80 ml/min

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	5 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 cm²
Materials	Polycarbonate top and bottom part, silicone gasket 10 *f* 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 46.

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 cm²
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 41. 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 *f* 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 46.
Filters see page 20.

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.
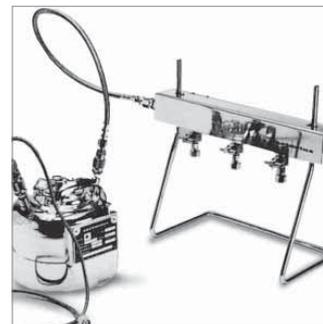
Specifications for Ultrasart D20

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.

Order Number for Dosing Syringe 16685--2

Order Number for 3-way Valve	16639	Autoclavable (121 °C).
Replacement parts	6986070	Sealing (4 f)
	6986071	Pressure spring (2 f)
	6986072	Fixing spring (2 f)
	6986073	Perbunan valve (2 f)
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

Sartorius Sartolab® RF|BT
Vacuum Filtration Units

Sartorius Sartolab® 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 cm² 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.
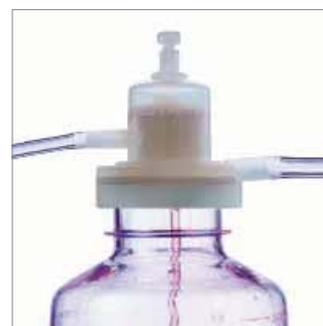
Order Numbers for Sartolab® RF Vacuum Filtration Units

180C1---------E	150 ml, with receiver, 18 cm² filter area, 0.22 µm PES membrane Case with 12 units
180C7---------E	250 ml, with receiver, 24 cm² filter area, 0.22 µm PES membrane Case with 12 units
180C2---------E	500 ml, with receiver, 63 cm² filter area, 0.22 µm PES membrane Case with 12 units
180C3---------E	1000 ml, with receiver, 79 cm² filter area, 0.22 µm PES membrane Case with 12 units
180C8---------E	1000 ml, with receiver, 79 cm² filter area, 0.1 µm PES membrane Case with 12 units

Order Numbers for Sartolab® BT Vacuum Filtration Units

180C4---------K	150 ml, 18 cm² filter area, 0.22 µm PES membrane Case with 48 units
180C5---------E	500 ml, 63 cm² filter area, 0.22 µm PES membrane Case with 12 units
180C6---------E	1000 ml, 79 cm² filter area, 0.22 µm PES membrane Case with 12 units

Order Number for Sartolab® 150 V

18080----------M	Sterile vacuum filtration unit, pack of 3

Special brochure available. Order no. SLU1511-e and SL-2023-e

25 mm Glass Holder
for the Filtration of Small Volumes

6980115
glas funnel
30 ml

6983008
small clamp

17149
screen support and
PTEE-ring

6980117
silicone
O-ring

17148
glass frit
and
PTEE-ring

6980116
glass base

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 *f* 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)
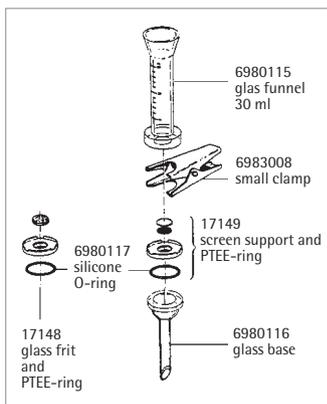
Order Numbers

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

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 f 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 53. Replacement parts see diagram.

6980121 lid

6980119 glass funnel, 250 ml

6983009 large clamp

6983006 glass frit

6983007

17146 glass frit and PTFE ring with centre edge

6983010 drain screen

6980123 silicone O-ring

17147 screen support and PTFE ring with centre edge

6980120 glass base, 50 mm
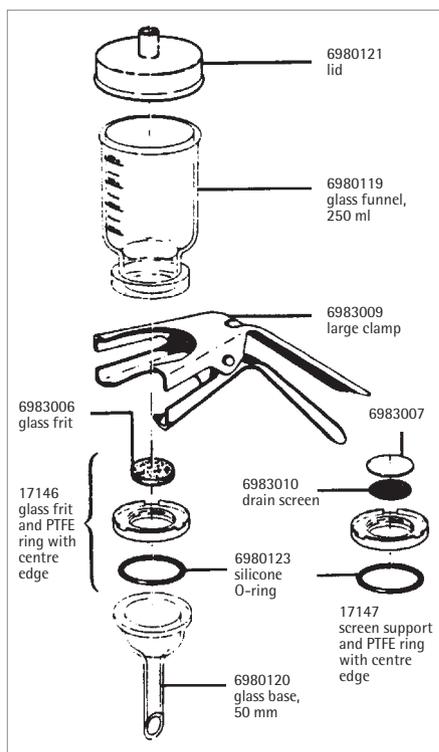
All-glass Holder for Particle Removal from Solvents for Analytical Determinations

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 22), 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 f 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).

6980119
glass funnel

6983004
filter support
with glass frit
and O-ring

00124
Viton O-ring

6983003
connector
with sealing

6983009
large
clamp

6983005
Viton sealing
for connector

6983002
glass base

6983001
vauumresistant
glass flask

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 53. 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 231.

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 f 3 mm), filter support (40 f 5 mm) and opening (14 f 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 cm²
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 53|96.

Replacement Parts

16514E	13 mm filter holder, pack of 12
6980110	Silicone O-ring, 40 f 5 mm
6980225	Plug, pack of 10
6980226	Funnel
6980227	Stopper for lid
6980228	Lid
6980229	Silicone O-ring, 80 f 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 f 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 [l/min]	20
Wattage [W]	80
Weight [kg]	4.5
Dimensions [mm]	203 f 145 f 187
Max. ambient temperature	40 ℃

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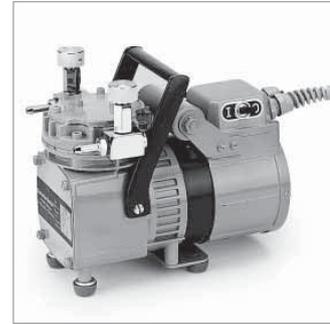
Laboratory Vacuum Pump, 98%
Membrane pump with high performance, reliable vacuum source, oil-free.

Specifications

Max. vacuum	13 mbar (10 torr)
Max. flow rate [l/min]	26
Wattage [W]	120
Current [Amp]	1.8
Weight [kg]	9.8
Dimensions [mm]	338 f 250 f 225
Max. ambient temperature	40 ℃

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.
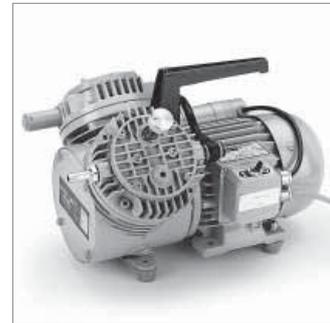
Water Jet Pump with G³/₄ Female Thread
Simple vacuum source. For connection
to a water tap with G³/₄ male thread.

Order Number

16611	
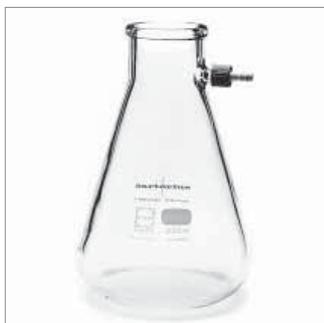
Suction Flask, 2 Liter Capacity
Vacuum-resistant flask made of Duran 50
glass with plastic safety hose nipple according
to the German Industrial Standard No. 12476.
Outer diameter of the hose nipple, 9 mm.
Inner diameter of the opening, 60 mm.
Stoppers are not enclosed.

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 mem-
brane 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 ℃ to 40 ℃
Storage temperature range	−40 ℃ to 70 ℃
Weight [kg|lb]	5.35|12
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

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 cm²) 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.
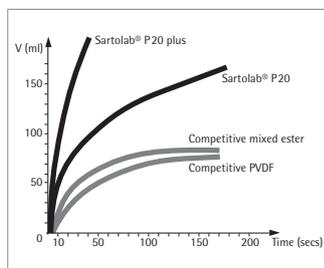
Top part: results with contaminated medium (DMEM + 10% FCS), at 1 bar differential pressure.

Specifications for Sartolab® P20 Units

Connectors	Inlet, Luer Lock inner cone or 6–12 mm stepped hose nipple. Outlet, 6–12 mm stepped hose nipple
Biosafety	Pass the USP Plastics-Class VI-Test
Bubble point	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 cm²
Filling volume	6 ml
Housing burst pressure	> 5 bar|500 kPa|72.5 psi
Materials	Membrane filter (0.2 µm). Cellulose acetate (SFCA) or Polyethersulfone. PTFE airfilter. Polycarbonate housing
Max. recommended inlet pressure	3 bar|300 kPa|43.5 psi
Protein adsorption	Less than 10 µg γ-Globulin/cm²
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 (SFCA)	With hose nipple inlet connection, pack of 10
18053----------D (SFCA)	With Luer Lock inlet connection, pack of 10
18075----------D (PES)	With Luer Lock inlet connection, pack of 10, without automatic venting

Order Numbers for Sartolab® P20 plus Units

18056----------D (SFCA + GF)	With hose nipple inlet connection, pack of 10
18058----------D (SFCA + GF)	With Luer Lock inlet connection, pack of 10
18068----------D (PES + GF)	With Luer Lock inlet connection, pack of 10

Recommended accessories are described on page 96.
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...
- Sartoguard® GF 548...
- Sartoguard® PES 547...
- Sartopore® 2 XLI 544...
- Sartopore® 2 XLG 544...
- Sartopore® 2 XLM 544...

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 cm²
Materials	Capsule housing polypropylene, all common filter materials of Sartorius
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
5445307GS--**--M	Sartopore® 2 XLG 0.2 µm, pack of 3
5445307IS--**--M	Sartopore® 2 XLI 0.2 µm, pack of 3
5445358MS--**--M	Sartopore® 2 XLM 0.1 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
5485358MS--**--M	Sartoguard GF 0.1 µm nominal, pack of 3
5485307GS--**--M	Sartoguard GF 0.2 µm nominal, pack of 3
5475358GS--**--M	Sartoguard PES 0.1 µm nominal, pack of 3
5475307IS--**--M	Sartoguard PES 0.2 µm nominal, 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® 300

Sartobran® 150 (Typ SS)

Comparison of filtered volumes
(5 × 10^7 Ps. diminuta/ml)
in 2 min. at 1 bar

- ■ Sartobran® 300
- ■ Competitive product, 0.22 μm PVDF
- ■ Competitive product, 0.2 μm polysulfone
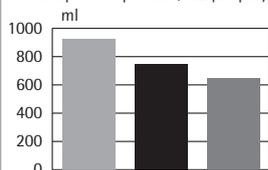
Newly developed, ready-to-use pressure filtration units offering maximum convenience for the sterile filtration of 0.1 to 50 liters of buffers, infusion solutions, tissue culture solutions, sera and other solutions containing proteins. No more problems with air bubbles in the liquid. A hydrophobic PTFE 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 through-puts 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 cm² and 300 cm²
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® P 150 Capsules with 0.2 μm Final Filter and 0.45 μm Prefilter

Sterile, individually packed

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

Order Numbers for Sartobran® P 300 Capsules with 0.2 μm Final Filter and 0.45 μm Prefilter

Sterile, individually packed

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

Recommended accessories are described on page 96.
Special data sheet available. Order no. SPK2027-e.

Sartoguard PES
Membrane Prefiltration MidiCaps®

Description

Sartoguard PES filter are especially designed for effective bioburden control and reliable removal of particles from a broad range of fluid streams. They provide the finest, most efficient and reliable performance for critical prefiltration applications. They can be used for protection of Mycoplasma retentive or sterilizing grade filters. They allow downsizing of filtration systems and cost saving in applications where the use of validated sterilizing grade filters is not required, but reliable bioburden and turbidity reduction is.

Applications

Typical applications of Sartoguard PES filter include prefiltration of:

- Buffers
- Downstream Intermediates (before and after UF│DF and chromatography steps)
- Clarified cell culture harvest
- Cell Culture Media
- Aseptically filled Small Volume Parenterals (SVP)

Economy

Sartoguard PES filter feature a unique heterogeneous double layer membrane construction in combination with an increased filtration area of 0.8 m²/10" cartridge. By providing outstanding total throughput and flow rate performance, they ensure highest process efficiency, minimized overall filtration costs and short filtration cycle times.

Reliable Retention

Sartoguard PES filters are available with 0.1 μm and 0.2 μm nominal retention rating. The 0.1 μm rated filters typically provide a LRV of 6 per cm² filtration area for Brevundimonas Diminuta, while the 0.2 μm rated filters typically provide a LVR of 6 per cm² filtration area for Serratia Marcescens.

Compatibility

Sartoguard PES filter elements are designed for broad chemical compatibility from pH 1 to pH 14 and low extractable levels. They are compatible with multiple in line steam sterilization cycles up to 134 °C for cartridges and multiple autoclaving cycles for MidiCaps®.

Quality & Security

Sartoguard PES filter are individually tested for integrity during production. The integrity of the filters can be verified onside before and after use by a diffusion or bubble-point test.

Scalability

Sartoguard PES filter elements are available in a broad range of sizes and formats to provide linear scale-up from R&D to process scale.

Documentation

Sartoguard PES filter 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		
	▪ Prefilter Membrane	PES, asymmetric
	▪ Endfilter Membrane	PES, asymmetric
	▪ Support Fleece	Polypropylene
	▪ Core	Polypropylene
	▪ Capsule Housing	Polypropylene
	▪ End Caps	Polypropylene
	▪ O-Rings	Silicone

Pore Size Combinations

0.8 µm + 0.1 µm nominally
1.2 µm + 0.2 µm nominally

Available Sizes│Filtration Area

Size 4	0.021 m^2│0.22 ft^2

MidiCaps®

Size 7	0.065 m^2│0.7 ft^2
Size 8	0.13 m^2│1.4 ft^2
Size 9	0.26 m^2│2.8 ft^2
Size 0	0.52 m^2│5.6 ft^2

Available Connectors MidiCaps®

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

S: 1½" Tri-Clamp (Sanitary)
O: ½" Single stepped hose barb
F: ¾" Tri-Clamp (Sanitary)
H: ¼" Multiple stepped hose barb
   (with filling bell at the outlet)

Operating Parameters

Max. Allowable Differential Pressure	5 bar│72.5 psi at 20 °C (MidiCaps®)
	4 bar│58 psi at 20 °C (Capsules)
	2 bar│29 psi at 80 °C (MidiCaps®│capsules)
Max. Allowable Back Pressure	2 bar│29 psi at 20 °C

Extractables
Sartoguard PES filter meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory Compliance
▪ Individually integrity tested during production
▪ Onside integrity testable by diffusion or bubble-point test
▪ Non pyrogenic according to USP Bacterial Endotoxins
▪ Pass USP Plastic Class VI Test
▪ Non fiber releasing according to 21 CFR

Sterilization
Autoclaving: 134 °C, 2 bar, 30 min

Sterilization Cycles
Autoclaving   Min. 25 (MaxiCaps & MidiCaps®)

Technical References
Validation Guide: SPK5782-e

Soy Peptone Supplement Cell Culture Media
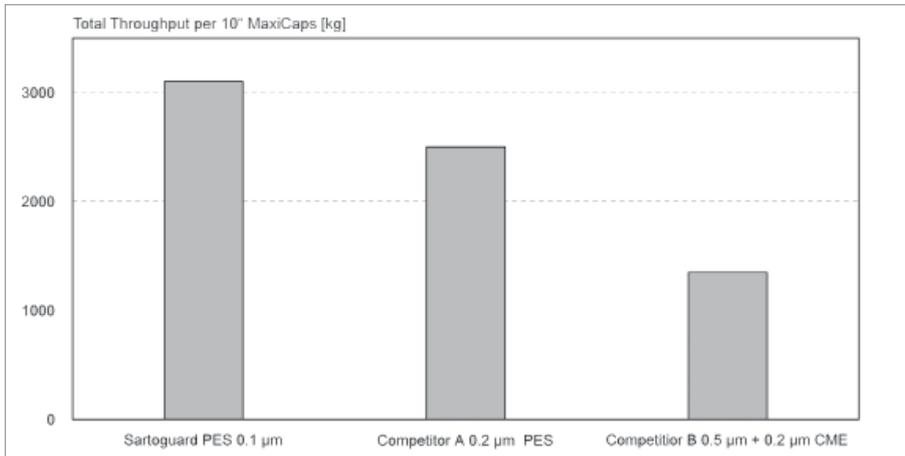
Soy Peptone Supplement Cell Culture Media
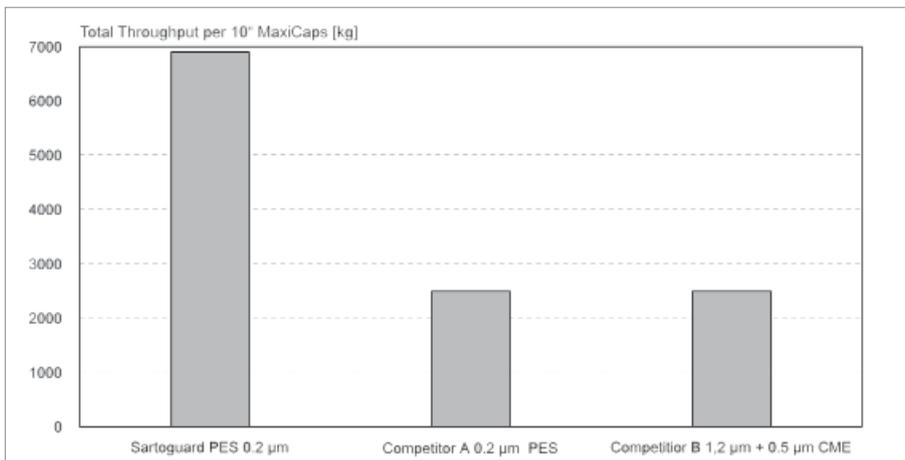
Order Codes

Filter	Pore Size Nominally [µm]	Test Pressure [bar|psi]	Max. Diffusion [ml/min]	Min. Bubble Point [bar|psi]
MidiCaps®|Capsule				
5471358G4	0.1	1.5|22	1.1	2.8|40.5
5475358G7	0.1	1.5|22	3	2.8|40.5
5475358G8	0.1	1.5|22	6	2.8|40.5
5475358G9	0.1	1.5|22	9	2.8|40.5
5475358G0	0.1	1.5|22	18	2.8|40.5
MidiCaps®|Capsule				
5471307F4	0.2	1.2|17.5	1.1	1.8|26
5475307F7	0.2	1.2|17.5	3	1.8|26
5475307F8	0.2	1.2|17.5	4	1.8|26
5475307F9	0.2	1.2|17.5	6	1.8|26
5475307F0	0.2	1.2|17.5	12	1.8|26

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 re-usable 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

Filter Combination
■ 0.2 μm only   ■ 0.2 μm + 0.2 μm
■ 0.2 μm + 0.45 μm

Total Volume filtered
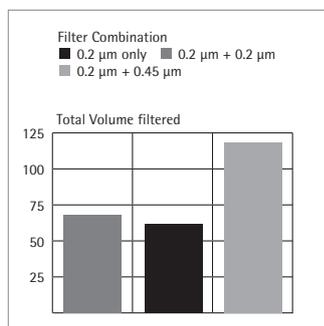
Specifications for Sartobran® P Filter Units

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 m², 0.1 m², 0.2 m² or 0.45 m²
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.

Order Numbers for Sartobran® P MidiCaps®*

With 0.2 μm Final Filter and 0.45 μm Prefilter

Type OO, with ½" Hose Nipple Inlet and Outlet

5235307H7-OO-A	0.05 m² filter area, pack of 4
5235307H8-OO-A	0.1 m² filter area, pack of 4
5235307H9-OO-A	0.2 m² filter area, pack of 4
5235307H0-OO-V	0.45 m² filter area, pack of 2

Type SS, with 1½" Sanitary Flange Inlet and Outlet

5235307H7-SS-A	0.05 m² filter area, pack of 4
5235307H8-SS-A	0.1 m² filter area, pack of 4
5235307H9-SS-A	0.2 m² filter area, pack of 4
5235307H0-SS-V	0.45 m² filter area, pack of 2

Type SO, with 1½" Sanitary Flange Inlet and ½" Hose Nipple Outlet

5235307H7-SO-A	0.05 m² filter area, pack of 4
5235307H8-SO-A	0.1 m² filter area, pack of 4
5235307H9-SO-A	0.2 m² filter area, pack of 4
5235307H0-SO-V	0.45 m² filter area, pack of 2

Type HH, with ¼" Multiple Stepped Hose Barb Inlet and Outlet

5235307H7-HH-A	0.05 m² filter area, pack of 4

Type FF, with ¾" Sanitary Flange Inlet and Outlet

5235307H7-FF-A	0.05 m² filter area, pack of 4
5235307H8-FF-A	0.1 m² filter area, pack of 4
5235307H9-FF-A	0.2 m² filter area, pack of 4
5235307H0-FF-V	0.45 m² filter area, pack of 2

With 0.45 μm Final Filter and 0.65 μm Prefilter

Type OO, with ½" hose nipple inlet and outlet

5235306D7-OO-A	0.05 m² filter area, pack of 4
5235306D8-OO-A	0.1 m² filter area, pack of 4
5235306D9-OO-A	0.2 m² filter area, pack of 4
5235306D0-OO-V	0.45 m² filter area, pack of 2

Type SS, with 1½" Sanitary Flange Inlet and Outlet

5235306D7-SS-A	0.05 m² filter area, pack of 4
5235306D8-SS-A	0.1 m² filter area, pack of 4
5235306D9-SS-A	0.2 m² filter area, pack of 4
5235306D0-SS-V	0.45 m² filter area, pack of 2

Type SO, with 1½" Sanitary Flange and ½" Hose Nipple Outlet

5235306D7-SO-A	0.05 m² filter area, pack of 4
5235306D8-SO-A	0.1 m² filter area, pack of 4
5235306D9-SO-A	0.2 m² filter area, pack of 4
5235306D0-SO-V	0.45 m² 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 m² Filter Area	0.1 m² Filter Area	0.2 m² Filter Area
0.2 μm	5231507H7B	5231507H8B	5231507H9B

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

Type SS, with hose nipple inlet and outlet

Type FF, with sanitary flange inlet and outlet

Type OO, with sanitary flange inlet and hose nipple outlet

Type HH (only size 7), with sanitary flange inlet and outlet

Sartopore® 2 150 and Sartopore® 2 300
Best Flow Rates and Optimum Convenience for up to 50 Liters
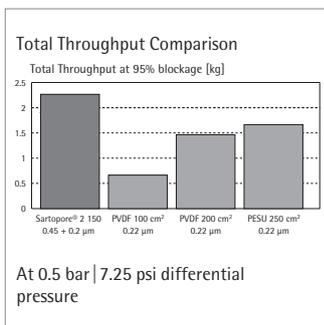
Sartopore® 2 150 and Sartopore® 2 300 are disposable, sterile, ready-to-use membrane filter capsules for convenient sterilizing grade filtration of 0.1 to 50 liters. The polyethersulfone membrane is compatible with a pH range from pH 1 to pH 14. Therefore Sartopore® 2 150 and Sartopore® 2 300 are ideal 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.

Total Throughput Comparison

Total Throughput at 95% blockage [kg]

At 0.5 bar | 7.25 psi differential pressure

Specifications for Sartopore® 2 150 and Sartopore® 2 300

Biosafety	All materials pass the USP Plastic Test Class VI
Chemical compatibility	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 m² and 0.03 m²
Materials	Asymetric, double-layerd polyethersulfone membrane filter, polypropylene housing parts and support framing, PTFE air filter

Order Numbers for Sartopore® 2 150

With 0.2 μm Final Filter and 0.45 μm Prefilter

5441307H4-SS-B	0.015 m², ½" sanitary flange inlet and outlet
5441307H4-OO-B	0.015 m², ¼" mutiple stepped hose barb inlet and outlet
5441307H4-SO-B	0.015 m², ½" sanitary flange inlet and 4" mutiple stepped hose barb outlet

With 0.1 μm Final Filter and 0.2 μm Prefilter

5441358K4-SS-B	0.015 m², ½" sanitary flange inlet and outlet
5441358K4-OO-B	0.015 m², ¼" mutiple stepped hose barb inlet and outlet
5441358K4-SO-B	0.015 m², ½" sanitary flange inlet and 4" mutiple stepped hose barb outlet

Order Numbers for Sartopore® 2 300

With 0.45 μm Final Filter and 0.8 μm Prefilter

5441306G5-OO-B	0.03 m², ¼" mutiple stepped hose barb inlet and outlet

With 0.2 μm Final Filter and 0.45 μm Prefilter

5441307H5-OO-B	0.03 m², ¼" mutiple stepped hose barb inlet and outlet

With 0.1 μm Final Filter and 0.2 μm Prefilter

5441358K5-OO-B	0.03 m², 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 64. 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.

Total Filtration Volume in Comparison
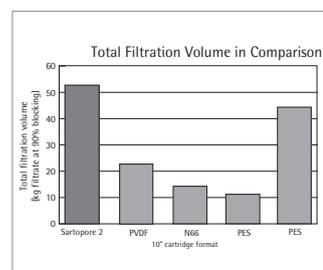
Specifications for Sartopore® 2 Capsules

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 m², 0.1 m², 0.2 m² or 0.45 m²
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 m² filter area
5445306G8-**-A	0.1 m² filter area
5445306G9-**A	0.2 m² filter area
5445306G0-**	0.45 m² filter area

Sartopore® 2 MidiCaps® with 0.2 μm Final Filter

5445307H7-**-A	0.05 m² filter area
5445307H8-**-A	0.1 m² filter area
5445307H9-**-A	0.2 m² filter area
5445307H0-**	0.45 m² filter area

Sartopore® 2 MidiCaps® with 0.1 μm Final Filter

5445358K7-**-A	0.05 m² filter area
5445358K8-**-A	0.1 m² filter area
5445358K9-**-A	0.2 m² filter area
5445358K0-**	0.45 m² filter area

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

Order Numbers for Packs of 5

Pore Size	0.05 m² Filter Area	0.1 m² Filter Area	0.2 m² 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)

Sartopore® 2 XLI 0.2 µm
Sterilizing Grade MidiCaps® and Capsules

Description
Sartopore® 2 XLI MidiCaps® and Capsules are self contained filter units that are especially designed for sterilizing grade filtration of pharmaceutical solutions with a homogenous particle spectrum. The unique heterogeneous double layer PES membrane combination of Sartopore® 2 XLI MidiCaps® and Capsules filters is specifically developed to provide exceptional high total throughputs and outstanding flow rates for totally chemically defined process fluids and other process fluids of biotech manufacturing processes with small particle spectrum.

Applications
Typical applications of Sartopore® 2 XLI MidiCaps® and Capsules include sterilizing grade filtration of:
- Ophthalmic solutions
- Chemically defined cell culture media
- High viscous large volume parenterals
- Any fully chemically defined media

Economy
The combination of the built-in 0.35 µm pre-filter in front of a 0.2 µm final filter together with the 30% enlarged effective filtration area per XLI filter element provide an outstanding total throughput and flow rate performance in the target applications. Thus ensuring highest process efficiency, minimized filtration costs and short filtration cycle times.

Compatibility
The PES membrane of Sartopore® 2 XLI MidiCaps® and Capsules provide broad chemical compatibility from pH 1 to pH 14 and low extractable levels. They are compatible with multiple autoclaving cycles up to 134 °C.

Scalability
Sartopore® 2 XLI filter elements are available in a broad range of sizes and formats to provide linear scale-up from R&D to process scale.

Cost Saving
The use of the capsule design concept avoids investment in stainless steel filter housings and eliminates additional costs for cleaning of housings and cleaning validation.

Microbiological Retention
Sartopore® 2 XLI MidiCaps® and Capsules are fully validated as sterilizing grade filters according to HIMA and ASTM F-838-05 guidelines.

Quality Control
Each individual element is tested for integrity by B.P. and Diffusion-Test prior to being released assuring absolute reliability.

Documentation
Sartopore® 2 XLI MidiCaps® and Capsules 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		
	Prefilter Membrane	PES, asymmetric
	Endfilter Membrane	PES, asymmetric
	Support Fleece	Polypropylene
	Core	Polypropylene
	End Caps	Polypropylene
	Capsule Housing	Polypropylene
	O-Rings	Silicone
	Filling Bell	Polycarbonate

Pore Size

0.35 µm + 0.2 µm

Available Sizes│Filtration Area

Capsules Size 4	0.021 m² │ 0.22 ft²

MidiCaps®

Size 7	0.065 m² │ 0.7 ft²
Size 8	0.13 m² │ 1.4 ft²
Size 9	0.26 m² │ 2.8 ft²
Size 0	0.52 m² │ 5.6 ft²

Available Connectors Capsules Size 4

SS, SO, OO

Available Connectors MidiCaps®

SS, SO, OO; FF, FO, HH (only size 7)

S: 1½" Tri-Clamp (Sanitary)
O: ½" Single stepped hose barb
F: ¾" Tri-Clamp (Sanitary)
H: ¼" Multiple stepped hose barb (with filling bell at the outlet)
S: ½" Tri-Clamp (only Capsule Size 4)
O: Multiple stepped hose barb (only Capsule Size 4)

Operating Parameters

Max. Allowable Differential Pressure	5 bar │ 75 psi at 20 °C (MidiCaps®) 4 bar │ 58 psi at 20 °C (Capsules) 2 bar│29 psi at 80 °C (MidiCaps®│capsules)
Max. Allowable Back Pressure	2 bar │29 psi at 20 °C

Extractables
Sartopore® 2 XLI 0.2 µm rated MidiCaps®, MaxiCaps® and Capsules meet or exceed the requirements for WFI quality standards set by the current USP.

Regulatory Compliance
■ Individually integrity tested during production
■ Integrity test correlated to HIMA/ASTM
  F 838-05 Bacteria Challenge Test
■ Non pyrogenic according to USP Bacterial Endotoxins
■ Pass USP Plastic Class VI Test
■ Non fiber releasing according to 21 CFR

Sterilization
Autoclaving: 134 °C, 2 bar, 30 min

Sterilization Cycles
Autoclaving: 25 min (MidiCaps® and MaxiCaps®)
No In-Line Steam Sterilization

Technical References
Validation Guide: SPK5768-e

Extractables Guide: SPK5776-e

Chemically Defined Cell Culture Media

Total Throughput per 10" MaxiCaps® [l]

Ophthalmic Solution

Total Throughput per 10" MaxiCaps® [l]
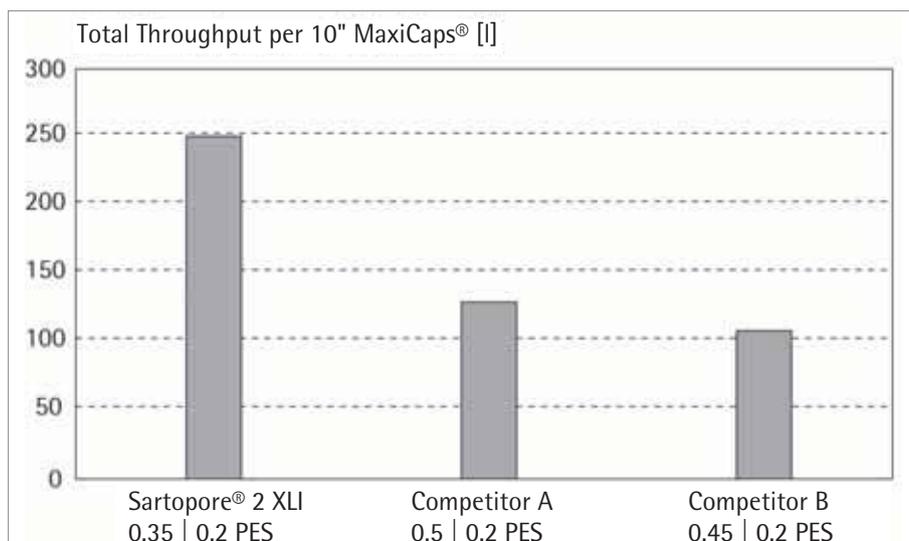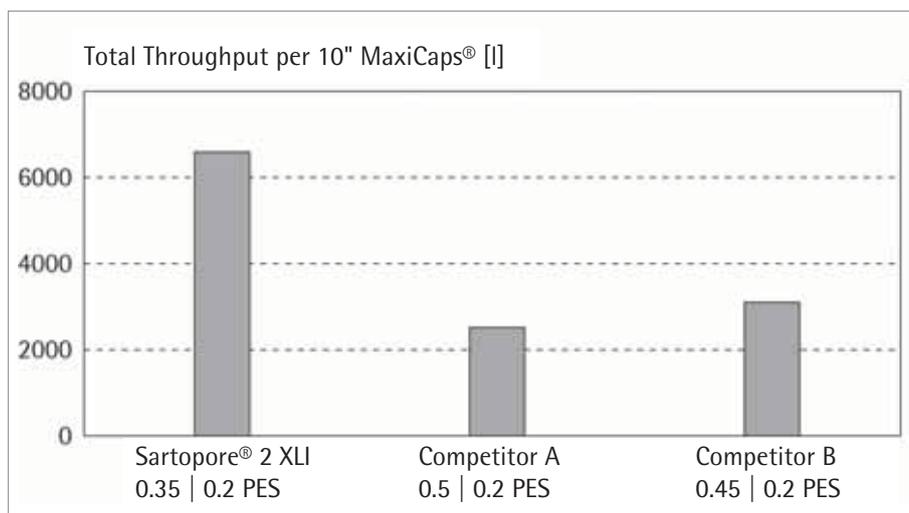
Order Codes

	Pore Size [µm]	Test Pressure [bar|psi]	Max. Diffusion [ml/min]	Min. Bubble Point [bar|psi]
XLI MidiCaps®				
5445307I7--**--A	0.35 + 0.2	2.5|36	5	3.2|46
5445307I8--**--A	0.35 + 0.2	2.5|36	6	3.2|46
5445307I9--**--A	0.35 + 0.2	2.5|36	9	3.2|46
5445307I0--**--V	0.35 + 0.2	2.5|36	18	3.2|46
XLI Capsules Size 4				
5441307I4--**--B	0.35 + 0.2	2.5|36	1.1	3.2|46

Sartopore® 2 XLG 0.2 µm
Sterilizing Grade MidiCaps®

Description
Sartopore® 2 XLG MidiCaps® are self con-
tained filter units that are especially designed
for sterilizing grade filtration in special appli-
cations of cell culture processes. The unique
heterogeneous double layer PES membrane
combination of Sartopore® 2 XLG MidiCaps®
is specifically developed to deal with the
broad variety of contaminants in up- and
downstream processing of biotech applica-
tions. They provide consistently high total
throughput performance for biological fluid
streams independent from media and process
variations.

Applications
Typical applications of Sartopore® 2 XLG
MidiCaps® include sterilizing grade filtration
of:
- Plant peptone or yeast supplemented cell
  culture media
- Serum containing cell culture media
- Other cell culture media used in biotech
  manufacturing
- Clarified cell culture harvest
- Downstream Intermediates (before and
  after UF|DF and chromatography steps)

Economy
The combination of the built-in 0.8 µm
prefilter in front of a 0.2 µm final filter
together with the 30% enlarged effective
filtration area per XLG filter element provide
an outstanding total throughput and flow
rate performance in the target applications.
Thus ensuring highest process efficiency,
minimized filtration costs and short filtration
cycle times.

Compatibility
The PES membrane of Sartopore® 2 XLG
MidiCaps® provide broad chemical compat-
ibility from pH 1 to pH 14 and low extractable
levels. They are compatible with multiple
autoclaving cycles up to 134 °C.

Scalability
Sartopore® 2 XLG filter elements are available
in a broad range of sizes and formats to
provide linear scale-up from R&D to process
scale.

Cost Saving
The use of the capsule design concept avoids
investment in stainless steel filter housings
and eliminates additional costs for cleaning
of housings and cleaning validation.

Microbiological Retention
Sartopore® 2 XLG MidiCaps® are fully vali-
dated as sterilizing grade filters according to
HIMA and ASTM F-838-05 guidelines.

Quality Control
Each individual element is tested for
integrity by B.P. and Diffusion-Test prior to
being released assuring absolute reliability.

Documentation
Sartopore® 2 XLG MidiCaps® are designed,
developed and manufactured in accordance
with an ISO 9001 certified Quality Manage-
ment System. A Validation Guide is available
for compliance with regulatory requirements.

Specifications

Materials		
	Prefilter Membrane	PES, asymmetric
	Endfilter Membrane	PES, asymmetric
	Support Fleece	Polypropylene
	Core	Polypropylene
	End Caps	Polypropylene
	Capsule Housing	Polypropylene
	O-Rings	Silicone
	Filling Bell	Polycarbonate

Pore Size

0.35 µm + 0.2 µm

Available Sizes|Filtration Area

MidiCaps®

Size 7	0.065 m²	0.7 ft²
Size 8	0.13 m²	1.4 ft²
Size 9	0.26 m²	2.8 ft²
Size 0	0.52 m²	5.6 ft²

Available Connectors MidiCaps®

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

S: 1½" Tri-Clamp (Sanitary)
O: ½" Single stepped hose barb
F: ¾" Tri-Clamp (Sanitary)
H: ¼" Multiple stepped hose barb (with filling bell at the outlet)

Operating Parameters

Max. Allowable Differential Pressure	5 bar │ 75 psi at 20 °C (MidiCaps®)
	4 bar │ 58 psi at 20 °C (Capsules)
	2 bar │ 29 psi at 80 °C
Max. Allowable Back Pressure	2 bar │ 29 psi at 20 °C

Extractables
Sartopore® 2 XLG 0.2 µm rated MidiCaps® meet or exceed the requirements for WFI quality standards set by the current USP.

Regulatory Compliance
■ Individually integrity tested
■ Integrity test correlated to HIMA/ASTM
   F 838-05 Bacteria Challenge Test
■ Non pyrogenic according to USP Bacterial Endotoxins
■ Pass USP Plastic Class VI Test
■ Non fiber releasing according to 21 CFR

Sterilization
Autoclaving: 134 °C, 2 bar, 30 min

Sterilization Cycles
Autoclaving: Min. 25
No In-Line Steam Sterilization

Technical References
Validation Guide: SPK5772-e08121
                    85034-536-30

Soy Peptone Supplemented Cell Culture Media

Total Throughput per 10" MaxiCaps® [l]

| | Sartopore® 2 XLG 0.8 │ 0.2 PES | Competitor A 0.5 │ 0.2 PES | Competitor B 0.45 │ 0.2 PES |

Monoclonal Antibody Pool

Total Throughput per 10" MaxiCaps® [l]

| | Sartopore® 2 XLG 0.8 │ 0.2 PES | Competitor A 0.5 │ 0.2 PES | Competitor B 0.45 │ 0.2 PES |
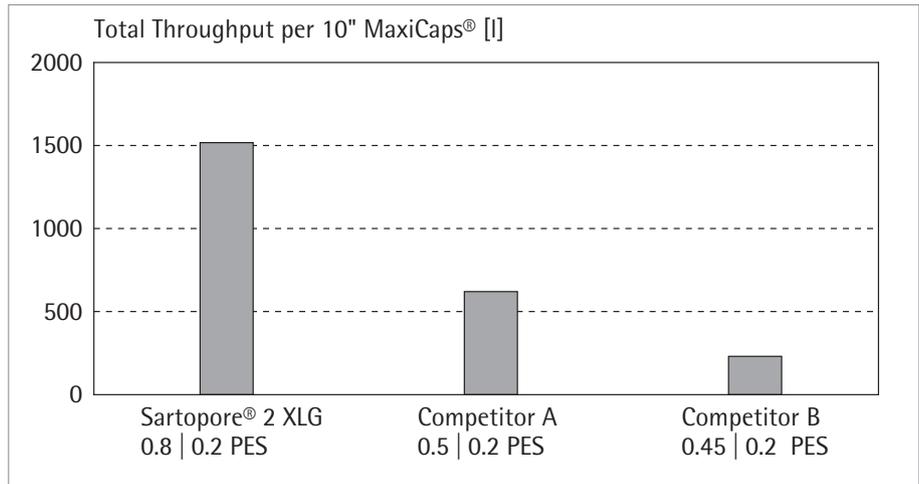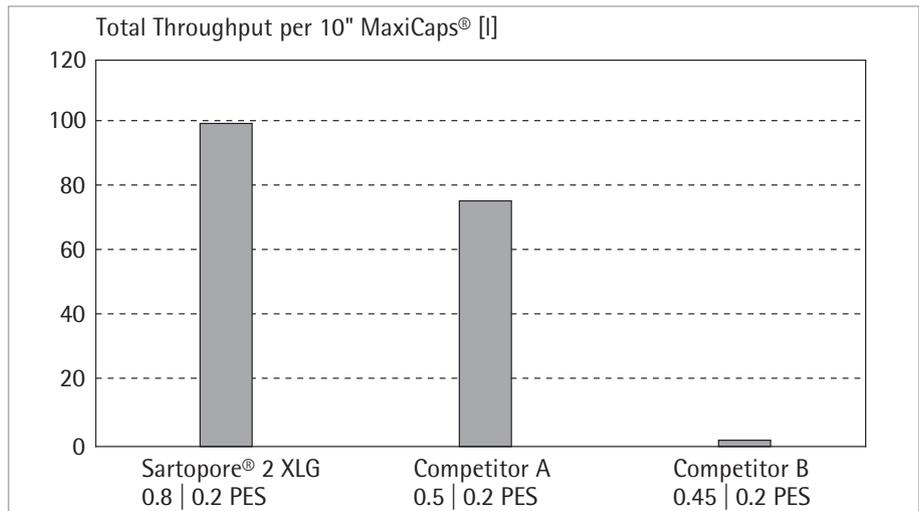
Antibody Concentration: 47.5 mg/ml

Order Numbers

	Pore Size [µm]	Pack Size (pieces)	Test Pressure [bar│psi]	Max. Diffusion [ml/min]	Min. Bubble Point [bar│psi]
XLG MidiCaps®					
5445307G7--**--A	0.8 + 0.2	4	2.5│36	5	3.2│46
5445307G8--**--A	0.8 + 0.2	4	2.5│36	6	3.2│46
5445307G9--**--A	0.8 + 0.2	4	2.5│36	9	3.2│46
5445307G0--**--V	0.8 + 0.2	2	2.5│36	18	3.2│46
XLG Capsule Size 4					
5441307G4--**--B	0.8 + 0.2	5	2.5│36	1.1	3.2│46

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 m², as listed under order numbers.

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

Order Numbers for Sartopure® PP2 MidiCaps® and Sartopure® GF Plus MidiCaps®

Sartopure® PP2 Depth Filter MidiCaps®

Type OO, with ½" Single Stepped Hose Barb

5595305P7-OO-A	0.65 µm, 0.05 m², pack of 4
5595305P8-OO-A	0.65 µm, 0.1 m², pack of 4
5595305P9-OO-A	0.65 µm, 0.2 m², pack of 4
5595305P0-OO-V	0.65 µm, 0.45 m², pack of 2
5595303P7-OO-A	1.2 µm, 0.05 m², pack of 4
5595303P8-OO-A	1.2 µm, 0.1 m², pack of 4
5595303P9-OO-A	1.2 µm, 0.2 m², pack of 4
5595303P0-OO-V	1.2 µm, 0.45 m², pack of 2
5595302P7-OO-A	3 µm, 0.05 m², pack of 4
5595302P8-OO-A	3 µm, 0.1 m², pack of 4
5595302P9-OO-A	3 µm, 0.2 m², pack of 4
5595302P0-OO-V	3 µm, 0.45 m², pack of 2
5595342P7-OO-A	5 µm, 0.05 m², pack of 4
5595342P8-OO-A	5 µm, 0.1 m², pack of 4
5595342P9-OO-A	5 µm, 0.2 m², pack of 4
5595342P0-OO-V	5 µm, 0.45 m², pack of 2

Type SS, with 1½" Sanitary Flange Inlet and Outlet

5595305P7-SS-A	0.65 µm, 0.05 m², pack of 4
5595305P8-SS-A	0.65 µm, 0.1 m², pack of 4
5595305P9-SS-A	0.65 µm, 0.2 m², pack of 4
5595305P0-SS-V	0.65 µm, 0.45 m², pack of 2
5595303P7-SS-A	1.2 µm, 0.05 m², pack of 4
5595303P8-SS-A	1.2 µm, 0.1 m², pack of 4
5595303P9-SS-A	1.2 µm, 0.2 m², pack of 4
5595303P0-SS-V	1.2 µm, 0.45 m², 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 m², pack of 4
5595303P8-SO-A	1.2 µm, 0.1 m², pack of 4
5595303P9-SO-A	1.2 µm, 0.2 m², pack of 4
5595303P0-SO-V	1.2 µm, 0.45 m², pack of 2

Sartopure® GF Plus Depth Filter MidiCaps®

Type OO, with ½" Single Stepped Hose Barb

5555305P7-OO-A	0.65 µm, 0.05 m², pack of 4
5555305P8-OO-A	0.65 µm, 0.1 m², pack of 4
5555305P9-OO-A	0.65 µm, 0.2 m², pack of 4
5555305P0-OO-V	0.65 µm, 0.45 m², pack of 2
5555303P7-OO-A	1.2 µm, 0.05 m², pack of 4
5555303P8-OO-A	1.2 µm, 0.1 m², pack of 4
5555303P9-OO-A	1.2 µm, 0.2 m², pack of 4
5555303P0-OO-V	1.2 µm, 0.45 m², pack of 2

Type SS, with 1½" Sanitary Flange Inlet and Outlet

5555305P7-SS-A	0.65 µm, 0.05 m², pack of 4
5555305P8-SS-A	0.65 µm, 0.1 m², pack of 4
5555305P9-SS-A	0.65 µm, 0.2 m², pack of 4
5555305P0-SS-V	0.65 µm, 0.45 m², pack of 2
5555303P7-SS-A	1.2 µm, 0.05 m², pack of 4
5555303P8-SS-A	1.2 µm, 0.1 m², pack of 4
5555303P9-SS-A	1.2 µm, 0.2 m², pack of 4
5555303P0-SS-V	1.2 µm, 0.45 m², pack of 2

Type SO, with 1½" Sanitary Flange Inlet and ½" Single Stepped Hose Barb Outlet

5555305P7-SO-A	0.65 µm, 0.05 m², pack of 4
5555305P8-SO-A	0.65 µm, 0.1 m², pack of 4
5555305P9-SO-A	0.65 µm, 0.2 m², pack of 4
5555305P0-SO-V	0.65 µm, 0.45 m², pack of 2
5555303P7-SO-A	1.2 µm, 0.05 m², pack of 4
5555303P8-SO-A	1.2 µm, 0.1 m², pack of 4
5555303P9-SO-A	1.2 µm, 0.2 m², pack of 4
5555303P0-SO-V	1.2 µm, 0.45 m², pack of 2

Order Numbers for Sartopure® CA MidiCaps® and Sartoclean® GF MidiCaps®

Sartoclean® CA MidiCaps®

Type OO, with ½" Single Stepped Hose Barb

5625307A7-OO-A	0.2 µm, 0.05 m², pack of 4
5625307A8-OO-A	0.2 µm, 0.1 m², pack of 4
5625307A9-OO-A	0.2 µm, 0.2 m², pack of 4
5625307A0-OO-V	0.2 µm, 0.45 m², pack of 2
5625306A7-OO-A	0.45 µm, 0.05 m², pack of 4
5625306A8-OO-A	0.45 µm, 0.1 m², pack of 4
5625306A9-OO-A	0.45 µm, 0.2 m², pack of 4
5625306A0-OO-V	0.45 µm, 0.45 m², pack of 2
5625305G7-OO-A	0.8|0.65 µm, 0.05 m², pack of 4
5625305G8-OO-A	0.8|0.65 µm, 0.1 m², pack of 4
5625305G9-OO-A	0.8|0.65 µm, 0.2 m², pack of 4
5625305G0-OO-V	0.8|0.65 µm, 0.45 m², pack of 2
5625304E7-OO-A	3.0|0.8 µm, 0.05 m², pack of 4
5625304E8-OO-A	3.0|0.8 µm, 0.1 m², pack of 4
5625304E9-OO-A	3.0|0.8 µm, 0.2 m², pack of 4
5625304E0-OO-V	3.0|0.8 µm, 0.45 m², pack of 2

Type SS, with 1½" Sanitary Flange Inlet and Outlet

5625307A7-SS-A	0.2 µm, 0.05 m², pack of 4
5625307A8-SS-A	0.2 µm, 0.1 m², pack of 4
5625307A9-SS-A	0.2 µm, 0.2 m², pack of 4
5625307A0-SS-V	0.2 µm, 0.45 m², pack of 2
5625306A7-SS-A	0.45 µm, 0.05 m², pack of 4
5625306A8-SS-A	0.45 µm, 0.1 m², pack of 4
5625306A9-SS-A	0.45 µm, 0.2 m², pack of 4
5625306A0-SS-V	0.45 µm, 0.45 m², pack of 2
5625305G7-SS-A	0.8|0.65 µm, 0.05 m², pack of 4
5625305G8-SS-A	0.8|0.65 µm, 0.1 m², pack of 4
5625305G9-SS-A	0.8|0.65 µm, 0.2 m², pack of 4
5625305G0-SS-V	0.8|0.65 µm, 0.45 m², pack of 2
5625304E7-SS-A	3.0|0.8 µm, 0.05 m², pack of 4
5625304E8-SS-A	3.0|0.8 µm, 0.1 m², pack of 4
5625304E9-SS-A	3.0|0.8 µm, 0.2 m², pack of 4
5625304E0-SS-V	3.0|0.8 µm, 0.45 m², 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 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

5625307A7-SO-A	0.2 µm, 0.05 m², pack of 4
5625307A8-SO-A	0.2 µm, 0.1 m², pack of 4
5625307A9-SO-A	0.2 µm, 0.2 m², pack of 4
5625307A0-SO-V	0.2 um, 0.45 m², pack of 2
5625306A7-SO-A	0.45 µm, 0.05 m², pack of 4
5625306A8-SO-A	0.45 µm, 0.1 m², pack of 4
5625306A9-SO-A	0.45 µm, 0.2 m², pack of 4
5625306A0-SO-V	0.45 µm, 0.45 m², pack of 2
5625305G7-SO-A	0.8/0.65 µm, 0.05 m², pack of 4
5625305G8-SO-A	0.8/0.65 µm, 0.1 m², pack of 4
5625305G9-SO-A	0.8/0.65 µm, 0.2 m², pack of 4
5625305G0-SO-V	0.8/0.65 µm, 0.45 m², pack of 2
5625304E7-SO-A	3.0/0.8 µm, 0.05 m², pack of 4
5625304E8-SO-A	3.0/0.8 µm, 0.1 m², pack of 4
5625304E9-SO-A	3.0/0.8 µm, 0.2 m², pack of 4
5625304E0-SO-V	3.0/0.8 µm, 0.45 m², pack of 2

Sartoclean® GF MidiCaps®

Type OO, with ½" single stepped hose barb

5605305G7-OO-A	0.8/0.65 µm, 0.05 m², pack of 4
5605305G8-OO-A	0.8/0.65 µm, 0.1 m², pack of 4
5605305G9-OO-A	0.8/0.65 µm, 0.2 m², pack of 4
5605305G0-OO-V	0.8/0.65µm, 0.45 m², pack of 2
5605304E7-OO-A	3.0/0.8 µm, 0.05 m², pack of 4
5605304E8-OO-A	3.0/0.8 µm, 0.1 m², pack of 4
5605304E9-OO-A	3.0/0.8 µm, 0.2 m², pack of 4
5605304E0-OO-V	3.0/0.8 µm, 0.45 m², pack of 2

Type SS, with 1½" sanitary flange inlet and outlet

5605305G7-SS-A	0.8/0.65 µm, 0.05 m², pack of 4
5605305G8-SS-A	0.8/0.65 µm, 0.1 m², pack of 4
5605305G9-SS-A	0.8/0.65 µm, 0.2 m², pack of 4
5605305G0-SS-V	0.8/0.65 µm, 0.45 m², pack of 2
5605304E7-SS-A	3.0/0.8 µm, 0.05 m², pack of 4
5605304E8-SS-A	3.0/0.8 µm, 0.1 m², pack of 4
5605304E9-SS-A	3.0/0.8 µm, 0.2 m², pack of 4
5605304E0-SS-V	3.0/0.8 µm, 0.45 m², 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 m², pack of 4
5605305G8-SO-A	0.8/0.65 µm, 0.1 m², pack of 4
5605305G9-SO-A	0.8/0.65 µm, 0.2 m², pack of 4
5605305G0-SO-V	0.8/0.65 µm, 0.45 m², pack of 2
5605304E7-SO-A	3.0/0.8 µm, 0.05 m², pack of 4
5605304E8-SO-A	3.0/0.8 µm, 0.1 m², pack of 4
5605304E9-SO-A	3.0/0.8 µm, 0.2 m², pack of 4
5605304E0-SO-V	3.0/0.8 µm, 0.45 m², 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.

Specifications

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 m² (size 8)|0.05 m² (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: G½ 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: G½ 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 G½ female thread
Adapters to attach the quick-connect couplings to taps or fittings of different thread sizes	17747	G3/8-female thread
	17748	G½-female thread
	17749	M 22 *f* 1-female thread
	17750	G 1-female thread
	17766	M 24 *f* 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

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.

Sartopure® PP2 Mini Cartridges
0.2 m², 0.65 µm, 1.2 µm, 3 µm
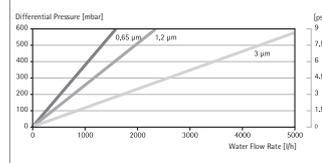
Water Flow Rates
for 0.2 m² Sartoclean® CA and Sartoclean® GF 0.8|0.65 µm
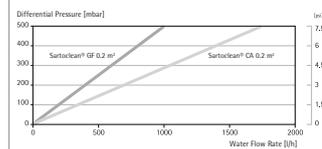
Specifications for Sartopure® and Sartoclean® Mini Cartridges

Connectors	Inner silicone O-ring and bayonet lock (twist lock) for safe hold on the base (also refer to descriptions on page 113 and page 115)
Flow rate*	Typical values for 0.2 m² 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 m², 0.1 m², 0.2 m² or 0.3 m², 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 m², pack of 5
5591505P8-B	0.65 µm, 0.1 m², pack of 5
5591505P9-B	0.65 µm, 0.2 m², pack of 5
5591503P9-B	1.2 µm, 0.2 m², pack of 5
5591502P9-B	3 µm, 0.2 m², pack of 5
5591542P9-B	5 µm, 0.2 m², pack of 5
5591501P9-B	8 µm, 0.2 m², pack of 5
5591520P9-B	20 µm, 0.2 m², pack of 5

Sartoclean® CA Membrane Filter Mini Cartridges

5621507A9-B	0.2 µm, 0.2 m², pack of 5
5621506A9-B	0.45 µm, 0.2 m², pack of 5
5621505G9-B	0.8|0.65 µm, 0.2 m², pack of 5
5621504E9-B	3.0|0.8 µm, 0.2 m², pack of 5

Sartoclean® GF Membrane Filter Mini Cartridges

5601505G9-B	0.8|0.65 µm, 0.2 m², pack of 5
5601504E9-B	3.0|0.8 µm, 0.2 m², 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 cm².

Product Benefits
Sartoclear® P Caps are completely disposable capsules. This technology provides highest flexibility for disposable small scale manu-facturing and scale up work. Sartoclear® P Caps can be simply and directly connected to the downstream processing line or dispos-able 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 50 l/m² 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

Grade	Nominal Retention [μm]	Thickness [mm]	Weight [kg/m²]	Ash Content [%]	Water Flow [l/m²/min]
C4-P	8	4.1	0.93	20	1,250
C8HP	4	4.1	1.08	35	700
F4HP	1.5	4.1	1.26	45	205
F7HP	1.0	4.0	1.42	50	100
S5-P	0.3	4.0	1.55	50	70
S9-P	0.1	4.0	1.64	48	42

Filtration area		25 cm²
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

Ordering Information
All Sartoclear® P Caps do have 3" Triclamp connectors at the in- and outlet.

Order No.	Grade	Description	Qty.
293C4-P13ACFF--M	C4HP	Single Layer 25 cm² Cap, Cell Harvest	3
293C8HP13ACFF--M	C8HP	Single Layer 25 cm² Cap, Cell Harvest	3
293F4HP13ACFF--M	F4HP	Single Layer 25 cm² Cap, Clarification	3
293F7HP13ACFF--M	F7HP	Single Layer 25 cm² Cap, Clarification	3
293S5-P13ACFF--M	S5P	Single Layer 25 cm² Cap, Bioburden reduction	3
293S9-P13ACFF--M	S9P	Single Layer 25 cm² Cap, Bioburden reduction	3
295PB1P13ACFF--M	PB1	Post Bioreactor 1, Multilayer 25 cm² Cap	3
295PB2P13ACFF--M	PB2	Post Bioreactor 2, Multilayer 25 cm² Cap	3
295PC1P13ACFF--M	PC1	Post Centrifuge 1, Multilayer 25 cm² Cap	3
295PC2P13ACFF--M	PC2	Post Centrifuge 2, Multilayer 25 cm² Cap	3

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 ⊠p = 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 cm²
Weight	83 g
Threads for connectors	M 12 f 1 female thread
Materials	Polycarbonate top part, base part and hose nipple. Polypropylene filter support. Silicone O-ring (40 f 5 mm).
Max. operating pressure	7 bar|700 kPa|101.5 psi
Suitable membrane filter diameter	50 mm (prefilter, 40 mm)
Sterilization	By autoclaving at 121 ℃ 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 96.
Replacement parts are shown in the diagram.

6985004 connector

6980232 filter support

6980110 silicone O-ring

6980232 filter support

6980383 base part

6985004 connector
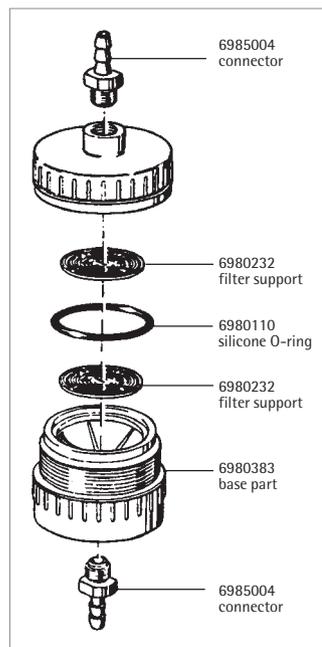
25 mm Stainless Steel Filter Holder for In-line Filtration

The 25 mm Filter Holder
The G¼ connection threads with density bar-rel, 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 G¼ female thread (Order no. 01030) or G³/₈ female thread (01029) or onto pressure tanks with G³/₈ male thread (00177).

6980176
Connector

6981031
Top part

6981033
Silicone O-ring

6981032
Base part

6981034
Closing ring

6980176
Connector

Specifications

Connectors	Hose nipples DN10
Filtration area	3 cm²
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 f 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 G^3/$_8$ female thread (Order no. 17089) or onto pressure tanks with G^3/$_8$ male thread (17069) or on taps with G^3/$_4$ male thread (17068).

Specifications

Connectors	Hose nipples DN10
Connection thread	M12 f 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 f 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 ℃) or by dry heat (max. 180 ℃).

Order Number

16254	Stainless steel holder for 47 mm ⴲ membrane filter

Replacement parts are shown in the diagram.

6980722
valve

6980656
PTFE flat gasket

6980717
Viton O-ring

6982005
closing ring

6982003
top par

6980721
back pressure screen

6980178
silicone O-ring

6980180
screen support

6980737
support plate

6982006
base plate

6980801
connector

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 G^3/$_8$ connector 17051.

Specifications for the 47 mm, 200 ml PTFE Filter Holder

Chemical compatibility	As for PTFE and Viton
Flow rate	For water at ⊠p = 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 f 1.5 male thread
Materials	Top part, barrel, base part, corrugated iron, hose nipples and filter support with 40 f 3.5 mm PTFE O-ring. Aluminium locking rings. 39 f 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 ℃) or by dry heat (180 ℃)

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
G^3/$_8$ 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 cm²
Weight	6 kg
Materials	Top part, base, back pressure screen, filter support with 131 *f* 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 f 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 f 2 mm (top part) and 42 f 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).

6980151 port closure

6986055 PTFE insert

6986084 top part

6982020 silicone O-ring

6982005 closing ring

6981288 holding rod

6980801 connector

6986083 barrel

6980178 silicone O-ring

6980737 underdrain screen

6980180 screen support

6982006 base part
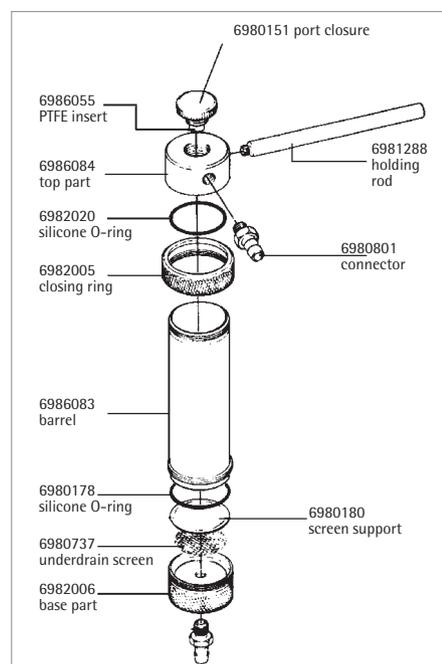
Order Number for the 47 mm, 200 ml Stainless Steel Pressure Holder

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

Recommended accessories are described on page 96. 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 cm², 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 cm²
Weight	12 kg│26.5 lbs
Threads for connectors	M 12 f 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 f 4 mm) in the top part and the filter support. Viton valve O-rings (3 f 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 96. Replacement parts see diagram.
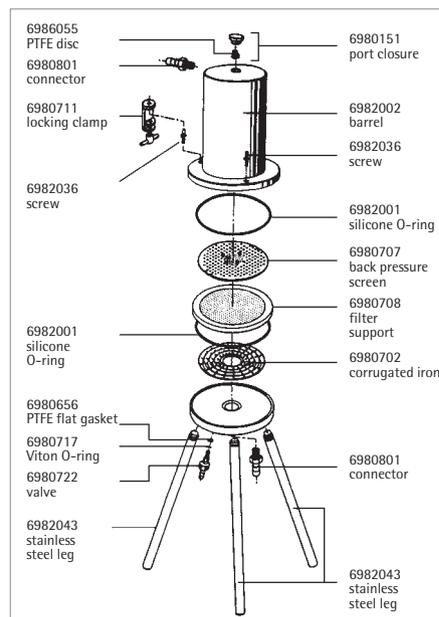
142 mm Stainless Steel Holder for the Filtration of up to about 50 Liter Volumes

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 cm² 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 cm²
Weight	6 kg
Threads for connectors	M 12 f 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 f 4 mm) in the top part and filter support. Viton valve O-rings (3 f 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).

6980801 connector
6982012 top part
6980717 Viton O-ring
6980656 PTFE flat gasket
6980722 valve
6982001 Silicone O-ring
6980707 back pressure screen
6980708 filter support
6982001 silicone O-ring
6980702 corrugated iron
6980711 locking clamp
6980712 screw
6980717 Viton O-ring
6980656 PTFE flat gasket
6980722 valve
6982043 stainless steel leg
6980711 locking clamp
6980801 connector
6982043 stainless steel leg

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 96. Replacement parts are shown in the diagram.
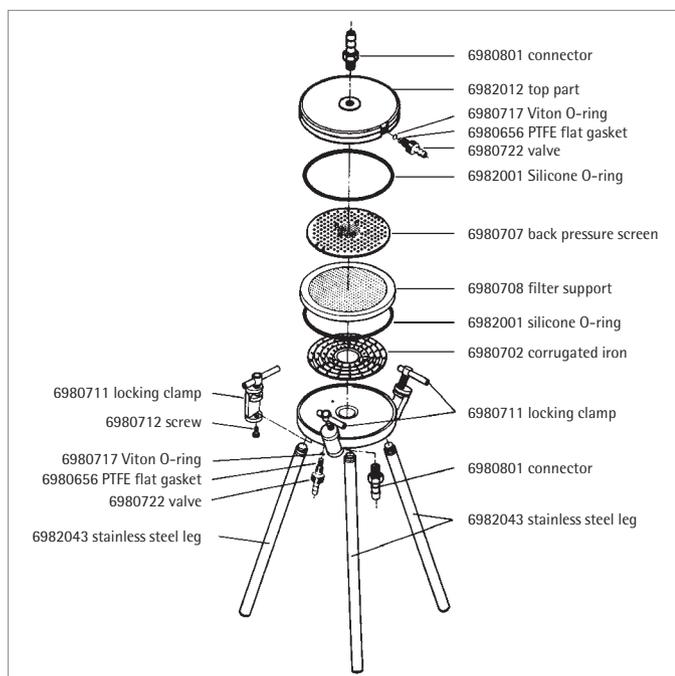
GMP–complying 142 mm Stainless Steel Holder with Sanitary Flanges

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 cm²
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 f 4 mm) in the top part and filter support. Viton valve O-rings (3 f 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 96. Replacement parts are shown in the diagram.

6980740 top part
6982001 silicone O-ring
6980707 back pressure screen
6980711 locking clamp
6980717 Viton O-ring
6980656 PTFE flat gasket
6980722 valve

6980717 Viton O-ring
6980656 PTFE flat gasket
6980722 valve
6980708 filter support
6982001 silicone O-ring
6980702 corrugated iron
6980711 locking clamp
6980712 screw for clamp

6982043 stainless steel leg
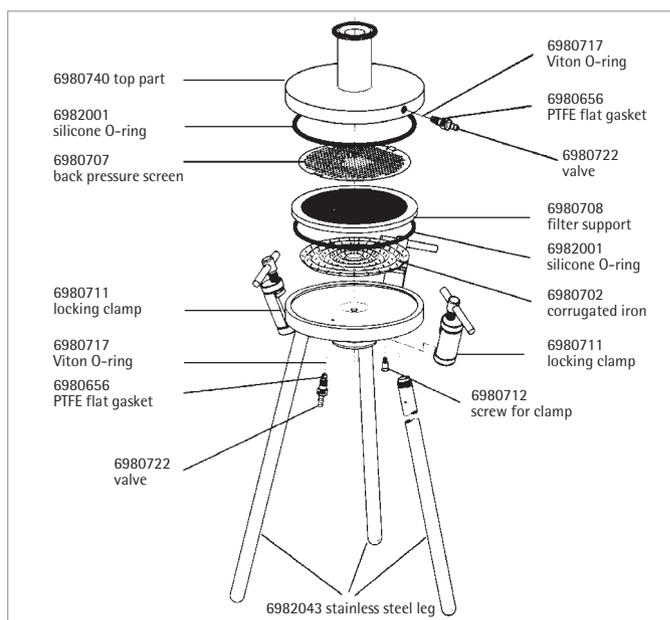
GMP-complying 293 mm Stainless Steel Holder with Sanitary Flanges

The construction of this holder is the same as that of the 142 mm holder described on page 93, 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).

Durchflussleistung für Wasser bei p = 1 bar

l/min

	0.2 µm	0.45 µm	0.65 µm	0.8 µm	Poren-größe
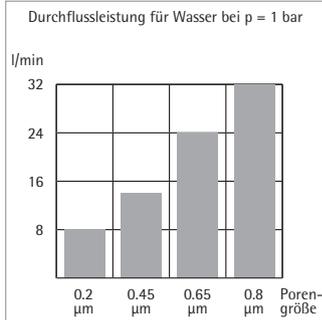
Specifications for the 293 mm Sanitary Flange Holder

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 ⊠p = 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 f 4 mm) in the top part and filter support. Viton valve O-rings (3 f 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)

6980717 Viton O-ring
6980656 PTFE flat gasket
6980722 valve
6982022 silicone O-ring
6980714 back pressure screeng
6980715 filter support
6982022 silicone O-ring
6980716 corrugated iron
6980718 locking clamp
6980718 locking clamp
6980717 Viton O-ring
6980656 PTFE flat gasket
6980722 valve
6982044 stainless steel leg
6982044 stainless steel leg
6980719 screw for clamp
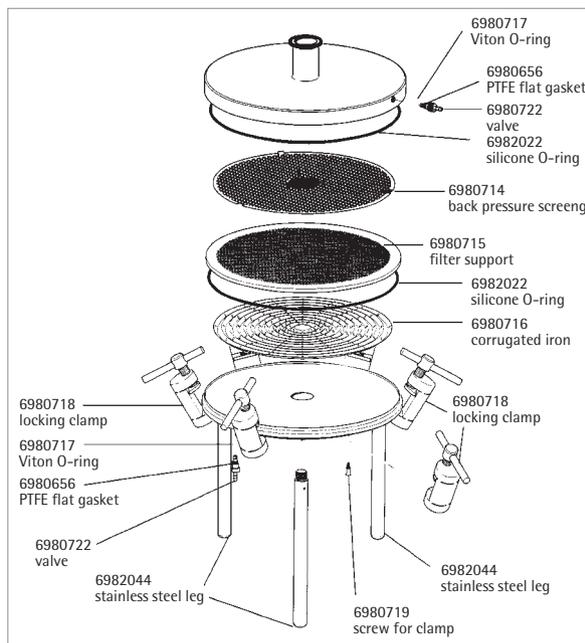
Order Number for the 293 mm Sanitary Flange Filter Holder

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 96. 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 81.
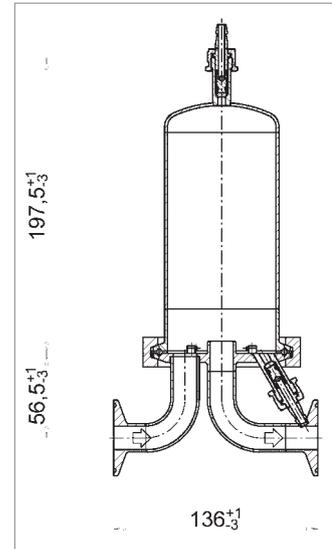
Quality Standards for the Modular System

Material	AISI 316 L
Surfaces	Interior: Ra < 0,5 µm
	Exterior: Ra <1.6 µm
Temperature range	−10...+150 ℃
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 ℃

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

2. For Sartobran® P Capsules
Connection to a pressurized container: either a capsule with $G^3/_8$ 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.

3. 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 $G^3/_8$ 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.

4. 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 $G^3/_8$ 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 $G^3/_8$ male thread and a PTFE pressure hose.

5. 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 $G^3/_8$ 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.

6. 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 $G^3/_8$ 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

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 [kg]	ca. 15
Threads for connectors	G¼ female thread
Dimensions [cm]	35 f 25 f 26
Max. performance [l/min]	55
Max. ambient temp.	40 ℃
Power [W]	250
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)
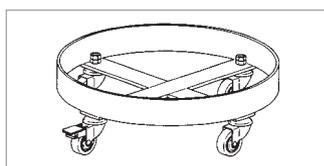
Pressure Tank

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 $G^3/_8$ 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 *f* diameter|weight	17530	235 *f* 234 mm|3.9 kg|8.6 lbs
	17531	360 *f* 234 mm|5.4 kg|11.9 lbs
	17532	600 *f* 234 mm|8.2 kg|18.2 lbs
	17533	705 *f* 300 mm|11.8 kg|26 lbs
	17534	643 *f* 400 mm|15.2 kg|33.5 lbs
	17535	802 *f* 400 mm|18.4 kg|40.5 lbs
	17536	962 *f* 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, G^3/$_8$
	6985131	PTFE cap (2 f)
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 G^3/$_8$ 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.
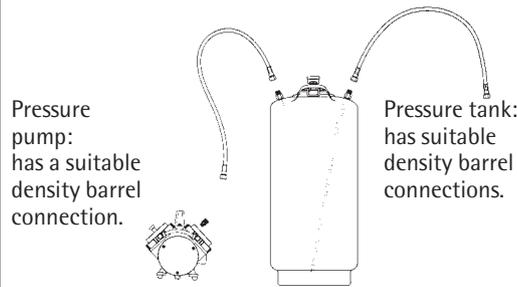
Sartobran® P capsules Type RO have a suitable density barrel connection. The inlet hose nipple of the holders 16249, 16275 and 16508 have to be replaced by connector 17089. Capsules, holders and holding with inlet sanitary flange require connector 17019.

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:
G^3/$_8$ connectors are to be replaced by quick-connect nipples (17170).
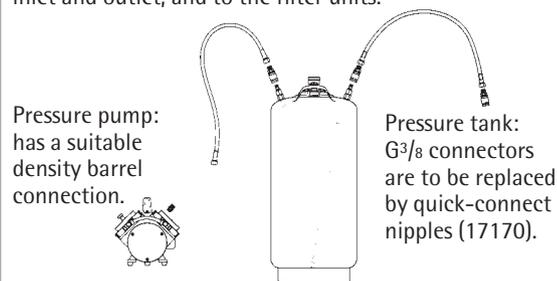
Not recommended for capsules, housings or devices with sanitary flanges. The inlet hose nipple of the holders 16249, 16275, and 16508 have to be replaced by the connector 17090.

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: G^3/$_8$ connectors have to be replaced by hose nipples (16863).

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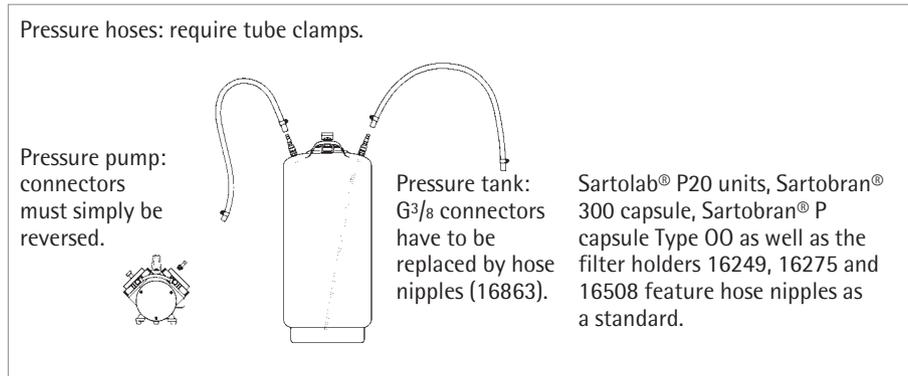
PTFE Pressure Hose

Stainless steel reinforced PTFE pressure hoses with $G^3/_8$ 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 $G^3/_8$ 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. $G^3/_8$ 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 $G^3/_8$ 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
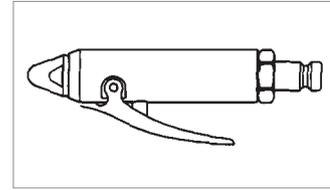
Accessories for 6985128

6980407	Trigger valve for cleaning

Replacement Part for 6985128

6985216	Seal set (Viton O-ring, flat gasket)
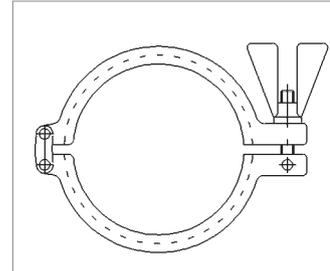
Order Number for Flexible Pressure Hose

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 f 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 cm² 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|0.29 psi (1.8 l/min for 0.45 µm) 2.0 l/min at 0.05 bar|0.72 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 cm²
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 with ethylene oxide. No gamma irradiation allowed.
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 ⌷p = 0.1 bar|1.45 psi
Filter area	5.3 cm²
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

Order No.	Pore Size	Membrane	Connectors E|A	Pieces/Case	Sterile
17804 E	0.45 µm	PTFE	Hose Barb|Hose Barb	12	Yes
17804 G	0.45 µm	PTFE	Hose Barb|Hose Barb	25	Yes
17804 NPE	0.45 µm	PTFE	$1/8$"|$1/8$" NPT	12	Yes
17804 NPG	0.45 µm	PTFE	$1/8$"|$1/8$" NPT	25	Yes
17805 E	0.2 µm	PTFE	Hose Barb|Hose Barb	12	Yes
17805 G	0.2 µm	PTFE	Hose Barb|Hose Barb	25	Yes
17805 NPE	0.2 µm	PTFE	$1/8$"|$1/8$" NPT	12	Yes
17805 NPG	0.2 µm	PTFE	$1/8$"|$1/8$" NPT	25	Yes
17805 UPN	0.2 µm	PTFE	Hose Barb|Hose Barb	100	No
17805 UPQ	0.2 µm	PTFE	Hose Barb|Hose Barb	500	No
17809 UNN	0.2 µm	PTFE	$1/8$"|$1/8$" NPT	100	No
17812 UNN	0.2 µm	PTFE	$1/8$"|Hose Barb	100	No
17805 TCN	0.2 µm	PTFE	TriClamp|TriClamp	100	No
17877 UPN	0.2 µm	PTFE	Small Hose Barb|Small Hose Barb	100	No

Standard Hose Barb

Small Hose Barb

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

$1/8$" NPT Thread

TriClamp

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

Description
Midisart® BV disposable venting filter manu-
factured 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 mem-
brane 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 Manage-
ment System. A Validation Guide is available
for compliance with regulatory requirements.

Specifications

Materials	Membrane:	PTFE
	Support fleece:	Polyester
	Housing:	Polypropylene
Pore size	0.2 µm	
Article codes	17805--------BVE (12 per box)	
	17805--------BVN (100 per box)	
	17805--------BVQ (500 per box)	
Connectors	Multiple stepped hosebarb (in- and outlet)	
Filtration area	20 cm²|3 square inch	
Housing diameter	64 mm|2.5"	
Sterilization	Gamma Irradiation 50 kGy (max.)	
Max. operation pressure	In direction of filtration:	1.5 bar|22 psi
	Opposite direction:	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 correspondinly 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.

Differential Pressure [mbar]

A = 5181307T4-00
B = 5181307T5-00

Air Flow Rate [l/min]

Differential Pressure [mbar]

A = 5181307T7-00
B = 5181307T8-00
C = 5181307T9-00

Air Flow Rate [m³/h]
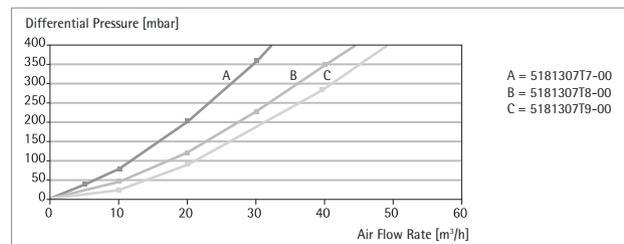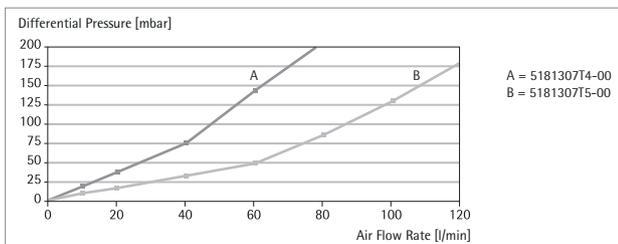
Specifications for Sartofluor® MidiCaps®

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 107
Filter area	0.015 m², 0.03 m², 0.05 m², 0.1 m² or 0.2 m²
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 m², pack of 5
5185358T8-XX-B	0.1 µm, 0.1 m², pack of 5
5185358T9-XX-A	0.1 µm, 0.2 m², pack of 4
5185307T7-XX-B	0.2 µm, 0.05 m², pack of 5
5185307T8-XX-B	0.2 µm, 0.1 m², pack of 5
5185307T9-XX-A	0.2 µm, 0.2 m², pack of 4
5185306T9-XX-A	0.45 µm, 0.2 m², 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 Filtration 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.
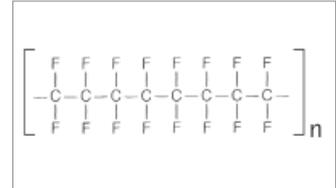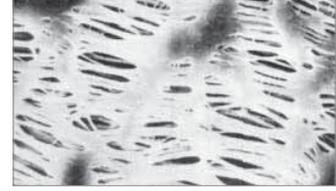
Specifications for PTFE Membrane Filters

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	11803-013 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

25 mm Stainless Steel Filter Holder for In-line Filtration

The 25 mm Filter Holder
The G¼ 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 G¼ 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 *f* 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).

6980176
connector

6981031
top part

6981033
silicone O-ring

6981032
base part

6981034
closing ring

6980176
connector

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 G$\frac{3}{8}$ female thread (Order no. 17089), or onto pressure tanks with G$\frac{3}{8}$ male thread (17069) or on taps with G$\frac{3}{4}$ male thread (17068).

6980722
valve

6980656
PTFE flat gasket

6980717
Viton O-ring

6982005
closing ring

6982003
top part

6980721
back pressure screen

6980178
silicone O-ring

6980180
screen support

6980737
support plate

6982006
base plate

6980801
connector

Specifications

Connectors	Hose nipples DN10
Connection thread	M12 *f* 1
Filtration area	13 cm^2
Flow rate	For air at $\square$p = 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 *f* 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 ǂ 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.
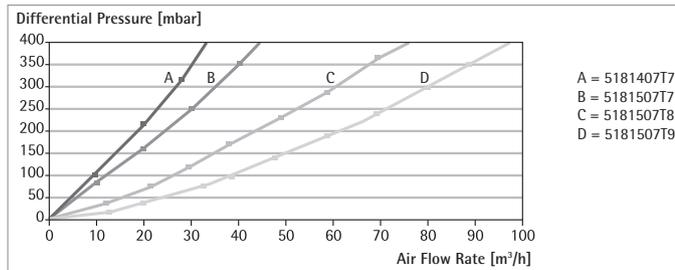
Air flow rates at atmosperic pressure Sartofluor® mini 0.2 µm,
Type 5181507T7, T8, T9, 5181407T7

A = 5181407T7
B = 5181507T7
C = 5181507T8
D = 5181507T9
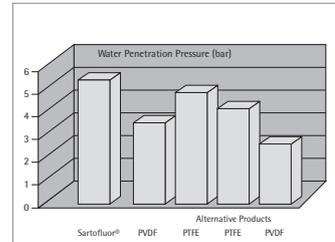
Specifications for Sartofluor® Mini Cartridges

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 m², 0.1 m² or 0.2 m²
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. ⊠p = 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 m² filter area, pack of 5
5181558T8 B	0.1 m² filter area, pack of 5
5181558T9 B	0.2 m² filter area, pack of 5

With 0.2 μm filter

5181507T7 B	0.05 m² filter area, pack of 5
5181507T8 B	0.1 m² filter area, pack of 5
5181507T9 B	0.2 m² filter area, pack of 5

Sartofluor® Junior

5181407T7 B	0.05 m² filter area, pack of 5

With 0.45 μm filter

5181506T9 B	0.2 m² filter area, pack of 5

Sartofluor® capsules see page 107.
Special brochure available on request. Order no. SPK1502-e

Housings for Sterile Air Venting and for Air|Gas Filtration

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 95). The housing follows PED 97/23/EC.

Suitable filter cartridges on page 81.

Housing for sterile venting

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

Housing for pressure gas filtration

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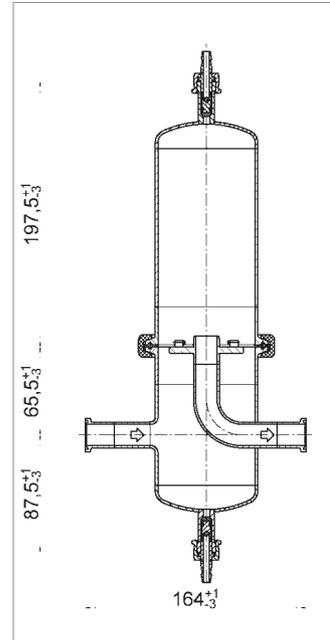
Sartocon® Slice
The Pilot-scale Crossflow System for Batches of 1 to 100 Liters

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 m²
Application limits	Max. 4 bar│58 psi 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 m² 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

Max. Flow at 100% (1 cP)

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.
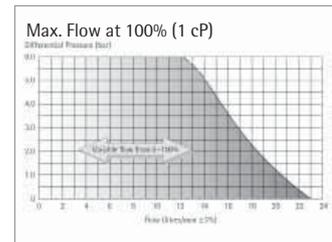
Specifications

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 *f* W *f* H [mm]	415 *f* 300 *f* 385

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 Area	Hydrosart® 200 cm² Filter Area	Polyethersulfone 200 cm² Filter
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 m²). 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 cm² each)
Dimensions L f W f H [mm]	160 f 120 f 275
Weight [kg]	5.8

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

Filter Papers
(Including Thimbles, Glass and Quartz Microfiber Filters)

Introduction
Nowadays, high-grade filter papers are indispensable for routine work in laboratory applications. Sartorius Stedim Biotech supplies you with a broad range of filter papers for myriad filtration tasks and supports you in solving all your filtration challenges.

Ash-free Filter Papers
for Quantitative and Gravimetric Analyses
These filter papers are used for quantitative and gravimetric analyses as well as for pressure or vacuum filtration. They are made out of 100% cotton linters with an alpha-cellulose content of > 98% and are washed out with acid to make the papers ashless and achieve high purity.

Wet-strengthened Filter Papers
for Qualitative Analyses
These qualitative filter papers are essentially used for analytical purposes and routine analyses, whenever no gravimetric analyses are required. They are wet-strengthened and can be used for pressure and vacuum filtration. They are made of refined pulp and linters with an > 95% alpha-cellulose content with an ash content < 0.1%.

High-purity Filter Papers
for Qualitative Analyses
These paper grades are used for analytical purposes that require a low ash content. Grades 292 and 292a are especially suitable for soil analyses because they are low in nitrogen. For phosphate or sodium determination, we recommend grades 131 and 132.

Smooth Filter Paper
for Qualitative-technical Analyses
These filter papers are used for routine analyses like clarification, determination of substances, but also as discs with a center hole for technical applications.

Crêped Filter Papers
for Qualitative-technical Analyses
Crêped filter papers are mostly used for the rapid filtration of relatively coarse precipitates; because of their crêped structure they provide a larger filtration area than smooth filter paper.

Boards
for the Filtration and Absorption of Liquids
Among other applications, these boards are used for the filtration of cooking and transformer oils, galvanic baths and as base paper for further impregnation with certain reagents, cytocards or fragrance test cards.

Seed Testing Papers
These papers satisfy the requirements for the determination of germination capability according to ISTA (International Seed Test Association) and are ideal for ensuring an optimal moisture content for the most diverse types of seeds and germination forms. Their pH ranges between 6.0 and 7.5, they are wet-strengthened and their special structure prevents fine seed roots from growing through the paper.

Filter Papers for the Sugar Industry
In the sugar industry, filter papers are used in laboratories to assay sugar beet or cane sugar. These papers are wet-strengthened and either smooth or crêped; they are made of cellulose or a mixture of cellulose and diatomaceous earth. Grade 100/N is not only supplied as discs or folded filters, but also on rolls for VENEMA systems.

Surface Protection Paper
LabSorb and LabSorb Ultra are highly absorptive grades of paper coated on one side with polyethylene. Used with the cellulose side up, the paper absorbs liquids, which are stopped by the polyethylene layer and thus prevented from soaking through. Used with the polyethylene side up, the papers are highly useful for recovery of valuable or toxic liquids.

Phase Separating Paper
Grade 480 is impregnated with a stabilized silicon, thus rendering it hydrophobic: It retains water, but allows solvents to flow through. The flow stops automatically when the entire solvent has passed through. In many applications, this phase separator paper eliminates the need to use separating funnels.

Diatomaceous Earth Filter Paper
Grade 470 papers are made of cellulose and diatomaceous earth and offer a much better separating capability than pure cellulose papers at the same rate of filtration. This grade quickly retains the finest particles at high flow rates.

Sample Carrier Paper

Grade TFN is made from pure cotton linters without any additives. This sample carrier material is intended for absorbing and transporting human bodily fluids and|or as a carrier for in-vitro diagnostic tests. For example, it is used to perform screening tests for hereditary diseases and metabolic disorders such as phenylketonuria (Guthrie test). Grade TFN papers comply with the requirements of EC Directive 98/79/EC, Annex I and III (other IVD) and is recommended for applications in accordance with the CLSI-LA4-A5:2007 standard.

Nonwovens

These nonwoven grades are made of rayon or polyester and are available in different weights. They are usually sold on rolls – as nonwoven rayon (viscose), but can also be supplied on request as discs or sheets.

Weighing Paper

Grade 605 weighing paper is made of transparent smooth parchment that is ideal for the weighing of viscous, semi-crystalline or solid substances.

Lens Cleaning Paper

Grade 2113 lens cleaning paper is a thin, non-linting silk tissue paper used for cleaning very sensitive surfaces, such as optical glasses or lenses without scratching them.

Extraction Thimbles

Sartorius Stedim Biotech thimbles are supplied in three different thimble designs to cover the majority of application areas. These cellulose or glass microfiber thimbles are primarily used in Soxhlet extraction units to extract defined substances from solids for further analyses. Quartz microfiber thimbles are preferred for emission control due to their high temperature resistance. They are supplied in a large variety of diameters and lengths.

Blotting Papers

These blotting papers are made from the purest raw materials with the maximum degree of absorptiveness and cellulose content.

Chromatography Papers

Chromatography papers are made of 100% cotton linters. These highly pure papers are not only ideal for chromatography, but also for a wide range of absorption applications like those common in the life sciences and diagnostics.

Glass Microfiber Filters Without Binder

Binder-free glass microfiber filters are recommended for analytical and gravimetric analyses and also as prefilters. These filters combine fast flow rates with high load capacity and the retention of very fine particles; they are biologically inert and resistant to most chemicals.

Glass Microfiber Filters With Binder

These filters are mostly used for monitoring air and gas. They are manufactured with synthetic binding agents to ensure that the filter has a defined strength. They are mechanically and chemically stable and – depending on the binding agent used – are either hydrophobic or hydrophilic.

Quartz Microfiber Filters

These quartz microfiber filters are free of glass fibers and binding agents. They are especially suited for emission monitoring at temperatures of up to 900 °C and wherever filters of the highest purity are needed. They are available in two grades:

- Grade T 293, quartz microfiber filters unconditioned
- Grade MK 360, quartz microfiber filters conditioned (heat pre-treated); certificate on trace elements available for every batch.

Chemical Compatibility
1. Filter Materials and Mini Cartridges

Solvents	Cellulose Acetate	Cellulose Nitrate	Reg. Cellulose	PTFE	Poly-amide	Glass Fiber	Polycar-bonate	Polyether-sulfone	Sartobran® P Cartridge	Sartofluor® Cartridge
	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	Polyether–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

Solvents	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless Steel	EPDM O-Ring	PTFE O-Ring	Silicone O-Ring	Viton O-Ring
Acetone	•	○	•	•	•	•	•	–	–
Acetonitrile	•	?	•	•	•	○	•	–	•
Gasoline	•	○	•	•	•	–	•	–	•
Benzene	•	–	–	•	•	–	•	–	•
Benzyl alcohol	•	–	•	•	•	○	•	•	•
n-Butyl acetate	•	–	○	•	•	•	•	–	–
n-Butanol	•	•	•	•	•	•	•	•	•
Cellosolve	•	–	–	•	•	○	•	–	–
Chloroform	•	–	–	•	•	–	•	–	•
Cyclohexane	•	○	•	•	•	–	•	–	•
Cyclohexanone	•	–	•	•	•	–	•	–	–
Diethylacetamide	•	–	?	•	•	?	•	•	–
Diethyl ether	•	–	○	•	•	–	•	–	–
Dimethyl formamide	•	–	•	•	•	•	•	○	–
Dimethylsulfoxide	•	?	?	•	•	?	•	○	–
Dioxane	•	–	○	•	•	•	•	–	–
Ethanol, 98%	•	•	•	•	•	•	•	•	•
Ethyl acetate	•	–	•	•	•	•	•	–	–
Ethylene glycol	•	•	•	•	•	•	•	•	•
Formamide	•	–	•	•	•	•	•	–	○
Glycerin	•	○	•	•	•	•	•	•	•
n-Heptane	•	•	•	•	•	–	•	•	•
n-Hexane	•	•	•	•	•	–	•	–	•
Isobutanol	•	•	•	•	•	•	•	•	•
Isopropanol	•	○	•	•	•	•	•	•	•
Isopropyl acetate	•	•	•	•	•	•	•	–	–
Methanol, 98%	•	–	•	•	•	•	•	•	•
Methyl acetate	•	?	•	•	•	•	•	–	–
Methylene chloride	•	–	–	•	•	–	•	–	○
Methyl ethyl ketone	•	–	•	•	•	•	•	–	–
Methyl isobutyl ketone	•	–	?	•	•	–	•	–	–
Monochlorobenzene	•	–	•	•	•	–	•	–	•
Nitrobenzene	•	–	○	•	•	–	•	–	–
n-Pentane	•	•	•	•	•	–	•	–	•
Perchloroethylene	•	–	○	•	•	–	•	–	•
Pyridine	•	–	○	•	•	–	•	–	–
Carbon tetrachloride	•	–	○	•	•	–	•	–	•
Tetrahydrofuran	•	–	○	•	•	–	•	–	–
Toluene	•	–	•	•	•	–	•	–	○

Key to symbols see next page.

Solvents	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless Steel	EPDM O–Ring	PTFE O–Ring	Silicone O–Ring	Viton O–Ring
Trichloroethane	•	–	?	•	•	–	•	–	•
Trichloroethylene	•	–	–	•	•	–	•	–	•
Xylene	•	–	○	•	•	–	•	–	○

Acids

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless Steel	EPDM O–Ring	PTFE O–Ring	Silicone O–Ring	Viton O–Ring
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

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless Steel	EPDM O–Ring	PTFE O–Ring	Silicone O–Ring	Viton O–Ring
Ammonium, 1N	•	–	•	•	•	•	•	–	–
Ammonium hydroxide, 25%	•	–	•	•	•	•	•	•	–
Potassium hydroxide, 32%	•	–	•	•	•	•	•	○	○
Sodium hydroxide, 32%	•	–	•	•	•	•	•	○	•
Sodium, 1N	•	–	•	•	•	•	•	•	•

Aqueous Solutions

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless Steel	EPDM O–Ring	PTFE O–Ring	Silicone O–Ring	Viton O–Ring
Formalin, 30%	•	•	•	•	•	•	•	○	•
Sodium hypochlorite, 5%	•	•	•	•	•	•	•	•	•
Hydrogen peroxide, 35%	•	•	•	•	•	•	•	•	•

Key to Symbols

• = compatible   ○ = limited compatibility
– = not compatible   ? = not tested

Contact time: 24 hours at 20 ℃
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

Solvents	Midisart® 2000	Minisart®	Minisart® HY	Minisart® RC	Minisart® SRP	Sartobran® 300	Sartobran® P Capsule	Sartofluor® Capsule	Sartolab® P20
Acetone	●	–	–	●	–	–	–	●	–
Acetonitrile	●	–	?	●	●	?	?	?	?
Gasoline	●	●	●	●	●	●	●	●	○
Benzene	●	–	–	?	●	–	–	○	–
Benzyl alcohol	●	?	?	?	●	○	○	●	–
n–Butyl acetate	●	–	–	?	●	●	●	●	–
n–Butanol	●	○	○	●	●	●	●	●	●
Cellosolve	○	–	–	●	○	–	–	○	–
Chloroform	●	–	–	●	●	–	–	●	–
Cyclohexane	●	–	–	?	●	○	○	●	○
Cyclohexanone	●	–	–	?	●	–	–	●	–
Diethylacetamide	●	–	–	●	●	–	–	●	–
Diethyl ether	●	?	?	?	●	○	○	●	–
Dimethyl formamide	●	–	–	?	●	–	–	●	–
Dimethylsulfoxide	●	–	–	●	●	–	–	●	–
Dioxane	●	–	–	●	●	–	–	○	–
Ethanol, 98%	●	–	–	●	●	●	●	●	●
Ethyl acetate	●	○	○	●	●	–	–	○	–
Ethylene glycol	●	?	?	●	●	●	●	●	●
Formamide	●	?	?	?	●	?	?	●	–
Glycerin	●	●	●	?	●	●	●	●	○
n–Heptane	●	●	●	?	●	●	●	●	●
n–Hexane	●	●	●	●	●	●	●	●	●
Isobutanol	●	○	○	●	●	○	○	●	○
Isopropanol	●	○	○	–	●	●	●	●	○
Isopropyl acetate	●	○	○	?	●	○	○	●	○
Methanol, 98%	●	–	–	●	●	●	●	●	–
Methyl acetate	●	–	–	?	●	–	–	●	–
Methylene chloride	●	–	–	●	●	–	–	○	–
Methyl ethyl ketone	●	–	–	●	●	–	–	●	–
Methyl isobutyl ketone	●	?	?	?	●	?	?	●	–
Monochlorobenzene	●	?	?	?	●	●	●	●	–
Nitrobenzene	●	?	?	?	●	○	○	●	–
n–Pentane	●	●	●	●	●	●	●	●	●
Perchloroethylene	●	○	○	?	●	○	○	●	–
Pyridine	●	–	–	?	●	–	–	●	–
Carbon tetrachloride	●	○	○	?	●	○	○	●	–
Tetrahydrofuran	●	–	–	●	●	–	–	○	–
Toluene	●	–	–	●	●	●	●	●	–

Key to symbols see next page.

Solvents	Midisart® 2000	Minisart®	Minisart® HY	Minisart® RC	Minisart® SRP	Sartobran® 300	Sartobran® P Capsule	Sartofluor® Capsule	Sartolab® P20
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
- – = not compatible
- ○ = limited compatibility
- ? = not tested

Contact time: 24 hours at 20 °C
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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.

Ultrafiltration & Sample Preparation

Vivaspin 500

100 µl to 500 µl Samples
Vivaspin 500 µl centrifugal filter units offer a simple, one step procedure for sample preparation. They can effectively be used in a fixed angle rotors accepting 2.2 ml centrifuge tubes.

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

Technical Specifications Vivaspin 500

Concentrator capacity	Swing bucket rotor	Do not use
	Fixed angle rotor	500 µl
Dimensions	Total length	50 mm
	Width	11 mm
	Active membrane area	0.5 cm²
	Hold-up volume, membrane and support	< 5 µl
	Dead stop volume	5 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polypropylene
	Concentrator cap	Polycarbonate
	Membrane	Polyethersulfone

Equipment Required Vivaspin 500

Centrifuge	Rotor type	Fixed angle
	Minimum rotor angle	40˚
	Rotor cavity	To fit 2.2 ml (11 mm) conical bottom tubes
	Maximum speed	15,000 g

Ordering Information

Vivaspin 500 Polyethersulfone	Pack Size	Prod. No.
3,000 MWCO	25	VS0191
3,000 MWCO	100	VS0192
5,000 MWCO	25	VS0111
5,000 MWCO	100	VS0112
10,000 MWCO	25	VS0101
10,000 MWCO	100	VS0102
30,000 MWCO	25	VS0121
30,000 MWCO	100	VS0122
50,000 MWCO	25	VS0131
50,000 MWCO	100	VS0132
100,000 MWCO	25	VS0141
100,000 MWCO	100	VS0142
300,000 MWCO	25	VS0151
300,000 MWCO	100	VS0152
1,000,000 MWCO	25	VS0161
1,000,000 MWCO	100	VS0162
0.2 µm	25	VS0171
0.2 µm	100	VS0172
Starter pack (5 of each 5 k, 10 k, 30 k, 50 k, 100 k)	25	VS01S1

24–well Ultrafiltration Frame
Safe and Fast Protein Concentration in High Throughput Format

The unique and re-usable 24-well 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.

The 24-well ultrafiltration frame and the supplied collection plates can effectively be used in a swing-out rotor for stacked deep well plates.

Vivaspin 500–HT
Vivaspin 500-HT centrifugal concentrators are designed for use with the Vivaspin 24-well ultrafiltration frame. The cap strips allow simple and convenient processing of 2–48 samples in parallel using a multiwell plate rotor accepting 2 stacked deep multiwell plates per bucket, and capable of spinning at up to 1,500 g.

Traditional Vivaspin 500 devices can be used in the 24-well ultrafiltration frame as well for a larger MWCO option.
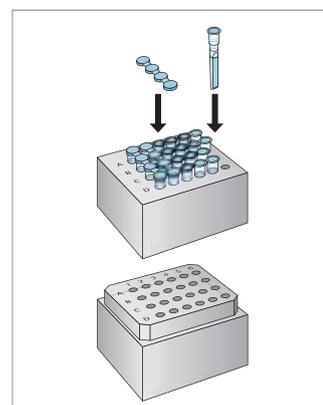
Technical Specifications 24–well Ultrafiltration Frame

Centrifuge requirements	Rotor type	Swing-out multiwell plate rotor accepting stacked deep well plates
	Maximum speed	1,500 g
Dimensions	Frame dimension L *f* W *f* H	128 *f* 85 *f* 25 mm
	Max. height of frame plus filtrate collection plate	49 mm
Materials of construction	Frame	Acetal
	Filtrate collection plate	Polystyrene
Concentrate recovery	Pipette type	Fixed or variable volume
	Recommended tip	Thin gel loader type

Ordering Information

	Pack Size	Prod. No.
24-well ultrafiltration frame (includes 2 collection plate)	2	VW24HT051
24-well filtrate collection plate	12	VW24PS0212
Vivaspin 500 High Throughput (HT) Polyethersulfone (includes 120 cap strips)		
10,000 MWCO	480	VS01HT01
30,000 MWCO	480	VS01HT21

Vivaspin 2
Choice of Membranes

0.4–2 ml Samples
The Vivaspin 2 bridges the gap between the 500 µl and 4 ml centrifugal concentrators. This device combines the speed of the classic Vivaspin products with low internal surface and membrane area for superior recoveries from very dilute solutions.

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

Also unique to the Vivaspin 2, is the choice of directly pipetting the concentrate from the dead stop pocket built into the bottom of the concentrator, or alternatively reverse spinning into the concentrate recovery cap which can then be sealed for storage. Both methods result in near total concentrate recoveries.

Technical Specifications Vivaspin 2

Concentrator capacity	Swing bucket rotor	3 ml
	Fixed angle rotor	2 ml
Dimensions	Total length	126 mm
	Width	17 mm
	Active membrane area	1.2 cm^2
	Hold-up volume of membrane	<10 µl
	Dead stop volume	8 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polycarbonate
	Concentrator cap	Polycarbonate
	Membrane	PES, CTA, HY

Equipment Required Vivaspin 2

Centrifuge

Rotor type	Swing bucket	Fixed angle
Minimum rotor angle	–	25°
Rotor cavity	To fit 15 ml (17 mm) conical bottom tubes	To fit 15 ml (17 mm) conical bottom tubes
Maximum speed	4,000 g	12,000 g*

* Please note, devices with membrane MWCO >100 kDa need to be processed at lower g forces. See data sheets for details.

- Crystal clear polycarbonate construction
- PES, CTA, or Hydrosart® membranes
- Integral deadstop avoids risk of concentrating to dryness
- Filtrate container fits standard 15 ml tube carriers
- Direct pipette recovery or choice of reverse spinning concentrate into sample cap
- Filtrate and concentrate can be sealed for storage
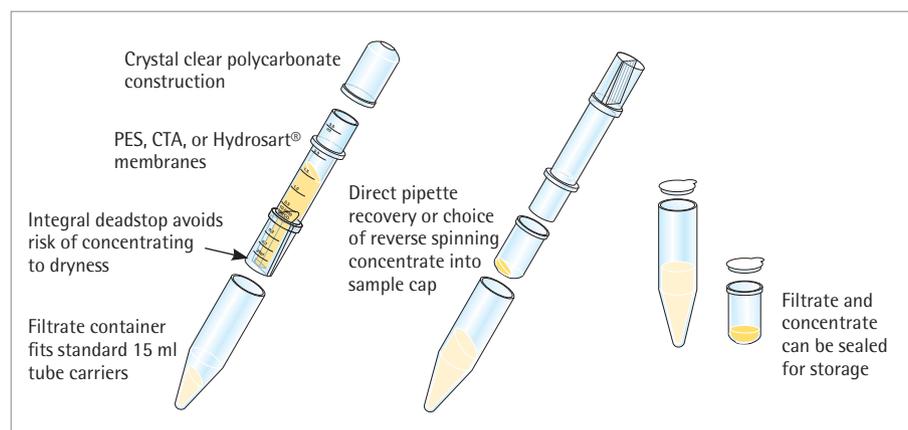
Ordering Information

Vivaspin 2 Polyethersulfone	Pack Size	Prod. No.
3,000 MWCO	25	VS0291
3,000 MWCO	100	VS0292
5,000 MWCO	25	VS0211
5,000 MWCO	100	VS0212
10,000 MWCO	25	VS0201
10,000 MWCO	100	VS0202
30,000 MWCO	25	VS0221
30,000 MWCO	100	VS0222
50,000 MWCO	25	VS0231
50,000 MWCO	100	VS0232
100,000 MWCO	25	VS0241
100,000 MWCO	100	VS0242
300,000 MWCO	25	VS0251
300,000 MWCO	100	VS0252
1,000,000 MWCO	25	VS0261
1,000,000 MWCO	100	VS0262
0.2 µm	25	VS0271
0.2 µm	100	VS0272
Starter pack (5 of each 5 k, 10 k, 30 k, 50 k, 100 k)	25	VS02S1

Vivaspin 2 Cellulose Triacetate	Pack Size	Prod. No.
5,000 MWCO	25	VS02U1
5,000 MWCO	100	VS02U2
10,000 MWCO	25	VS02V1
10,000 MWCO	100	VS02V2
20,000 MWCO	25	VS02X1
20,000 MWCO	100	VS02X2

Vivaspin 2 Hydrosart®	Pack Size	Prod. No.
2,000 MWCO	25	VS02H91
2,000 MWCO	100	VS02H92
5,000 MWCO	25	VS02H11
5,000 MWCO	100	VS02H12
10,000 MWCO	25	VS02H01
10,000 MWCO	100	VS02H02
30,000 MWCO	25	VS02H21
30,000 MWCO	100	VS02H22

Ordering Tips

- Choose a membrane pore size at least 50% smaller than the size of the molecule to be retained.
- Usually choose Polyethersulfone membranes for fastest concentrations.
- Usually choose Cellulose Triacetate for Protein Removal│Ultrafiltrate recovery.
- Usually choose Hydrosart® membranes for highest recovery with Ig fractions.

Centrisart® I
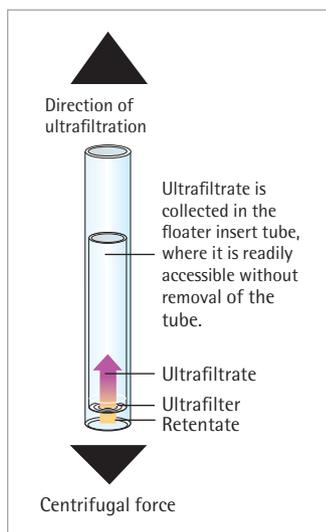
0.5–2.5 ml Samples
Centrisart® I is a ready to use unit for small volume centrifugal ultrafiltration to separate proteins from low molecular weight substances in biological samples.

Centrisart® I features a unique design, ultrafiltration in the opposite direction to the centrifugal force. This is so effective in preventing premature blockage of the filter that even whole blood samples can be deproteinized. The ultrafiltrate is collected in the floater insert tube, where it is readily accessible without removing the tube.

Typical Applications Include:
- Drug binding studies
- Determination of metabolites in serum
- Protein removal from blood samples
- Cleaning of liposomes
- Virus removal

Direction of ultrafiltration

Ultrafiltrate is collected in the floater insert tube, where it is readily accessible without removal of the tube.

Ultrafiltrate
Ultrafilter
Retentate

Centrifugal force

Technical Specifications Centrisart® I

Concentrator capacity	Swing bucket rotor	2.5 ml
	Fixed angle rotor	2.5 ml
Dimensions	Total length	93 mm
	Width	14 mm
	Active membrane area	0.79 cm^2
	Hold-up volume of membrane	< 5 µl
	Dead stop volume	100 µl
Materials of construction	Centrifuge tube	Polystyrene
	Floater tube	Cellulose propionate
	Cap	Polyethylene
	Membrane	CTA, PES

Equipment Required Centrisart® I

Centrifuge

Rotor type	Swing bucket	Fixed angle
Minimum rotor angle	–	25°
Rotor cavity	To fit 15 ml (17 mm) conical bottom tubes	To fit 15 ml (17 mm) conical bottom tubes
Maximum speed	2,500 g	2,000 g

Ordering Information

	Pack Size	Prod. No.
5,000 MWCO CTA	12	13229-E
10,000 MWCO CTA	12	13239-E
20,000 MWCO CTA	12	13249-E
100,000 MWCO PES	12	13269-E
300,000 MWCO PES	12	13279-E
Starter pack (3 units each of 5k, 10k, 20k, 100k)	12	13209-E

Vivaspin 4

1–4 ml Samples

Vivaspin 4 ml concentrators are disposable ultrafiltration devices for the concentration of biological samples. Maximum initial sample volumes range from 1 ml to 4 ml. They can be effectively used in either swing bucket or fixed angle rotors accepting 15 ml centrifuge tubes.

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

Vivaspin 4 is available with the high flux polyethersulfone membrane range which is recommended for most solutions.

Technical Specifications Vivaspin 4

Concentrator capacity	Swing bucket rotor	4 ml
	Fixed angle rotor	4 ml
Dimensions	Total length	122 mm
	Width	17 mm
	Active membrane area	2.0 cm^2
	Hold-up volume of membrane	< 10 µl
	Dead stop volume	20 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polypropylene
	Concentrator cap	Polycarbonate
	Membrane	Polyethersulfone

Equipment Required Vivaspin 4

Centrifuge

▪ Rotor type	Swing bucket	Fixed angle
▪ Minimum rotor angle	–	25°
▪ Rotor cavity	To fit 15 ml (17 mm) conical bottom tubes	To fit 15 ml (17 mm) conical bottom tubes
▪ Maximum speed	4,000 g	10,000 g*

* Please note, devices with membrane MWCO >100 kDa need to be processed at lower g forces. See data sheets for details.

Ordering Information

Vivaspin 4 Polyethersulfone	Pack Size	Prod. No.
5,000 MWCO	25	VS0413
5,000 MWCO	100	VS0414
10,000 MWCO	25	VS0403
10,000 MWCO	100	VS0404
30,000 MWCO	25	VS0423
30,000 MWCO	100	VS0424
50,000 MWCO	25	VS0433
50,000 MWCO	100	VS0434
100,000 MWCO	25	VS0443
100,000 MWCO	100	VS0444
0.2 µm	25	VS0473
0.2 µm	100	VS0474
Starter pack (5 of each 5 k, 10 k, 30 k, 50 k, 100 k)	25	VS04S3

Vivaspin 6

2–6 ml Samples

Vivaspin 6 ml concentrators have been developed to offer increased volume flexibility and performance.

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

The Vivaspin 6 features twin vertical membranes for unparalleled filtration speeds and 100 *f* 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.

Technical Specifications Vivaspin 6

Concentrator capacity	Swing bucket rotor	6 ml
	Fixed angle rotor	6 ml
Dimensions	Total length	122 mm
	Width	17 mm
	Active membrane area	2.5 cm^2
	Hold-up volume of membrane	< 10 µl
	Dead stop volume	30 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polycarbonate
	Concentrator cap	Polypropylene
	Membrane	Polyethersulfone

Equipment Required Vivaspin 6

Centrifuge

▪ Rotor type	Swing bucket	Fixed angle
▪ Minimum rotor angle	–	25°
▪ Rotor cavity	To fit 15 ml (17 mm) conical bottom tubes	To fit 15 ml (17 mm) conical bottom tubes
▪ Maximum speed	4,000 g	10,000 g*

* Please note, devices with membrane MWCO >100 kDa need to be processed at lower g forces.
  See data sheets for details.

Ordering Information

Vivaspin 6 Polyethersulfone	Pack Size	Prod. No.
3,000 MWCO	25	VS0691
3,000 MWCO	100	VS0692
5,000 MWCO	25	VS0611
5,000 MWCO	100	VS0612
10,000 MWCO	25	VS0601
10,000 MWCO	100	VS0602
30,000 MWCO	25	VS0621
30,000 MWCO	100	VS0622
50,000 MWCO	25	VS0631
50,000 MWCO	100	VS0632
100,000 MWCO	25	VS0641
100,000 MWCO	100	VS0642
300,000 MWCO	25	VS0651
300,000 MWCO	100	VS0652
1,000,000 MWCO	25	VS0661
1,000,000 MWCO	100	VS0662
0.2 µm	25	VS0671
0.2 µm	100	VS0672
Starter pack (5 of each 5 k, 10 k, 30 k, 50 k, 100 k)	25	VS06S1

Vivaspin 15

2–15 ml Samples

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.

In a single spin, 15 ml solutions can be concentrated up to 300 *f*. Samples can be typically concentrated in 10–30 minutes with macromolecular recoveries in excess of 95%. The longitudinal membrane location and adjacent thin channel, provide optimum cross flow conditions even for particle laden solutions, the centrifugal force pulling particles and solids away from the membrane to the bottom of the device. Macromolecules collect in an impermeable 50 µl concentrate pocket integrally moulded below the membrane surface, thereby eliminating the risk of filtration to dryness**.**

Technical Specifications Vivaspin 15

Concentrator capacity	Swing bucket rotor	15 ml
	Fixed angle rotor	8 ml
Dimensions	Total length	76 mm
	Width	25.5 mm
	Active membrane area	4 cm²
	Hold up volume of membrane	< 20 µl
	Dead stop volume	50 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polypropylene
	Concentrator cap	Polycarbonate
	Membrane	Polyethersulfone

Equipment Required Vivaspin 15

Centrifuge

▪ Rotor type	Swing bucket	Fixed angle
▪ Minimum rotor angle	–	25°
▪ Rotor cavity	To fit 50 ml (17 mm) conical bottom tubes	To fit 50 ml (17 mm) conical bottom tubes
▪ Maximum speed	3,000 g*	3,000 g

* Please note, devices with membrane MWCO >100 kDa need to be processed at lower g forces.
  See data sheets for details.

Ordering Information – Requires 50 ml Centrifuge Tubes

Vivaspin 15 Polyethersulfone	Pack Size	Prod. No.
5,000 MWCO	10	VS1511
5,000 MWCO	40	VS1512
10,000 MWCO	10	VS1501
10,000 MWCO	40	VS1502
30,000 MWCO	10	VS1521
30,000 MWCO	40	VS1522
50,000 MWCO	10	VS1531
50,000 MWCO	40	VS1532
100,000 MWCO	10	VS1541
100,000 MWCO	40	VS1542
Starter pack (2 of each 5 k, 10 k, 30 k, 50 k, 100 k)	10	VS15S1

Accessories

Conical bottom 50 ml tubes and lids	100	VSA001
Conical bottom 50 ml tubes and lids	40	VSA002

Vivaspin 15R

2–15 ml Samples

Vivaspin 15R is the latest member of the Vivaspin product family with all the unique features of Sartorius Stedim Biotech 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 Ig fractions.

- Ultimate recovery at low adsorption (95-98%)
- Extremely short concentration time (30 *f* in 15 min.)
- Convenient application protocol with easy handling
- Easy scale-up to Vivaflow 200 with Hydrosart® membrane for volumes up to 5 litres
- Very small hold up volume (< 20 µl)

Technical Specifications Vivaspin 15R

Concentrator capacity	Swing bucket rotor	15 ml
	Fixed angle rotor	12.5 ml
Dimensions	Total length	116 mm
	Width	30 mm
	Active membrane area	3.9 cm²
	Hold up volume of membrane	< 20 µl
	Dead stop volume	30 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polypropylene
	Concentrator cap	Polycarbonate
	Membrane	Hydrosart®

Equipment Required Vivaspin 15R

Centrifuge

Rotor type	Swing bucket	Fixed angle
Minimum rotor angle	–	25°
Rotor cavity	To fit 50 ml (30 mm) conical bottom tubes	To fit 50 ml (30 mm) conical bottom tubes
Maximum speed	3,000 g	6,000 g

Ordering Information

Vivaspin 15R Hydrosart®	Pack Size	Prod. No.
2,000 MWCO	12	VS15RH91
2,000 MWCO	48	VS15RH92
5,000 MWCO	12	VS15RH11
5,000 MWCO	48	VS15RH12
10,000 MWCO	12	VS15RH01
10,000 MWCO	48	VS15RH02
30,000 MWCO	12	VS15RH21
30,000 MWCO	48	VS15RH22

Vivaspin 20

5–20 ml Samples

Vivaspin 20 ml 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 100 *f* 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.

More Process Flexibility

Vivaspin 20 is available with unique accessories and operating methods that are designed to provide more process flexibility and further time saving.

Gas Pressure Filtration

When an appropriate centrifuge is unavailable, or for single sample processing, Vivaspin 20 can be filled with up to 15 ml and then pressurised for bench top concentration. For even faster processing, gas pressure can be combined with centrifugal force. "Pressure-fugation" is particularly suitable for difficult or viscous samples such as serum, or when using a low process temperature which reduces filtration speed, and generally when minimum process time is essential.

Technical Specifications Vivaspin 20

Concentrator capacity	Swing bucket rotor	20 ml
	Fixed angle rotor	14 ml
	With pressure head	15 ml
Dimensions	Total length	116 mm
		125 mm with pressure head
	Width	30 mm
	Active membrane area	6.0 cm²
	Hold up volume of membrane	< 20 µl
	Dead stop volume	50 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polycarbonate
	Concentrator cap	Polypropylene
	Pressure head	Acetal⏐aluminium
	Membrane	Polyethersulfone

Using the Vivaspin 20 pressure cap

pressurise
up to 5 bar with air or inert gas

either

spin
up to 3,000 *f* g

or

stand in rack

then recover
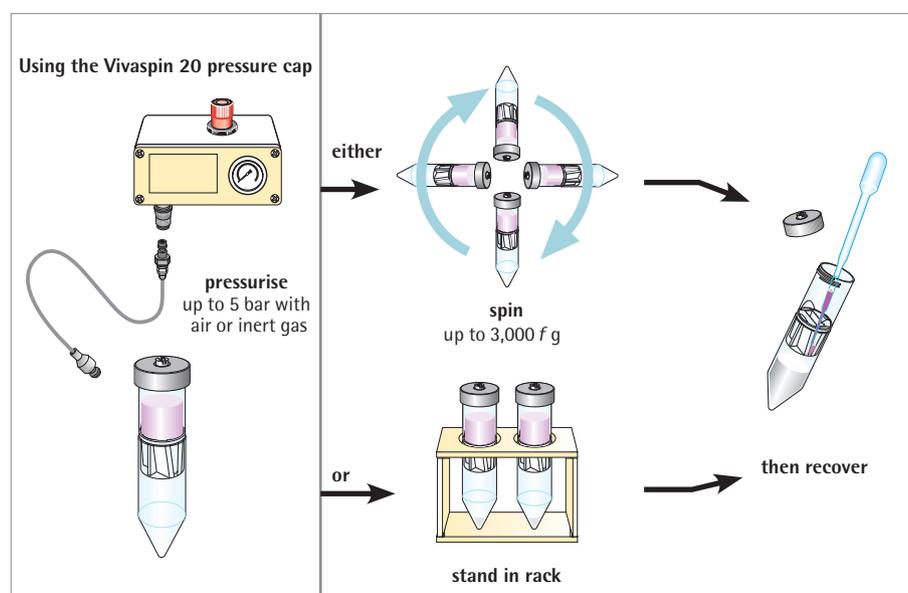
Desalting with Vivaspin 20

In this procedure following concentration, a diafiltration cup is filled with buffer and then spun one time to achieve 98% salt removal. This compares to the need for two spins to achieve the same result with the traditional refill and re-spin procedure.

The improved performance is due to the constant washing action of the buffer solution in the diafiltration cup as it replaces solvent and salts as they pass through the ultrafiltration membrane.

Desalting of Concentrated Sample

Diafiltration cup is filled with buffer solution

Solvent in sample is continuously replaced by fresh buffer solution

Remaining salts and contaminants are progressively cleared through membrane

Equipment Required Vivaspin 20

Centrifuge

	Swing bucket	Fixed angle
Rotor type	Swing bucket	Fixed angle
Minimum rotor angle	–	25°
Rotor cavity	To fit 50 ml (30 mm) conical bottom tubes	To fit 50 ml (30 mm) conical bottom tubes
Maximum speed	5,000 g*	8,000 g*

Optional Pressure Accessories

Air pressure controller (APC) complete with pressure gauge, regulator, over-pressure safety valve, female connector to Sartorius Stedim Biotech pressure products and 1 m extension line (4 mm pneumatic tubing) with male and female connectors and 1 m of 6 mm inlet tubing   Prod no. VCA002

Charge valve   Prod. no. VCA005
VS20 pressure head   Prod. no. VCA200

* Please note, devices with membrane MWCO >100 kDa need to be processed at lower g forces. See data sheets for details.
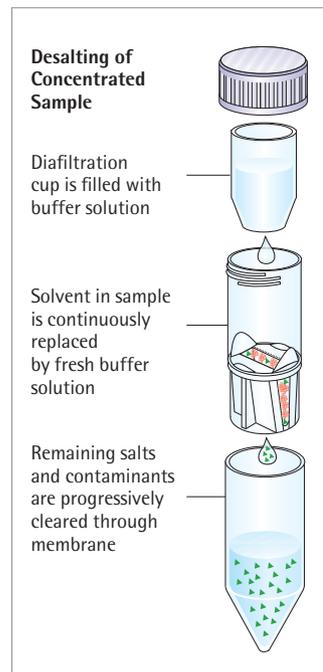
Ordering Information

Vivaspin 20 Polyethersulfone	Pack Size	Prod. No.
3,000 MWCO	12	VS2091
3,000 MWCO	48	VS2092
5,000 MWCO	12	VS2011
5,000 MWCO	48	VS2012
10,000 MWCO	12	VS2001
10,000 MWCO	48	VS2002
30,000 MWCO	12	VS2021
30,000 MWCO	48	VS2022
50,000 MWCO	12	VS2031
50,000 MWCO	48	VS2032
100,000 MWCO	12	VS2041
100,000 MWCO	48	VS2042
300,000 MWCO	12	VS2051
300,000 MWCO	48	VS2052
1,000,000 MWCO	12	VS2061
1,000,000 MWCO	48	VS2062
0.2 µm	12	VS2071
0.2 µm	48	VS2072
Starter pack (2 of each 5 k, 10 k, 30 k, 50 k, 100 k, 0.2 µm)	12	VS20S1

Vivaspin 20 Accessories

Air pressure controller (APC)	1	VCA002
Charge valve for pressure head	1	VCA005
Diafiltration cups	12	VSA005
Female connector	1	VCA010
Male connector	1	VCA011
4 mm OD pneumatic tube (3 m)	1	VCA012
Vivaspin 20 pressure head	1	VCA200

Vivaclear Centrifugal Filters

Vivaclear centrifugal filters are disposable microfiltration devices for the fast and reliable clarification|filtration of biological samples in the range 100 µl to 500 µl. They can be used in fixed angle rotors accepting 2.2 ml centrifuge tubes.

Product Features
- High-flux Polyethersulphone membrane
- 0.8 µm pore size
- Low hold up volume (< 5 µl)
- Fast and reproducible performance

Applications
- Clarification of samples before loading onto Vivapure® protein purification spin columns
- Removal of particles and participates
- Filtration of plasma and serum
- Filtration of cells or cell debris

Technical Specifications

Rotor	40–45° Fixed angle rotor 500 µl
Pore size	0.8 µm
Dimensions	Total length 43 mm Filtrate collection tube diameter 11 mm Active membrane area 0.34 cm^2 Hold-up volume, membrane plus support < 5 µl Maximum RCF 2,000 f g
Materials of construction	Body Polypropylene Membrane Polyethersulphone Filtrate collection tube Polypropylene

Ordering Information

Ordering Information	Pack Size	Cat. No
Vivaclear Mini 0.8 µm PES	100	VK01P042

Vivacell 70

10–70 ml Samples
Vivacell 70 combines the ease of use of centrifugal devices with the flexibility and control provided by pressurised ultrafiltration cells. Vivacell 70 is inexpensive, quick and easy to assemble, requires no tubing connections or stirring mechanisms and can be adapted to equipment availability or to specific user preferences.

For convenience, simply spin in a large capacity centrifuge (rotors accepting 250 ml bottles). For highest speeds particularly with difficult samples, pressurise the device with air or inert gas before centrifuging.

For more process control or for single samples, combine gas pressure with a gentle orbital shake, or you can even pressurise and then leave standing on a bench top or in a refrigerator for highest simplicity with minimum equipment requirements.

The longitudinal membrane inhibits fouling, whilst the built-in dead stop will hinder further concentration when residual volume drops below 150 µl.
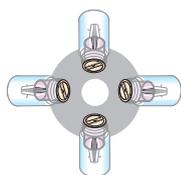
Centrifuge
- Process convenience
- Low shear, no foaming
- Less visual control
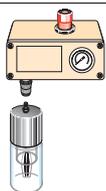
Pressurise
- Simplicity and highest process control
- Ideal for refrigerated use
- Slower concentrations
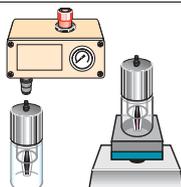
Pressure–shake
- Speed and process control
- Ideal for single samples
- If left unattended can concentrate to dryness
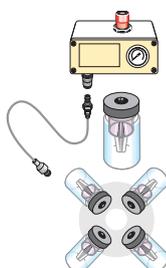
Pressure–fuge
- Fastest processing
- Ideal with low MWCO or with difficult solutions
- Less visual control

Technical Specifications Vivacell 70

Concentrator capacity	Swing bucket rotor	70 ml
	Fixed angle rotor	50 ml
	With pressure head	70 ml
	With pressure-fuge head	50 ml
Dimensions	Total length	119 mm standard centrifugal
		185 mm with pressure head
		125 mm with pressure fuge head
	Width	62 mm
	Active membrane area	20 cm^2
	Hold up volume of membrane	< 200 µl
	Dead stop volume	150 µl
Operating requirements	Rotor type	Swing bucket or fixed angle
	Minimum rotor angle	25˚
	Rotor cavity	To fit 250 ml (62 mm) centrifuge bottles
	Maximum speed	1,000 g
	Maximum pressure	5 bar|75 psi
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polycarbonate
	Concentrator cap	Santoprene
	Pressure head|pressure fuge head	Acetal
	Membrane	Polyethersulfone

Total Process Flexibility

Centrifugal mode swing-out rotors

Centrifugal mode fixed-angle rotors modified cap

Pressure mode bench top

Pressure mode centrifuge
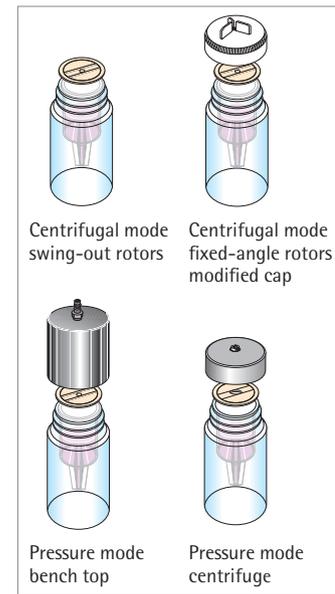
Ordering Information

Vivacell 70 Polyethersulfone – Concentrator Bodies with Polycarbonate Filtrate Bottles	Pack Size	Prod. No.
5,000 MWCO	2	VS6011
10,000 MWCO	2	VS6001
30,000 MWCO	2	VS6021
50,000 MWCO	2	VS6031
100,000 MWCO	2	VS6041
0.2 μm	2	VS6071

Vivacell 70 Polyethersulfone – Concentrator Body Only		
5,000 MWCO	10	VS6012
10,000 MWCO	10	VS6002
30,000 MWCO	10	VS6022
50,000 MWCO	10	VS6032
100,000 MWCO	10	VS6042
0.2 μm	10	VS6072

Vivacell 70 Accessories		
Air pressure controller (APC) complete with pressure gauge, regulator, over-pressure safety valve, female connector to Sartorius Stedim Biotech pressure products and 1 m extension line (4 mm pneumatic tubing) with male and female connectors and 1 m of 6 mm inlet tubing	1	VCA002
250 ml centrifuge bottle – standard caps	4	VSA003
Modified caps for use in fixed angle rotors with 250 ml centrifuge bottles	2	VCA004
Charge valve for pressure-fuge head	1	VCA005
Replacement seals for pressure-fuge head (VCA701)	10	VCA007
Female connector	1	VCA010
Male connector	1	VCA011
4 mm pneumatic tubing (3 m)	1	VCA012
Vivacell 70 pressure head with reservoir and filtrate bottle (bench top use)	1	VCA700
Vivacell 70 pressure-fuge head (for use in centrifuge)	2	VCA701

Vivacell 100

20–100 ml Samples

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

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

Vivacell 100 is designed for centrifugal concentration of samples up to 100 ml which makes it the largest centrifugal unit available. At the same time, the new construction design allows for maximum centrifugal force of 4,000 *f* g to be used for even faster concentration.

Vivacell 100 Utilizes:

- Pressure
- Centrifuge
- Pressure-shake

Vivacell 100, when used as a centrifugal device, fits only into swing bucket rotors accepting 250 ml bottles.

Vivacell 100 units can also be used for single or extremely sensitive samples in the pressurized mode only and left on the bench or placed on a laboratory shaker for faster concentration. It can also be kept in a pressurized mode in the refrigerator. Handling is made easy by use of quick connectors. In whichever mode Vivacell 100 is used, the vertical membrane design inhibits membrane fouling while the built-in dead stop impedes concentration to dryness and loss of sample.

Technical Specifications Vivacell 100

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

Quick release connector

Pressure head

Concen-
trator cap

Santoprene
seal

Graduations

Twin vertical
membranes

Concen-
trator

50
40
30
20

Filtrate container fits
standard 250 ml rotors

Centrifuge
- Process convenience
- Low shear, no foaming
- Less visual control

Pressure
- Simplicity and highest process control
- Ideal for refrigerated use
- Slower concentrations

Pressure–shake
- Speed and process control
- Ideal for single samples

▪ Protein Concentration | **Ultrafiltration & Sample Preparation**
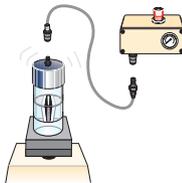
Ordering Information

Vivacell 100 Polyethersulfone with Polypropylene Concentrator Cap	Pack Size	Prod. No.
5,000 MWCO	2	VC1011
5,000 MWCO	10	VC1012
10,000 MWCO	2	VC1001
10,000 MWCO	10	VC1002
30,000 MWCO	2	VC1021
30,000 MWCO	10	VC1022
50,000 MWCO	2	VC1031
50,000 MWCO	10	VC1032
100,000 MWCO	2	VC1041
100,000 MWCO	10	VC1042
300,000 MWCO	2	VC1051
300,000 MWCO	10	VC1052
1,000,000 MWCO	2	VC1061
1,000,000 MWCO	10	VC1062
0.2 µm	2	VC1071
0.2 µm	10	VC1072

Accessories	Pack Size	Prod. No.
Air pressure controller (APC) complete with pressure gauge, regulator, over-pressure safety valve, female connector, 1 m extension line (4 mm pressure tubing) with male and female connectors and 1 m of 6 mm inlet tubing	1	VCA002
Plastic pipettes	100	VPA005
Female connector	1	VCA010
Male connector	1	VCA011
4 mm pressure tubing (3 m)	1	VCA012
Santoprene replacement seals	10	VCA014
Vivacell 100 pressure head with replacement seals (5)	1	VCA800

Vivacell 250

Screw Closure

Quick connect check valve

Combined pressure indicator and safety valve

Membrane module takes seconds to replace

Unique conical base allows concentrations to under 1 ml

Concentrate inspection window
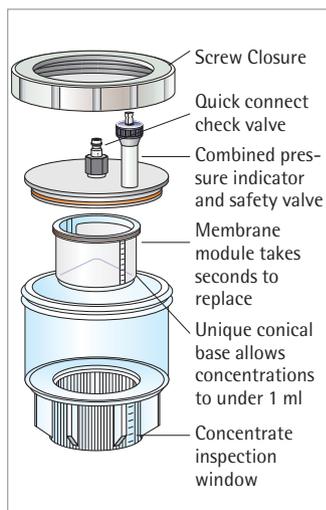
50–250 ml Samples
The Vivacell 250 is a totally new concept for the concentration of larger biological samples. This product offers numerous advantages when compared to stirred cells.

- One size handles a volume range from under 50 ml to 250 ml.
- Use free standing on a bench top or in a refrigerator for maximum simplicity, or use on laboratory shaker for fastest concentrations.
- The unique conical dead stop built into the bottom of the membrane insert allows concentrations to under 1 ml.
- The gentle vortex action controls membrane polarisation whilst greatly reducing the shear effects typical of stirring mechanisms.
- Set up or membrane replacement takes just a few seconds. Quick connect fittings and simple screw closure further enhance ease of use.

Unique membrane module takes seconds to replace. Concentrate can be easily monitored through the graduated inspection window.

Technical Specifications Vivacell 250

Concentrator capacity	250 ml	
Max pressure	4 bar|60 psi	
Dimensions	Width	116 mm
	Height (incl. pressure indicator)	235 mm
	Active membrane area	40 cm²
	Hold-up vol. memb. & support	< 200 µl
	Dead stop volume	600 µl
Materials of construction	Screw closure	Acetal
	Pressure head	Acetal
	Quick release connector	Acetal
	Concentrator body|sleeve	Polycarbonate
	Filtrate container	Polycarbonate

Ordering Information

Vivacell 250	Pack Size	Prod. No.
Vivacell 250 complete with pressure head, pressure indicator|over-pressure release valve, quick release connection to APC, 2 sample reservoirs, filtrate container & insert tool	1	VCA25

Vivacell 250 Polyethersulfone Inserts		
5,000 MWCO	5	VC2511
10,000 MWCO	5	VC2501
30,000 MWCO	5	VC2521
50,000 MWCO	5	VC2531
100,000 MWCO	5	VC2541
0.2 µm	5	VC2571
Starter kit (1 of each 5 k, 10 k, 30 k, 50 k, 100 k)	5	VC25S1

Accessories		
Air pressure controller (APC) complete with pressure gauge, regulator, over-pressure safety valve, female connector to Sartorius Stedim Biotech pressure products and 1 m extension line (4 mm pneumatic tubing) with male and female connector and 1 m of 6 mm inlet tubing	1	VCA002
Replacement pressure indicator|over-pressure relief valve	1	VCA008
Vivacell 250 maintenance kit (includes one sample reservoir and filtrate container, and O-ring seals for pressure head)	1	VCA009
Female connector	1	VCA010
Male connector	1	VCA011
4 mm OD pressure tubing (3 m)	1	VCA012
Replacement pressure head & screw closure	1	VCA015

Vivaflow 50

Multiple modules

Single module

Filtrate vessel

Sample | diafiltration
reservoir (VFA006)
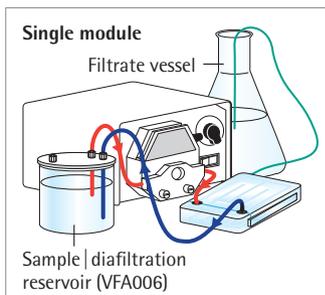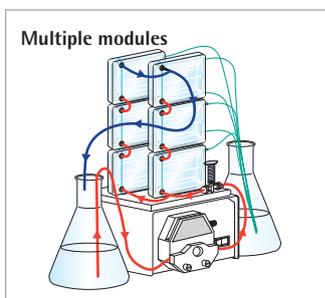
100 ml to 5 Litres

The novel Vivaflow 50 system (patents pending) provides a standard of ease of use, performance, flexibility and economy which is unrivalled by any laboratory or pilot scale filtration system on the market.

Unique Features

- Thin channel flip-flow recirculation path provides high cross flow velocities with minimum pump requirements.
- No need for pressure holders.
- Crystal clear for simple control of remaining hold up and membrane status.
- Unique Interlocking modules with series connectors for easy scale up.
- Disposable.

Unique Performance

- A single 50 cm² module will typically reduce 500 ml to less than 15 ml in under 50 minutes.
- Less than 10 ml minimum system recirculation for highest concentrations.
- Less than 500 µl non recoverable hold up volume.
- Near total recoveries achievable with a single 10 ml rinse.

Unique "flip-flow" thin channel flow path results in high turbulence and linear velocity for exceptional flux even at high concentrations

Technical Specifications Vivaflow 50

Dimensions	Overall L f H f W	107 f 84 f 25 mm
	Channel W f H	15 f 0.3 mm
	Active membrane area	50 cm²
	Hold up volume (module)	1.5 ml
	Minimum recirculation volume	< 10 ml
	Non recoverable hold-up	< 0.5 ml
Operating conditions	Pump flow	200-400 ml/min
	Maximum pressure	3 bar|45 psi
	Maximum temperature	60 ˚C
Materials of construction	Main housing	Polycarbonate
	Flow channel	TPX (PMP)
	Membrane support	TPX (PMP)
	Seals and O-rings	Silicone
	Pressure indicator	Polypropylene, SS spring
	Flow restrictor	Polypropylene
	Fittings	Nylon
	Tubing	PVC (medical grade)

Ordering Information

Vivaflow 50 Modules Include Filtrate Tube, Size 16 Peristaltic Tubing, Flow Restrictor and Fittings	Pack Size	Prod. No.
3,000 MWCO PES	2	VF05P9
5,000 MWCO PES	2	VF05P1
10,000 MWCO PES	2	VF05P0
30,000 MWCO PES	2	VF05P2
50,000 MWCO PES	2	VF05P3
100,000 MWCO PES	2	VF05P4
1,000,000 MWCO PES	2	VF05P6
0.2 µm PES	2	VF05P7
10,000 MWCO RC	2	VF05C0
100,000 MWCO RC	2	VF05C4

Vivaflow 50 Complete System Comprises

Pump (240 V), Easy load pump head (size 16), tubing, 500 ml sample|diafiltration reservoir, module stand, pressure indicator, T connectors, series interconnectors	1	VFS502
Pump (115 V), Easy load pump head (size 16), tubing, 500 ml sample|diafiltration reservoir, module stand, pressure indicator, T connectors, series interconnectors	1	VFS504

Vivaflow 50 PVC Tubing and Fittings

Size 16 PVC pump tubing (3 metres, 3.2 f 1.6 mm)	VFA004
Flow restrictor set (2 f 0.4, 0.6 and 0.8 mm)	VFA009
T connectors for running 2 stacks (2 pieces)	VFA030
Series interconnectors (6 pieces)	VFA031
Female luer fittings (10 pieces)	VFA032
VF50 tubing Kit (2 f 1 m size 16 PVC tubing with inlet fittings, 2 f 50 cm size 16 PVC tubing with 0.6 mm flow restrictors, 1 f series interconnector)	VFA034
Flow restrictor 0.6 mm (6 pieces)	VFA035

VivaFlow 50 Accessories

Masterflex economy drive variable speed peristaltic pump (240 V)	VFP001
Masterflex economy drive variable speed peristaltic pump (115 V)	VFP002
500 ml sample and|or diafiltration reservoir	VFA006
Masterflex easy load pump head – size 16	VFA012
Vivaflow 50 stand	VFA016
Pressure indicator (1–3 bar)	VFA020

Vivaflow 200

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

Near total sample recoveries can be expected with most solutions.

The economical standard package comes complete with tubing, pressure indicator, flow restrictor and high pressure pump tubing. All you need is a peristaltic pump capable of handling 6.4 mm OD (size 16) tubing. Should your pump head require larger tubing, link your own peristaltic tube up to the standard product, using the interconnector provided.

Two modules in parallel will concentrate 5 litres in under 75 minutes

Vivaflow 200 Set-up for Diafiltration

Technical Specifications Vivaflow 200

Dimensions	Overall L *f* H *f* W	126 *f* 138 *f* 38 mm
	Channel W *f* H	10 *f* 0.4 mm
	Active membrane area	200 cm²
	Hold up volume (module)	5.3 ml
	Min. recirculation volume	< 20 ml
	Non recoverable hold-up	< 2 ml
Materials of construction	Main housing	Acrylic
	Flow channel	Acrylic
	Membrane support	Polypropylene
	Seals and O-rings	Silicone
	Pressure indicator	Polypropylene, SS spring
	Flow restrictor	Polypropylene
	Fittings	Nylon
	Tubing	PVC (medical grade)
Operating conditions	Pump flow	200-400 ml/min
	Maximum pressure	4 bar⏐60 psi
	Maximum temperature	60 ˚C

Ordering Information

Vivaflow 200 Modules Include Pressure Indicator, Flow Restrictor and Size 16 PVC Peristaltic Tubing and Fittings	Pack Size	Prod. No.
2,000 MWCO Hydrosart®	1	VF20H9
3,000 MWCO PES	1	VF20P9
5,000 MWCO PES	1	VF20P1
10,000 MWCO PES	1	VF20P0
30,000 MWCO PES	1	VF20P2
50,000 MWCO PES	1	VF20P3
100,000 MWCO PES	1	VF20P4
0.2 µm PES	1	VF20P7
10,000 MWCO RC	1	VF20C0
100,000 MWCO RC	1	VF20C4
5,000 MWCO Hydrosart®	1	VF20H1
10,000 MWCO Hydrosart®	1	VF20H0
30,000 MWCO Hydrosart®	1	VF20H2

Operation – Single Module

Operation – Two Modules

Vivaflow 200 Complete System Comprises

Pump (240 V), Easy load pump head (size 16), tubing, 500 ml sample|diafiltration reservoir	1	VFS202
Pump (115 V), Easy load pump head (size 16), tubing, 500 ml sample|diafiltration reservoir	1	VFS204

Vivaflow 200 Accessories

Masterflex economy drive variable speed peristaltic pump (240 V)	VFP001
Masterflex economy drive variable speed peristaltic pump (115 V)	VFP002
500 ml sample and|or diafiltration reservoir	VFA006
Masterflex easy load pump head – size 16	VFA012
Masterflex easy load pump head – size 15	VFA013

Vivaflow 200 Tubing and Fittings

Size 15 pvc pump tubing and Luer fittings (3 m, 4.8 f 2.6 mm)	VFA003
Size 16 pvc pump tubing and Luer fittings (3 m, 3.2 f 1.6 mm)	VFA004
Y connector (size 15 to 2 f size 16)	VFA005
Flow restrictor set (2 f 0.4, 0.6 and 0.8 mm)	VFA009
Female luer fittings size 16 (10 pieces)	VFA032
Flow restrictors 0.6 mm (6 pieces)	VFA035
Female luer fittings size 15 (10 pieces)	VFA036
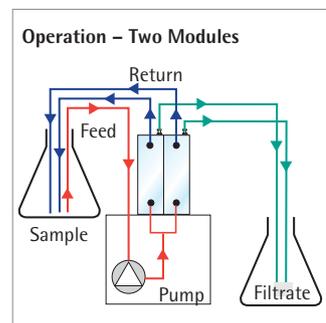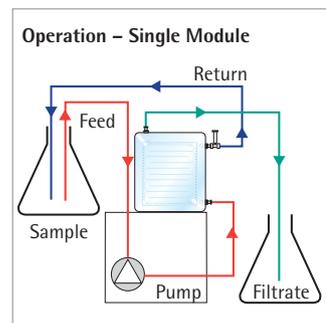
Vivapore Solvent Absorption Concentrators

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.

Just fill the unit with the solution to be concentrated, wait for the desired concentration level to be achieved and then pipette the concentrated sample from the bottom of the 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.
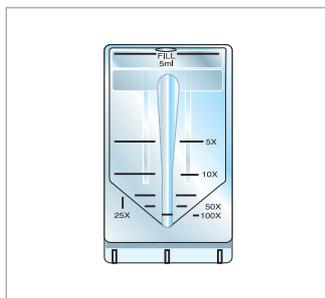
Vivapore 5
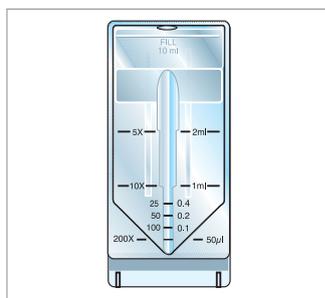
Vivapore 10|20

Technical Specifications

	Vivapore 5	Vivapore 10|20
Membrane material	PES	PES
Membrane MWCO	7,500	7,500
Membrane surface area	20 cm^2	28 cm^2
Reservoir material	SAN	SAN
Volume range	1–5 ml	2–10 ml | 20 ml*
Minimum concentrate volume	50 µl	50 µl
Vivapore overall dimensions Width [mm] Height [mm]	42 82	46 100

Ordering Information

Vivapore 5
Includes Stand and Recovery Pipettes

7,500 MWCO PES	4	VP0503
7,500 MWCO PES	30	VP0501

Requires Stand

7,500 MWCO PES	100	VP0502

Vivapore 10|20
Includes Stand and Recovery Pipettes

7,500 MWCO PES	4	VP2003
7,500 MWCO PES	30	VP2001

Requires Stand

7,500 MWCO PES	100	VP2002

Vivapore Accessories

Disposable stands for 4 units	6	VPA002
Plastic recovery pipettes (Vivapore 10|20)	100	VPA005
10 ml expansion reservoir (Vivapore 10|20)	10	VPA006
Plastic recovery pipettes (Vivapore 5)	100	VPA007

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/cm²
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/cm²
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/cm²
Protein retention	Cytochrome C	99%

Order numbers see next page.

Order Numbers for Polyethersulfone Membrane Filters, Type 146

25 mm diameter	14629—25------D	5,000 NMGT (MWCO), pack of 10
	14639—25------D	10,000 NMGT (MWCO), pack of 10
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
63 mm diameter	14629—63------D	5,000 NMGT (MWCO), pack of 10
	14639—63------D	10,000 NMGT (MWCO), pack of 10
	14659—63------D	30,000 NMGT (MWCO), pack of 10
	14668—63------D	100,000 NMGT (MWCO), pack of 10
76 mm diameter	14629—76------D	5,000 NMGT (MWCO), pack of 10
	14639—76------D	10,000 NMGT (MWCO), pack of 10

Order Numbers for Cellulose Triacetate Membrane Filters, Type 145

43 mm diameter	14549—43------D	20,000 NMGT (MWCO), pack of 10
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
50 mm diameter	14539—50------D	10,000 NMGT (MWCO), pack of 10

Order Numbers for Regenerated Cellulose Membrane Filters, Type 144

25 mm diameter	14429—25------D	5,000 NMGT (MWCO), pack of 10
	14439—25------D	10,000 NMGT (MWCO), pack of 10
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
63 mm diameter	14429—63------D	5,000 NMGT (MWCO), pack of 10
	14439—63------D	10,000 NMGT (MWCO), pack of 10
	14459—63------D	30,000 NMGT (MWCO), pack of 10
76 mm diameter	14429—76------D	5,000 NMGT (MWCO), pack of 10
	14439—76------D	10,000 NMGT (MWCO), pack of 10

Vivacon® 500
For DNA Sample Desalting and Concentration

Reproducible DNA and Protein Sample Desalting and Concentration
Vivacon® 500 centrifugal concentrators offer the optimal solution for DNA and protein concentration and buffer exchange applications. For optimal performance with very dilute samples, e.g. forensic samples, Vivacon® 500 is equipped with the patented regenerated cellulose membrane Hydrosart®.

High recoveries and excellent reproducibilities are paired with convenience offered by molecular weight cut-off printed on individual devices.

The possibility of a re-spin after sample processing assures complete concentrate recovery which is especially important when working with low sample concentrations.

New: Vivacon® 500-PCR Grade
When using DNA amplification technologies, any traces of DNA originating from the equipment have to be eliminated.

Vivacon® 500-PCR Grade units are treated with ethylene oxide (ETO) in a validated process in order to deactivate all traces of DNA that might interfere with subsequent amplification procedures.

Technical Specifications Vivacon® 500

Concentrator capacity	Fixed angle rotor	0.5 ml
Dimensions	Total length (concentration)	45 mm
	Total length (back spin)	47.5 mm
	Width	12.4 mm
	Active membrane area	0.32 cm²
	Hold up volume of membrane and support	< 5 µl
	Dead stop volume (40° rotor)	5 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polypropylene
	Membrane	Hydrosart®

Conversion Table for Hydrosart® MWCO to Nucleotide Cut-off

Membrane	MWCO	Double-Stranded Nucleotide Cut-off [bp]
Hydrosart®	2 kDa	> 10
Hydrosart®	10 kDa	> 30
Hydrosart®	30 kDa	> 50
Hydrosart®	50 kDa	> 300
Hydrosart®	100 kDa	> 600

Ordering Information

Vivacon® 500	Pack Size	Prod. No.
2,000 MWCO	25	VN01H91
2,000 MWCO	100	VN01H92
10,000 MWCO	25	VN01H01
10,000 MWCO	100	VN01H02
30,000 MWCO	25	VN01H21
30,000 MWCO	100	VN01H22
50,000 MWCO	25	VN01H31
50,000 MWCO	100	VN01H32
100,000 MWCO	25	VN01H41
100,000 MWCO	100	VN01H42

Vivacon® 500 Sample Pack	Pack Size	Prod. No.
Sample Kit L (4 units each of 2, 10 and 30 K)	12	VN01HL12
Sample Kit H (4 units each of 30, 50 and 100 K)	12	VN01HH12

Vivacon® 500–PCR Grade Sample Pack	Pack Size	Prod. No.
30,000 MWCO	4	VN01H2–SETO
50,000 MWCO	4	VN01H3–SETO
100,000 MWCO	4	VN01H4–SETO

Vivacon® 500–PCR Grade	Pack Size	Prod. No.
30,000 MWCO	25	VN01H21ETO
30,000 MWCO	100	VN01H22ETO
30,000 MWCO	500	VN01H23ETO
50,000 MWCO	25	VN01H31ETO
50,000 MWCO	100	VN01H32ETO
50,000 MWCO	500	VN01H33ETO
100,000 MWCO	25	VN01H41ETO
100,000 MWCO	100	VN01H42ETO
100,000 MWCO	500	VN01H43ETO

Vivacon® 2
For DNA Sample Desalting and Concentration

Reproducible DNA Sample Desalting and Concentration

Vivacon® 2 centrifugal concentrators offer the optimal solution for DNA and protein concentration and buffer exchange applications. For optimal performance with very dilute samples, e.g. forensic samples, Vivacon® 2 is equipped with the patented regenerated cellulose membrane Hydrosart®.

High recoveries and excellent reproducibilities are paired with convenience offered by volume graduation and molecular weight cut-off printed on individual devices.

The possibility of a re-spin after sample processing assures complete concentrate recovery which is especially important when working with low sample concentrations.

New: Vivacon® 2–PCR Grade

Vivacon® 2-PCR Grade units are treated with ethylene oxide (ETO) in a validated process in order to deactivate all traces of DNA that might interfere with subsequent amplification procedures.

Technical Specifications

Concentrator capacity	Fixed angle rotor	2 ml
Dimensions	Total length (Concentration)	125 mm
	Total length (Back-spin)	115 mm
	Width	16 mm
	Active membrane area	0.95 cm^2
	Hold-up volume membrane and support	10 µl
	Dead stop volume (25° rotor)	55 µl
Materials of construction	Body	Polycarbonate
	Filtrate vessel	Polypropylene
	Back spin vial	Polypropylene
	Concentrator cap	Polypropylene
	Membrane	Hydrosart®

Ordering Information

Vivacon® 2	Pack Size	Prod. No.
2,000 MWCO	25	VN02H91
2,000 MWCO	100	VN02H92
2,000 MWCO	500	VN02H93
10,000 MWCO	25	VN02H01
10,000 MWCO	100	VN02H02
10,000 MWCO	500	VN02H03
30,000 MWCO	25	VN02H21
30,000 MWCO	100	VN02H22
30,000 MWCO	500	VN02H23
50,000 MWCO	25	VN02H31
50,000 MWCO	100	VN02H32
50,000 MWCO	500	VN02H33
100,000 MWCO	25	VN02H41
100,000 MWCO	100	VN02H42
100,000 MWCO	500	VN02H43

Vivacon® 2–PCR Grade	Pack Size	Prod. No.
30,000 MWCO	25	VN02H21ETO
30,000 MWCO	100	VN02H22ETO
30,000 MWCO	500	VN02H23ETO
50,000 MWCO	25	VN02H31ETO
50,000 MWCO	100	VN02H32ETO
50,000 MWCO	500	VN02H33ETO
100,000 MWCO	25	VN02H41ETO
100,000 MWCO	100	VN02H42ETO
100,000 MWCO	500	VN02H43ETO

Vivacon® 2–PCR Grade Sample Pack	Pack Size	Prod. No.
30,000 MWCO	4	VN02H2-SETO
50,000 MWCO	4	VN02H3-SETO
100,000 MWCO	4	VN02H4-SETO

Vivapure®
Ion Exchange Protein Purification Products
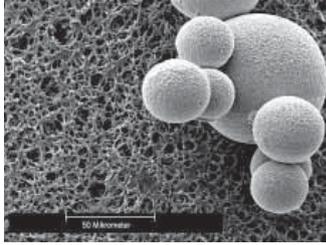
Chromatography gel beads (right) are shown on top of a membrane adsorber in this SEM picture. The membrane adsorber pores are over 50 f larger than bead pores.

Fast and Easy-to-use Spin Columns
Vivapure® Ion Exchange (IEX) spin columns are centrifugal devices, incorporating Sartobind® Membrane Adsorber technology as their chromatography matrix. Vivapure® IEX spin columns make protein purification as easy as filtration. The devices are ready-to-use and do not bear the risk of running dry. For many protein purification applications, they can replace time-consuming and tedious column chromatography.

The rapid 1-2-3 bind-wash-elute protocol especially lends itself to screening applications, where many different samples are processed in parallel.

The Sartobind® Membrane Adsorber Matrix
Sartobind® IEX membrane adsorbers are based on stabilized regenerated cellulose and display a microporous structure with a pore size of > 3 μm, which is orders of magnitude larger than conventional chromatographic gel materials. This allows molecules to be transported to the ligands immobilized on the membrane adsorber by convective flow, leading to very high flow rates.

Order No.	Kits	Quantity
VS-AVPQ020	Vivapure® AdenoPack 20	
VS-AVPQ022	Vivapure® AdenoPack 20 RT	
VS-AVPQ101	Vivapure® Adenopack 100	
VS-AVPQ102	Vivapure® Adeno PACK 100 RT*	
VS-AVPQ501	Vivapure® Adeno PACK 500	
VS-AVPQ502	Vivapure® AdenoPack 500 RT	
VS-LVPQ040	LentiSELECT 40	
90-KIT-01	Sartobind® Demo Kit	
1ZA---0004	Adapter UNF 10–32 to Luer male, PEEK	1
1ZA---0005	Adapter UNF 10–32 to Luer female, PEEK	1
17002---140	Pair of Luer adapters, black Tefzel M6 thread	2
16517----------E	Syringe filter holders, 25 mm diameter, polycarbonate for filter or adsorber membrane	12
16214	Syringe filter holder 25 mm diameter, stainless steel for filter or adsorber membrane	1

8 Strips│Spin Columns 1.4 mm Bed Height

Order No.	Vivawell	Quantity
VW08IS02	Vivawell 8 Strip S-IEX centrifugal purification strips	24 strips (2 plates)
VW08IQ02	Vivawell 8 Strip Q-IEX centrifugal purification strips	24 strips (2 plates)
VW08ID02	Vivawell 8 Strip D-IEX centrifugal purification strips	24 strips (2 plates)

Order No.	Vivapure® Mini Spin Columns	Spin Columns│ Centrifuge Tubes
VS-IX01SM24	Vivapure® S Mini M	24│48
VS-IX01SH24	Vivapure® S Mini H	24│48
VS-IX01QM24	Vivapure® Q Mini M	24│48
VS-IX01QH24	Vivapure® Q Mini H	24│48
VS-IX01DM24	Vivapure® D Mini M	24│48
VS-IX01DH24	Vivapure® D Mini H	24│48

Order No.	Vivapure® Maxi Spin Columns	Spin Columns│ Centrifuge Tubes
VS-IX20SM08	Vivapure® S Maxi M	8│16
VS-IX20SH08	Vivapure® S Maxi H	8│16
VS-IX20QM08	Vivapure® Q Maxi M	8│16
VS-IX20QH08	Vivapure® Q Maxi H	8│16
VS-IX20DM08	Vivapure® D Maxi M	8│16
VS-IX20DH08	Vivapure® D Maxi H	8│16

Related products for production
Sartobind® SingleSep capsules

* Vivapure® Adeno PACK RT does not contain Benzonase®

Vivawell 8-strip plate-300 µl
Binding capacity: 1 mg

Vivapure® Mini-400|500 µl
Binding capacities: 1–4 mg

Vivapure® Maxi-19|20 ml
Binding capacities: 15–80 mg

Available Formats

Vivapure® IEX Products	Application
Vivawell 8-strip plates	■ High throughput application, where larger capacities are needed (e.g. high throughput applications for Vivapure® Mini)
Vivapure® Mini Spin Columns	■ Sample fractionation ■ Purification condition scouting ■ Small scale purification
Vivapure® Maxi Spin Columns	■ Large scale sample fractionation ■ One step protein purification|concentration ■ Polishing of His-tagged protein

Membrane Availability

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

Performance Characteristics

Vivapure® Spin Columns	Protein Binding Capacity* [mg]	Max. Volume per Centrifuge Run Using a Swing–Out Rotor [ml]	Max. Volume per Centrifuge Using a Fixed Angle Rotor Run [ml]
Vivawell 8-strip	1	0.3	
Vivapure® Mini M	1	0.5	
Vivapure® Mini H	4	0.4	
Vivapure® Maxi M	15–20	20	10.5
Vivapure® Maxi H	60–80	19	10.5

* Actual yields depend on specific protein sample and selected pH and salt conditions. Yields established using 1 mg/ml BSA in 25 mM Tris/HCL pH 8.0 with Vivapure® Q & D spin columns and 1 mg/ml cytochrome c in 25 mM sodium acetate buffer pH 5.5 with Vivapure® S spin columns.

Typical Applications
■ Fractionation prior to further analysis e.g. 2D gels
■ Scouting purification conditions for new protein preparation protocols
■ Endotoxin removal
■ Polishing His-tagged proteins after metal chelate chromatography
■ Purification and concentration of proteins
■ Removal of heme moiety from heme containing proteins

Detailed application notes are available on our website: www.sartorius-stedim.com

Ordering Information

Prod. No.	Description	Spin Columns	Centrifuge Tubes
Vivapure® Mini Ion Exchange Spin Columns (up to 0.5 ml)			
VS–IX01SQ16	Vivapure® Mini S&Q H starter kit	16	32
VS–IX01DM24	Vivapure® D Mini M	24	48
VS–IX01DH24	Vivapure® D Mini H	24	48
VS–IX01QM24	Vivapure® Q Mini M	24	48
VS–IX01QH24	Vivapure® Q Mini H	24	48
VS–IX01SM24	Vivapure® S Mini M	24	48
VS–IX01SH24	Vivapure® S Mini H	24	48

	Vivapure® Maxi Ion Exchange Spin Columns (up to 20 ml)		
VS–IX20DH08	Vivapure® D Maxi H	8	16
VS–IX20QM08	Vivapure® Q Maxi M	8	16
VS–IX20QH08	Vivapure® Q Maxi H	8	16
VS–IX20SM08	Vivapure® S Maxi M	8	16
VS–IX20SH08	Vivapure® S Maxi H	8	16

Vivawell 8–Strip		Pack Size
VW08ID02	Vivawell 8-Strip D	24
VW08IS02	Vivawell 8-Strip S	24
VW08IQ02	Vivawell 8-Strip Q	24

Vivawell Vac Vacuum Manifold Systems

Vivawell Vac 96 set-up

Vivawell Vac 96

Vivawell Vac 8

Vivawell Vac 8-strip plate

New Vivawell Vac 8 and Vivawell Vac 96 Vacuum Manifold Systems

The new Vivawell-Vac vacuum manifolds have been designed specifically for use with Vivawell Vac 8-strip units and plates.

The extra long drip nozzles on the 8-strip outlet eliminate gaps between the sample flow and receiver wells. This direct stacking prevents cross talk between individual wells. Vivawell Vac 96 can be easily conficured for both flow-to-waste and analyte collection.

The system is easy to use with quick release fitting and can be run without initial set up time.

The Vivawell Vac 8 and 96 vacuum manifold features:
- Cross-talk free filtration due to extra long drip nozzels
- Configurations for 1 ml and 2 ml collection plates with adaptor

Specifications for Vivawell Vac 96

Manifold assembly	1
Quick release vacuum fitting	1
Control valve	1
Vacuum Tubing	1 m
Hose barb fitting	1
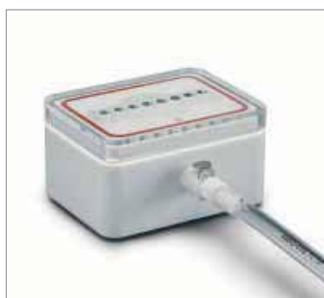
Materials of Construction

Manifold Base + Adaptor ring	Acetal
Manifold Top Plate	Anodised Aluminium
O-ring	Silicone
Quick release vacuum fitting	Acetal
Manifold dimensions W f D f H [mm]	144 f 102 f 71

Ordering information	Description	Pack Size
VW96VAC01	Vivawell Vac 96	1
VW96VAA02	Vivawell Vac 96 liquid trap and reservoir	1
VW96VAA03	96 deep well collection plate 1 ml (square wells)	25
VW96VAA04	96 deep well collection plate 2 ml (square wells)	25
VW96VAA05	Replacement seal for Vivawell Vac 96	1

Required Equipment

Vivawell Vac 96	■ Vivawell Vac 8-strip plate ■ Vacuum pump or vacuum source capable of applying vacuum at 10" Hg or higer

Specifications for Vivawell Vac 8

Manifold assembly	1
Quick release vacuum fitting	1
Control valve	1
Vacuum Tubing	1 m
Hose barb fitting	1
8-well collection strips (1.2 ml)	5
Single strip silicone gaskets	12

Materials of Construction

Manifold Base + Adaptor ring	Acetal
Manifold Top Plate	Clear acrylic
O-ring	Silicone
Quick release vacuum fitting	Acetal
Manifold dimensions W f D f H [mm]	105 f 80 f 58

Ordering Information	Description	Pack Size
VW08VAC01	Vivawell Vac 8	1
VW08VAA02	Vivawell Vac 8 liquid trap and reservoir	1
VW08VAA03	8 well collection strips 1.2 ml (round wells)	125
VW08VAA04	Replacement seal for Vivawell Vac8	1

Required Equipment

Vivawell Vac 8	■ Vivawell Vac 8-strip units
	■ Vacuum pump or vacuum source capable of applying vacuum at 10" Hg or higer

Vivawell Vac 8–Strip Plate

Vivawell Vac 8-strip plate

Vivawell Vac 8-strip plate
on Vivawell Vac 96

Vivawell Vac 8-strip on Vivawell Vac 8

- For use with Vivawell Vac Vacuum manifold systems
- Optimal for high-throughput applications
- Flexibility in number of samples to be processed

Vivawell Vac 8-strips feature a modular design of individual 8-strip units set into a 96-well frame. A silicone gasket seals the plate set-up of 12 individual 8-strip units, for vacuum processing.

For large sample quantities, the full plate set-up can be processed quickly with Vivawell Vac 96.

Using Vivawell Vac 8, individual 8-strips can be run for medium throughput applications.

The Vivawell Vac 8-strip IEX plate is available with two different membrane functionalities and can be processed as a 96-well plate with the Vivawell Vac 96 (VW96VAC01) or as indiviual 8-strips with the Vivawell Vac 8 (VW08VAC01).

Membrane Availability

Functional Groups	Ion Exchange Type
Sulphonic acid (S)	Strong acidic cation exchanger $R\text{-}CH_2\text{-}So_3^-Na^+$
Quaternary ammonium (Q)	Strong basic anion exchanger $R\text{-}CH_2\text{-}So_3^-Na^+\text{-}(CH_2)_2Cl^-$

Membrane Adsorber

Nominal pore size	3–5 µm (Large pore size prevents gel filtration effects and minimizes non-specific adsorption)
Thickness	230–320 µm
Amount of ionic groups (µ-Equivalents/ml)	145–218 µ-Equivalents/ml for monovalent ions (Q & S)
Working pH (Q&S)	2–12
Approximate pka of ionic groups	Q-11|S-1

Materials of Construction

Vivawell 8-strip IEX units	Polypropylene
Supporting matrix	Stabilized regenerated cellulose
Holding Frame	Polypropylene

Capacities and Dimensions

Device	Bed Volume [µl]	Membrane Area [cm²]
Vivawell Vac 8-strip	80	2.4

Ordering Information

Ordering Information	Description	Pack Size
VW08IQ02V	Vivawell Vac 8-strip Q-IEX purification strips	24
VW08IS02V	Vivawell Vac 8-strip S-IEX purification strips	24

Required Equipment

Vivawell Vac 8-strip IEX plate	■ Vivawell Vac manifold (VW96VAC01/VW08VAC01) ■ Vacuum pump or vacuum source capable of applying vacuum at 10" Hg or higer ■ Vivawell Vac system liquid trap

Vivapure® mini|maxiprep Protein A & G Spin Columns

Affinity purification of monoclonal antibodies has been largely confined to the use of Protein A and Protein G chromatography. The Vivapure® mini|maxiprep A & G kits are designed for simple, rapid antibody purification from serum, ascites and tissue culture supernatant such as those derived form static cultures and bioreactors. Vivapure® mini|maxiprep spin columns replace lengthy and expensive chromatographic methods such as FPLC.

Large numbers of samples can be processed in parallel. The low hold-up volume ensures high solute recovery with minimal non-specific absorptive losses.

The Vivapure® mini|maxiprep A & G Advantages
- Spin column based kits for fast results
- Parallel processing
- Different configurations to suit all needs
- Economical due to re-usability

Working with Samples > 20 ml

Accessory
For working with sample volumes larger than 20 ml, e.g. diluted cell culture supernatants, a sealing cap and peristaltic pump collar (VS-PPCSC) for Vivapure® maxiprep columns offer a fast and easy to use alternative to multiple centrifugation steps. The sample is pumped into the maxiprep spin column through a tube attached to the sealing cap with a connector. To ensure the usage of high sample loading flow rates, the peristaltic pump collar securely locks the sealing cap to the column barrel.

Required Equipment
Variable speed peristaltic pump capable of speeds less than 20 rpm.
E. g. Masterflex pump (VFP001, 240 V|VFP002, 115 V), Masterflex easy load pump head-size 16 (VFA012).

Ordering Information

Product Name	Pack Size	Product No.
Vivapure® A Starter Pack*	2 miniprepA	VS-ARSTPKA2
Vivapure® miniprepA Kit*	16 miniprepA	VS-ARAMINIK
Vivapure® miniprepA Bulk Pack	48 miniprepA	VS-ARAMINIB
Vivapure® maxiprepA Kit*	4 maxiprepA	VS-ARAMAXIK
Vivapure® maxiprepA Bulk Pack	12 maxiprepA	VS-ARAMAXIB
Vivapure® A Buffer Pack		VS-ARABUFPK
Vivapure® G Starter Pack*	2 miniprepG	VS-ARSTPKG2
Vivapure® miniprepG Kit*	16 miniprepG	VS-ARGMINIK
Vivapure® miniprepG Bulk Pack	48 miniprepG	VS-ARGMINIB
Vivapure® maxiprepG Kit*	4 maxiprepG	VS-ARGMAXIK
Vivapure® maxiprepG Bulk Pack	12 maxiprepG	VS-ARGMAXIB
Vivapure® G Buffer Pack		VS-ARGBUFPK
Sealing Cap & Peristaltic Pump Collor	1	VS-PPCSC

* including UF-concentrators and buffers

Technical Data

Protein A & G for Antibody Purification

Protein A & G miniprep	Centrifuge
Sample size	0.65 ml
Typical Binding Capacity	1 mg IgG/column
Number of re-uses	3

Protein A & G maxiprep	Centrifuge[1]
Sample size	20 ml
Typical Binding Capacity	20 mg IgG/ column
Number of re-uses	5

[1] Use the peristaltic pump accessory (VS-PPCSC) for larger volumes

Binding Affinities of Protein A and Protein G

Antibody	Protein A	Protein G
Human IgG1	****	****
Human IgG2	****	****
Human IgG3	×	****
Human IgG4	****	****
Human IgGA	**	×
Human IgGD	**	×
Human IgGE	**	×
Human IgGM	**	×
Mouse IgG1	*	**
Mouse IgG2a	****	****
Mouse IgG2b	***	***
Mouse IgG3	**	***
Rat IgG2a	×	****
Rat IgG2b	×	**
Rat IgG2c	*	**
Rabbit IgG	****	***
Hamster IgG	*	**
Guinea Pig IgG	****	**
Bovine IgG	**	****
Sheep IgG	*|×	**
Goat IgG	*|×	**
Pig IgG	***	***
Chicken IgG	×	*

**** = Strong Affinity
*** = Moderate Affinity
** = Weak Affinity
* = Slight Affinity
× = No Affinity

Vivapure® mini|maxiprep MC Spin Columns

The Vivapure® mini|maxiprep MC kit is designed for simple, rapid His-tagged recombinant protein purification from a cell lysate under native or denaturing conditions. Vivapure® spin columns replace lengthy and expensive chromatographic methods such as FPLC®. Metal chelate affinity chromatography is a rapid onestep purification, which removes most contaminants and can achieve purities close to homogeneity.

This Vivapure® MC purification kit incorporates pre-packed Ni^{2+}-IDA agarose resin plugs in ready-to-use spin columns. The objective is to offer the researcher total protein purification solutions from the initial fractionation stage to the final polishing steps. Resolution of the His-tagged protein is achieved either in a 2.2 ml microfuge tube for the Vivapure® Mini spin column or in a 50 ml centrifuge tube for the Vivapure® Maxi spin column.

The Vivapure® mini|maxiprep MC Advantages
- Spin column based kits for fast results
- Parallel processing
- Different configurations to suit all needs
- Economical due to re-usability

Working with Samples > 20 ml

Accessory
For working with sample volumes larger than 20 ml, e.g. diluted cell culture supernatants, a sealing cap and peristaltic pump collar (VS-PPCSC) for Vivapure® maxiprep columns offer a fast and easy to use alternative to multiple centrifugation steps. The sample is pumped into the maxiprep spin column through a tube attached to the sealing cap with a connector. To ensure the usage of high sample loading flow rates, the peristaltic pump collar securely locks the sealing cap to the column barrel.

Required Equipment
Variable speed peristaltic pump capable of speeds less than 20 rpm.
E. g. Masterflex pump (VFP001, 240 V|VFP002, 115 V), Masterflex easy load pump head-size 16 (VFA012).

Technical Data

Protein MC miniprep Kits	Centrifuge
Sample size	0.65 ml
Typical Binding Capacity	1 mg His-tagged protein
Number of re-uses	2

Protein MC maxiprep Kits	Centrifuge[1]
Sample size	20 ml
Typical Binding Capacity	10 mg His-tagged protein
Number of re-uses	2

[1] Use the peristaltic pump accessory (VS-PPCSC) for larger volumes

Ordering Information

Product Name	Pack Size	Product No.
Vivapure® metal cheleate Starter Pack*	4	VS-MCST04
Vivapure® miniprepMC Kit*	24	VS-MCMINI24
Vivapure® miniprepMC Bulk Pack	72	VS-MCMINIB
Vivapure® maxiprepMC Kit*	8	VS-MCMAXIK
Vivapure® maxiprepMC Bulk Pack	24	VS-MCMAXIB
Vivapure® metal chelate Buffer Pack		VS-MCBUFPK

* including UF-concentrators and buffers

Vivapure® Anti-HSA/IgG Kits – for Human Albumin and Human Albumin/IgG Depletion

The Vivapure® Anti-HSA and Anti-HSA/IgG kits are intended for biologists involved in the discovery of serum biomarkers that need highly specific albumin or albumin and IgG removal at Single-use pricing.

The Vivapure® Albumin Depletion Kit is based on a unique antibody fragment for specific albumin removal.

The Albumin/IgG Depletion Kit uses a combination of the Anti-HSA antibody fragment and Protein G resin for depleting albumin and IgG.

Additionally, all buffers and spin tubes required for albumin and albumin/IgG removal from 12 f 20 μl samples of human serum are included as well as a recommended protocol for recovery of albumin or albumin and IgG and associated proteins.

The Vivapure® Advantage
- Highly specific antibody fragment based albumin removal
- Protein G based IgG removal
- Priced for Single-use – no risk of contamination

Before

After

Ordering Information

	Kit Contents	
VS-SP08HAR	Vivapure® Anti-HSA Kit for Human Albumin Depletion	
	Anti-HSA Affinity Resin (50% slurry)	5 ml
	Clarification spin columns (Vivaclear)	12
	Collection tubes (2 ml)	24
	Binding Buffer	15 ml
VS-SP50HAR	Vivapure® Anti-HSA Affinity Resin for Human Albumin Depletion	
	Anti-HSA Affinity Resin (50% slurry)	50 ml
VS-SP08HAIGG	Vivapure® Anti-HSA/IgG Kit for Human Albumin and IgG Depletion	
	Anti-HSA/IgG Affinity Resin (50% slurry)	5.5 ml
	Clarification spin columns	12
	Collection tubes (2 ml)	24
	Binding Buffer	15 ml

Specifications: Vivapure® Anti-HSA and Anti-HSA/IgG Kits

Anti-HSA Affinity Resin binding capacity (suspension containing 50% packed medium)	2 mg/ml
Anti-HSA/IgG Affinity Resin binding capacity (suspension containing 50% packed medium)	1.8 mg/ml albumin 0.6 mg/ml IgG
Clarification spin columns (Vivaclear) max. volume capacity	500 μl
Recommended centrifugation speed	400 f g

Handling overview – Albumin and Albumin/IgG removal in 20 minutes

| Fill Vivaclear with Anti-HSA/IgG Affinity Resin | Add up to 20 μl serum sample → Mix sample with Anti-HSA/IgG Affinity Resin incubate for 15 min. | spin → Recover albumin and IgG depleted sample | spin → Wash 1–3 f with Binding Buffer for complete sample recovery | Albumin and IgG depleted sample is ready for analysis |
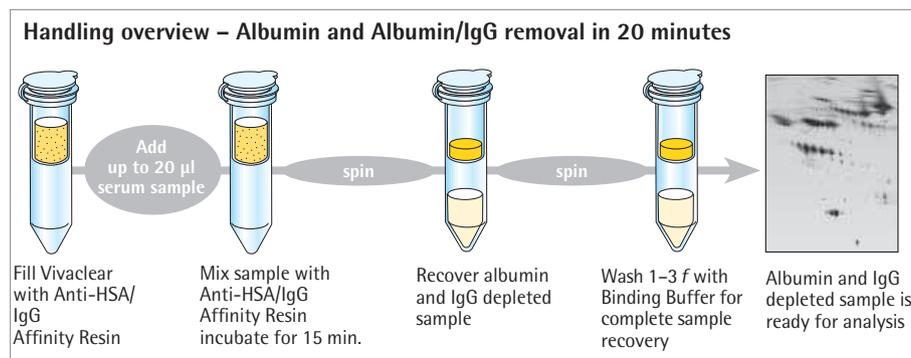
Vivapure® C18 Micro Spin Columns

Fast Sample Preparation for Mass Spectrometry

Vivapure® C18 Micro spin columns are centrifugal membrane-based devices for concentration, purification and desalting of peptides prior to analysis by mass spectrometry. The columns are prepacked with a membrane containing C18 hydrophobic chains for reversed-phase chromatography.

The columns are the size of standard microcentrifuge tubes. With Vivapure® C18 micro spin columns, a few centrifugation steps replace the tedious repetitive pipetting procedure for sample preparation prior to MALDI MS analysis. Samples are easily processed in parallel, and the tiny elution volumes are thoroughly collected in the included microtubes.

The Vivapure® C18 spin columns offer a very fast and effective method to simultaneously desalt and concentrate up to 200 µl of highly dilute peptide solutions from any source (2D-PAGE, chromatographic methods or biological samples).

The Vivapure® Advantage
- Centrifugal format
- High volume capacity
- Low elution volume
- Parallel processing
- High reproducibility
- Elution in Matrix

Ordering Information	Kit Contents	
VS-RP218L24	Vivapure® C18 Micro spin columns	
	Vivapure® C18 Micro spin columns	24
	Micro collection tubes (200 µl)	24
	Collection tubes (2 ml)	48

Specifications

Binding capacity (for standard digestion)	5 µg
Maximum volume	200 µl
Minimum elution volume	3 µl

Adenovirus Purification with Vivapure® AdenoPACK Kits

AdenoPACK 20|100|500

The AdenoPACK adenovirus purification and concentration kits offer researchers who need to recover up to 3 f 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.

AdenoPACK kits are offered as AdenoPACK 20, AdenoPACK 100 and AdenoPACK 500, for the purification and concentration of adenovirus type 5 from 20 ml to 500 ml cell culture, leading to 1 f 10^{11}- 3 f 10^{13} purified viral particles. For each sample volume, the most convenient handling method is offered for ultimate convenience.

AdenoPACK 20

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 f $10^{11\text{-}12}$
AdenoPACK 100|60 ml culture	1–2 hours	1 ml	65%	1–3 f 10^{12}
AdenoPACK 100|200 ml culture	2 hours	1 ml	80%	1 f 10^{13}
AdenoPACK 500|500 ml culture	2 hours	1 ml	80%	1–3 f 10^{13}
500 ml CsCl density gradient	24–48 hours	1–2 ml**	60–70%	1 f $10^{11\text{-}12}$

** after dialysis   *** before buffer exchange

Vivapure® AdenoPACK 20 Contents and Ordering Information

Vivapure® AdenoPACK 20	VS-AVPQ020
Vivapure® AdenoPACK 20 RT*	VS-AVPQ022
AdenoPACK Maxi spin columns	6
Vivaclear Maxi 0.45 µm PES	6
Empty 50 ml tubes	6
Loading Buffer (10 f)	25 ml
Washing Buffer (10 f)	30 ml
Elution Buffer	20 ml
Benzonase® (12.5 U/µl)	120 µl
Vivaspin 20, 100 kDa MWCO	6
Instructions	1 each for Kit and Vivaspin

* AdenoPACK 20 RT does not contain Benzonase®

Technical Data

Kit Specifications

Sample size	20 ml of cell culture
Number of purifications	6 f 20 ml
Virus particles (VP) per ml	Typically up to 1 f 10^{11} – 10^{12}
VP|IU	50–100
Processing time	Typically 1 hour
Endotoxin level	< 0.025 EU/ml

AdenoPACK 100

Vivapure® AdenoPACK 100 Contents and Ordering Information

Vivapure® AdenoPACK 100	VS-AVPQ101
Vivapure® AdenoPACK 100 RT*	VS-AVPQ102
AdenoPACK 100 units	2
Minisart® Plus	4
20 ml syringe	4
Tubing set and one way valve	2
10 ml syringe (elution)	2
Loading Buffer (10 ×)	1 × 25 ml
Washing Buffer	1 × 120 ml
Elution Buffer	1 × 20 ml
Benzonase® 12.5 U/µl	200 µl
Vivaspin 20 concentrator	4
Instructions	1 each for Kit and Vivaspin

AdenoPACK 100 Accessories

VS-AVPA001	Pump tubing set for Vivapure® AdenoPACK 100

* AdenoPACK 100 RT does not contain Benzonase®*

Technical Data

Kit Specifications

Sample size	20–200 ml of cell culture
Number of purifications	2 × 20–60 ml 1 × 200 ml
Virus particles (VP) per ml	Typically up to 1 × 10^{13}
VP|IU	20–50
Processing time	Typically 2 hours
Endotoxin level	< 0.025 EU/ml

Vivapure® AdenoPACK 500 Contents and Ordering Information

Vivapure® AdenoPACK 500	VS-AVPQ501
Vivapure® AdenoPACK 500 RT*	VS-AVPQ502
AdenoPACK 500 unit	1
Sartopore® 2 150	1
Tubing set and one way valve	2
10 ml syringe	1
Loading Buffer (10f)	60 ml
Washing Buffer (10f)	30 ml
Elution Buffer	20 ml
Benzonase® 12.5 U/µl	500 µl
Vivaspin 20 concentrator	2
Instructions	1 each for Kit and Vivaspin

Vivapure® AdenoPACK 500

* AdenoPACK 500 RT does not contain Benzonase®

Technical Data

Kit Specifications

Sample size	500 ml of cell culture
Number of purifications	1 f 500 ml
Virus particles (VP) per ml	Typically up to 3 f 10^{13}
VP|IU	20–50
Processing time	Typically 2 hours
Endotoxin level	< 0.025 EU/ml

Lentivirus Purification with Vivapure® LentiSELECT Kit

Vivapure® LentiSELECT 40

LentiSELECT 40|500|1000
The LentiSELECT lentivirus purification and concentration kits offer researchers who need to recover up to 5 f 10^9 infective lentivirus particles per ml for invitro transfection or animal studies a fast and easy to use solution.

These straight forward kits replace time-consuming ultracentrifugation protocols, which typically take approximately one day for large sample volumes, thus reducing the purification time to only a few hours.

Purification Results from Preparations with VSV–G Pseudotyped Lentivirus Constructs

Purification Method	Process Time	Eluate	Viral Particles [ml]	Recovery	Infective Viral Particles
LentiSELECT 40|40 ml sample	45 min	200 µl*	4 f 10^9	50%	8 f 10^8
LentiSELECT 500|500 ml sample	3 hours	1 ml*	3 f 10^9	35%	2–5 f 10^9
LentiSELECT 1000|1000 ml sample	6 hours	2 ml*	5 f 10^9	35%	1 f 10^{10}
Ultracentrifugation|500 ml sample	10–11 hours	500 µl	6 f 10^9	25%	3 f 10^9

* After desalting|buffer exchange

Vivapure® LentiSELECT 40 Contents and Ordering Information

Vivapure® LentiSELECT 40	VS-LVPQ040
LentiSELECT units	4
50 ml syringe	4
10 ml syringe	4
Tube set with one-way valve	4
Loading buffer (10 f)	30 ml
Washing buffer	150 ml
Elution buffer	20 ml
Vivaspin 20, 100 kDa MWCO	8
Instructions	1 each for Kit and Vivaspin

Technical Data

Kit Specifications

Sample size	40 ml cell culture
Number of purifications	4 f 40 ml
Infective particles (P) per ml	Typically up to 3 f 10^9
VP|IU	5–15
Processing time	Typically 45 minutes
Endotoxin level	< 0.025 EU/ml

Vivapure® LentiSELECT 500 Contents and Ordering Information

Vivapure® LentiSELECT 500	VS-LVPQ500
LentiSELECT unit	1
Sartopore® 2 150	1
50 ml syringe	1
Tube set with one-way valve	1
Loading buffer (10 f)	30 ml
Washing buffer	170 ml
Elution buffer	30 ml
Vivaspin 20, 300 kDa MWCO	2
Operating manual	1 each for Kit and Vivaspin

Vivapure® LentiSELECT 500

Technical Data

Kit Specifications

Sample size	500 ml cell culture
Number of purifications	1 f 500 ml
Infective particles (IP) per ml	Typically up to 2–5 f 10^9*
Processing time	Typically up to 3 hours
Endotoxin level	< 0.025 EU/ml

* 1 ml final elution sample

Vivapure® LentiSELECT 1000 Contents and Ordering Information

Vivapure® LentiSELECT 1000	VS-LVPQ1000
LentiSELECT unit	2
Sartopore® 2 150	1
50 ml syringe	1
Tube set with one-way valve	1
Loading buffer (10 f)	30 ml
Washing buffer	170 ml
Elution buffer	60 ml
Vivaspin 20, 300 kDa MWCO	2
Operating manual	1 each for Kit and Vivaspin

Vivapure® LentiSELECT 1000

Technical Data

Kit Specifications

Sample size	1000 ml cell culture
Number of purifications	1 f 1000 ml
Infective particles (IP) per ml	Typically up to 4–5 f 10^9**
Processing time	Typically up to 6 hours
Endotoxin level	< 0.025 EU/ml

** 2 ml final elution sample

UV-VIS Spectrophotometer VivaSpec

The UV-VIS spectrophotometer family enables the fast and reliable determination of concentration and purity of your samples. Pre-programmed methods allow the simple selection of all relevant parameters. The results are calculated automatically and displayed together with the accompanying data. The results can be transferred to a PC using the included software.

General features are the maintenance-free long-life xenon lamp as light source, a USB port for optional connection to PC, and a large graphical display.

The basic model **VivaSpec LS** is dedicated for the use in classical life science applications:
- Nucleic acid quantification and purity control
- Protein assays: Bradford, Lowry, BCA, Biuret, direct UV measurements
- Cell Density (OD600)
- Simple absorption measurements

In addition, the **VivaSpec and VivaSpec+** instruments offer a higher flexibility with additional methods:
- Measurement of single and multiple wavelengths
- Concentration calculation
- Scan within two user defined wavelengths (from 200 nm to 900 nm) with automatic peak detection
- Generation of calibration curves
- Kinetic measurements

Optional accessories are printer, SD card reader or a Bluetooth® module, all of them available either preinstalled or separately.

For measurements in the microliter range (0.7 µl to 5 µl), the Hellma TrayCell offers a sophisticated solution.

Technical Specifications

Wavelength range	190–1100 nm
Spectral bandwidth	5 nm (3 nm VivaSpec+)
Wavelength accuracy	± 2 nm
Wavelength reproducibility	± 1 nm
Light source	Xenon lamp
Beam height	15 mm
Detector	1024 CCD Array
Photometric range	− 0.3 to 2.5 A
Photometric reproducibility	± 0.003 A (0 to 0.5 A), ± 0.007 A (0.5–1.0 A)
Digital Output	Standard USB Port, Bluetooth® as option
Dimensions W f D f H [mm]	260 f 390 f 100
Weight [kg]	< 4.5
Power input	90-250 V, 50│60 Hz

Order Numbers

SMB80-3003-75	VivaSpec
SMB80-3003-76	VivaSpec with printer
SMB80-3003-77	VivaSpec with Bluetooth® module
SMB80-3005-11	VivaSpec with SD card module
SMB80-3004-80	VivaSpec+
SMB80-3004-81	VivaSpec+ with printer
SMB80-3004-82	VivaSpec+ with Bluetooth® module
SMB80-3005-12	VivaSpec+ with SD card module
SMB80-3004-70	VivaSpec LS
SMB80-3004-71	VivaSpec LS with printer
SMB80-3005-10	VivaSpec LS with SD card module
SMB80-3005-00	SD card module
SMB80-3003-84	Printer
SMB80-3003-96	Bluetooth® module
SMB80-3004-07	Paper rolls (box with 20 pieces)
SMB70-3006-00	TrayCell with 2 lids (1 mm and 0.2 mm)

Membrane Chromato-graphy

Sartobind®
The Pace Maker in Membrane Adsorber Technology

Unique Microporous Structure
Sartobind® Membrane Adsorbers display a microporous structure with a pore size of >3 µm which is orders of magnitudes 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 0.8 and 4 mm
- Scalable to process dimension with 4 mm Sartobind® disposable capsules and 8 mm batch re-usable|disposable Sartobind®
- Robust high performance separations
- No bed cracking, channeling or air entrapment
- Flow rate of ion exchange membranes 5–30 membrane volumes per minute below 2 bar (30 psi, 0.2 MPa)
- 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
Sartobind® ready-to-use units are run at 5 to 30 membrane volumes per minute. This is at least one order of magnitude faster than chromatographic columns. A typical speed up factor is about 25 measured in direct comparison to conventional column technology (reference: Walter, J. K. in: Bioseparation and Bioprocessing, Strategies and Considerations for Advanced Economy in Downstream Processing of Biopharmaceutical Proteins. G. Subramanian (ed.) Wiley VCH, Vol. II p. 447-460, (1998). Flow rate does not affect breakthrough performance.

Sartobind® Membrane Types
- Sartobind® S, Q, STIC PA and D ion exchange
- Sartobind® IDA (iminodiacetic acid) metal chelate
- Sartobind® Aldehyde
- Sartobind® Protein A (recombinant)

Sartobind® Applications
Purification and concentration
- Large proteins, blood factors, protein conjugates, viruses, VLP, mAbs

Contaminant Removal
- Host cell proteins, DNA, viruses, leached ligands, endotoxins, aggregates

... for Robust Separations

Constant Capacity

The robustness of Sartobind® Membrane Adsorbers in ion exchange chromatography has been tested in consecutive runs of 1000 chromatographic cycles (see figure below).

Laboratory Units: Sartobind® MA

You may use Sartobind® Membrane Adsorbers for any ion exchange or affinity chromatography which require high speed and simple operation. The small scale units for laboratory use is the MA 15 with 0.8 mm bed height (3 membrane layers), MA 75 with 4 mm (15 layers) and MA 100 with 1.4 mm (5 layers). These may be reused hundreds of times.

Chemical Compatibility

The housing of Sartobind® SingleSep capsules is polypropylene. 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 and can be cleaned with 1 N sodium hydroxide.

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

Sartobind® MA units for laboratory applications

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.

Technical Data Sartobind® Laboratory Scale Units

	MA 15	MA 75	MA 100	nano
Membrane material	Stabilized reinforced cellulose			
Application for	Purification, re-usable	Purification, downscale for production, re-usable	Purification, re-usable	Down-scale for biopharma production
Adsorption area [cm²]	15	75	100	36|110
Number of layers	3	15	5	15|30
Bed height [mm]	0.8	4.0	1.4	4|8
Bed volume* [ml]	0.41	2.1	2.8	1|3
Membrane diameter [mm]	25	25	50	–
Housing material	Polysulfone	Polysulfone	Polysulfone	Polypropylene
Inlet connector	Female Luer	Female Luer	Female Luer	Female Luer
Outlet connector	Male Luer	Male Luer	Male Luer	Female Luer
Typical dynamic protein binding capacity [mg/unit] (with lysouome for S BSA for Q/D)	10.5/S 15 12/Q 15	52.5/S 75 60/Q 75 45/D 75	70/S 100 80/Q 100	29/Q nano 1 ml 25/S nano 1 ml 60/PA nano 1 ml 88/Q nano 3 ml 77/S nano 3 ml 44/Phenyl nano 3 ml
Flow rate** at 0.1 MPa (1 bar|14.5 psi) [ml/min]	> 50	> 25	> 75	10–30|5–15
Void volume [ml]	1.0	1.3	4.2	5 (1 ml)/4 (3 ml)
Maximum pressure [MPa]	0.6	0.6	0.6	0.4
pH stability of housing	2–13	2–13	2–13	
Storage before use at	Room temperature			

pH Stability for MA15, 75, 100 and nano

	S	Q	D
Short term	3–14	2–14	2–14
Long term	4–13	2–12	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 (20 for Protein A)
Bed height [mm]	4.0
Bed volume [ml]	2.1
Membrane diameter [mm]	25
Adsorption area [cm²]	75
Dead volume [ml]	1.3
Maximum pressure	0.6 MPa (6 bar│87 psi)
Housing material	Polysulfone
Inlet connector	Female Luer
Outlet connector	Male Luer
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 2 ml	IDA 75
Ligand	Recombinant protein A	Iminodiacetic acid (IDA)
Binding capacity Test proteins	10–15 mg/unit polyclonal human IgG	7.5 mg/unit His$_6$-tagged protein* depending on sample
Recommended ions for coupling	–	Ni²⁺, Co²⁺, Cu²⁺ or Zn²⁺
Flow rate at 0.1 MPa (1 bar│14.5 psi)	> 10 ml/min	> 10 ml/min
Recommended flow rate	5–10 ml/min	50 ml/min
pH stability (long term)	3–9	2–12
pH stability (short term)	2–10	1–14
Storage before use	+ 4 ℃	Dry at room temperature

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

Sartobind® 4 mm Capsules for Polishing

Sartobind® ion exchange capsules with 4 mm bed height are designed to remove contaminants, e. g. DNA, host cell proteins, endotoxins, leached ligands and viruses, at accelerated flow rates in flowthrough mode. 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.

- 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
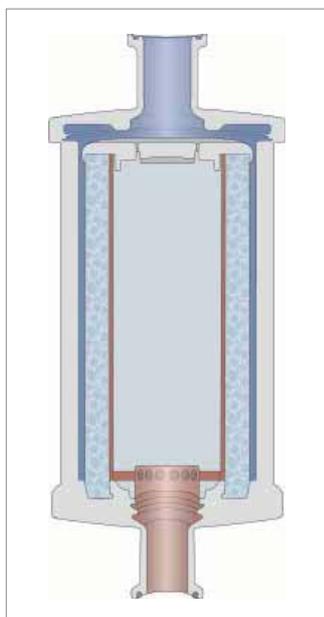
Technical Data Sartobind® 4 mm Capsules

Membrane	Base material	Stabilized reinforced cellulose
	Membrane thickness	275 μm
	Membrane types	■ strong cation exchanger S (sulfonic acid)
		■ strong anion exchanger Q (quaternary amine)
		■ salt tolerant anion exchanger Sartobind® STIC PA (primary amine)
Capsule	Design	Cylindric
	Bed height	4 mm (nominal number of layers: 15)
	Housing material	Polypropylene
Operation	Max. pressure	0.4 MPa (4 bar|58 psi)
		0.5 MPa (5 bar|73 psi) Sartobind® STIC 5"

Technical Data Sartobind® 4 mm Capsules

Order No.	Chemistry	Description Adapter Inlet and Outlet	Quantity	Protein Binding Capacity* [g]	Recommended Flow Rate [l/min]
Sartobind® nano					
92IEXQ42DN-11	Q	Luer female	1	0.029	0.03
92IEXQ42DN-11--A	Q	Luer female	4	0.029	0.03
Sartobind® mini					
92IEXQ42D4-OO--A	Q	Hose barb	4	0.2	0.2
92IEXQ42D4-SS--A	Q	Sanitary flange	4	0.2	0.2
Sartobind® nano					
92STPA42DN-11--A	STIC PA	Luer female	4	0.050	0.03
Sartobind® nano					
92IEXS42DN-11	S	Luer female	1	0.025	0.03
92IEXS42DN-11--A	S	Luer female	4	0.025	0.03
Sartobind® mini					
92IEXS42D4-OO--A	S	Hose barb	4	0.175	0.2
92IEXS42D4-SS--A	S	Sanitary flange	4	0.175	0.2

* Typical dynamic binding capacity at 10% breakthrough was measured with BSA for Q|PA and lysozyme for S chemistry.

For Sartobind® STIC PA 150 mM NaCl was added to the buffer.

For further information, please request the brochure, Sartobind® Ion Exchange Membrane Adsorber capsules, 4 mm bed height. Order no. 85030-531-08.

Overview Membrane Types and Formats

Membrane Type	Description	Pore Size [µm]	Capacity* [mg/ml]	Sartobind® Lab Scale A4 sheet	96 well 0.8 mm	MA 15, 100	MA 75	pico 0.08 ml	nano 1 ml	nano 3 ml	Process Scale Capsule FT 4 mm	Capsule FT/B&E** 8 mm
S	Sulfonic acid	>3	25	•	(•)	•	•	(•)	•	•	•	•
Q	Quaternary ammonium	>3	29	•	(•)	•	•	(•)	•	•	•	•
PA	Primary amine	>3	60		(•)			(•)	•		•	
D	Diethylamine	>3	22	•			•					
IDA	Iminodiacetic acid	>3	3.6	•			•					
HIC	Phenyl	>3	44		(•)			(•)		•		•
Aldehyde	Aldehyde	0.45	1	•								
Protein A	Recombinant Protein A	0.45	5–7.5				•					

* Typical dynamic binding capacity 10%
** FT = Flow through, B&E = Bind and elute
• available   (•) coming soon

Sartobind Pico with 0.08 ml bed volume and 4 mm bed height as well as Sartobind 96 3well plates, both sizes with Q, PA, S and HIC are coming soon.

Ordering Information

Luer Lock Units|Sheets|Kits

Order No.	Sartobind®	Quantity
93IEXQ42GB-12--A	Sartobind® Q 15	4
93IEXS42GB-12--A	Sartobind® S 15	4
93IEXQ42DB-12--V	Sartobind® Q 75	2
93IEXS42DB-12--V	Sartobind® S 75	2
93IEXD42DB-12--V	Sartobind® D 75	2
93IEXQ42BC-12	Sartobind® Q 100	1
93IEXS42BC-12	Sartobind® S 100	1
93IDA426DB-12--V	Sartobind® IDA 75	2
93PRAP06HB-12--A	Sartobind® Protein A 2 ml	4

Order No.	Sartobind® A4 Sheet	Quantity
94IEXS42-001	Sartobind® S A4 Sheet	1
94IEXQ42-001	Sartobind® Q A4 Sheet	1
94IEXD42-001	Sartobind® D A4 Sheet	1
94IDA-42-001	Sartobind® IDA A4 Sheet	1
94ALD-06-001	Sartobind® Aldehyde A4 Sheet	1

Sartobind® Capsules 4 mm Bed Height

Order No.	Description Sartobind® Q	Quantity
92IEXQ42DN-11	Sartobind® Q SingleSep nano 1 ml	1
92IEXQ42DN-11--A	Sartobind® Q SingleSep nano 1 ml	4
92IEXQ42D4-OO--A	Sartobind® Q SingleSep mini capsule	4
92IEXQ42D4-SS--A	Sartobind® Q SingleSep mini capsule	4
92IEXQ42D9-OO--A	Sartobind® Q SingleSep 5" capsule	4
92IEXQ42D9-SS--A	Sartobind® Q SingleSep 5" capsule	4
92IEXQ42D1-SS	Sartobind® Q SingleSep 10" capsule	1
92IEXQ42D2-SS	Sartobind® Q SingleSep 20" capsule	1
92IEXQ42D3-SS	Sartobind® Q SingleSep 30" capsule	1
92IEXQ42DC3SS	Sartobind® Q SingleSep mega capsule	1

Order No.	Sartobind® S	Quantity
92IEXS42DN-11	Sartobind® S SingleSep nano 1 ml	1
92IEXS42DN-11--A	Sartobind® S SingleSep nano 1 ml	4
92IEXS42D4-OO--A	Sartobind® S SingleSep mini capsule	4
92IEXS42D4-SS--A	Sartobind® S SingleSep mini capsule	4
92IEXS42D9-OO--A	Sartobind® S SingleSep 5" capsule	4
92IEXS42D9-SS--A	Sartobind® S SingleSep 5" capsule	4
92IEXS42D1-SS	Sartobind® S SingleSep 10" capsule	1
92IEXS42D3-SS	Sartobind® S SingleSep 30" capsule	1

Order No.	Sartobind® STIC	Quantity
92STPA42DN-11--A	Sartobind® STIC PA nano 1 ml	4
92STPA42D9-FF--A	Sartobind® STIC PA 5" capsule	4
92STPA42D1-SS	Sartobind® STIC PA 10" capsule	1
92STPA42D3-SS	Sartobind® STIC PA 30" capsule	1
92STPA42DC3SS	Sartobind® STIC PA mega capsule	1
9ZAIAM0001	Legs for Sartobind® mega capsule (stainless steel)	3

Sartobind® Capsules 8 mm Bed Height

Order No.	Description Sartobind® Q	Quantity
96IEXQ42EUC11--A	Sartobind® Q nano 3 ml	4
96IEXQ42E9BFF	Sartobind® Q 150 ml	1
96IEXQ42E3ESS	Sartobind® Q Jumbo 5 l	1

Order No.	Description Sartobind® S	Quantity
96IEXS42EUC11--A	Sartobind® S nano 3 ml	4
96IEXS42E9BFF	Sartobind® S 150 ml	1
96IEXS42E3ESS	Sartobind® S Jumbo 5 l	1

Order No.	Description Sartobind® Phenyl	Quantity
96HICP42EUC11--A	Sartobind® Phenyl nano 3 ml	4
96HICP42E9BFF	Sartobind® Phenyl 150 ml	1
96HICP42E3ESS	Sartobind® Phenyl Jumbo 5 l	1
9ZGL--0102	Trolley for Sartobind® Jumbo 5 l capsule	

Microbiological Control

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 m³/h enables isokinetic sampling at flow rates that are usual in laminar flow as well as filtration of 1 m³ 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 m³/h–8 m³/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 ℃
Noise level	For gelatine membrane filters, max. 62 dB (A)
Weight [kg]	Approx. 6.5
Dimensions L ƒ W ƒ H [mm]	375 ƒ 242 ƒ 228
Correction of the air flow	When the entered air flow rate cannot be attained, rate setting the display shows the max. attainable flow rate for a corresponding new setting below this value.
Inclusive filter holder	17655 (Gelatine disc filters)

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

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. SMI2001-e|SM-3011-e

AirPort MD8
Battery–powered Portable Air Sampler

AirPort MD8 is the 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 four languages; English, French, German and Spanish.
- Parameters last used stored even after automatic shut-off.
- The device can be calibrated locally.

For guaranteeing reliable and exact measurement results AirPort MD8 uses the gelatine membrane filter method or the impaction method with BACTair™.

Specifications for AirPort MD8

Volume flow regulation	By an integrated impeller wheel.
Volume flow adjustable	30 l/min., 40 l/min., 50 l/min. and 125 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 for 50 l/min
Noise level	For gelatine membrane filters 48 dB (A)
Weight [kg]	Approx. 2.5
Dimensions L ƒ W ƒ H [mm]	300 ƒ 135 ƒ 165
Inclusive adapter	17801 (for disposable gelatine filter units) 17803 (for BACTair™ Plates)

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 two adapters (17801 and 17803) and battery charger (69898525).

Accessories and Replacement Parts for the AirPort MD8

Order Number	
17803	Adapter for BACTair™ on the AirPort MD8 air sampler
17801	Holder for disposable gelatine filter units
69898525	Battery charger

Ordering Information for Consumables
Please refer to the following pages.

Special brochures available on request. Order no. SM-1502-e and SM-4023-e

Gelatine Membrane Filters
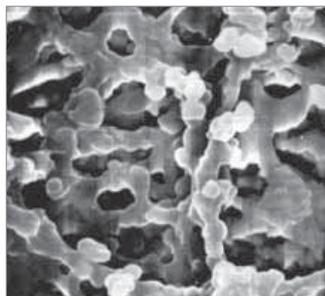
Gelatine filters in conjunction with the MD8 air samplers (gelatine filter method) are used for collecting of airborne microbes and viruses. Gelatine filter disposables are individually packed, pre-sterilized and ready-to-connect units, each consisting of a gelatine membrane filter and a holder. Gelatine 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
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 pre-sterilized 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. SM-3011-e

BACTair™ – Big Impact
Microbiological Air Monitoring by the Impaction Method

A new developed system for sampling airborne organisms that allows impaction onto culture media plates, where the plates function directly as collection heads. This means that the collection properties are integrated right into the culture media plates. Metal sieve plates or metal collection heads with slots, which have to be sterilized for routine samplings on a regular basis, are eliminated. Now, non-sterile sieves or slots have become a thing of the past.

The geometry of the culture medium plate and the 400 holes in the sieve plate yield exceptional sampling efficiency, which is generally higher than that of other impaction samplers.

This new method uses the AirPort MD8 air sampler to draw the air stream over the BACTair™ Culture Media Plates. BACTair™ is ready-to-connect to the AirPort MD8.

BACTair™ offers the following benefits:
- Individually, sterile packaged
- Integrated disposable sieve
- Pre-filled with agar media
- Samples 1 m³ in just 8 min
- Optimized geometry

Specifications for BACTair™

Material	Polystyrene
Dimensions [mm]	116 f 24
Number of impaction holes	400 holes, ‡ 0.47 mm each
High retention of particles	> 0.65 µm
Sterilization	Gamma irradiation

BACTair™ Culture Media Plates with Agar, 110 mm, Individually, Sterile Packaged, 10 Units

Order Number	Determination of	Medium Type
14320-110----ACD	Total Count	Tryptic Soy Agar (TSA)
14321-110----ACD	Yeasts and molds	Sabouraud Agar (acc. USP)

Other BACTair™ Culture Media types on request.

Air Sampler

16757	AirPort MD8 Air Sampler for BACTair™ incl. charger

Accessories

17803	Adapter for BACTair™ on the AirPort MD8 air sampler
1ZPX-D0002	Covers for BACTair™ Culture Media Plates, 10 f 2 units individually, sterile packaged
14301-110------K	BACTair™ Plates, sterile, without media, 50 units

Special brochures are available on request. Order no. SM-4023-e and SL-2047-e

Accessories
for the MD8 Air Samplers

Calibration Unit
The user can calibrate the MD8 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
Stedim Biotech 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 m³/h
Max. error	1–16 m³/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 connec-
tion 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 MD8 airscan®, incl. accessories.

Aluminum 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 bet ween 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 Number

16756	Calibration unit for the MD8 air samplers
17208	Case for MD8 airscan®
17656	Aluminum stack for MD8 air samplers

Replacement Parts for the Stack

Order Number

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

Tubing and Connectors Set

Order Number

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), aluminum
17658	Connector (air sampler inlet to flexible hose), aluminum
17659	Connector (flexible hose to filter holder|adapter), aluminum

Accessories for Isolator Application

Order Number	
17016	Adapter (DN 25 hose barb to 1"–1 ½" 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"–1½" sanitary flange) to connect MD8 airscan® to an isolator via flexible PVC hose and filter capsule, stainless steel
17033	Clamp for 1"–1½" 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
5185307TS‑‑‑‑‑SS	Sartofluor® MidiCap® 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 Number	
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 Number	
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 Number	
11404‑‑80‑‑‑‑ALN	Cellulose nitrate membrane filters, 0.8 µm, white with black grid, pre-sterilized in bags of 5
13004‑‑80‑‑‑‑ALN	Cellulose nitrate membrane filters, 0.8 µm, gray with white grid, pre-sterilized in bags of 5
11301‑‑80‑‑‑‑ALN	Cellulose nitrate membrane filters, 8 µm, white no grid, pre-sterilized in bags of 5

Gridded Membrane Filters from Cellulose Nitrate (Cellulose Ester) acc. to ISO Standards, Sterile and Individually Packaged, for Colony Counting

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

They are pre-sterilized and ready-to-use and save preparatory time. As they are individually packed, they avoid the possibility of contamination of remaining filters in opened packs and 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 ISO 16266. In addition to this they have been manufactured for use especially at the same time with Sartorius Stedim Biotech 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.

Specifications

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 f 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. Especially E. coli shows best growth promotion on High Flow Membranes. As every Sartorius Stedim Biotech 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 packaged (page 210).

Cellulose nitrate (cellulose ester) and cellulose acetate membrane filters, white, individually, sterile packaged (page 212).

Hydrophobic edge membranes are used mainly in the sterility testing of solutions containing antibiotics (page 214).

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 counting, 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 f H f W [mm]	204 f 213 f 165
Weight [kg]	2.9
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
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 ƒ 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|black	11406Z-47----SCM	0.45 µm
White|black	11406Z-50----SCM	0.45 µm
White|black	11404Z-47----SCM	0.8 µm
White|black	11403Z-47----SCM	1.2 µm
White|black	11403Z-50----SCM	1.2 µm
White|black	11402Z-47----SCM	3 µm
White|green	139H6Z-47----SCM	0.45 µm High Flow
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	130H6Z-50----SCM	0.45 µm High Flow
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

* Gray membranes after wetting black

Microsart® e.motion Membrane Filters are also available together with Nutrient Pads (page 217).

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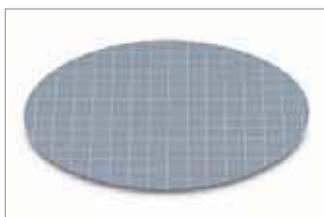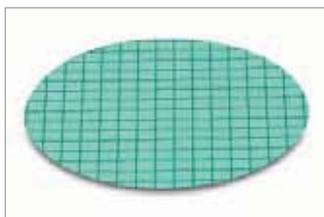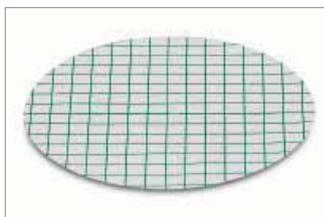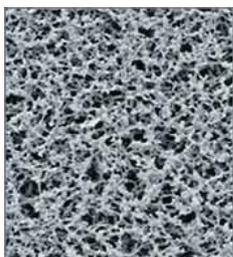
Applications

Membrane filters for colony counting, 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 124).

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 cm² at 1 bar acc. to DIN 58355 [ml/min]	20	70	100	130
Coliform retention [%]	100	100	100	n. a.
Recovery rate lot-released acc. to ISO 7704 [%]	≥ 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
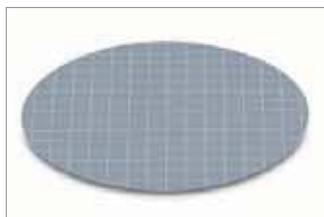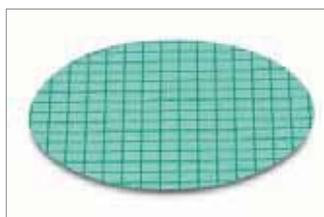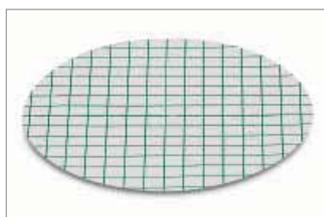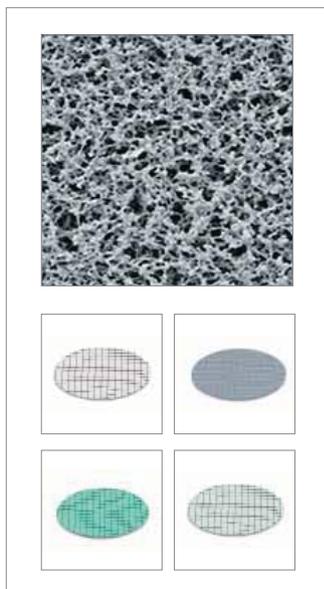
Applications
Membrane filters for colony counting, particle testing and microscopy

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 124).

Typical Performance Rates for Various Pore Sizes

Pore size	0.2 µm*	0.45 µm**	0.65 µm
Flow rate for water per cm² at 1 bar acc. to DIN 58355 [ml/min]	20	70	130
Coliform retention [%]	100	100	n. a.
Recovery rate lot-released acc. to ISO 7704 [%]	≥ 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
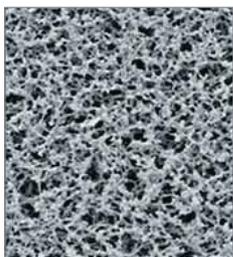
Sterile, individually packed filters have long become standard for routine microbiological quality control because of the user benefits they offer. They are pre-sterilized and ready-to-use and save preparatory time. As they are individually packed, they avoid the possibility of contaminating remaining 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 counting, 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	25, 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 124).

Cellulose Nitrate Membrane Filters, White, for Colony Counting, Sterility Testing, Particle Count & Microscopy, Type 113, Individually, Sterile Packaged

Pore Size	Order No.	Diameter	Pack Size
0.45 µm	11306--25----ACN 11306--47----ACN 11306--50----ACN	25 mm 47 mm 50 mm	100 100 100
0.65 µm	11305--47----ACN 11305--50----ACN	47 mm 50 mm	100 100
0.8 µm	11304--47----ACN 11304--50----ACN	47 mm 50 mm	100 100
1.2 µm	11303--47----ACN 11303--50----ACN	47 mm 50 mm	100 100
3 µm	11302--47----ACN 11302--50----ACN	47 mm 50 mm	100 100
8 µm	11301--47----ACN 11301--50----ACN	47 mm 50 mm	100 100

Cellulose Acetate* Membrane Filters, White, for Colony Counting, Sterility Testing, Particle Count & Microscopy, Type 111, Individually, Sterile Packaged

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

* If cellulose nitrate is not compatible.

Hydrophobic Edged Cellulose Nitrate (Cellulose Ester), Cellulose Acetate and Regenerated Cellulose Membrane Filters Individually, Sterile Packaged & Non–sterile
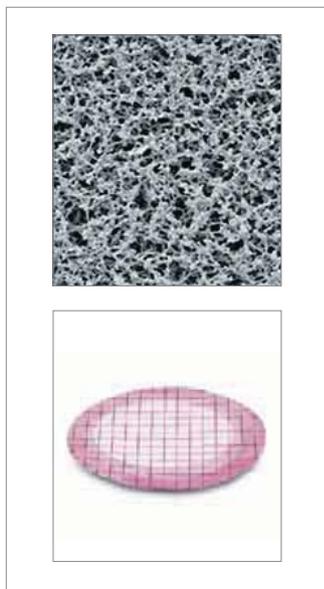
Hydrophobic edge membranes are used mainly for colony counting and sterility testing of solutions containing substances with antibiotic characteristics. The hydrophobic edge avoids the penetration of any growth-inhibitory substance into the membrane clamp zone wherefrom it could not be rinsed out and the substance could inhibit microbial growth during incubation.

Materials
The membranes are available in three different materials:
- Cellulose nitrate (cellulose ester), a material which assures effective retention with high flow rates and optimum colony growth
- Cellulose acetate, a material which combines high flow rates and thermal stability with very low adsorption characteristics
- Regenerated cellulose, a material which combines excellent chemical resistance and thermal stability with very low adsorption characteristics.

Applications
Membrane filters for colony counting 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 and RC: 180 °C max.
Thickness acc. to DIN 53105	CN: 115–145 µm │ CA: 120 µm (average value) │ RC: 160–200 µm
Chemical compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents, RC is resistant to almost all solvents and is compatible in a pH-range of 3-12. Detailed information in section "Chemical Compatibility" under Cellulose Nitrate type 113, page 124, Cellulose Acetate type 111 and Regenerated Cellulose type 184.

Cellulose Nitrate Membrane Filters, White with Black Grid, 3 mm Hydrophobic Edge, for Colony Counting & 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 Counting & 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 Counting & 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 Counting & 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 Counting & 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 Counting & 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

* If cellulose nitrate is not compatible

Cellulose Acetate* Membrane Filters, White with Black Grid, 3 mm Hydrophobic Edge, for Colony Counting & Sterility Testing, Type 135, Sterile, Packaged of 10 Discs per Sleeve

Pore Size	Order No.	Diameter	Pack Size
0.45 µm	13506--47----ALS	47 mm	100

Cellulose Acetate* Membrane Filters, White with Black Grid, 3 mm Hydrophobic Edge, for Colony Counting & 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 Counting & Sterility Testing, Type 135, Non–sterile

0.45 µm	13506--47----HCN	47 mm	100

Regenerated Cellulose* Membrane Filters, White, Hydrophobic Edged, for Colony Count-ing & Sterility Testing, Type 184, 100 Membranes per Box, Individually, Sterile Packaged

0.45 µm	18406--47----ACN	47 mm	3 mm hydropho. edge
	18406--47----HDN	47 mm	4 mm hydropho. edge

* 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 Stedim Biotech Nutrient Pad Sets have been used successfully in the membrane filter method for 30 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 up to 24 months. This makes the Sartorius Stedim Biotech Nutrient Pads Sets unique: No other ready-to-use culture media around the globe assures such consistently high quality and reproducible results up to 24 months.

Compliance with International Standards
Currently, Sartorius Stedim Biotech offers more than 30 different Nutrient Pad Set types to meet the diverse objectives of micro-biological analysis. Aside from the European drinking water directive, they comply with other international regulations and recom-mendations: international pharmacopoeias, DIN and ISO standards, the American Stand-ards 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.

Inclusive Membranes
All Nutrient Pad Set types are supplied with the appropriate membrane filters, which are also pre-sterilized and individually pack-aged. Microsart® e.motion Membrane Filters are specially designed for the Microsart® e.motion Dispenser and can be conveni-ently inserted. The membrane filters then are automatically removed from their sterile package – either in a touch-free mode via an optical sensor or at the touch of a button. All membrane filters tailored to meet the special requirements of microbial detection are avail-able 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.

Consistently Quality
During the production, each nutrient pad set batch is compared with the corresponding agar medium, in order to guarantee consistently quality and reproducible results.

Trouble-free Storage
Nutrient Pad Sets can be stored at room temperature in a warehouse, up to 24 months.
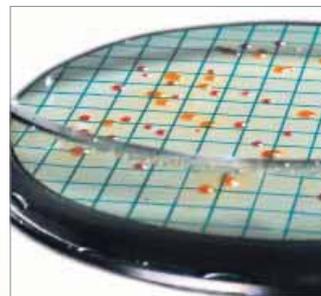
Order Numbers for Nutrient Pad Sets in Petri Dishes

Nutrient Pad Sets for Total Colony Counting,
individually, sterile packaged in petri dishes, 100 per box, with 100 individually,
sterile packaged 47 mm membrane filters (order no. –RDN = Microsart® e.motion Membranes)

Determination of	NPS Type (Filter Type)[1]	Order No.[2]
Total count	Caso (1)	14063--47------N
Total count	R2A (1)	14084--47----RDN
Total count	R2A (1)	14084--47------N
Total count	Standard TTC (1)	14055--47----RDN
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 Glucose Extract	14076--47----RDN
Total count	TGE (1)|Tryptone Glucose 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 (order no. –RDN = Microsart® e.motion Membranes)

E. coli and coliforms	Chromocult (7)	14087--47----RDN
E. coli and coliforms	Chromocult (7)	14087--47------N
E. coli	ECD (2)	14082--47------N
E. coli and coliforms	Endo (9)	14053--47----RDN
E. coli and coliforms	Endo (9)	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	m FC in closed petri dishes (2)	14068--50----PDN
E. coli and coliforms	Teepol|Lauryl Sulphate (2)	14067--47----RDN
E. coli and coliforms	Teepol|Lauryl Sulphate (2)	14067--47------N
E. coli and coliforms	Tergitol TTC (2)	14056--47----RDN
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 (order no. –RDN = Microsart® e.motion Membranes)

Enterococci	Azide|KF Strep (1)	14051--47----RDN
Enterococci	Azide|KF Strep (1)	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 (order no. –RDN = Microsart® e.motion Membranes)

Pseudomonas aeruginosa	Cetrimide (2)	14075--47----RDN
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 (order no. -RDN = Microsart® e.motion Membranes)

Determination of	NPS Type (Filter Type)[1]	Order No.[2]
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 (10)	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----RDN
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	Schaufus Pottinger|m green yeast and mold (8)	14091--47----RDN
Yeasts and molds	Schaufus Pottinger|m green yeast and mold (8)	14091--47------N
Yeasts and molds and bacteria	Wallerstein Nutrient|WL Nutrient (2)	14089--47------N
Yeasts and molds	Wort (3)	14058--47----RDN
Yeasts and molds	Wort (3)	14058--47------N
Yeasts and molds	Wort (8)	14092--47----RDN

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 (order no. -RDN = Microsart® e.motion Membranes)

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
Lactobacilli and other soft drink-spoiling microorganisms	MRS (1)	14077--47------N
Acid-tolerant microorganisms	Orange Serum|pH 5.5 (1)	14062--47----RDN
Acid-tolerant microorganisms	Orange Serum|pH 5.5 (1)	14062--47------N
Acid-tolerant microorganisms	Orange Serum|pH 3.2 (6)	14096--47----RDN
Acid-tolerant microorganisms	Orange Serum|pH 3.2 (6)	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

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

1) 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
   (9) = White with green grid, 0.45 µm pore size, High Flow, (ideal for E.coli)
   (10) = Gray (after wetting black) with white grid, 0.45 µm pore size, High Flow

2) 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.

Most of the NPS types are also available with Microsart® e.motion Membrane Filters:
Order number as above, but ---N replaced by -RDN.

Other NPS types and NPS with Microsart® e.motion Membrane Filters on request.

Nutrient Pad Set Poster
The photo shows a poster, original size
70 cm f 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 Stedim Biotech 1.4 mm thick absorbent pads are wetted with the appropriate liquid culture medium before a membrane filter is placed on them. They come pre-sterilized in plastic magazines, which fit onto the Sartorius Stedim Biotech 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
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
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

Lactose Broth Media, Bottled Concentrate, for Drinking Water Analysis

Concentration Factor	Packaging	Order No.
Two times concentrated	4 bottles à 100 ml	14155----------A

Broth Media in 20 ml Tubes, 50 Tubes per Box

Determination of	Broth Type	Order No.
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 f 100 pads	1,000 per box, incl. one dispenser	15410--47----ALR
Absorbent Pad Set, 10 f 100 pads plus 1,000 membrane filters (0.45 µm, white|green)	1,000 per box, incl. two dispensers	13906--47----APR

Absorbent Pads, 47 mm, Sterile Packaged of 10 Discs per Sleeve

Description	Packaging	Order No.
Absorbent Pad Set, 10 f 10 pads in sleeves plus 100 membrane filters (0.2 µm, white|black)	100 per box	13707--47----ALN
Absorbent Pad Set, 10 f 10 pads in sleeves plus 100 membrane filters (0.45 µm, white|black)	100 per box	13706--47----ALN

Absorbent Pads, 50 mm, Sterile–Packaged in 10 Magazines, Each with 100 Pads

Description	Packaging	Order No.
Absorbent Pads, 10 f 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 re-usable 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.
- International Standard's microbiological methods, such as ISO 7704, ISO 9308-1, DIN EN ISO 16266, 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. Especially E. coli shows best growth promotion on High Flow Membranes.

Applications

Colony counting, 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
- Consistently 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; membranes removable for filing
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 cm²
Max. operating pressure	Vacuum only
Outlet	6.5 f 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 on Trays, Sterile, 48 Units

0.2 µm	CN white|black	16401-47-07----K
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
0.8 µm	CN gray|white**	16403-47-04-V--K

Biosart® 100 Monitors, 100 ml, 47 mm, Sterile, 48 Units, Membrane Fixed
available only in the U.S. and Canada

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

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

Biosart® 100 Monitor Adapters and Membrane Lifter

Description	Adaptation	Order No.
Biosart® 100 Adapter, polypropylene and silicone	Biosart® 100 Monitor onto Sartorius Stedim Biotech stainless steel frits e.g. 16840 (Combisart® single base, 50 mm) or onto 16841 (individual base)	16424
Biosart® 100 Adapter, silicone	Equal 16424	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

Each box of Biosart® 100 Nutrient Media contains 50 ampoules with sterile media, each with 2.5 ml and a lot certificate. If stored under proper conditions (+4 °C), the culture media have a shelf life of 12 month (except for Endo, KF Strep, Lauryl Sulfate and Tergitol which have a 9-month shelf life). Biosart® 100 Nutrient Media comply with international regulations and recommendations: International pharmacopoeias, DIN and ISO standards, the American Standards for Water and Foods, mineral water regulations, guidelines of the food and beverage industries.

Within the scope of the quality assurance procedure and the stringent quality control standards every batch has passed Sartorius Stedim Biotech in-house tests of growth promotion, sterility, physical and technical parameters have been passed successfully. Biosart® 100 Nutrient Media are convenient in use and eliminating the handling of glass ampoules.

Application
Colony counting

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

Safe & Reliable
- Pre-sterilized media
- Certificate of Quality for every batch
- In compliance with international standards
- Consistently 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	Wort	16400-02----WZ-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

Microsart® @filter 100 | Microsart® @filter 250
Sterile Disposable Filter Units for Advanced Colony Counting

The process of producing pharmaceuticals and bringing new drugs to the market is becoming an increasingly costly business. The pharmaceutical and biotech industries are driven by the need to optimize their work flows and increase efficiency without compromising their level of safety. Products and raw materials used in the pharmaceutical or biotech industry require control of microbial levels during processing and handling. Microorganisms in liquids are quantified by the membrane filtration method. Use of this membrane filtration method allows accurate quantification of bacteria, yeasts and molds when low counts in a high sample volume are anticipated. All components of the filtration system must comply with international guidelines, such as USP, EP or ISO standards.

Description
Microsart® @filter 100 and 250 filter units are a ready-to-use combination funnel, filter base and gridded membrane in one unit. The range of Microsart @filter types has been tailored to meet individual needs: It is possible to choose between two volume sizes, 100 ml and 250 ml, different pore sizes and different filter colors for contrasting backgrounds during evaluation. The filter units exist as tray versions with lids or are stacked in bags for safe removal using the Microsart® Funnel Dispenser.

Despite the diversity of Microsart® @filters one thing is common: The optimal design.
- Click-Fit fastening allows for easy removal of funnels
- Leaking-free procedure due to innovative Click-Fit and bayonet closures
- Bayonet closure allows for easy mounting and removal of units
- Sterile Filter Base with recesses allows for simple membrane removal
- Innovative geometry of the funnel allows for effective rinsing after filtration (no sample residue is left in the funnel)

They have been specifically developed for the detection and enumeration of microorganisms in pharmaceuticals, biopharmaceuticals and cosmetics.

Microsart® @vance®
The Microsart® product family consists of all the most recent products from SSB for microbiological analysis, which are especially characterized by innovation and clever design. The Microsart® @filter unit kicks off the new product line Microsart® @vance®. @vance® stands for even more progress and intelligent design, enhanced safety and thus more reliable results.

The products in the Microsart® @vance® line have been specially developed for analyses in the pharmaceutical and biotechnological industry. Following the trend of using Single-use products, these products are delivered sterile, ready-to-use and can be disposed of in an environmentally friendly manner. Microsart® @filter not only saves time and labor costs but minimizes the risk of secondary contamination - that's advanced colony counting by Sartorius Stedim Biotech.

Microsart® Funnel Dispenser
The Funnel Dispenser for secure removal of single, sterile Microsart® @filter has proven itself in practice. Even after opening the bag, the remaining funnels are protected from secondary contamination. The Microsart® Funnel Dispenser is made of high-grade stainless steel, the dispenser opening is made of polypropylene and contains a silicone O-ring. All these materials guarantee reliable autoclaving.

Applications
Colony counting and microscopy

Some of the advantages you will benefit from when using Microsart® @filter units:

Safe and Reliable
- **Sterile Packaged**
  Sterilization at the point of use is not required
- **Fully Disposable Base and Funnel**
  Preparation-and sterilization-free procedure reduces the risk of secondary contamination
- **Optimized Design and Materials**
  No liquid remains after filtration, eliminates the need of rinsing

Easy Handling
- **Click–fit Closure**
  Fast in routine analysis, eliminates the risk of leakage

Economy
- **Adaptable on Combisart®**
  Given flexibility, no additional investment required
- **Transparent Funnel Material**
  Visibility of the complete filtration

Specifications

Materials	Funnel: Polypropylene, Base: Polypropylene, Membrane filter: Cellulose Nitrate (C. Ester); Regenerated Cellulose; choice of various colors and grids
Capacity	100 ml, graduations at 20, 50 and 100 ml 250 ml, 50, 100, 200 and 250 ml graduations
Filter diameter	47 mm, prefilter 40 mm (particle testing only)
Filtration area	13.2 cm²
Max. operating pressure	Vacuum only
Sterilization	Ethylene oxide
Lot certificate	Recovery rate, sterility and performance test

Microsart® @filter 100, Sterile Disposable Filter Units, 47 mm, 100 ml, Packaged on Trays, Ideal for the Use in Clean Benches, 24 Units

Pore Size	Membrane Filter* Color | Grid Color	Order No.
0.2	CN white | black	16D01--10-07--TG
0.45, High Flow	CN white | black	16D01--10-H6--TG
0.45, High Flow	CN gray | white**	16D03--10-H6--TG
0.45	CN green | dark green	16D02--10-06--TG
0.45	RC white (w/o grid)	16D05--10-06--TG

Microsart® @filter 250, Sterile Disposable Filter Units, 47 mm, 250 ml, Packaged on Trays, Ideal for the Use in Clean Benches, 16 Units

Pore Size	Membrane Filter Color | Grid Color	Order No.
0.2	CN white | black	16D01--25-07--TF
0.45, High Flow	CN white | black	16D01--25-H6--TF
0.45, High Flow	CN gray | white**	16D03--25-H6--TF
0.45	CN green | dark green	16D02--25-06--TF
0.65	CN gray | white**	16D03--25-05--TF

Microsart® @filter 100, Sterile Disposable Filter Units, 47 mm, 100 ml, Stacked and Packaged in Bags, Ideal for the Use with Microsart® Funnel Dispenser, 60 Units

Pore Size	Membrane Filter Color | Grid Color	Order No.
0.2	CN white | black	16D01--10-07--BL
0.45, High Flow	CN white | black	16D01--10-H6--BL
0.45, High Flow	CN gray | white**	16D03--10-H6--BL
0.45	CN green | dark green	16D02--10-06--BL
0.45	RC white (w/o grid)	16D05--10-06--BL

Microsart® @filter 250, Sterile Disposable Filter Units, 47 mm, 250 ml, Stacked and Packaged in Bags, Ideal for the Use with Microsart® Funnel Dispenser, 48 Units

Pore Size	Membrane Filter Color | Grid Color	Order No.
0.2	CN white | black	16D01--25-07--BK
0.45, High Flow	CN white | black	16D01--25-H6--BK
0.45, High Flow	CN gray | white**	16D03--25-H6--BK
0.45	CN green | dark green	16D02--25-06--BK
0.65	CN gray | white**	16D03--25-05--BK

Accessories

Description	Order No.
Microsart® Funnel Dispenser Funnel dispenser for secure removal of single, sterile Microsart® @filter packaged in bags	16A08

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

Microsart® Funnel 100 | Microsart® Funnel 250
Sterile Disposable Funnels with Click-fit

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 if not properly performed. Alternatively, the funnels can be sterilized by autoclaving, but this is too laborious for routine use. A disposable filter funnel is the ideal combination for reliability and time saving.

Description
Microsart® Funnels are sterile plastic funnels, which are available for the filtration of various sample volumes. They allow quick performance of the filtration steps required in the routine testing of water, food and beverages, pharmaceutical and cosmetic products.

A Sartorius Stedim Biotech 47 mm gridded membrane is placed on a stainless steel filter support. A Microsart® Funnel is simply and practically fitted on. The sample is filtered.

The funnel is made of polypropylene and thus is elastic enough for optimal sealing with a Click-Fit closure. Graduations are marked to allow accurate sample volumes. The large inner diameter ensures a high flow rate. The optimized shape allows thorough rinsing of the system subsequent to filtration. No liquid is retained in the filter funnel.

Microsart® Base 47 mm
The Microsart® Base 47 mm is the perfect addition to existing Combisart® and Microsart® Combi.jet stainless steel manifolds. The slightly recessed frit ensures the plane positioning of the membrane filter. Thus wrinkled membranes, which make the counting of the colony growth difficult, are eliminated. Lateral notches make sure that the membrane can be removed easily after filtration.

Microsart® Funnel Dispenser
The Funnel Dispenser for secure removal of single, sterile Microsart® Funnels has proven itself in practice. Even after opening the bag, the remaining funnels are protected from secondary contamination. The Microsart® Funnel Dispenser is made of high-grade stainless steel, the dispenser opening is made of polypropylene and contains a silicone O-ring. All these materials guarantee reliable autoclaving.

Applications
Colony counting, particle testing and microscopy

Some of the advantages you will benefit from when using Microsart® Funnel 100:
- **Reliable Results**
  Use a new, sterile funnel for each test for certain prevention of cross contamination!
- **Time-saving**
  Just change the funnel, rather than spending time sanitizing it!
- **Simpler Handling**
  No more holding hot funnels! And, you can see when filtration has been completed, particularly useful when using manifolds in routine testing.

Specifications

Material	Polypropylene
Capacity	100 ml, graduations at 20, 50 and 100 ml 250 ml, graduations at 50, 100, 200 and 250 ml
Filter diameter	47 mm, prefilter 40 mm (particle testing only)
Filtration area	13.2 cm²
Max. operating pressure	Vacuum only
Sterilization	Ethylene oxide
Lot certificate	Sterility and performance test

Microsart® Funnel 100, Sterile Disposable Funnel, 100 ml, 100 Units

Description	Order No.
Microsart® Funnel 100, sterile in 5 sealed bags	16A07--10------N

Microsart® Funnel 250, Sterile Disposable Funnels, 250 ml, 96 Units

Description	Order No.
Microsart® Funnel 250, sterile in 6 sealed bags	16A07--25------N

Accessories and Replacement Parts

Description	Order No.
Microsart® Funnel Dispenser Funnel dispenser for secure removal of single, sterile Microsart® Funnels	16A08
Microsart® Base 47 mm, with frit, stainless steel base for Combisart® and Microsart® Combi.jet Optimized for the use with 47 mm membranes, Click-Fit closure for Microsart® Funnel and Microsart® @filter (other funnel types sealed by bayonet closure)	1ZU---0002
Silicone O-ring for Microsart® Base 47 mm male thread (pack size 3)	6980274
Replacement frit for Microsart® Base, stainless steel	1ZU---0001

Further information about Microsart® Combi.jet and Combisart® stainless steel manifolds you will find on the following pages.

Biosart® 250 Funnels

In microbiological quality control, sterility of the equipment used for processing samples is a necessary basic requirement. The reuseable 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 Stedim Biotech 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 counting, 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 cm²
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 Stedim Biotech 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 Microsart® Funnels 100 and 250, Microsart® @filter 100 and 250, Biosart® 100 Monitors and Biosart® 250 Funnels
- Flammable units such as stainless steel funnels for colony counting
- Autoclavable re-usable funnels made of glass or polycarbonate

The outlet of the 1- and 3-branch manifolds are newly Quick Connection Nipples, which could be used together with Quick Connection Couplings (more information under Microsart® Combi.jet) or as hose nipples for vacuum tubings. 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 (for 50 mm membranes) 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.

Alternatively to 16840 the Microsart® Base 47 mm is highly recommended for all 47 mm membrane filters, Microsart® Funnels and for Microsart® @filter.

The Biosart® 100 adapter 16424 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 turnable single base for 50 mm membranes 16840 or the Microsart® Base 47 mm 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 membrane after 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-set-ups

Filtration systems fast and easy completed at www.sartorius-stedim.com/microbio
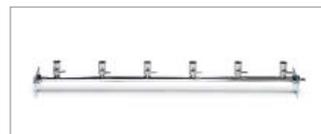
Specifications

Stainless steel quality	High-grade stainless steel: B.S. 304S31|AISI 304
Dimensions L × H × D [mm]	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	50 mm (47 mm, if using a 47 mm frit 6980103) filter diameter
Outlet spout (individual system)	10 mm outer diameter
Inlet (branches only)	Female thread, TR 20 × 2
Outlet (1- and 3-branches only)	Quick Connection Nipple DN 7 (tubings with DN 10 are max. connectable)
Outlet (6-branch)	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® 1-branch stainless steel manifold, 100 ml	1 × 100 ml	16844-CS
Combisart® 1-branch stainless steel manifold, 500 ml	1 × 500 ml	16845-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 (50 mm), 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® Single base with frit (for 50 mm membranes), stainless steel, accommodate stainless steel funnels and Biosart® 100|250	16840
Microsart® Base 47 mm, with frit, stainless steel base for Combisart® and Microsart® Combi.jet Optimized for the use with 47 mm membranes, Click-Fit closure for Microsart® Funnel, Microsart® @filter (other funnel types sealed by bayonet closure)	1ZU---0002

Combisart® Hardware Set-Ups – Choose complete filtration systems easy and fast under: http://www.sartorius-stedim.com/microbio

Replacement Parts for Combisart® Individual Filter Holders

6981001
stainless steel lid

6981003
silicone lid seal

6981002
stainless steel funnel 500 ml
with clamp

6980264
clamp

6981063
stainless steel lid

6981064
silicone lid seal

6981065
stainless steel funnel 100 ml
with clamp

6980264
clamp

6981004
stainless steel
funnel 40 ml
with clamp

6980102 stainless steel frit 50 mm
6980103 stainless steel frit 47 mm

6980124 silicone flat gasket
6980104 PTFE flat gasket

17012-E
Plug Luer Lock
(pack of 12)

17575-ACK
Minisart SRP
(pack of 50)

6980267 3-way tap
6980268 knurled nut

6980225
Plug conical
(pack of 10)

16841
individual
stainless
steel base

Replacement Parts for Combisart® Manifolds

6981004
funnel 40 ml
with clamp

6981063
stainless steel lid

6981064
silicone lid seal

6981065
funnel 100 ml
with clamp

6980264
clamp

6981001
stainless steel lid

6981003
silicone lid seal

6981002
funnel 500 ml with clamp

6980264 clamp

6980271
silicone O-ring
16 × 2 mm

16840*
single base

16840*
single base

6980102 stainless steel frit 50 mm
6980103 stainless steel frit 47 mm

6980124 silicone flat gasket
6980104 PTFE flat gasket

16840* stainless steel single base
(incl. 50 mm frit and silicone gasket)

6980274 silicone O-ring 8 × 20

6980235 silicone O-ring (pack of 3)

6980270
stainless steel cap

6980268
knurled nut

17575-ACK
Minisart SRP
(pack of 50)

17012-E
Plug Luer Lock
(pack of 12)

Manifolds
without base
supports and
funnels:
16844 1-branch
16842 3-branch
16843 6-branch

1EAS—0026 quick connection nipple
6980272 hose nipple

6980271
silicone O-ring
16 × 2 mm

6980267
stainless steel
3-way tap

6980225
Plug conical
(pack of 10)

*) Alternatively to 16840 the Microsart® Base 47 mm is highly recommended
for all 47 mm membrane filters, Microsart® Funnels and Microsart® @filter units.

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 single base 16840 male thread (also 1ZU---0002)	3	6980274
Silicone O-ring for manifold female threads	3	6980235
Silicone flat gasket underneath the frit (16840)	1	6980124
PTFE flat gasket underneath the frit (16840)	1	6980104
Stainless steel frit, 50 mm diameter (16840)	1	6980102
Stainless steel frit, 47 mm diameter (16840)	1	6980103
Quick Connection Nipple, stainless steel	1	1EAS--0026
Hose nipple, stainless steel, DN 10	1	6980272
Stainless steel frit for Microsart® Base 47 mm (1ZU---0002)	1	1ZU---0001

Funnels, Lids, Seals and Filter Holders to Connect on the Combisart® System

Description	Capacity	Membrane Filter ⊧	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® single base) or onto 16841 (individual base)	16424
Biosart® 100 Adapter, stainless steel with silicone stopper	Biosart® 100 Monitors onto Combisart® manifolds 16844, 16842 and 16843	16835
Glass funnel Adapter, stainless steel with silicone stopper	16306│15 (glass funnel, 30 ml) onto Combisart® manifolds 16844, 16842 and 16843	16836
Glass funnel Adapter, stainless steel with silicone stopper	16307 (glass funnel, 250 ml) onto Combisart® manifolds 16844, 16842 and 16843	16837

Microsart® Combi.jet
2-branch Stainless Steel Manifold for Microbiological Analysis

The Microsart® Combi.jet is a 2-branch manifold, made of high-grade stainless steel. The manifold has been specifically designed for the use together with the Microsart® e.jet Transfer Pump. The system is able to create sufficient vacuum for vacuum filtration concomitantly transferring the filtered liquid directly to waste. Microsart® Combi.jet and Microsart® e.jet can be easily connected and disassembled by the innovative Quick Connection technology.

Compact Design
The complete traditional equipment, such as connectors, tubes, suction flask, protection filter, Woulff's bottle and a vacuum pump, requires a lot of laboratory space and is time consuming to operate and maintain. Microsart® Combi.jet reduces operating complexity due to its small and compact design. The Transfer Pump Microsart® e.jet fits visually and ergonomically into this design.

Quick Connection
Building-up the vacuum filtration system is easy and fast thanks to the innovative Quick Connection Coupling and Nipples at the Microsart® Combi.jet manifold and Microsart® e.jet Transfer Pump. Simply push-to-connect for assembling and pull-to-disassembling the whole system within seconds.

Sterile Venting
A special feature of the Microsart® Combi.jet manifold are the stainless steel three-way valves (taps). They allow 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.

Maximum Flexibility
The Microsart® Combi.jet enables you to select the optimal hardware and consumables for your needs in microbiological analysis in quality assurance. At the heart of the whole system is the Microsart® Combi.jet, the stainless steel 2-branch manifold, designed to accommodate all types of filter holders and funnels such as:
- Ready-to-use units Microsart® @filter 100 and 250
- Ready-to-use units Microsart® Funnel 100 and 250
- Ready-to-use units Biosart® 100 Monitors
- Ready-to-use units Biosart® 250 Funnels
- Flammable units such as stainless steel funnels
- Autoclavable glass filter holders
- Autoclavable polycarbonate filter holders

Reliability: Ideal for Microbiology Applications
- Sterile venting after filtration
- Easy to clean and sanitize
- Smooth and reliable filtration

Economically Efficient
- Saving time due to Quick Connection technology
- Saving work space (saves 70%)
- No need of suction flasks and water traps

Specifications

Stainless steel quality	High-grade stainless steel: B.S. 304S31	AISI 304
Dimensions L f H f D [mm]	246 f 98 f 130
Max. operating pressure	Vacuum only
Sterilization	By autoclaving (max. 134 °C)
Parts and materials	Manifold: stainless steel, silicone O-ring
Quick Connection Coupling	PVDF, closure: stainless steel, sealing: FKM	FPM
Inlet (manifold)	Female thread, TR 20 f 2
Outlet	Quick Connection Coupling (female), inner diameter NW 7, non-shut-off

Microsart® Base 47 mm

Materials	Stainless steel, silicone O-ring
Suitable membrane filter diameter	47 mm
Filtration area (e. g. for the use with Microsart® Funnels)	12.5 cm²

Microsart® Combi.jet 2-branch Manifold, Made of High-grade Stainless Steel, without Frits and Funnels, to Accommodate Various Funnel Types

Description	Order No.
Microsart® Combi.jet 2-branch manifold, without frits	16848-CJ
Microsart® Base 47 mm, with frit, stainless steel base for Combisart® and Microsart® Combi.jet Optimized for the use with 47 mm membranes, Click-Fit closure for Microsart® Funnel and Microsart® @filter (other funnel types sealed by bayonet or adapter)	1ZU---0002

Accessories and Replacement Parts for Microsart® Combi.jet

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 Microsart® Base 47 mm male thread	3	6980274
Silicone O-ring for manifold female threads	3	6980235
Combisart® single base, stainless steel, optimal for the use with 50 mm membrane filters, funnel closure by bayonet or adapter	1	16840
Microsart® Combi.jet Coupling, Quick Connection, PVDF	1	1EAS--0022

Funnels and filter holders to connect onto the Microsart® Combi.jet manifold are equivalent to those for the use with the Combisart® system (page 231).

How to Set-up a Vacuum Filtration System

Microsart® Combi.jet 2-branch Stainless Steel Manifold plus Microsart® e.jet
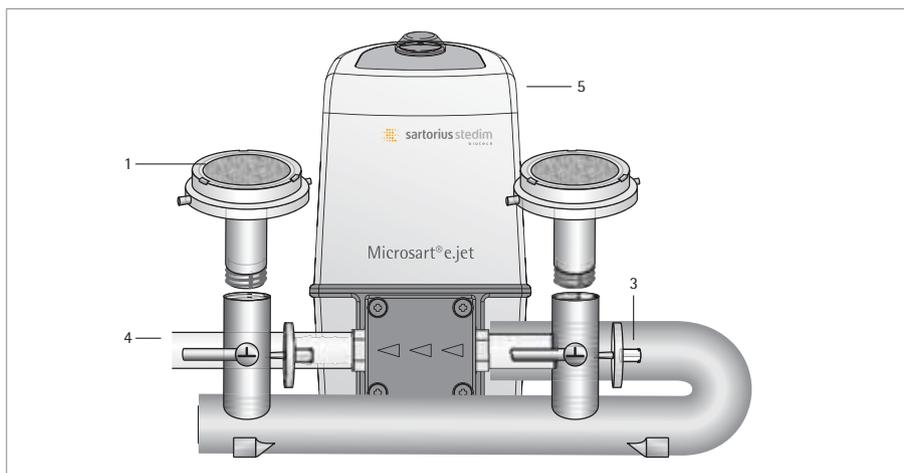
The filter stations are directly connected to a Transfer Pump for simultaneous transfer of the filtrate to waste. Easy assembling thanks to Quick Connection technology.

Order Information

Pos.	Description	Order Qty.	Order No.	Detailed Information on Page
	Microsart® Combi.jet stainless steel equipment:			237
1	Microsart® Base 47 mm	2	1ZU---0002	
2	Microsart® Combi.jet 2-branch manifold	1	16848-CJ	
	Sterile venting of the filter station:			234
3	Minisart® SRP25, 0.2 µm	1	17575--------ACK	
4	Silicone tubing, pressure-sided,1 m	2*	1ZAS--0007	249
	Vacuum Pump:			248
5	Microsart® e.jet Transfer Pump, 230 V, 50 Hz	1	166MP-4	
	Additional accessories:			
	Microsart® @filter 100, sterile filter units, packaged on trays	1	16D01--10-H6--TG	226
	Stainless steel tweezers	1	16625	253
	Colony Counter	1	17649	252
	Incubator	1	18113	252
	Container for anaerobic incubation	1	16671	253

* required length depends on distance between Transfer Pump and drain

Combisart® 1–branch Stainless Steel Manifold Plus Microsart® mini.vac
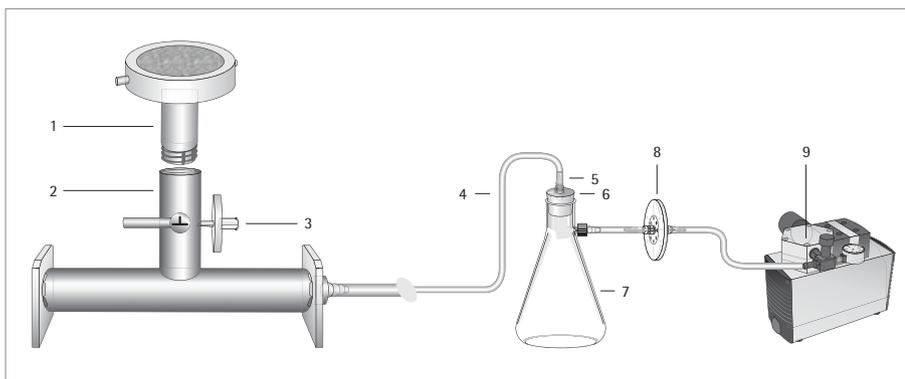
The filter station is connected to a suction flask, which is connected to a filtrate-protected vacuum pump.

Order Information

Pos.	Description	Order Qty.	Order No.	Detailed Information on Page
	Combisart® stainless steel equipment:			231
1	Combisart® single base, 50 mm	1	16840	
2	Combisart® 1–branch manifold	1	16844	
	Sterile venting of the filter station:			234
3	Minisart® SRP25, 0.2 μm	1	17575--------ACK	
4	Rubber vacuum hose, 1 m	3*	16623	246
	Suction flask and stopper:			245
5	Tube connector	1	17204	
6	Silicone stopper	1	17173	
7	Suction flask, 2 liters	1	16672	
	Water trap for pump protection:			246
8	Vacusart®, 0.45 μm	1	17804----------M	
	Vacuum Pump:			247-249
9	Microsart® mini.vac, 230 V, 50 Hz	1	16694-2-50-06	
	Additional accessories:			
	Microsart® e.motion Dispenser	1	16712	239
	Stainless steel tweezers	1	16625	253
	Colony Counter	1	17649	252
	Incubator	1	18113	252
	Stainless steel prefilter attachment	1	16807	253
	Container for anaerobic incubation	1	16671	253

* required length depends on distance between the filter station and the vacuum source

Combisart® 1-branch Stainless Steel Manifold plus Microsart® e.jet
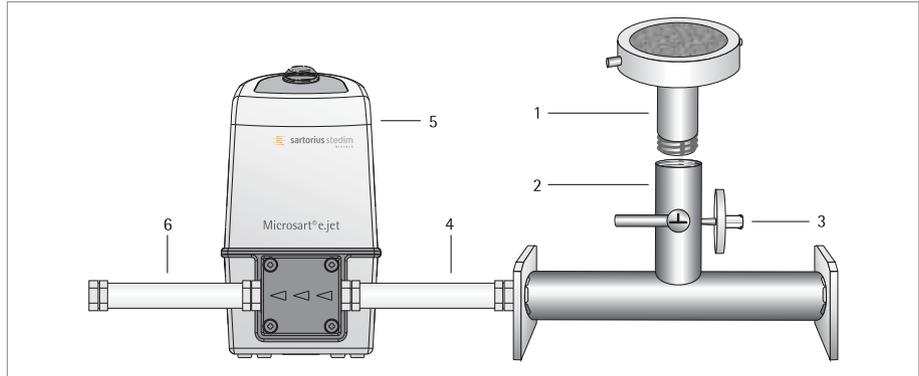
The filter station is directly connected to a vacuum fluid pump for simultaneous transfer of the filtrate to waste. Easy assembling thanks to Quick Connection technology.

Order Information

Pos.	Description	Order Qty.	Order No.	Detailed Information on Page
	Combisart® stainless steel equipment:			231
1	Combisart® single base, 50 mm	1	16840	
2	Combisart® 1-branch manifold	1	16844	
	Sterile venting of the filter station:			234
3	Minisart® SRP25, 0.2 µm	1	17575--------ACK	
4	Silicone tubing with Quick Connection Coupling, 20 cm, vacuum-sided	1	1ZA---0006	249
	Vacuum Pump:			248
5	Microsart® e.jet Transfer Pump	1	166MP-4	
6	Silicone tubing, pressure-sided 1 m	2*	1ZAS--0007	249
	Additional accessories:			
	Microsart® e.motion Dispenser	1	16712	240
	Stainless steel tweezers	1	16625	253
	Colony Counter	1	17649	252
	Incubator	1	18113	252
	Stainless steel prefilter attachment	1	16807	253
	Container for anaerobic incubation	1	16671	253

* required length depends on distance between vacuum source and drain

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 W × H × D [mm]	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|29 psi pressure
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 cm²
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

6981001
stainless steel lid

6981003
silicone lid seal

6981002
stainless steel funnel 500 ml
with clamp

6980264
clamp

6981063
stainless steel lid

6981064
silicone lid seal

6981065
stainless steel funnel 100 ml
with clamp

6980264
clamp

6981004
stainless steel funnel 40 ml
with clamp

6980102 stainless steel frit 50 mm
6980103 stainless steel frit 47 mm

6980124 silicone flat gasket
6980104 PTFE flat gasket

6982119 spare parts
(leaf spring, washer, lock washer)

6980101 stainless steel base

Replacement Parts for Traditional Manifolds

6981004
funnel 40 ml
with clamp

6980271
silicone O-ring
16 + 2 mm

6980270
stainless steel cap

6982119 spare part
kit for tap
(leaf spring, washer,
lock washer)

6981063
stainless steel lid

6981064
silicone lid seal

6981065
stainless steel
funnel 100 ml
with clamp

6980264
clamp

6981001
stainless steel lid

6981003
silicone lid seal

6981002
stainless steel funnel 500 ml
with clamp

6980264
clamp

6980102 stainless steel frit 50 mm
6980103 stainless steel frit 47 mm

6980124 silicone flat gasket
6980104 PTFE flat gasket

Manifolds
without funnels:

16824-----1 3-branch
16831-----1 6-branch

6980272
hose nipple

6980271
silicone O-ring

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 *f* 100 ml	16219
Individual stainless steel filter holder, 500 ml	1 *f* 500 ml	16201
Individual stainless steel filter holder without lid, 40 ml	1 *f* 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 *f* 100 ml	16824
3-branch stainless steel manifold, 500 ml	3 *f* 500 ml	16828
6-branch stainless steel manifold, 100 ml	6 *f* 100 ml	16832
6-branch stainless steel manifold, 500 ml	6 *f* 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 75 D 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 (not necessary when a Vacusart® is connected directly to the bored stopper)	17204
Suction flask, 1 liter (not available in countries which have safety restrictions on glass hose nipples)	16606

Replacement Parts for Suction Flasks

Description	Order No.
Glass tube for silicon stopper 75 D for suction flask 5 liters 16672-----1	1EAQ--0017
Bored stopper 75 D for suction flask 5 liters 16672-----1	1EAS--0019
Assembling kit for hose barb for suction flask 5 liters 16672-----1	1EA---0018
Hose barb, complete, Polypropylene, for suction flask 2 liters 16672	6983003

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	16306│15 (glass funnels, 30 ml) onto the suction flask 16672	17174
Silicone stopper	16307 (glass funnel, 250 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	16306│15 (glass funnels, 30 ml) onto the suction flask 16606	17005
Silicone stopper	16307│16 (glass funnel, 250 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. It could be put directly into the hole of the bored stopper and connected with the rubber hose to the vacuum pump.

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

Microsart® mini.vac
Microsart® maxi.vac
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.
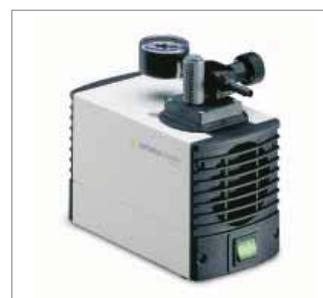
Specifications of Electric Vacuum Pumps

	Microsart® maxi.vac 16694–2–50–22 16694–1–60–22	Microsart® mini.vac 16694–2–50–06 16694–1–60–06
Delivery [l/min]	22	6
Ultimate Vacuum [mbar]	100	100
Noise level [100 mbar]	57.5–59.0 dBA	53.5 dBA
Operating Pressure [bar]	1	2.5
Materials (contact with filtrate possible)	Aluminum, CR (Neoprene), NBR (Perbunan)	PPS, EPDM, FPM (Viton)
Connectors for Tube [mm]	ID 9	ID 4
Ambient Temperature	5...40 ℃	5...40 ℃
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 [W]	130	65
Operating Current [A]	0.9	0.63
Weight [kg]	7.1	1.9
Dimensions W f H f D [mm]	261 f 204 f 110	164 f 141 f 90
Recommended application	All multi-branch manifolds individual filter station	Single filtration run up to 3-branch manifolds

Order Numbers

Description	Order No.
Microsart® maxi.vac for multiple filtration runs, 230 V, 50 Hz	16694-2-50-22
Microsart® maxi.vac for multiple filtration runs, 115 V, 60 Hz	16694-1-60-22
Microsart® mini.vac up to 3 filter stations in parallel, 230 V, 50 Hz	16694-2-50-06
Microsart® mini.vac up to 3 filter stations in parallel, 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
Fine adjustment head for 16694-2-50-06 and -1-60-06, for pressure filtration	1EV---0003

Microsart® e.jet Transfer Pump with Quick Connection

The Microsart® e.jet is a new vacuum laboratory pump able to create sufficient vacuum for vacuum filtration and concomitantly transferring the filtered liquid directly to waste. The second generation of Microsart® e.jet is ideal for sample preparation in Microbiology achieving a trans membrane pressure of 600 mbar and a higher flow rate of > 4.0 Nl/min (4.0 Normliters water displacement by air in one minute). Constant flow rates and a defined maximum vacuum guarantee smooth and reliable filtration.

Reducing Operating Complexity

Until now vacuum equipment for the Membrane Filtration Method consists of numerous parts including connectors, tubes, vacuum containers, protection filter, Woulff's bottle and a vacuum pump. After several samples the vacuum must be broken to empty the filtrate collection container. The complete traditional equipment requires far more laboratory space and is time consuming to operate and maintain. Microsart® e.jet will eliminate the need for side-arm flasks or Woulff's bottles from the laboratory filtration bench.

The Microsart® e.jet pump is an ideal accessory for manifolds up to 3 filter stations. Compared to traditional equipment Microsart® e.jet and a stainless steel manifold require only 30% of the average space meaning in particular less congestion working in Laminar Flow Cabinets.

Traditional vacuum pumps often loose their efficiency and capability to generate sufficient vacuum, when liquid is drawn into the pump head. The Microsart® e.jet is designed to pump both gas and liquids, meaning no loss of efficiency or malfunctions from water drawn into the pump head.

Quick Connection

Building-up the vacuum filtration system is easy and fast thanks to the innovative Quick Connections. The Microsart® e.jet Transfer Pump is equipped with Quick Connection Nipples assembled to Quick Connection Couplings on hose nipples for DN 10 tubings. Simply push-to-connect for assembling and pull-to-disassembling the whole system within seconds. The Quick Connections are non-shut-off.

Some of the advantages you will benefit from when using the Microsart® e.jet
- Ideal for microbiology applications
- No need of suction flasks and water traps
- Saving 70% of work space while saving money – that's economic efficiency

Specifications

Technical Specifications

Flow rate	> 4.0 Nl/min
Max. vacuum	0.4 bar
Max. pressure	1.0 bar
Mains	100–240 V│50-60 Hz
Materials (in contact with filtrate)	PTFE, ETFE, Polypropylene, EPDM, POM, PSU
Weight [g]	Pump: 1425.3; Power supply: 202.8
Dimensions W ƒ L ƒ H [mm]	120 ƒ 170 ƒ 190
Max. ambient Temp.	+ 5...+ 40 ° C
Max. temp of liquid	+ 5...+ 80 ℃
Max. viscosity	<150 cSt
Protection type	IP 64
Protection class	III
Inlet│outlet	Quick Connection on hose nipples for DN 10 tubings

Order Information

Description	Order Number	No. in Picture
Microsart® e.jet Transfer Pump with Quick Connection, without tubings, inlet and outlet hose nipples for DN 10 tubings	166MP-4	1

Accessories

Description	Order Number	No. in Picture
Tubing with Quick Connection Coupling (PSU), silicone, 20 cm, for vacuum-sided connection, inner diameter DN 10, outer diameter DN 20, wall thickness 5 mm (when ordering, please state length required in meters)	1ZA---0006	2
Silicone tubing, 1 m, for pressure-sided connection, inner diameter DN 10, outer diameter DN 14, wall thickness 2 mm	1ZAS--0007	3

Replacement Parts

Description		
Pump head complete for 166MP-3 and 166MP-4	1EP---0001	
Power supply complete for 166MP-3 and 166MP-4	1EE---0007	
Threaded Fittings		
Quick Connection set, 2 Nipples (POM) on R3/8" male thread and 2 Couplings (PSU) on DN 10 hose nipple	1EAS--0027	4
Quick Connection Nipple, stainless steel	1EAS--0026	5
DN 10 hose nipple on R3/8" male thread	1EAF--0020	

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., 110 V, 60 Hz	16695
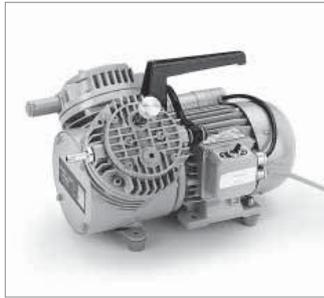
Replacement Parts	Order No.
Set of two neoprene membranes, four valve springs and two neoprene head seals for 16612│16615	6986017
Set of one neoprene membrane, two valve springs and one neoprene head seal for 16692│16695	6986105

Water Jet Pump
Simple vacuum source. For connection to
a water tap with G ¾ male thread.

Description	Order No.
Water jet pump, with G ¾ female 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
Replacement part: tubing with sinker for 16685-2 and 16685	6986125
Service Kit for Dosing Syringe 16685-----2	1EP---0002

Colony Counter
Compact, handy battery–operated colony counter, it 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 *f* 47 mm or 160 *f* 56 mm| 60 mm or 72 *f* 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	18113
Voltage [V]	230
Frequency [Hz]	50|60
Rated power [kW]	0.2
Weight [kg]	5.5|12
Max. load for insertion plate [kg|lbs]	5|12
Dimensions W *f* H *f* D [mm]	Inner 270 *f* 205 *f* 288 Outer 340 *f* 270 *f* 431
Temperature range	20 ℃ (or 5 ℃ above room temperature) to 50 ℃
Temperature deviation	Less than ±0.2 ℃ (at 37 ℃ and RT 20 ℃)
Spacial temperature deviation	Less than ±0.8 ℃
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 Stedim Biotech 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. The 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

Aluminum 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 aluminum case

Sterility Testing Systems
Sterisart® Universal Pump

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.

The new Sterisart® Universal Pump is available in two versions: as a basic version, 16419, and as an upgraded version, 16420, with display and user software. The pump can be used in clean rooms, integrated into clean benches, or installed countersunk in the working surface of isolators. Its low, compact design has a space-saving footprint – a great benefit for most clean room benchtops and isolators.

Additional Features and Benefits
- Closed system – no ventilation for enhanced safety
- Rugged and maintenance-free
- Compact and ergonomic construction
- Modular design
- Pump available with special software (menu-driven prompts for operator guidance; all process sequences can be logged; barcode recognition)

Special brochures available on request.
Order no. SLD1003-e, SLD2010

Technical Specifications for Sterisart® Universal Pump

Pump flow rate [ml/min]	70–650
Power requirements [VAC]	100–240
Frequency [Hz]	50–60
Power consumption [W]	100
Dimensions W ƒ D ƒ H [mm] Pump	Approx. 336 ƒ 260 ƒ 210 (with lever)
Pump with holding ring for bottles, container	Approx. 440 ƒ 365 ƒ 485
Weight [kg] Basic version 16419	Approx. 13.5
Upgraded version 16420 with display and user software	Approx. 14.6

Ordering Information

Order No.	Description
16419	Sterisart® Universal pump, basic version
16420	Sterisart® Universal pump, upgraded version with display|user software

Accessories

Order Number	Description
1ZE---0033	Footswitch
1ZG---0014	Adapter for Sterisart® NF units, fitting into container for draining of Millipore Equinox pump
1ZG---0025	Adapter for Sterisart® NF units, fitting into container for draining (with two slightly different diameters of the fixation-slots) of new Millipore Equinox pump
1ZE---0039	Transport trolley
1ZE---0040	Communication kit
1ZE---0050	Installation kit for isolators

Further accessories are available on request.

Sterility Testing Systems
Sterisart® NF

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, SL-2019-e, SLD2006-e, SLD2005-e, SLD2007-e, S--2019-e, SLD2009-e, SLD2011-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
  - Several user-friendly, practical adapters available
  - Product-|lot number identification
- Safe and protected:
  - 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 ℃
Max. operating temperature	50 ℃
Sterilization	ETO (ethylene oxid gas) or gamma irradiation

Ordering Information

Sterisart® NF alpha Disposable Units for Sterility Testing in Clean Rooms, Individually, Sterile Packaged, ETO-sterilized, Needles Made of Flame-sterilizable Stainless Steel, 10 Units

Type of Sample	Type of Sample Container	Description	Order No.
LVPs	Closed glass bottles with septum	Sterisart® NF alpha with long dual-needle metal spike, sterile-vented	16466--------ACD
LVPs SVPs	Open containers, i.e. glass ampoules, glass bottles collapsible bags	Sterisart® NF alpha with long needle and protective plate, inclusive sterile venting needle	16467--------ACD
LVPs SVPs	Open containers, i.e. glass ampoules, glass bottles, collapsible bags	Sterisart® NF alpha with long needle, inclusive sterile venting needle	16467--------TCD
Medical devices	Tubing systems and bags with Luer or Luer Lock connectors	Sterisart® NF alpha with Luer or Luer Lock connector, inclusive long needle and sterile venting needle	16468--------ACD

Sterisart® NF gamma Disposable Units for Sterility Testing in Isolators, Individually Sterile, Double-packaged, Gamma Irradiated, Needles Made of Flame-sterilizable Stainless Steel, 10 Units

Type of Sample	Type of Sample Container	Description	Order No.
LVPs	Closed glass bottles with septum	Sterisart® NF gamma with long dual-needle metal spike, sterile-vented	16466--------GBD
SVPs	Closed glass vials with septum	Sterisart® NF gamma with short dual-needle metal spike, sterile-vented	16476--------GBD
LVPs, SVPs, eye drops	Closed plastic containers|vials| ampoules, plastic containers of Blow-Fill-Seal fillings	Sterisart® NF gamma with long needle, (side opening, with solid pointed tip, non-coring), protective plate, inclusive sterile venting needle	16477--------GBD
LVPs SVPs	Open containers, (i.e. glass ampoules, glass bottles), collapsible bags	Sterisart® NF gamma with long needle and protective plate, inclusive sterile venting needle	16467--------GBD
Lyophillisates, soluble powders, liquid antibiotics	Closed glass vials with septum	Sterisart® NF gamma with two dual-needle metal spikes of different length, one is sterile-vented	16475--------GBD
Pre-filled syringes	Syringes with and without needles	Sterisart® NF gamma with syringe-adapter and long dual-needle metal spike, sterile-vented	16469--------GBD
Medical devices	Tubing systems and bags with Luer or Luer Lock connectors	Sterisart® NF gamma with Luer or Luer Lock connection, inclusive long needle and sterile venting needle	16468--------GBD
New Medical devices	Containers|bags with Luer Lock male connectors	Sterisart® NF gamma with female Luer Lock connector	16478--------GBD

Sterisart® NF gamma Septum, Disposable Units for Sterility Testing in Isolators, Sterisart® NF Containers with Integrated Septum for Reliable Sample Taking during Incubation, Individually Sterile, Double-Packaged, Gamma Irradiated, Needles Made of Flame-sterilizable Stainless Steel, 10 Units

LVPs	Closed glass bottles with septum	Sterisart® NF gamma Septum with long dual-needle metal spike, sterile-vented	16466--------GSD
LVPs SVPs	Open containers, (i.e. glass ampoules, glass bottles), collapsible bags	Sterisart® NF gamma Septum with long needle and protective plate, inclusive sterile venting needle	16467--------GSD
Lyophillisates, Soluble powders, Liquid antibiotics	Closed glass vials with septum	Sterisart® NF gamma Septum with two dual-needle spikes of different length, one is sterile-vented	16475--------GSD
Pre-filled syringes	Syringes with and without needles	Sterisart® NF gamma Septum with syringe-adapter and long dual-needle metal spike, sterile-vented	16469--------GSD

Accessories

Application	Description	Order No.
Difficult-to-dissolve powders in closed glass vials with septum, non-vacuo	Sterisart® NF gamma tubing system with two dual-needle metal spikes of different length, needles made of flamable stainless steel	16470--------GBD
Sterile venting of containers with rinsing solution and nutrient media, additional sterile venting needles, equal to the inclusive needles of the Sterisart® NF units i.e. type 16467, 16468 and 16477	Needle with venting filter, 4 cm, stainless steel, individually sterile packaged, gamma-irradiated, pack size 50	16596--------HNK

Further units (16464--------ACD|GBD) on request.

Re-usable Sterility Test System

Re-usable sterility test system for the sterility testing of injection and infusion solutions. The filter holders are easy to clean, dish-watersafe 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, 40.5 f 3.5 mm (6980574)
Filter diameter	47 mm
Filtration area	12.5 cm²
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 Re-usable Sterility Test System

Description	Order Numbers
Filter holder with 130 ml capacity	16523
Stainless steel manifold	16826
Stainless-steel adapter	17756
T-distributor for 2 filter holders	16966
Filling cap with filling needle	16967
Silicone adapter	16968
Peristaltic pump	16696
Silicone tubing, 4 f 1.5 mm	16699
Holding rod for inlet tube|needle	16974
Incubation rack	16975
Tube clamps (tubing clips)	16978
Venting filters, pack size 50	17574----------K

Additional Accessories for Re-usable Sterility Test System (for Ampoule Testing)

Description	Order Numbers
Inlet tube	16963
Holding tongs	16973
Ampoule breaker	16969
Clamp holder	16976
Support stand	16970

Additional Accessories for Re-usable Sterility Testing System
(for Testing Infusion Solutions in Bottles)

Description	Order Numbers
Inlet needle (long)	16964
Inlet needle (short)	16964-----3

Consumables (Membrane Filters, 47 mm, 100 Pieces/Pack)
for the Re-usable 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	0.2 μm	Cellulose nitrate membrane filter	pH 4-8, most hydrocarbons
13107--47----HCN	0.2 μm	Cellulose nitrate membrane filter with hydrophobic edge	pH 4-8, most hydrocarbons
11107--47------N	0.2 μm	Cellulose acetate membrane filter	pH 4-8, most alcohols, hydrocarbons and oils
13507--47----HCN	0.2 μm	Cellulose acetate membrane filter with hydrophobic edge	pH 4-8, most alcohols, hydrocarbons and oils
18407--47------N	0.2 μm	Regenerated cellulose membrane filter	pH 3-12, solvent-resistant

Peristaltic Pump

Specifications

Rotor speed	1.5–220 rpm
Operating voltages and frequencies	110–240 V 50/60 Hz
Speed control ratio	147:1
Power rating	100 VA
Operating temperature	4 ℃ to 40 ℃
Storage temperature range	−40 ℃ to 70 ℃
Weight	5.5 kg│12.1 lbs
Noise	<70 dBA at 1 m
Standards	IEC 335-1, EN 60529 (IP31)
Machinery Directive	98/37/EG EN 60204-1
Low Voltage Directive	73/23/EG EN 61010-1
EMC Directive	89/336/EG EN 50081-1/EN 50082-1

Order Number

16696

Bags for Fluid Handling

FLEXBOY ®

50 mL

Standard Flexboy® Bags

Description
Standard Flexboy® Bags are designed for the preparation, storage and transport of biopharmaceutical solutions, intermediates and final bulk products. They provide a Single-use alternative to traditional glass and rigid plastic carboys in a large variety of applications.

Applications
The broad chemical compatibility of Flexboy® Bags assures the safe processing of a wide range of biopharmaceutical fluids in a variety of applications:
- Fraction collection
- Sample collection
- Buffers and Media sterile filtration & storage
- Bulk Harvest
- Product pooling
- Bulk intermediate hold
- Final Product transport

Cost Reduction and Risk Reduction
Single-use Systems improve process safety as they reduce the risk of cross contamination from batch-to-batch and product-to-product. Cost and time consuming CIP & SIP operations are minimized. This results not only in significant cost savings within the entire process, but also in the optimization of capacity utilization.

Flexibility
Standard Flexboy® bags are available in a variety of bag sizes allowing easy adaptation to process volume and media.

Female and male Luer Lock fittings allow easy and convenient filling, emptying and sampling.

Easy Implementation
Standard Flexboy® Bags with Luer Lock connections are available in bag chamber volumes between 5 ml and 20 l. They are supplied sterilized and ready to use. This allows an easy and convenient process implementation. A series of associated systems such as Flexboy® Trays and Racks facilitate an easy bag handling. Sartorius Stedim Biotech supports users already at the design & implementation phase of a new research and development with the most comprehensive support program that ensures successful design implementation of Single-use Manufacturing.

Features	Benefits
Multiple manufacturing sites	High security of supply
100% integrity testing of bag and immediate connection	Process safety and integrity
All connections extensively qualified	Safe and robust
Full compliance with ISO11137	Highest sterility assurance level
Standard design	Most designs available from stock

Specifications

Bag Chamber	Multiple Film Construction, EVA Fluid Contact Layer
Tubing	EVA, Silicone
Fittings	Female Luer Lock, Needle free sampling port
Number of Ports	3 (except for 5 ml: 1 Port)
Volumes	5 ml –20 l
Sterilization	By Gamma Irradiation

Security of Supply

Sartorius Stedim Biotech has established multiple manufacturing sites with consistent industrial processes. The expertise of designing Single-use solutions based on collaborative supplier management and customer demand planning ensure a state of the art and robust supply chain that can cope with strong market growth.

Validation

Flexboy® Bags have been qualified applying the most complex and innovative test regimes. Biological, chemical and physical tests combined with extensive extractable testing provide users of Flexboy® with data representing the widest range of process fluids in a variety of processing conditions.

Full compliance with ISO11137 allows sterility assurance level validation of 10^{-6} for each Single-use System over its entire shelf life.

Quality Assurance

Sartorius Stedim Biotech Quality Systems for Single-use Products follow applicable ISO and FDA regulations for Medical Devices. Design, Manufacture and Sterilization processes are conducted under conditions that mirror biopharmaceutical operations and meet cGMP requirements.

Flexboy® bags are tested for compliance to:
- USP <87>: Biological reactivity tests, in Vitro
- USP <88>: Biological reactivity tests, in Vivo
- USP <661>: Tests for plastic
- USP <788> and E.P. 2.9.19 : Particulate
- ISO 11737: Bioburden
- ISO 11137: Sterilization of Medical Devices

Rapid Supply

The majority of Standard Flexboy® storage systems are available from stock.

Ordering Information

Standard Flexboy® with EVA Tubes (5 ml with Luer Lock Connection)
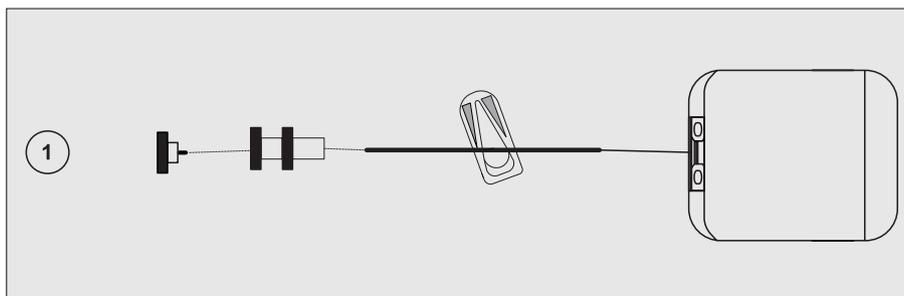
Part Number	Description	Tubing	Bag Port 1	Bag Port 2	Bag Port 3	Qty/ Box
FB115270	Flexboy® 5 ml	EVA	$3/16$" f $1/4$" f 5 cm (2") Female LL + plug, slide clamp	NA	NA	100

Dimensions

5 ml – 3l

Volume	5 ml	50 ml	150 ml	250 ml	500 ml	1 l	3 l
Length (L) [mm|"]	70|2.76	134|5.28	205|8.07	230|9.06	241|9.49	299|11.77	381|15.00
Width (W) [mm|"]	59|2.32	95|3.74	85|3.35	94|3.70	130|5.12	155|6.10	223|8.78
Length inc. Tubing (T) [mm|"]	110|4.33	231|9.09	302|11.89	327|12.88	338|13.31	396|15.59	478|18.82
Film Surface Area [cm²| in²]	21|3.3	143|22.2	275|42.6	329|51.0	452|70.0	707|109.6	1346|208.7

5 l – 50 l

Volume	5 l	10 l	20 l
Length (L) [mm|"]	376|14.80	621|24.45	654|25.75
Width (W) [mm|"]	332|13.07	300|11.81	431|16.97
Length inc. Tubing (T) [mm|"]	473|18.62	718|28.27	749|29.57
Film Surface Area [cm²| in²]	1929|299.0	3528|546.9	4826| 748.0

Ordering Information

Standard Flexboy® with EVA Tubes (50 ml to 3 l with Luer Lock Connection)

Part Number	Description	Tubing	Bag Port 1	Bag Port 2	Bag Port 3	Qty/Box
FFB102603	Flexboy® 50 ml	EVA	$1/4$" f $5/16$" f 10 cm (4") LL male + Cap, pinch clamp	$1/4$" f $5/16$" f 10 cm (4") LL female + Cap, pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20
FFB102643	Flexboy® 150 ml	EVA	$1/4$" f $5/16$" f 10 cm (4") LL male + Cap, pinch clamp	$1/4$" f $5/16$" f 10 cm (4") LL female + Cap, pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20
FFB102670	Flexboy® 500 ml	EVA	$1/4$" f $5/16$" f 10 cm (4") LL male + Cap, pinch clamp	$1/4$" f $5/16$" f 10 cm (4") LL female + Cap, pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20
FFB103547	Flexboy® 1000 ml	EVA	$1/4$" f $5/16$" f 10 cm (4") LL male + Cap, pinch clamp	$1/4$" f $5/16$" f 10 cm (4") LL female + Cap, pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20
FFB102812	Flexboy® 3000 ml	EVA	$1/4$" f $5/16$" f 10 cm (4") LL male + Cap, pinch clamp	$1/4$" f $5/16$" f 10 cm (4") LL female + Cap, pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20
FFB103551	Flexboy® 5 l	EVA, Silicone	$3/8$" f $15/32$" f 10 cm (4") LL male + Hose barb $3/8$" f $1/4$" + $3/16$" f $5/16$" f 50 cm (20") + male Luer Lock + female screw + cap + dust cap + pinch clamp	$3/8$" f $15/32$" f 10 cm (4") LL male + Hose barb $3/8$" f $1/4$" + $3/16$" f $5/16$" f 50 cm (20") + female luer + male luer plug + dust cap + pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20
FFB102470	Flexboy® 10 l	EVA, Silicone	$3/8$" f $15/32$" f 10 cm (4") LL male + Hose barb $3/8$" f $1/4$" + $3/16$" f $5/16$" f 50 cm (20") + male Luer Lock + female screw cap + dust cap + pinch clamp	$3/8$" f $15/32$" f 10 cm (4") LL male + Hose barb $3/8$" f $1/4$" + $3/16$" f $5/16$" f 50 cm (20") + female luer + male luer plug + dust cap + pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20
FFB102326	Flexboy® 20 l	EVA, Silicone	$3/8$" f $15/32$" f 10 cm (4") LL male + Hose barb $3/8$" f $1/4$" + $3/16$" f $5/16$" f 50 cm (20") + male Luer Lock + female screw cap + dust cap + pinch clamp	$3/8$" f $15/32$" f 10 cm (4") LL male + Hose barb $3/8$" f $1/4$" + $3/16$" f $5/16$" f 50 cm (20") + female luer + male luer plug + dust cap + pinch clamp	$3/16$" f $1/4$" f 5 cm (1.97 in.) + septum	20

Laboratory Water Systems

arium® 615S Softener Systems
Water Pretreatment Systems

Description
arium® 615S systems are designed to produce highly softened water, free of magnesium and calcium.

Compact and mounted on 4 rollers, the softener systems can be ordered in 3 different types, variable in production capacity (400, 600 or 1,200 liters*).

All systems can be readily regenerated with sodium chloride brine. Regeneration is timercontrolled allowing the user to pre-adjust regeneration intervals.

* At 20° dH

Applications
Pretreatment for:
- Reverse osmosis system
- ASTM type 2 water system
- Glassware machine
- Boiler etc.

Features
- Low water and salt consumption
- Compact design mounted on rollers
- Automatic regeneration
- Easy to install

Specifications

Materials of Construction

System	Fiber-glass and PE
Plumbing	PE

Capacity	615S004	615S006	615S012
At 1 °dH [l]	8,000	12,000	24,000
At 20 °dH [l]	400	600	1,200

Dimensions

	615S004	615S006	615S012
Height [cm]	57.2	71.4	71.4
Width [cm]	23	23	23
Depth [cm]	40	40	40

Connection

	615S004	615S006	615S012
Inlet (male) ["]	3/4	3/4	3/4
Outlet (male) ["]	3/4	3/4	3/4

Regeneration

	615S004	615S006	615S012
Salt consumption [kg]	0.5	0.75	1.5
Time [min]	30	30	30
Water consumption [l]	55	55	55

Operating Pressure

	615S004	615S006	615S012
Max. [kg/cm²]	6	6	6
Min. [kg/cm²]	2	2	2

Order No.

	615S004	615S006	615S012
Softener	615S004	615S006	615S012
25 kg salt	615SC001		

arium® 615DI Deionization Cartridges
Water Pretreatment Systems

Description

The arium® 615DI deionization cartridges are designed to produce highly deionized water.

These cartridges contain highly effective ion exchange resins to remove cations and anions from water by exchanging H^+ and OH^-. Their uniform and compact mixed bed ensures reliable desalination and optimal utilization of the resin material, reducing conductivity by up to < 0.1 µS/cm.

The arium® lines also includes conductivity meters for checking the quality of product water. These convenient options are available in a choice of LED controlled display or digitally controlled display.

The LED controlled conductivity meter enables the user to monitor the conductivity of the product water with a red (> 20 µS/cm) or green (< 20 µS/cm) light. If the water does not meet the user's quality requirements, the LED will light up in red to alert the user.

The digitally controlled conductivity meter lets the user monitor the conductivity by individually defined setpoint limits (0.1–200 µS/cm). The conductivity measurement range is between 0.056 and 200 µS/cm.

Features

- Low water consumption
- Compact design, easy to install
- Reliable procedure
- Conductivity typically < 0.1 µS/cm
- High efficiency

Applications

Pretreatment for
- Ultrapure water systems
- Autoclaves
- Glassware machinery, etc.

Post-treatment for
- RO permeate

Specifications

Description of the DI Cartridges		615DI004	615DI007	615DI010	615DI014
Material of construction		Plastic (white)	Plastic (white)	Stainless steel	Stainless steel
Capacity [l]	at 10 °dh	840	1,300	2,100	2,800
	at 20 °dh	420	650	1,050	1,400
Flow [l/h]		40	300	300	600
Dimensions [cm]	Height	40	140	44.5	60
	Diameter	23	23	23.7	23.7
Connectors ["]	Inlet (male)	3/4	3/4	3/4	3/4
	Outlet (male)	3/4	3/4	3/4	3/4
Operating pressure [bar]	Max.	6	6	6	6
	Min.	0.5	0.5	0.5	0.5
Operating temperature [℃]	Max.	35	35	35	35

Order No.	Description
615DI004	arium® deionization cartridge including set of tube connectors, capacity of up to 420 l at 20 °dh
615DI007	arium® deionization cartridge including set of tube connectors, capacity of up to 650 l at 20 °dh
615DI010	arium® deionization cartridge including set of tube connectors, capacity of up to 1,050 l at 20 °dh
615DI014	arium® deionization cartridge including set of tube connectors, capacity of up to 1,400 l at 20 °dh
615ADC1	arium® conductivity meter for deionization cartridges, with digital conductivity display; conductivity measurement range 0.056–200 µS/cm
615ALC1	arium® conductivity meter for deionization cartridges, with LED display (red > 20 µS/cm & green < 20 µS/cm)
615DIC1	arium® replacement package for deionization cartridges, ion exchange resin mixture in 25 l PE bag

arium® 613L
Reverse Osmosis Systems

Description

arium® 613L reverse osmosis (RO) systems have been developped fo applications requiring large volumes of RO water on a daily basis. Capable of delivering up to 300 l/h of purified water per hour, the arium® 613L is an efficient, reliable, low-maintenance RO system that is affordable as well.

The high-performance RO membranes reduce water wastage and provide excellent product water quality, whilst ensuring high retention rates of water constituents.

Product water storage is simplified by the use of an integrated 100-liter tank. The built-in distribution pump readily distributes the product water at a speed of 2 m³/h and 3.7 bar to the point of use.

Applications

- Feed water for glassware machines, autoclaves and air humidifiers
- General laboratory applications
- Feed water for ultrapure water purification systems (ASTM type 1)

Features

- High performance, low-energy, thin-film composite (TFC) RO membranes
- Feed pump which ensures stable pressure and water flow
- Permeate distribution pump
- 5-µm particle filter
- Integrated 100-l permeate tank
- Compact design
- High-quality integrated components (Grundfos pump, Danfoss valves)
- Fully assembled control panel (no additional electrical installations required)
- CE-certified
- Flow meter and manometer for control of permeate flow and pressure
- Integrated pressure sensor with alarm function
- Optional UV lamp and conductivity meter

Specifications

Footprint W ƒ H ƒ D [cm]	58 ƒ 81 ƒ 58

Product Water Quality

Rejection rates*	
■ Monovalent ions	Up to 98%
■ Polyvalent ions	Up to 99%
■ Particles	> 99%
■ Microorganisms	> 99%
■ Dissolved organics (> 300 MW)	> 99%
Max. recovery rate %*	40–80
Conductivity [µS/cm]*	< 20

* Depends on feed water quality

Specifications RO 613L

Systems	613L050	613L100	613L150	613L200	613L250	613L300
Capacity [l/h]**	50	100	150	200	250	300
Tank [l]	100	100	100	100	100	100
Electrical connection [V]	230	230	230	230	230	230
Power consumption [kW/h]	1.3	1.3	1.3	1.3	1.3	1.3
Power frequency [Hz]	50	50	50	50	50	50
Max. water temperature [°C]	25	25	25	25	25	25
Max. water pressure [bar]	7	7	7	7	7	7
Min. water pressure [bar]	2	2	2	2	2	2
Weight (full) [kg]	150	151	152	153	154	155
Number of membranes	1	2	3	4	5	6

** Drinking water quality at 10 °C, 3 bar, max. 500 mg/l total salt content ± 5% flow rate
*** Drinking water quality at 500 µS/cm
  40% without pretreatment softening (standard), 80% with pretreatment softening (option)

Ordering Information

Order No.	Description
613L050	Complete arium® RO system with distribution pump, 50 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, RO membrane and 100-l tank
613L050D	Complete arium® RO system without distribution pump (in conjunction with an external tank system) 50 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, RO membrane
613L100	Complete arium® RO system with distribution pump, 100 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, RO membrane and 100-l tank
613L100D	Complete arium® RO system without distribution pump (in conjunction with an external tank system), 100 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, & 2 RO membranes
613L150	Complete arium® RO system with distribution pump, 150 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 3 RO membranes and 100-l tank
613L150D	Complete arium® RO system without distribution pump (in conjunction with an external tank system), 150 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, & 3 RO membranes
613L200	Complete arium® RO system with distribution pump, 200 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 4 RO membranes and 100-l tank
613L200D	Complete arium® RO system without distribution pump (in conjunction with an external tank system), 200 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, & 4 RO membranes
613L250	Complete arium® RO system with distribution pump, 250 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 5 RO membranes and 100-l tank
613L250D	Complete arium® RO system without distribution pump (in conjunction with an external tank system), 250 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, & 5 RO membranes
613L300	Complete arium® RO system with distribution pump, 300 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 6 RO membranes and 100-l tank
613L300D	Complete arium® RO system without distribution pump (in conjunction with an external tank system), 300 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, & 6 RO membranes
613AOV200	Standard 200-l tank with system-controlled distribution pump (for RO 613L050D, 613L100D, 613L150D, 613L200D, 613L250D & 613L300D systems)
613AOV600	Standard 600-l tank with system-controlled distribution pump (for RO 613L050D, 613L100D, 613L150D, 613L200D, 613L250D & 613L300D systems)
613AOV1000	Standard 1000-l tank with system-controlled distribution pump (for RO 613L050D, 613L100D, 613L150D, 613L200D, 613L250D & 613L300D systems)
613L-AE002	Conductivity meter
613L-AE002	UV lamp with housing
613L-CH001	5 µm prefilter
613L-CH002	RO membrane

arium® 613AOV Open Gravity Tanks
Product Water Storage Tanks for Reverse Osmosis Water
Produced by arium® 613L Systems

Description

The arium® open gravity tanks are designed to store water produced by the arium® 613L reverse osmosis systems.

The polyethylene tanks are equipped with Grundfos reservoir distribution pump (2 m³/h at 3.7 bar) and can be ordered in 3 different storage capacities from 200 l, 600 l up to 1,000 l.

Applications

- Storage reservoir for reverse osmosis water produced by 613L water systems
- Feed reservoir for ultra pure water systems, autoclaves and general laboratory equipment, etc.

Features

- Integrated filtrate distribution pump
- Compact design
- High-quality components (Grundfos pump, Danfoss valves)
- Fully assembled control panel

Specifications

Material of Construction

Reservoir: Rotation-molded P.E.

Reservoir

Volume [l]	200	600	1,000
Pump capacity [bar|m³/h]	3.7|2	3.7|2	3.7|2

Dimensions

Height [m]	1.55	1.92	1.93
Diameter [cm]	51	76	1

Connection

Inlet height [m]	1.02	1.4	1.4
Outlet height [m]	1.37	1.75	1.75
Outlet dimensions (Male) ["]	¾	¾	¾

Order No.

Open gravity Tank	613AOV 200	613AOV 600	613AOV 1000

arium® RO 61316
Reverse Osmosis Systems

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 loss of water, ensuring excellent quality of the purified water and a high retention rate of the constituents in the raw water.

By the use of an optional closed pressurized tank (30, 70, 100 liter) the RO product water will be distributed with up to 2.5 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 pretreatment 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 W *f* H *f* D [cm|"]	43|16.85 *f* 48|19 *f* 33.4|13.15
System weight [kg|lbs]	14|31
Operation weight [kg|lbs]	20|44
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 [bar|psi]	1.2|17.4
Maximum inlet pressure [bar|psi]	6.9|100
Maximum conductivity [µS/cm]	< 1500
Temperature [°C|°F]	2–35|41–15
Max. Hardness (max $CaCO_3$) [ppm]	360
Silt density index	< 5
Free chlorine [ppm]	0.1
Turbidity	< 1 NTU
Iron (total as Fe) [ppm]	< 0.1

Ambient Temperature & Humidity

Operation	2 °C–35 °C (41 °F–95 °F) max. 80% relative humidity
Storage	5 °C–45 °C (41 °F–113 °F) max. 80% relative humidity

RO System Schematic
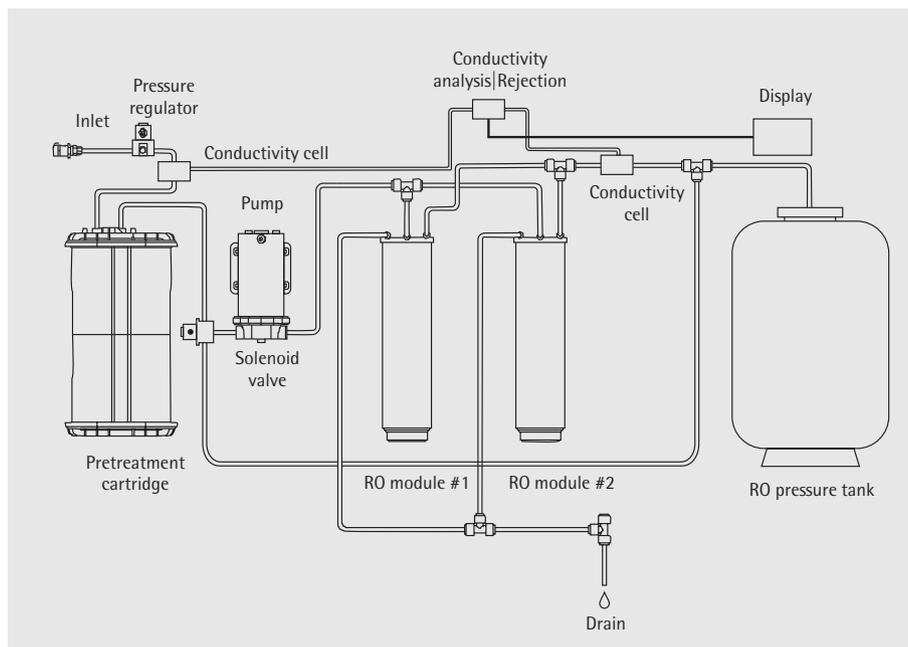
Product Water Quality

Typical conductivity	< 20 µS/cm
Bacteria**	< 1 CFU/1000 ml
Particle**	< 1/ml
Specifications RO modules	
▪ 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

Ordering Information

61316	arium® RO system
613CPF05--------V	2 f pretreatment cartridges
613CPM4--------V	2 f RO modules
611CDS2	Sanitization kit for the tank (2 syringes)
612CDS2	Sanitization kit for the RO modules (2 syringes)
613-AMDG1	Dispense gun with height-adjustable tripod for 613APV pressure tanks
613-AMDG2	Dispense gun with wall mounting kit for 613APV pressure tanks
613APV31	30-liter tank***
613APV50	50-liter tank***
613APV70	70-liter tank***
613APV100	100-liter tank***

*   Depends on feed water quality and temperature
**   With Sartopore® 2 150 ml final filter
*** At 2.5 bar tank pressure

Ordering Information

Benchtop System	Built–in System	Description
61316030F05M1A	61316030F05M1D	Complete Reverse Osmosis System with a tank capacity of 30 liter*** (includes arium® 61316, tank, 2 *f* RO modules, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61316050F05M1A	61316050F05M1D	Complete Reverse Osmosis System with a tank capacity of 50 liter*** (includes arium® 61316, tank, 2 *f* RO modules, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61316070F05M1A	61316070F05M1D	Complete Reverse Osmosis System with a tank capacity of 70 liter*** (includes arium® 61316, tank, 2 *f* RO modules, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61316100F05M1A	61316100F05M1D	Complete Reverse Osmosis System with a tank capacity of 100 liter*** (includes arium® 61316, tank, 2 *f* RO modules, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).

*** At 2.5 bar tank pressure

arium® EDI 61215
ASTM Type 2 Pure Water System

Description

The compact arium® EDI 61215 laboratory water purification system is designed to produce ASTM type 2[1,3] water for general laboratory applications.

The arium® EDI 61215 guarantees constant water quality and high economy for daily lab use, delivering purified water at a rate of at least 15 l/hr and retaining ⊠ 99% of single- and multiple-charged ions as well as bacteria and viruses.

These powerful RO membranes reduce loss of water, ensuring excellent quality of the purified water and a high retention rate of the constituents in the raw water.

The use of proven Ionpure® EDI technology guarantees the highest quality of reagent grade water (ASTM type 2)[1,3]. The combined arium® EDI 61215 purification procedure including reverse osmosis, softening and electronic|chemical desalting as well as the continuous, automatic regeneration of the EDI module enables nearly maintenance-free and inexpensive supply of pure water.

The proven Ionpure® EDI technology offers convincing advantages:
- High retention rating of up to 95%
- Chemical-free deionization process
- Resistance to the build-up of biological deposits
- Maintenance-free performance

By the use of an optional closed pressurized tank (30, 50, 70, 100 liter) the product water will be distributed with up to 2.5 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
- Reagent preparation
- Electrophoresis
- Pharmaceutical applications
- Microbiological media and buffer preparation
- General biotechnology applications
- Rinsing glass ware
- Feed water for ultrapure water systems
- Feed water for humidifiers autoclaves and dish washer

Features
- Four line alphanumerical display
- Simple menu navigation
- Displaying product and feed water quality, rejection rate of RO modules, tank-level, temperature etc.
- Production capacity up to 360 liter per day
- Automatic RO-membrane-back-flush with RO-permeate
- Constant flow rate
- Several alarm and service functions
- Automatic regeneration of the EDI stack
- Product water storage in open gravity or closed pressurized tank
- Serial interface RS-232
- PLC interface for external communication
- Flexible display unit can be mounted at the top, at the bottom or in a remote location up to 2.8 m from the system

[1] Depends on feed water quality, temperature and storage tank
[2] In absence of CO_2
[3] With Sartopore® 2 150 final filter

Specifications

Unit dimensions W *f* H *f* D [cm|"]	43|16.85 *f* 48|19 *f* 33.4|13.15
System weight [kg|lbs]	20|44
Operation weight [kg|lbs]	25|55
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 [bar|psi]	1.2|17.4
Maximum inlet pressure [bar|psi]	6.9|100
Maximum conductivity[2]	< 1000 µS/cm
Temperature [°C|°F]	5–35|41–95
Max. Hardness (max $CaCO_3$) [ppm]	360
Silt density index	< 5
Free chlorine [ppm]	0.1
Turbidity	< 1 NTU
Iron (total as Fe) [ppm]	< 0.1

Ambient Temperature & Humidity

Operation [°C|°F]	2–35|41–95 max. 80% relative humidity
Storage [°C|°F]	5–45|41–113 max. 80% relative humidity

[1] Depends on feed water quality, temperature and storage tank
[2] In absence of CO_2
[3] With Sartopore® 2 150 final filter

Product Water Quality

Typical resistivity[1]	5–15 M¥ *f* cm
Typical conductivity[1]	0.2–0.07 µS/cm
Typical TOC level[1]	< 30 ppb
Rejection rates RO modules ◾ Bacteria[2] ◾ Particle[2]	< 1 CFU/1000 ml < 1/ml
Product flow rate [l/h]* (± 20% at 25 °C)	15

[1] Depends on feed water quality, temperature and storage tank
[2] With Sartopore® 2 150 final filter

Flow Chart
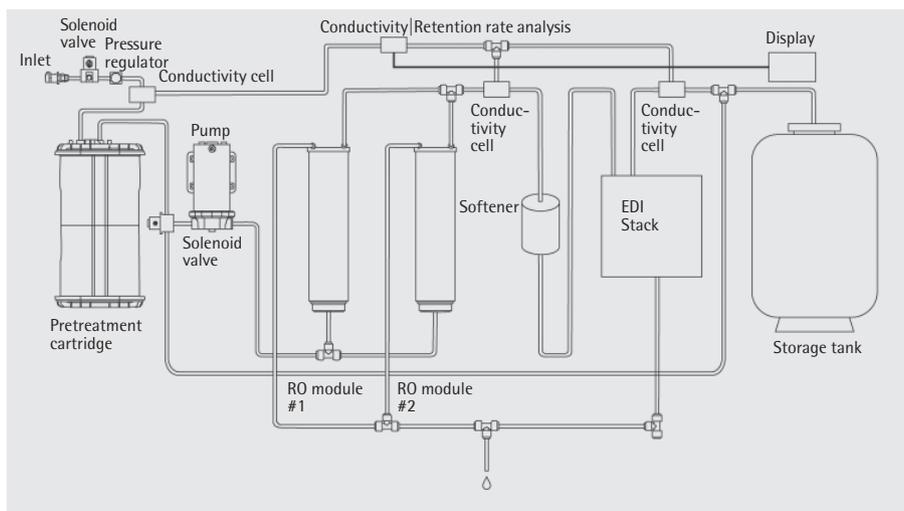
Ordering Information

61215	arium® ASTM type 2 water system with built in EDI stack
613CPF05-------V	2 *f* pretreatment cartridges
612CPS1--------A	4 *f* softener cartridges
613CPM4-------V	2 *f* RO modules
611CDS2	Sanitization kit for the tank (2 syringes)
612CDS2	Sanitization kit for the system (2 syringes)
613-AMDG1	Dispense gun with height-adjustable tripod for 613APV pressure tanks
613-AMDG2	Dispense gun with wall mounting kit for 613APV pressure tanks
613APV31	30-liter tank**
613APV50	50-liter tank**
613APV70	70-liter tank**
613APV100	100-liter tank**

Benchtop System	Built-in System	Description
61215030F05M1A	61215030F05M1D	Complete arium® EDI 61215 type 2 water system with a tank capacity of 30 liter** (includes arium® EDI 61215, tank, 2 *f* RO modules, 4 *f* softener cartridges, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61215050F05M1A	61215050F05M1D	Complete arium® EDI 61215 type 2 water system with a tank capacity of 50 liter** (includes arium® EDI 61215, tank, 2 *f* RO modules, 4 *f* softener cartridges, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61215070F05M1A	61215070F05M1D	Complete arium® EDI 61215 type 2 water system with a tank capacity of 70 liter** (includes arium® EDI 61215, tank, 2 *f* RO modules, 4 *f* softener cartridges, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).
61215100F05M1A	61215100F05M1D	Complete arium® EDI 61215 type 2 water system with a tank capacity of 100 liter** (includes arium® EDI 61215, tank, 2 *f* RO modules, 4 *f* softener cartridges, 2 pretreatment cartridges + sanitizing syringes for RO modules & tank).

** Depends on tank pressure 2.5 bar

arium® 613CPF05-------V
Pretreatment Cartridge

Description
The Sartorius arium® 613CPFO5-------V is an encapsulated cartridge, containing pre-treatment media and a 5 µm depth filter as a convenient, one-piece disposable. Designed for installation within the arium® 61316 and 61215, 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 f 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	Virgin unfilled polypropylene
	Purification media	■ 20 f 50 mesh granular activated carbon
		■ Chlorine|hardness catalyst
		■ 5 µm [nominal] PP filter cartridge
Unit dimensions W f H f D [cm|"]		18|7 f 26|10.2 f 11|4.3
Operation weight [kg]		3.5

Inlet Feed Water Requirements
Potable tap water feed only

Minimum inlet pressure [bar|psi]	1|15
Maximum inlet pressure [bar|psi]	6.8|100
Hardness (max CaCO$_3$) [ppm]	360
Silt density index	< 5%
Turbidity	< 1 NTU
Iron (total as Fe) [ppm]	< 0.1

Ambient Temperature and Humidity

Operation [°C|°F]	5–28|41–82.4 80% relative humidity
Storage [°C|°F]	5–28|41–82.4 80% relative humidity

Ordering Information

Order Number	Quantity
613CPFO5-------V	2 cartridges

arium® 613CPM4--------V
Reverse Osmosis Modules

Description

The arium® 613CPM4--------V reverse osmosis modules are designed for installation within the arium® 61316 RO and the arium® EDI 61215 systems. 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 system will produce higher quality permeate water as compared to conventional systems that store membranes in feed water.

The 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 [cm|"]	Height 30.8|12.13 Diameter 7.8|3.07
Operation weight [g|lbs]	468|1.03 each
Feed pressure [bar|psi]	Min 1.2|15 Max 6.8|100
Temperature [°C|°F]	5–35|41–99
Silt density index	< 3
Iron (total as Fe) [ppm]	< 0.1
Hardness (max $CaCO_3$) [ppm]	360 or softened water
Output	Up to 380 liters per day* (16 liters per hour) at 25 °C ± 20%

* Depends on feed water quality and temperature

Ordering Information

Order Number	Quantity
613CPM4--------V	2 modules

arium® Pressure Tanks –
Product Water Storage Tanks for Reverse Osmosis Systems arium® 61215
and Type 2 Water Systems arium® 61316

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 [bar|psi] Standard precharge [bar|psi]	0–10|0–146 max. 0–2.6|0–38 ± 0.3|5
Operating temperature	5 °C–90 °C (41 °F–200 °F) Not to exceed 60 °C (140 °F) ambient	
Connectors [mm|"]	Inlet Outlet	6|¼ John Guest 9|3/8 quick connect, 6|¼ NPT for optional pressure switch or outlet
Pressure gauge [kPa|psi]	0–700|0–100	
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 [litres|gallons]	Height [cm|"]	Diameter [cm|"]	Weight Empty [kg|lbs]	Weight Full [kg|lbs]
613APV31	30|8	57|23	41|16	11|24	41|90
613APV50	50|11	74.9|29	41|16	12|26	62|136
613APV70	70|19	111|44	41|16	21|46	91|201
613APV100	100|26	94|37	53|21	26|57	126|278

arium® basic Ultrapure Water System

The arium® basic system supplies ASTM type 1 ultrapure water and is used for both critical applications and routine analyses. Streamlined to incorporate only the most important functions for the production of high-quality ultrapure water, the arium® basic is a costeffective alternative for the discerning user that is also very easy to use.

Areas of Application
- Atomic absorption (AA)
- Ion exchange chromatography (IC)
- Inductively coupled plasma mass spectrometry (ICP-MS)
- Rinsing glass vessels
- Preparing buffers and media
- Manufacturing reagents

Features
- Innovative glass operator interface with touch function
- Time-controlled dispensing
- Freely adjustable flow rates up to 2 l/min**
- Conductivity measurement for product water
- Data logging on printer or PC
- Activatable PIN code for basic configurations
- Service and alarm functions supported by graphic displays
- Intelligent alarm system
- Compact design

Specifications

Product Water Quality

Specific resistivity [M¥ f cm]	18.2
TOC at 50 ppb* inlet water	≤ 5
Particulate matter (at 0.2 μm)	< 1/ml
Bacteria (CFU/1,000 ml)	< 1
Flow rate [l/min]**	Up to 2

Inlet Water Requirements

Specific conductance	
■ RO water	100 μS/cm
■ Distilled water	4 μS/cm
■ Deionized water	20 μS/cm
TOC [ppb]	< 50
Turbidity	< 1 NTU
Silica [ppb]	< 1000
Minimum inlet pressure	Depressurized
Maximum inlet pressure [bar]	6.9
Dimensions W f H f D [mm]	350 f 492 f 451
Empty weight [kg]	Approx. 17
Operating weight [kg]	Approx. 27
PC|Printer connections	RS-232

Electrical Requirements

100–240 Vac (± 10%), 50–60 Hz, 80 W (max.), 130 VA (max.)

Environmental Conditions

Operation	5–30 °C***; 80% relative humidity, non condensing
Storage	5–45 °C; 80% relative humidity, non condensing

* Values may vary depending on the quality of the feed water, the amount of contamination contained in the feed water, and|or the type of cartridge in use.
** At a pressure of 2 bar without a final filter
*** 5–40 °C optional

Systems

Order No.	Description
H2O basic-B	arium® basic wall-mounted unit for producing ultrapure water for standard applications with front bottom-mounted display|dispenser unit and integrated wall-mounting bracket for the system
H2O basic-T	arium® basic bench-top system for producing ultrapure water for standard applications with front top-mounted display|dispenser unit

Cartridge Kits

Order No.	Description
611CKDI	1 pretreatment cartridge and 1 polishing cartridge for DI or electrically deionized feed water for applications requiring a low level of inorganic substances
611CKDO	1 pretreatment cartridge and 1 polishing cartridge for DI or electrically deionized feed water for low TOC level applications
611CKRI	1 pretreatment cartridge and 1 polishing cartridge for RO or distilled feed water for applications requiring a low level of inorganic substances
611CKRO	1 pretreatment cartridge and 1 polishing cartridge for RO or distilled feed water for low TOC level applications
611CKHI	1 pretreatment cartridge and 1 polishing cartridge for RO, distilled, DI, or electrically deionized feed water for applications requiring a low level of inorganic substances
611CKTI*	1 pretreatment cartridge and 1 polishing cartridge for potable feed water for applications requiring a low level of inorganic substances
611CKTO*	1 pretreatment cartridge and 1 polishing cartridge for potable feed water for low TOC level applications

Consumables

Order No.	Description
5441307H4--CE--B	Sartopore® 2 150 sterile final filters, pore size: 0.2 µm (pack with 5 pcs.)

General Accessories

Order No.	Description
611APR1	Dot matrix printer for data logging

* Tap water cartridges should be used only after the feed water specifications have been checked and following consultation with the responsible Sartorius application specialist.

arium® pro Ultrapure Water System

arium® pro, ASTM Typ1 water purification system for the high end user. Whether for routine analysis or critical applications where reagent-grade water is required, the system consistently supplies high quality that is perfect for your applications.

arium® pro features a convincing innovative design, quality and ease of use. From the intuitive menu navigation to the operatorfriendly setup, all units in the arium® pro series feature ultra easy operation and ultra high flexibility for producing laboratory-grade purified water.

arium® pro UV and pro VF water purification systems are also optionally available with an integrated TOC monitor for regularly checking the organic water constituents in product water.

The TOC can be measured manually or automatically as required.

Areas of Application
- Atomic absorption (AA)
- Ion exchange chromatography (IC)
- High performance liquid chromatography (HPLC)
- Polymerase chain reaction (PCR)
- Inductively coupled plasma mass spectrometry (ICP-MS)
- Preparing cell culture media
- Proteinpurification
- Manufacturing reagents
- Preparing buffers and media
- Rinsing glass vessels

Features
- Innovative glass operator interface with touch function
- Integrated TOC measurement (optional)
- Volume- and time-controlled dispensing
- Freely adjustable flow rates up to 2 l/min**
- Conductivity measurement for feed and product water
- Integrated monitoring of water consumption
- Data logging on SD card and printer or PC
- Activatable PIN code for basic configurations
- Service and alarm functions supported by graphic displays
- Intelligent alarm system
- Compact design

Specifications

Product Water Quality	pro DI	pro UV	pro UF	pro VF
Resistivity [M¥ f cm]	18.2	18.2	18.2	18.2
TOC at 50 ppb* feed water [ppb]	≤ 5	1–2	≤ 5	1–2
Endotoxin [EU/ml]	n.a.	n.a.	< 0.001	< 0.001
Particules (at 0.2 μm)	< 1/ml	< 1/ml	< 1/ml	< 1/ml
Bacteria (CFU/1000 ml)	< 1	< 1	< 1	< 1
Flow rate [l/min]**	up to 2	up to 2	up to 1.7	up to 1.7

Inlet Water Requirements

Specific conductance	
■ RO water	100 μS/cm
■ Distilled water	4 μS/cm
■ Deionized water	20 μS/cm
TOC [ppb]	< 50
Turbidity	< 1 NTU
Silica [ppb]	< 1,000
Minimum inlet pressure	Depressurized
Maximum inlet pressure [bar]	6.9
Dimensions W f H f D [mm]	350 f 492 f 451
Empty weight [kg]	17–19 (depends on the type of system)
Operating weight [kg]	27–29 (depends on the type of system)
PC|Printer connections	SD Card RS-232

* Values may vary depending on the quality of the feed water, the amount of contamination contained in the feed water, and|or the type of cartridge in use.
** At a pressure of 2 bar, without final filter

Electrical Requirements

100–240 Vac (± 10%), 50–60 Hz, 80 W (max.), 130 VA (max.)

Environmental Conditions

Operation	5–30 °C* 80% relative humidity, non condensing
Storage	5–45 °C; 80% relative humidity, non condensing

* 5–40 °C optional

Systems

Order No.	Order No. arium® pro System with Integrated TOC–Monitor	Description
H2Opro-DI-B	–	arium® pro DI wall-mounted unit for producing ultrapure water for standard applications with front bottom mounted display|dispenser unit and integrated wall bracket for the system
H2Opro-DI-T	–	arium® pro DI bench-top system for producing ultrapure water for standard applications with front top-mounted display| dispenser unit
H2Opro-DI-D	–	arium® pro DI built-in system for producing ultrapure water for standard applications, including wall mounting kit for the display|dispenser unit with 2.8 meter extended cable, tubing and wall bracket
H2Opro-UF-B	–	arium® pro UF wall-mounted unit for producing ultrapure water for cell culture applications with front bottom mounted display|dispenser unit and integrated wall bracket for the system
H2Opro-UF-T	–	arium® pro UF bench-top system for producing ultrapure water for cell culture applications with front top-mount-ed display|dispenser unit
H2Opro-UF-D	–	arium® pro UF built-in system for producing ultrapure water for cell culture applications, including wall mount-ing kit for the display|dispenser unit with 2.8 meter extended cable, tubing and wall bracket
H2Opro-UV-B	H2Opro-UV-B-TOC	arium® pro UV wall-mounted unit for producing ultrapure water for chromatographic applications with front bot-tom-mounted display|dispenser unit and integrated wall bracket for the system
H2Opro-UV-T	H2Opro-UV-T-TOC	arium® pro UV bench-top system for producing ultrapure water for chromatographic applications with front top-mounted display|dispenser unit
H2Opro-UV-D	H2Opro-UV-D-TOC	arium® pro UV built-in system for producing ultrapure water for chromatographic applications, including wall mounting kit for the display|dispenser unit with 2.8 meter extended cable, tubing and wall bracket
H2Opro-VF-B	H2Opro-VF-B-TOC	arium® pro VF wall-mounted unit for producing ultrapure water for standard, cell culture and chromatographic applications with front bottom mounted display|dispenser unit and integrated wall bracket for the system
H2Opro-VF-T	H2Opro-VF-T-TOC	arium® pro VF bench-top system for producing ultrapure water for standard, cell culture and chromatographic appli-cations with front top-mounted display|dispenser unit
H2Opro-VF-D	H2Opro-VF-D-TOC	arium® pro VF built-in system for producing ultrapure water for standard, cell culture and chromatographic applications, including wall mounting kit for the display|dispenser unit with 2.8 meter extended cable, tubing and wall bracket

Cartridge Kits for pro DI and pro UF Systems

Order No.	Description
611CKDI	1 pretreatment cartridge and 1 polishing cartridge for DI or electrically deionized feed water for applications requiring a low level of inorganic substances
611CKDO	1 pretreatment cartridge and 1 polishing cartridge for DI or electrically deionized feed water for low TOC level applications
611CKRI	1 pretreatment cartridge and 1 polishing cartridge for RO or distilled feed water for applications requiring a low level of inorganic substances
611CKRO	1 pretreatment cartridge and 1 polishing cartridge for RO or distilled feed water and low TOC level applications
611CKHI	1 pretreatment cartridge and 1 polishing cartridge for RO, distilled or electrically deionized feed water for applications requiring a low level of inorganic substances
611CKTI*	1 pretreatment cartridge and 1 polishing cartridge for potable tap water feed for applications requiring a low level of inorganic substances
611CKTO*	1 pretreatment cartridge and 1 polishing cartridge for potable tap water feed and for low TOC level applications

Cartridge Kits for pro UV and pro VF Systems

Order No.	Description
611CKDU	1 pretreatment cartridge and 1 polishing cartridge for DI or electrically deionized feed water and low TOC level applications
611CKRU	1 pretreatment cartridge and 1 polishing cartridge for RO or distilled feed water and low TOC level applications
611CKTU*	1 pretreatment cartridge and 1 polishing cartridge for potable tap water feed and low TOC level applications

Consumables

Order No.	Description
611CDU5	UF cartridge
611CEL1	UV lamp
611CDS2	Sanitization kit with 2 syringes
611CDS6	Sanitization kit with 6 syringes
5441307H4--CE--B	Sartopore® 2 150 final filter, pore size: 0.2 µm (pack with 5 pcs.)

Accessories

Order No.	Description
H2Opro-AMDG1	Dispense gun including height-adjustable stand
H2Opro-AMDG2	Dispense gun including wall mounting kit
H2Opro-ADM1	Display mounting kit including height-adjustable stand
611APR1	Dot matrix printer for data logging
H2O-AFS1	Foot switch for water dispensing
H2O-ALS1	2 Level Sensors for connection to an open tank system

* Tap water cartridges should be used only after the feed water specifications have been checked and following consultation with the responsible Sartorius application specialist.

arium® Cartridge Kits
Disposables for Ultrapure Water Systems

Description
The Sartorius arium® cartridge kits are designed to be installed in the arium® 611, basic and H_2O pro 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 M¥ f 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® Cartridge Kits

Materials of construction	Housing Connecting screws	Virgin unfilled polypropylene Stainless steel
Purification media	20 f 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

arium® product line (6 1 1)

Consumables kit (C K)

Polishing Pack (Pack 2)
I = Low inorganic application
O= Low organic application for 611DI & 611UF systems
U= Low organic application for 611UV & 611VF systems

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

arium® Water Guard

Description
arium® Water Guard detects water leaks early. That means your lab gets optimal protection against water damage.

Thanks to its high-grade materials and its finely-tuned sensors, arium® Water Guard is the ideal partner for laboratory-grade and ultrapure water systems.

Leaks are registered by an optical sensor. This automatically closes the inlet line and triggers an acoustic warning signal. In addition, the user can also constantly monitor the system's status on the built-in LED display.

Areas of Application
- For pure and ultrapure water systems

Features
- Reliably protects against leaks
- Highly sensitive optical sensor, also suitable for detecting ultrapure water leaks
- High-grade material, non-corrosive
- Optic and acoustic alarm
- Easy to install
- Integrated wall holder for solenoid valve
- Automatically blocks the feed water line when a leak is detected
- Electrically powered
- Versatile

Specifications

Footprint

Height [cm]	2.5
Diameter [cm]	5
Sensor cable	Length 2 m
Tubing connector	Inlet diameter $3/8$" Outlet diameter $3/8$"
Power supply	100–240 V AC 50–60 Hz

Feed Water Requirements

Minimum inlet pressure [bar]	0
Maximum inlet pressure [bar]	7
Temperature	5 ℃–30 ℃

Room Temperature and Humidity

Operation	5 ℃–30 ℃ at 80% relative humidity
Storage	5 ℃ – 45 ℃ at 80% relative humidity

Ordering Information

Order No.	Description
610AWG1	arium® Water Guard

Cell Cultivation Systems

CERTOMAT® Benchtop Shakers

CERTOMAT® benchtop shakers 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:

- Aluminium trays (type EU, 420 *f* 420 mm or type FU, 420 *f* 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

Overview Shakers and Homogenizers SL-0013-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.

Cultivation of Microorganisms and Plant Cells

These 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 ƒ 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.

Based on the construction of the CERTOMAT® BS-1 the model CERTOMAT® Tplus provides a sophisticated controller for extensive data communication with process control software, such as our MFCS/win process control software.

Cultivation of Mammalian Cells

Mammalian cells require very precise temperature control, CO_2 gassing and humidity control for successful cultivation. The CERTOMAT® CTplus incubation shaker has been especially designed to fulfil these needs. The encapsulated drive unit is protected from corrosion. The controller is based on the wellknown DCU-controller of our BIOSTAT® fermentors. The patented variable mass compensation allows operation of up to 3 stacked CERTOMAT® CTplus units.

The validatable CERTOMAT® CTplus can be combined with the SENSOLUX® intelligent tray and with MFCS/win process control software.

Accessories for CERTOMAT® Incubation Shakers

CERTOMAT® benchtop shakers are compatible with the full range of accessories (see following pages).

They are not part of the instruments and must be ordered separately.
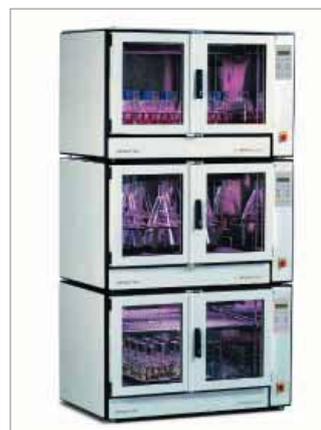
Order Numbers for CERTOMAT® Incubation Shakers

			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
CERTOMAT® Tplus	25 mm	Heat|cool	BBI-8865906	not available
	50 mm	Heat|cool	BBI-8865922	not available
CERTOMAT® CTplus	25 mm	Heating	CTMCTPA2H	CERTOMAT CTplus
	50 mm	Heating	CTMCTPA5H	CERTOMAT CTplus

Overview Shakers and Homogenizers SL–0013-e
Data sheet CERTOMAT® CTplus SL–2059-e

Accessories

Reference	Description
BBI-886 1455	Illumination unit for CERTOMAT® BS-1, 5 *f* 18 W, individually activated, programmable, only in combination with cooling
BBI-886 1463	Illumination unit for CERTOMAT® BS-T, 5 *f* 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, including mounting rails, for use in CERTOMAT® BS-1
BBI-885 4416	Installation set for reference thermometer (Pt100), for CERTOMAT® BS-1 and CERTOMAT® BS-T
BBI-8864403	Support frame, 220 mm high, for up to 2 units CERTOMAT® Tplus or CTplus
BBI-8864446	Support frame, 780 mm high, with 2 shelves, for one unit CERTOMAT® plus or CTplus
BBI-8850062	Connection kit for second Pt1000 temperature sensor, for CERTOMAT CTplus
	Universal Trays
BBI-885 3002	Type EU, 420 *f* 420 mm, for all CERTOMAT® shakers
BBI-885 3037	Type FU, 800 *f* 420 mm, for CERTOMAT® S II, RM, R, U, and CERTOMAT® BS-1 and BS-T
	Type E Trays (420 *f* 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 *f* 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 *f* 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. 12 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 f1 mm
BBI-886 0416	Premium, roll of 10 m, 30 f 1 mm, repeated use
BBI-886 4470	Anti-skid layer, 380 f 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

CultiFlask® 50 Disposable Bioreactor

The production of recombinant proteins in suspension cell culture nowadays is a major issue in the biopharmaceutical industry. Each of the mammalian cell lines used for this purpose has individual characteristics, furthermore the different stages during the production process have different requirements. Process development and particularly media optimisation are of utmost importance to provide maximum cell numbers and highest protein yield.

The CultiFlask® 50 disposable bioreactor is a versatile tool to perform media optimization|process development experiments with many samples in parallel. It resembles the classic 50 ml centrifuge tubes design, thus making handling steps, such as media exchange, very convenient. Each bioreactor is equipped with a vented screw cap with five holes of different size for optimal gas exchange with the surrounding atmosphere; a PTFE membrane serves as a sterile barrier and minimizes liquid loss caused by evaporation. There is no stirrer or any other mixing mechanism extending into the bioreactor's interior; mass transfer is achieved by shaking in an appropriate incubation shaker (temperature, CO_2 and humidity controlled; regulation of shaking frequency). Due to its unsophisticated design the CultiFlask® 50 disposable bioreactor provides an ideal tool to perform hundreds of parallel cell cultivations for media optimization|process development experiments.

Features and Benefits

- **Centrifuge Tube Design** – Flexible working volume; easy handling, minimal expenses
- **Each Tube Represents an Individual Bioreactor** – Allows for parallel experiments in high numbers
- **Passive Mixing with no Stirring Mechanism Inside** – Low risk of contamination, less shear stress to the cells, negligible foaming
- **Vented Cap with PTFE Membrane** – Optimal gas exchange, reduced liquid loss by evaporation
- **Completely Disposable** – No need for elaborate cleaning or validation procedures, tubes are sacrificed after the run

Ordering Information

Article No.	Description	Pack Size
DF-050MB-SSH---4	CultiFlask® 50 disposable bioreactor for high throughput applications in process development and media optimization	1 box of 180 pieces

CELLine Disposable Two-compartement-Bioreactor

The CELLine bioreactor is a disposable, two-compartment cultivation device suitable for many cell culture applications, e.g. the production of monoclonal antibodies on a laboratory scale. Two different sizes of the CELLine are available: CELLine CL 350 and CL 1000.

Efficient cell cultivation is dependent on an optimal supply of oxygen and nutrients, as well as an efficient removal of inhibiting metabolic waste products. In static cell culture the optimal balance of these factors is not given. These limitations lead to a reduced cell growth and are unfavorable for achieving high levels of protein expression.

The two-compartment bioreactor CELLine is designed to overcome these limitations by dividing the bioreactor into a medium compartment and a cell compartment. A semi-permeable membrane (10 kDa MWCO) between the compartment allows small molecules to diffuse from one compartment to the other. Higher molecular weight molecules secreted by the proliferating cells are retained within the cell compartment. This results in a continuous flow of nutrients into the cell compartment and a concurrent removal of any inhibitory waste products.

The CELLine is perfectly suited for a wide range of applications involving suspension cell culture, like monoclonal antibody production or long-term continuous culture maintenance. The unit is optimised for cultivation of hybridoma, CHO (Chinese hamster ovary) cells, NSO (mouse myeloma) cells and Spodoptera frugiperda.

Features
- High cell density & High product concentration
- Disposable & Ready-to-use
- Cost efficient & Space saving

Ordering Informationen

Order–No.	Product Name	Description	Pack Size
DC-90010	CELLine CL 350	Disposable two-compartment Bioreactor for suspension cell cultures, 350 ml medium, 5 ml culture volume	5
DC-90005	CELLine CL 1000	Disposable two-compartment Bioreactor for suspension cell cultures, 1000 ml medium, 15 ml culture volume	3

Manufactured and invented by Wilson Wolf Manufacturing, Patent Number: US 5 693 537, EP 0 769 048. Made in U.S.A.

SENSOLUX® Stand-alone Version

The SENSOLUX® stand-alone version is an intelligent shaker tray with an integrated sensor system. It is applied for monitoring the pH value and the dissolved oxygen (DO) saturation during the cultivation of animal and human cells.

Used in combination with the new Single-use SENSOLUX® Erlenmeyer flasks, it facilitates easy, safe and highly informative online measurement of these crucial process parameters in incubation shakers.

The first member of the SENSOLUX® family is an attractive tool for significant results in the early process development phase, e.g. for the advanced clone screening & media optimization.

Nine measurement points for both pH and DO are integrated in the shaker tray. The tray has a size of 420 mm *f* 420 mm and is compatible with a broad range of standard incubation shakers including the CERTOMAT® shaker family of Sartorius Stedim Biotech.

The Single-use SENSOLUX® EF Erlenmeyer flasks are equipped with two pre-calibrated sensor patches – sensitive to pH and DO, respectively. The flasks are delivered sterile, single-packed and ready-to-use.
The SENSOLUX® EF are available in four different sizes: 125 ml, 250 ml, 500 ml and 1000 ml. Special clamps ensure the exact positioning of each flask on the shaker tray and thus precise measurement.

The SENSOLUX® tray comes with a dedicated software which enables the monitoring and visualization of the measured parameters in each flask. It guides the operator through the whole experiment.

Features and Benefits
- Non-invasive & optical measurement
- Online detection
- Fast
- Reproducible
- Ready-to-use

Ordering Informationen

Order No.		Product Description	Pack Size
DCS09	SENSOLUX® stand-alone version	SENSOLUX® stand-alone version – shaker tray with a sensor system (9 measurement points) for optical pH- and DO determination in shake flasks. Cables, data collector unit & the software SENSOLUX® control are included.	1
DCS--F1	SENSOLUX® EF 125	SENSOLUX® EF 125 – Single-use 125 ml Erlenmeyer flasks with a vented cap. The SENSOLUX® EF 125 are patched with the Single-use and pre-calibrated pH and DO sensors, sterile packed and ready-to-use.	9
DCS--F2	SENSOLUX® EF 250	SENSOLUX® EF 250 – Single-use 250 ml Erlenmeyer flasks with a vented cap. The SENSOLUX® EF 250 are patched with the Single-use and pre-calibrated pH and DO sensors, sterile packed and ready-to-use.	9
DCS--F3	SENSOLUX® EF 500	SENSOLUX® EF 500 – Single-use 500 ml Erlenmeyer flasks with a vented cap. The SENSOLUX® EF 500 are patched with the Single-use and pre-calibrated pH and DO sensors, sterile packed and ready-to-use.	9
DCS--F4	SENSOLUX® EF 1000	SENSOLUX® EF 1000 – Single-use 1000 ml Erlenmeyer flasks with a vented cap. The SENSOLUX® EF 1000 are patched with the Single-use and pre-calibrated pH and DO sensors, sterile packed and ready-to-use.	9
DCS--C1	SENSOLUX® C 125	SENSOLUX® C 125 – stainless steel clamps for SENSOLUX® Erlenmeyer flasks 125 ml.	9
DCS--C2	SENSOLUX® C 250	SENSOLUX® C 250 – stainless steel clamps for SENSOLUX® Erlenmeyer flasks 250 ml.	9
DCS--C3	SENSOLUX® C 500	SENSOLUX® C 500 – stainless steel clamps for SENSOLUX® Erlenmeyer flasks 500 ml.	9
DCS--C4	SENSOLUX® C 1000	SENSOLUX® C 1000 – stainless steel clamps for SENSOLUX® Erlenmeyer flasks 1000 ml.	9
DCS--B1	SENSOLUX® BCS	SENSOLUX® BCS – Barcode scanner for the easy and safe transfer of the sensor calibration data of the different SENSOLUX® Erlenmeyer flasks.	1

Patent No.: US 6 673 532 B2; US 7 041 493 B2; CA 2 419 474 A; EP 1 309 719 A1; AU 2001/282908 A8.

SuperSpinner D 1000

The SuperSpinner D 1000 is a fully disposable, pre-assembled and ready-to-use bioreactor for efficient lab scale cultivation of animal cells. Main feature is a membrane stirrer which allows controlled and gentle mixing and bubble-free aeration, which avoids foam generation.

The gassing membrane ensures higher oxygen transfer and thus optimal growth conditions and higher cell densities compared to standard spinner flasks.

The SuperSpinner D 1000 consists of a cultivation flask and a membrane aeration system that also functions as a stirrer.

A hollow-fiber membrane is wound around the stirrer bar which contains a magnetic core driven by a magnetic drive unit. A membrane gas pump feeds ambient air through a sterile filter into the flask.

The entire set-up is placed in an incubator.

The SuperSpinner D 1000 allows easy and safe sampling, feeding and direct transfer of cell suspension to a larger bioreactor. Additionally the cultivation flask is compatible with standard centrifugation rotors.

The SuperSpinner D 1000 is an easy, cost-effective and efficient cultivation system compared to traditional cell cultivation techniques which provides fast and economic lab-scale production of recombinant proteins monoclonal antibodies and biomass.

Features and Benefits
- Fully disposable
- Ready-to-use
- Efficient gassing
- High cell density
- Easy sampling in place & feeding

Components & Material

Components	Material	Comments
1000 ml cultivation flask	Polycarbonate	Working volume 200 ml–800 ml
Membrane system	Polypropylene	Pore size 0.2 µm
Midisart®	Polypropylene with PTFE	Pore size 0.2 µm
Luer Lock connector, clamp	Polypropylene	Fixed to sample port and spare port
Tubings	Silicone C-Flex®	3.2 mm ID f 1.6 mm wall $^1/_8$" ID f $^1/_4$" OD

Ordering Information

Order No.	Comments
DF-001LS-SSB---V	SuperSpinner D 1000, a fully disposable, membrane aerated spinner flask for efficient cultivation of animal cells. Main feature is a membrane stirrer which allows controlled mixing and aeration without foaming. A pack unit contains 2 SuperSpinner 1000 D.
DZ-------AMP2-2	Membrane pump as gassing unit. For use in the incubator cabinet (100 % humidity at 37 ℃). 230 V.
DZ-------AMP3-2	115 V version
DZ-----MM---2	Magnetic drive suitable for use in the incubator cabinet (100 % humidity at -10 ℃ to 56 ℃). The magnetic drive offers a speed range from 5–120 1/min. 230 V.
DZ-----MM---3	115 V version

VoluPAC™ Tubes

Disposable spin tubes for the determination of biomass in cell culture suspensions, expressed as packed cell volume (PCV).

The VoluPAC™ tubes provide a fast, easy to use, reproducible and reliable alternative to manual cell counting. They are 15 times faster and 5 times more accurate (margin of error less than 5%) compared to the hemacytometer.

The VoluPAC™ tubes enables the determination of the packed cell volume (PCV) in a cell suspension, resulting in absolute data correlating with parameters like protein content, cell count, metabolic activity and others.

Features and Benefits

- **Fast**
  1 min centrifugation compared to 5–15 min counting under the microscope
- **Reliable**
  Less prone to statistical errors due to the high number of cells in the pellet
- **Reproducible**
  No user to user variations; no dilution, manipulations, or calibrations are neccessary
- **Convenient and Easy to Use**
  Even for inexperienced users, no elaborate training necessary

- **Works for All Cell Lines**
  No problems with cells forming microclusters
- **Allows Parallel Determination of Many Samples**
  Manual counting has to be performed sequentially
- **Compatible with Standard Rotors**
  No additional equipment required except a bench top centrifuge
- **Disposable**
  Does not afford preliminary cleaning steps
- **Cost Effective**
  Compared to highly sophisticated techniques, in particular no initial investment costs and maintenance
- **Provides Absolute Data**
  Irrespective of the actual volume of the cell culture

With these features biomass determination with VoluPAC™ tubes is one of the simplest and most rapid methods for obtaining precise information about a cell culture. The overall accuracy competes with the best currently available techniques.

Ordering Informationen

Article No.	Description	Pack Size
DCC0304W-------K	VoluPAC™ tubes for reproducible determination of packed cell volume (PCV) as an alternative to manual cell count	50
DCC0304W-------S	VoluPAC™ tubes for reproducible determination of packed cell volume (PCV) as an alternative to manual cell count	200

UniVessel® SU
Single-use Stirred Tank Bioreactor

Introduction

The UniVessel® SU is the latest development in Sartorius Stedim Biotech's broad portfolio of single-use bioreactor and cell culture devices. Featuring a similar design as the glass version, the UniVessel® SU can easily be interchanged with or replace a classical autoclavable vessel. Dedicated motor adaptors enable connection to many BIOSTAT® as well as other systems. As the complete vessel gets discarded after one use, cleaning time, autoclaving and re-installation hassle are eliminated. The UniVessel® SU is currently available in 2L working volume and its flexibility allows for connection to most existing BIOSTAT® systems as well as other controllers for autoclavable bioreactors.

Features

- Completely single-use from vessel to sensor
- Designed for GMP and non-GMP environments
- USP class VI
- Connection to standard controllers of autoclavable bioreactors
- Possible to switch back and forth between single-use and multi-use vessels
- For cell culture applications

Design

UniVessel® SU cell culture vessels are made of polycarbonate and come pre-assembled and sterile. The stirrer assembly featuring two shaft bearings for optimal stirrer shaft support and a lip seal ensure sterile vessel operation. Two 3-blade segment impellers for efficient and low shear mixing are also included. The vessel lid has 3 addition ports, 3 ports with dip tubes for harvesting or submers media addition, 3 ports with blind plugs for insertion of classical sensors e.g. pH and Dissolved Oxygen (DO) or other assemblies and a luer septum port with dip tube for sterile sampling. All inlet and outlet ports for fluids come with thermo-weldable tubing and feature common MPC or Luer connectors for easy connection to addition│harvest peripherals. All tubings can be secured at the vessel lid for an orderly working space.
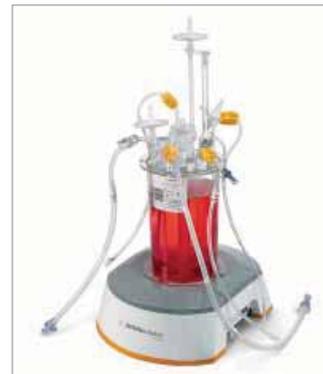
Product Specification UniVessel® SU

Material (Product Contact)

Vessel & components, O-Rings	Polycarbonate
Tubings	Silicone, CFlex®
O-Ring	EPDM
Seal	EPDM

Volume

Total [l]	2.6
Max. Working [l]	2
Minimum [l]	0.6

Impeller

Type	3-blade segment impeller 30° angled
Number of impellers	2
Flow characteristics	Down flow
Diameter [mm]	54
Lower impeller distance to bottom [mm]	47.3
Impeller distance [mm]	70.2

Sparger

Hole diameter	L-Sparger 0.5 mm
Number of Holes	14

Dimensions

Vessel inner diameter (top) [mm]	130 (1.5° slope)
Vessel inner height [mm]	242
Vessel weight [kg]	1
Diameter thermowell [mm]	8
Gas Filters (Sparger, Overlay and Exhaust)	Midisart®, 0.20 µm PTFE (hydrophobic)
Maximum operating pressure	0.5 barg
Maximum operating temperature [°C]	50
Vessel bottom design	Torospherical
Sterilization	Irradiated to dose exceeding 25 kGy

Vessel Holder

UniVessel® SU culture vessels are designed to fit into a special vessel holder for safe support. The vessel feet have different sizes to ensure correct positioning of the culture vessel in the holder. The holder itself is made of two parts, a base module and a vessel ring. The vessel ring is available in different sizes to fit culture vessels of various volumes. Currently the UniVessel® SU is only available in 2 l working volume.

Motor Adaptor

The UniVessel® SU can be used with most bio-reactor controllers for autoclavable bioreactors. Stainless steel adaptors for several existing motors are available and can be mounted on the UniVessel® SU stirrer shaft coupling. The motor adaptor features a bayonet lock for secure motor|vessel connection.

Aeration

Aeration is performed via a L-sparger located underneath the impeller as well as via a top plate port for headspace aeration. The two gas inlets as well as the gas outlet include pre-installed Midisart® aeration filters. The air outlet filter can be connected to a filter holder including a filter heater. The UniVessel® SU works with most existing gassing systems for autoclavable bioreactors.

pH, DO and Temperature Control

Each UniVessel® SU has three top plate ports for insertion of sensors and other devices. Classical sensors (e.g. for pH and DO measure-ment) are normally autoclaved separately and get inserted into the UniVessel® SU through the top plate ports under a laminar flow cabinet.

Standard temperature sensors can be inserted into a thermowell which is already installed in the vessel. Due to the use of standard|existing sensors automatic control is executed by the controller just like with a standard glass vessel.

Non-invasive pH and DO Measurement with SENSOLUX®

(For BIOSTAT® B-DCU II systems only)
Furthermore, single-use sensor patches for optical non-invasive measurement of pH and DO are included in every UniVessel® SU. The determination of pH and dissolved oxygen (DO) with the SENSOLUX® technology is based upon the principle of fluorescence. This measurement method eliminates the risk of contamination.

Sensor patches come pre-calibrated. Calibra-tion data are printed on the vessel label. These can be entered manually into the calibration menu of the control tower or may be trans-ferred via a 2D barcode also located on the label. A barcode scanner can be connected via the BIOSTAT® controller.

Single-use sensors can be used with all BIOSTAT® B-DCU II. All other controllers for autoclavable bioreactors can be interfaced via classical pH and DO probes.

Vessel holder

Motor adaptor (e.g. BIOSTAT®-family)
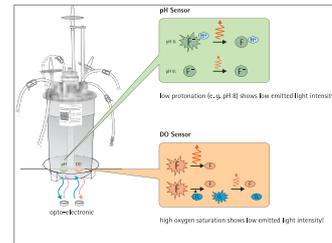
Barcode Scanner

Product Specification UniVessel® SU Holder

UniVessel® SU Holder

Dimensions W ƒ H ƒ D [mm]	265 ƒ 110 ƒ 350
Weight (incl. adaptor ring) [kg]	13.7
Interface to BIOSTAT® B-DCU II	RS485
Ambient temperature|relative humidity (non-condensating)	+5 ℃ – 45 ℃|95 %

Product Specification SENSOLUX® Sensor Patches

	DO	pH
Measurement range	0 – 220 μmol /l*	6.0–8.5
Response time	30 sec	3 min
Resolution	± 0.05 % @ 1 % air saturation ± 0.2 % @ 100 % air saturation	± 0.01 @ pH 7
Accuracy	± 0.2 % @ 1 % air saturation ± 1.0 % @ 100 % air saturation	± 0.1 with one point calibration
Drift	< 0.2 % @ 100 % air saturation /day (1 min. sampling interval @ 50% air saturation	< 0.01 pH / day (1 min. sampling interval, pH 7)
Temperature range	+5 ℃–45 ℃	+5 ℃–45 ℃
Cross-sensitivity	CL_2, SO_2	Slightly to ionic strength, severe to small fluorescent molecules

* Max. 110 % air saturation at 37 ℃ in water

Head Plate Connections|Ports
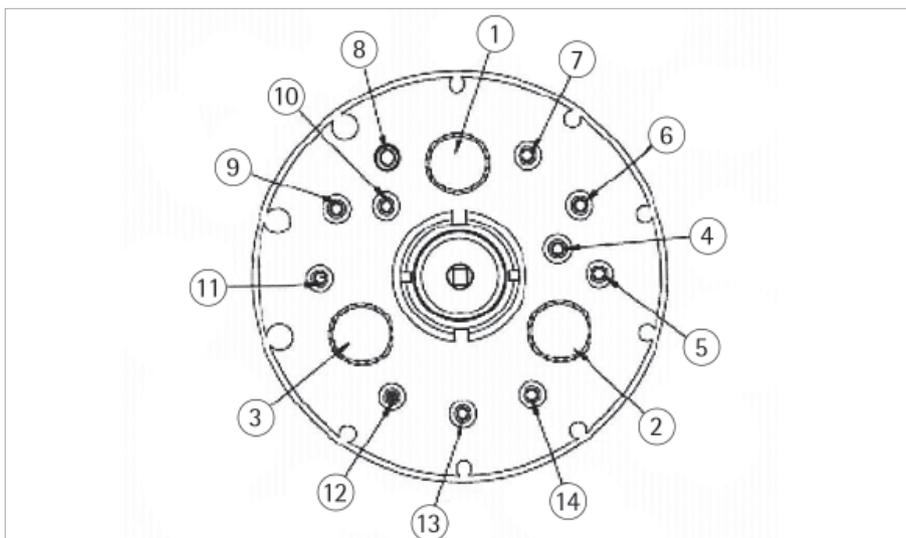
1	12 mm port with blind plug, PG 13.5 thread, for standard 12 mm sensor, length max. 225 mm
2	12 mm port with blind plug, PG 13.5 thread, for standard 12 mm sensor, length max. 225 mm
3	12 mm port with blind plug, PG 13.5 thread, for standard 12 mm sensor, length max. 225 mm
4	Gas Inlet Overlay, Midisart®, silicone tubing $1/8$" f $1/4$" f 200 mm
5	Gas Inlet Sparger, Midisart®, silicone tubing $1/8$" f $1/4$" f 200 mm
6	Addition 1, C–Flex® tubing $1/8$" f $1/4$" 500 mm, Male Luer $1/8$"
7	Dip tube 1, C–Flex® tubing $1/8$" f $1/4$", Male Luer $1/8$", Dip Tube to min. working volume
8	Thermowell
9	Gas Outlet, Midisart®, silicone tubing $1/4$" f $7/16$" f 200 mm
10	Addition 2, C–Flex tubing $1/4$" f $7/16$" f 500 mm, Female MPC 4"
11	Dip tube 2, C–Flex® tubing $1/4$" f $7/16$", Male MPC $1/4$", Dip Tube (bended) to vessel bottom
12	Sample port, silicone tubing $1/8$" f $1/4$", Luer with needle free septum port
13	Addition 3, C–Flex® tubing $1/8$" f $1/4$" 500 mm, Female Luer $1/8$"
14	Dip tube 3, C–Flex® tubing $1/8$" f $1/4$" f 500 mm, Male Luer $1/8$", Dip Tube below min. working volume

Ordering Information

Order Number	Description
DUO002LL-SS----V	UniVessel® SU 2 l, 2 f 3-blade segment impeller, (pack of two)
DZ-------MB	Motor adaptor – Bplus|B-DCU I|B-DCU II
DZ-------MAP	Motor adaptor – Aplus
DZ-------MAA	Motor adaptor – Applikon
DZ-------VHB	UniVessel® SU holder, basic (Aplus, Bplus, B-DCU I & II, Applikon)
DZ-------VHO	UniVessel® SU holder, SENSOLUX® (B-DCU II)
DCS—B1	Barcode Scanner
DZ002L---VHI	UniVessel® SU holder adaptor ring 2 l
DZ-------FH1	Filter heater UniVessel® SU, Size 1
DZ-------VE1	Safety Valve Air Inlet UniVessel® SU, BIOSTAT® systems
DZ-------VE2	Safety Valve Air Inlet UniVessel® SU, other controllers

Biostat® Aplus
The Compact, Autoclavable Fermentor|Bioreactor

Biostat® Aplus... plug in and grow

The BIOSTAT® Aplus is a compact, 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 to get started immediately. The BIOSTAT® Aplus is available with interchangeable 1 l, 2 l, or 5 l working volume single-wall boroslicate glass culture vessels. Alternatively a single-use 2 l polycarbonate culture vessel can be connected for cell culture applications. All of our vessels, glass or single-use are interchangeable, so select the size and type that meet your needs today! Each system also includes a powerful Notebook PC with local control software, as well as our BioPAT® MFCS/DA software package for simultaneous control and data collection.

The BIOSTAT® Aplus 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
- Education and research

Features
- Ready-to-use packages for microbial or cell culture applications
- Notebook PC for operation included
- Control of temperature, pH, DO, stirrer speed, gas mixing, Foam|Level and substrate
- 2-stage DO controller configurable via stirrer speed, gas mixing or substrate
- In-line pH calibration
- Trend display
- Flexible 4-gas mixing system with individual gas flow path for cell culture packages
- Oxygen enrichment capability for microbial packages
- Interchangeable borosilicate glass culture vessels with 1 l, 2 l or 5 l working volume
- Single-use culture vessel with 2 l working volume for cell culture applications
- Industry proven hardware
- Powerful PC operating software – capable of handling up to four units
- BioPAT® MFCS/DA data storage and plotting software package
- Easy-to-follow step-by-step installation and user guide

BIOSTAT® Bplus
Integrated System Design for Convenience Research

BIOSTAT® Bplus Integrated System Solution ...

The BIOSTAT® Bplus has been designed to fulfill the widest range of R&D, process development and small-scale production demands.

A comprehensive range of pre-configured packages are available to satisfy the demands of both microbial & cell culture applications.

Designed as a compact-system solution, the space saving components require a bench space of less than one meter for a Twin version.

The BIOSTAT® Bplus is delivered with a completely-configured software package, including various options. Culture vessels on all systems are interchangeable without any expensive software extensions.

BioPAT® MFCS/DA

For further enhancement of system performance our powerful supervisory process control software BioPAT® MFCS/DA for extended visualization, data acquisition and trend display is included.

The BIOSTAT® Bplus is ideal for:

- Industrial and academic research
- Process development
- Process optimization
- Up- and Down-scale experiments
- Quality control
- Production process control

Application

- Growth and production studies of microbial, mammalian, insect and plant cells
- Culture media composition and optimization
- Downscale of production process for process optimization
- Upscale of shaking flasks
- Small-scale protein and mAB production
- High-cell density cultivation

Features

- Sanitary stainless steel housing for easy cleaning
- Space saving integrated system design
- Single or Twin configuration available
- User-friendly graphical user interface with color display and touch screen
- Trend display with up to 6 process values
- Fully-equipped 1 l–10 l UniVessel® culture vessels with storage bottle tray, lifting handles and sampling system
- Fully-equipped 2 l single-use culture vessel for cell culture applications
- High-performance agitation motor for all applications and UniVessel® sizes
- Application driven integrated gassing systems:
  - Microbial Culture
    - O_2 Enrichment
    - Gas Flow Ratio Control
  - Cell culture|dual use
    - Exclusive Flow
    - Additive flow
- Integrated thermostat or dry heating system
- Control of Agitation Speed, pH, DO, Temperature, Foam, Level, Substrate Addition, Gas Mixing and Gas Flow Rate
- Scaleable vessel design
- Easy upgrade of cell culture packages for multipurpose use
- Optional Redox and Turbidity measurement
- Inclusive Supervisory Process control software

Reliable System Performance ...

Basic Unit
The Basic unit incorporates all necessary supply devices for independent control of up to two culture vessels. All basic unit|culture vessel connections are designed for easy handling. Quick couplings for vessel jacket and exhaust cooler connections, direct probes and agitation motor connections.

Gassing Systems
Four different gassing systems are available. All provide individual flow rates and gas blending for each culture vessel. The flow rates are adjustable via precision flow meters (rotameters). Optional Thermal Mass Flow Controllers (MFC) are available for each flow path. A safety valve is installed in each flow path to the culture vessel for vessel protection. Microbial packages come with an integrated oxygen addition system. Cell-culture packages are supplied with an integrated 4-gas mixing system for Air, O_2, N_2 and CO_2. O_2, N_2 and CO_2 are routed to the Sparger outlet. Air is routed to Sparger and Overlay.

Temperature Control
The integrated thermostat system (multi-use vessel only) or dry heating system with heating blanket provide precise temperature control.

Dosing Pumps
Up to four industrial proven, easy-to-use peristaltic pumps for each culture vessel are included. Infinitely controlled, they can be configured to add corrective agents and feeding, as well as culture volume control. Two additional external pumps for feeding can easily be connected.
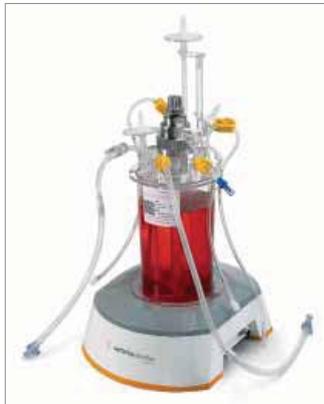
Agitation
The high-performance agitation motor combines low-shear agitation for cell cultures with high speed mixing for microbial high cell density cultivation. The motor is gear- and maintenance-free for quiet operation (even at high speed ranges) and provides convenient handling due to its small size and easy connection.

Multi-use Culture Vessel
UniVessel® culture vessels, developed with over 40 years of experience in up-scale and sterile design, are part of every BIOSTAT® Bplus. They are available in 1 l, 2 l, 5 l or 10 l working volume. All vessels are made of borosilicate glass with a stainless steel headplate. They have a round bottom design for optimal mixing results at low and high speed agitation. The polished stainless steel headplate has been specifically designed for easy cleaning and a maximized number of ports for probes and culturing accessories. Available as single and double-wall vessels UniVessel® have been designed for all types of application demands. Each vessel is supplied with a separate stand and 3-fold bottle holder. Fitting both single and double-wall vessels, they may be used in more than one application.

Single-use Culture Vessel
The UniVessel® SU is the latest development in our broad portfolio of single-use cell culture devices. Featuring a similar design as the glass version, the UniVessel® SU can easily be interchanged with or replace a classical vessel.

Composed of polycarbonate, the vessel comes completely equipped. A sparger, impellers, stirrer shaft and addition|harvest pipes are already installed inside the vessel. A Pt100 sensor can be inserted via a sleeve, supporting temperature control by a heating blanket. Multiple top plate ports are available for use with classical pH and DO sensors or other devices. All inlet and outlet ports for fluids come with thermo-weldable CFlex® tubing and feature common MPC or Luer connectors.

As the complete vessel gets discarded after one use, cleaning time, autoclaving and re-installation hassle is eliminated.

The UniVessel® SU is currently available in 2 l working volume and its flexibility allows for connection to most existing BIOSTAT® as well as other controllers for autoclavable bioreactors.

Control Performance ...

Utilizing proven technology and expert engineering, we have developed our existing in-house systems to bring powerful control capabilities to the sophisticated biotechnology market. Using a local controller for process control in combination with a high-level SCADA system ensures a high safety level right from the start.

Local Control
The control system presents an "intuitive to-use" touch screen for excellent local operation and process control for each culture vessel. Clearly designed screens provide excellent process value overview and operation. Proven industrial control hardware ensures reliable system performance.

Data Storage and Visualization BioPAT® MFCS/DA
For further enhancement of your system performance our powerful supervisory process control software BioPAT® MFCS/DA for extended visualization, data acquisition, data storage and trend display is included. Batch-oriented bioprocessing is essential for data management. Therefore, all batch-related data is stored under a unique batch name. BioPAT® MFCS/DA even has the ability to incorporate other laboratory data, such as off-line process analysers. A plotting module provides comprehensive features for further evaluation of measured bioprocess data. The export function gives added flexibility to analyze data using other off-line programs. More advanced control strategies can be developed using the Programmer's Interface.

A typical application of this module could include calculation of Oxygen Uptake Rates (OUR), Carbon Dioxide Evolution Rate (CER) and Respiration Coefficient (RQ). These values can be used to establish new controller setpoints for individual process optimization.
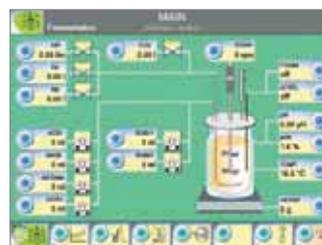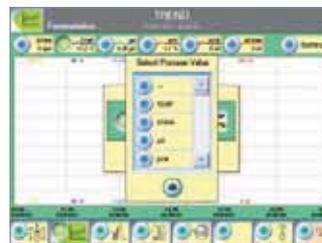
Single-use Bioreactors

BIOSTAT® CultiBag RM 20 Basic
The BIOSTAT® CultiBag RM basic is a rocking motion single-use bioreactor for single-use cultivation bags (CultiBag RM). The rocker unit moves back and forth, generating a fluid movement in the cell culture and medium with low shear. Easy to use, it is applicable to all cell types, including mammalian cells, plant cells, insect cells and microorganisms. The system can be placed on a bench-top or in an incubator for stand-alone use.

The BIOSTAT® CultiBag RM 20 basic is a flexible medium-scale platform for various bag sizes with working volumes from 100 ml to 10 l. It can also be combined with the BIOSTAT® CultiBag RM controller to optimize the process by using intuitive touch-screen operation and feedback control of all relevant process parameters by cutting edge Single-use sensors (see BIOSTAT® CultiBag RM optical and perfusion).

BIOSTAT® CultiBag RM Ordering Information

Cat. No.	Hardware Packages – BIOSTAT® CultiBag RM
DH-020LBRM-1	BIOSTAT® CultiBag RM 20 basic, 120 VAC
DH-020LBRM-2	BIOSTAT® CultiBag RM 20 basic, 230 VAC
DH-020LBRMC1	BIOSTAT® CultiBag RM 20 basic, clear lid, 120 VAC
DH-020LBRMC2	BIOSTAT® CultiBag RM 20 basic, clear lid, 230 VAC

BIOSTAT® CultiBag RM 20 Optical and Perfusion

The BIOSTAT® CultiBag RM 20 optical is a medium-scale Single-use bioreactor consisting of rocker unit ("basic" system), BIOSTAT® RM control tower, CultiBag RM and superior BioPAT® MFCS/DA data logging software.

The perfusion system consists of an optical system, harvest and feed pumps, two balances and an automated perfusion control system (to be ordered as Perfusion Configuration 1). Gravimetric flow controllers ensure precise perfusion rates. These systems can be used for R&D purposes, small scale production and inoculum production under GMP and non-GMP. The control tower is connected to the rocking units for monitoring and controlling the culture, including pO_2 (cascade control), pH, agitation, and temperature in batch and fed batch mode of operation. Single-use optical sensors for measurement of pH and pO_2 are pre installed in the CultiBag RM bags. These bags are gamma irradiated as a closed system.

BIOSTAT® CultiBag RM reduces the risk of cross-contamination. It reduces set-up time, the time between the batches and investment costs. Single-use CultiBag RMs eliminate the need for cleaning (CIP) and sterilizing (SIP). Validation requirements for single-use bioreactors are low.

BIOSTAT® CultiBag RM 20 Ordering Information

Cat. No.	Description
DH-020LORM-1	BIOSTAT® CultiBag RM 20 optical, 120 VAC
DH-020LORM-2	BIOSTAT® CultiBag RM 20 optical, 230 VAC
DH-020LPRM-1	BIOSTAT® CultiBag RM 20 perfusion, 120 VAC
DH-020LPRM-2	BIOSTAT® CultiBag RM 20 perfusion, 230 VAC
DH-----PRM11	Perfusion Configuration 1, 120 VAC
DH-----PRM12	Perfusion Configuration 1, 230 VAC

BIOSTAT® CultiBag RM 20 Optical and Perfusion TWIN-Rocker

The BIOSTAT® CultiBag RM 20 optical and perfusion TWIN-Rocker consists of two rocker units, one TWIN control tower and superior BioPAT® MFCS/DA data logging software. This system has two identical independent control systems installed in one housing to simultaneously control two CultiBag RMs mounted on two Bag Holders and Rockers, respectively.

BIOSTAT® CultiBag RM 20 Optical and Perfusion TWIN-Rocker Ordering Information

Cat. No.	Description
DH-020LOR2-1	BIOSTAT® CultiBag RM 20 optical TWIN-Rocker, 120 VAC
DH-020LOR2-2	BIOSTAT® CultiBag RM 20 optical TWIN-Rocker, 230 VAC
DH-020LPR2-1	BIOSTAT® CultiBag RM 20 perfusion TWIN-Rocker, 120 VAC
DH-020LPR2-2	BIOSTAT® CultiBag RM 20 perfusion TWIN-Rocker, 230 VAC
DH-020LRR2-1	BIOSTAT® CultiBag RM 20 optical and perfusion TWIN-Rocker, 120 VAC
DH-020LRR2-2	BIOSTAT® CultiBag RM 20 optical and perfusion TWIN-Rocker, 230 VAC

CultiBag RM

Single-use CultiBag RM bioreactor chambers are USP class VI tested. Bags are available in basic, optical (with pH/DO sensors) and perfusion pro (with pH/DO sensors and internal perfusion membrane) configurations. Sterile-tube connections allow addition of media to the cultivation chamber. Bags are equipped with C-Flex tubing which allows the use of a BioWelder to make sterile connections. For more information about single-use bioreactor chambers, please refer to our datasheet or CultiBag RM. CultiBag RMs are not part of the packages and need to be ordered separately.
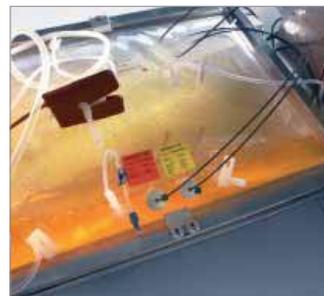
CultiBag RM Ordering Information

Cat. No.	Description
DBB001L	CultiBag RM 1 l basic
DBB002L	CultiBag RM 2 l basic
DBB010L	CultiBag RM 10 l basic
DBB020L	CultiBag RM 20 l basic
DBO002L	CultiBag RM 2 l optical
DBO010L	CultiBag RM 10 l optical
DBO020L	CultiBag RM 20 l optical
DBP002L--SM	Cultibag RM 2 l perfusion pro 1.2 µm
DBP010L--SM	CultiBag RM 10 l perfusion pro 1.2 µm
DBP020L--SM	Cultibag RM 20 l perfusion pro 1.2 µm

RPM 1000

Mikro-Dismembrator U

7   8

4   5

1   2

Homogenizers & Centrifuges

sartorius stedim
b i o t e c h

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 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 should be considered for increased user comfort. Particularly the high output power of the LABSONIC® P requires users to protect the environment against high energy audible sound generated during sample treatment. 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 $\oplus$ 3 mm to 10 mm. Glass beads $\oplus$ 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, $\oplus$ 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, $\oplus$ 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

Overview Shakers and Homogenizers SL-0013-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 2-16PK 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 3-30K, 6-16|6-16K and 8K, 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
1-14K	Yes	14,800	13,000	0.2 to 2.2, hematocrit
1-15P	No	14,000	12,000	0.2 to 2.2, hematocrit, PCR
1-15PK	Yes	14,000	14,000	0.2 to 2.2, hematocrit, PCR
2-6E	No	3,900	3,900	0.2 to 100
2-6	No	4,000	4,000	0.2 to 100
2-16P	No	15,000	12,000	0.2, to 100, microtiter, PCR
2-16PK	Yes	15,300	14,000	0.2 to 100, PCR
3-16P	No	14,500	5,000	0.2 to 250, microtiter, cyto
3-16PK	Yes	15,300	5,500	0.2 to 250, microtiter, cyto
3-18	No	18,000	5,500	0.2 to 250, microtiter, cyto
3-18K	Yes	18,000	5,500	0.2 to 250, microtiter, cyto
3–30K	Yes	30,000	10,000	0.2 to 125
4-16	No	13,500	4,500	0.2 to 650, microtiter
4–16K	Yes	15,000	5,100	0.2 to 650, microtiter
6-16	No	12,500	4,500	0.2 to 800, microtiter, blood bags
6-16K	Yes	15,000	5,100	0.2 to 800, 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® mini
Filter Integrity Tester for Food & Beverage Applications

Description
The automatic filter integrity tester Sartocheck® mini can be used to verify the integrity of membrane filters which are used in the food & beverage environment.

Taken those specific needs into account, this unit offers the following main features:
- Automatic filter integrity tester
- Pressure Drop Test &
- Diffusion Test
- Small, portable unit
- 19 different test programs
- 100 test results to be stored
- LCD display
- Automatic venting after the test
- Thermo-printer (57 mm paper)
- Easy and reliable data transfer to PC
- High capacity batteries for up to 4 hrs work
- Protection rating IP50
- Incl. bag and case

Test Result Documentation
Test results are automatically printed using the built-in thermo printer. An additional port allows the connection of an external printer.

Data Storage
The unit stores up to 100 test results in the internal memory. To avoid the oldest data to be overwritten, electronic data can be stored on a connected PC with user-friendly software. The same software can be used for programming the device.

Equipment Supplied
- Sartocheck® mini integrity test unit
- Low volume adapter for net volumes < 5 l
- Printer paper (4 rolls)
- Pressure inlet tubing (18104)
- Pressure outlet tubing (18103)
- Carrier bag (soft case)
- Hard case

Order Information
26292---01

Specifications

Technical Specifications

Power Requirements	100–240 V AC, 50│60 Hz
Max. Power Input	20 W
Max. inlet pressure	4500 mbar
Dimensions W ƒ H ƒ D [mm]	315 ƒ 150 ƒ 280
Weight [g]	ca. 3,900
Languages	German, English, French, Italian, Spanish, Portuguese

Operating Conditions

Temperature	3–30 °C
Humidity	5–95% rel.

Measuring Ranges

Test pressure	0–3900 mbar
Max. inlet pressure	0–4500 mbar
Net volume	0.1–999 L

Measuring Accuracy

Rel. deviation pressure measurement	< 0.2%
Abs. deviation pressure measurement (@ 20 °C)	max. ± 4 mbar

Interfaces

External printer	Centronics 25 pol
Communication port	232,9 pole male

Sartocheck® 3 plus

Description
This unit supports all established integrity test methods and is characterized by its intuitive and easy handling. The Sartocheck® 3 plus is not encumbered by the 21 CFR part 11 code as it is a paper based system and does not store test results electronically.

Main Features
- Smart design
- Large colour TFT display
- User-friendly menu structure
- On-screen assistance
- Paper-based result documentation (21CFR part 11 not applicable)
- Up to 250 different test programs to be stored
- Password protected access
- Individual user profiles|rights to be defined
- SD card reader for storing|transferring test programs
- Reliable cleaning of the complete internal pneumatics

Sartocheck® 3 plus Performs the Following Tests:
- Bubble Point Test
- Diffusion Test
- Bubble Point and Diffusion Test (combined test)
- Pressure Drop Test
- Water Intrusion Test
- Water Flow Test
- Multipoint Diffusion Test

Data Storage
As a pure paper-based system the Sartocheck® 3 plus does not have an electronic result database. However, the system allows to store up to 250 test programs within its internal memory. Test programs can be stored|archived on standard SD cards (Secure Digital memory Card).

Cleaning Function Guarantees Highest Process Security
The cleaning function of Sartocheck® 3 plus allows you to flush all internal pneumatic parts completely. On-screen instructions guide you through all necessary steps. The automatic drying function guarantees that no cleaning liquid remains inside.

Because only stainless steel and PTFE is used for the internal pneumatic parts, the unit can be cleaned even with aggressive cleaning fluids (e.g. 1 M NaOH). This guarantees highest cleaning efficacy and therefore enhances the safety of the integrity testing procedure.

Specifications

Power requirements	100-240 V AC, 50|60 Hz
Max. Power Input	74 watts
Max. operating pressure [mbar|psi]	9999|145
Minimum inlet pressure [mbar|psi]	4000|58
Dimensions W ƒ D ƒ H [mm]	460 ƒ 390 ƒ 212

Measuring Ranges

Test pressure [mbar|psi]	100–8000|1.5–116
Pressure drop [mbar|psi]	1–2000|0.01–29
System inlet volume	
With internal ref. vessel	9000 ml
With external ref. vessel	max. 100 l

Measuring Accuracy

Pressure	± 0.1% full scale ± 9.5 mbar
Pressure drop	± 1 mbar
Volume determination	± 4%
Diffusion	± 5%
Water-Intrusion	± 5%
Bubble Point [mbar|psi]	± 50|± 0.7

Operating Conditions

Ambient temperature	+15 °C to +35 °C
Rel. humidity	10–80%

Colour Display

Size	8.4"
Resolution	640 *f* 480 pixel
Language Option	English, German, French, Spanish, Italian

Equipment Supplied	Order No.
Sartocheck® 3 plus	16290
Tubing for compressed gas inlet	18104
Tubing for compressed gas outlet	18103
Ribbon cassette	6982141
Rolls of printer paper	6982142
Test certificate	
Calibration certificate	
Operating instructions	
Validation package	16290---VP
Mains lead (country specific)	

Accessories

Cleaning kit	26288---CK
Ext. reference vessel (10 l)	16288---RV

1: External reference tank
2: Venting 1
3: Out
4: Venting 2
5: In

1: Main switch
2: Service TU
3: Service MU

Sartocheck® 4 plus
Fully Automatic Integrity Testing Device

Description
The Sartocheck® 4 plus is the result of Sartorius' 30 years experience in developing automatic filter integrity testers. Valuable productivity enhancing features and robust build quality have been combined with incredible ease of use to make the Sartocheck® 4 plus the only logical choice for integrity testing.

The Sartocheck® 4 plus provides the following unique combination of benefits:
- Barcode Scanner for easy and reliable data entry (optional)
- Intelligent selection of test program after scanning the filter
- Combination of large, color touchscreen display with keypad
- External pressure sensor and external valves (optional)
- Automated cleaning function eliminates expensive service calls
- Sophisticated Cleaning Kit available (optional)
- Automatic detection of improper test setup (e.g. disconnected filters)
- Multitasking menu
- Electronic test reports in PDF format
- No thermo paper but dot matrix printer (longer print preservation)
- SD card reader for easy test program proliferation to other Sartocheck® testers
- Profibus communication (interface as accessory)
- Unparalleled accuracy and repeatability of results for all test types
- World class documentation, training, applications, and service support
- Allows concurrent filter testing by controlling up to four additional test units (optional MultiUnits)
- Fully compliant with 21 CFR Part 11
- Developed in accordance with GAMP

Integrity Test Methods
- Bubble Point Test (BPT)
- Diffusion Test (Diff)
- Combined Test (Diff + BPT)
- Pressure Drop Test
- Water Intrusion Test (WIT)
- Water Flow Test (WFT)
- Multipoint Diffusion Test
- Customer Specific Tests
- Automatic Test Time function for intelligent optimization of test times

Barcode Scanning
Using the optional barcode scanner allows easy and error-free entry of filter data into the unit. Sartocheck® 4 plus automatically locates the suitable test program that matches the scanned cartridge.

Cleaning Function
The patented cleaning function of Sartocheck® 4 plus allows the user to perform reliable cleaning of the complete internal pneumatics even with aggressive cleaning agents (up to 1 M NaOH). This unique feature provides highest security of the integrity testing procedure while eliminating the need for costly down time and service calls.

Network Concept
The network solution for the Sartocheck® 4 plus incorporates the TCP-IP and FTP protocol standards, with data being transmitted via the Ethernet standard. Via standard RJ45 connection, all data can be easily up-loaded on a FTP server. Profibus communication can be used to allow bidirectional communication with process control system as a basis for complete automation.

Multiunit Concept
In order to increase productivity through parallel filter testing, up to four additional MultiUnits can be easily connected to the Sartocheck® 4 plus. This provides the equivalent testing capacity of five Sartochecks® operating concurrently at a significant cost savings to the end user.

Qualification
Sartocheck® 4 plus ensures that all integrity tests are carried out with highest precision and accuracy. Our comprehensive Sartocheck® 4 plus validation documentation and world-class Service Team provide exemplary support for the user.
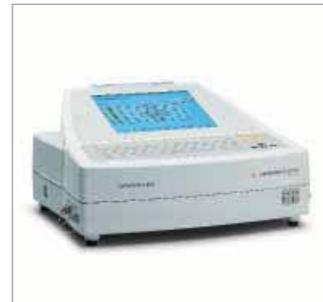
Specifications

Technical Specification

Power requirements	100–240 V AC, 50|60 Hz
Max. power input	74 watts
Max. operating pressure	9999 mbar|145 psi
Min. inlet pressure	4000 mbar|58 psi
Dimensions W *f* D *f* H1 *f* H2 [mm]	460 *f* 390 *f* 140 *f* 245

Measuring Ranges

Test pressure	100–8000 mbar|1.5-116 psi
Pressure drop	1-2000 mbar|0.01-29 psi
System inlet volume ▪ With int. reference vessel ▪ With ext. reference vessel	 14 l 150 l

Measuring Accuracy

Pressure	± 0.1 % full scale
Pressure drop	± 1 mbar|0.015 psi
Volume determination	± 4 %
Diffusion	± 5 %
Water intrusion	± 5 %
Bubble point	± 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	RS232
	Serial Port MU	RS485
	PLC Port	binary signals, 12 pins
	Network	RJ45
Language Option	English, German, French, Spanish, Italian	
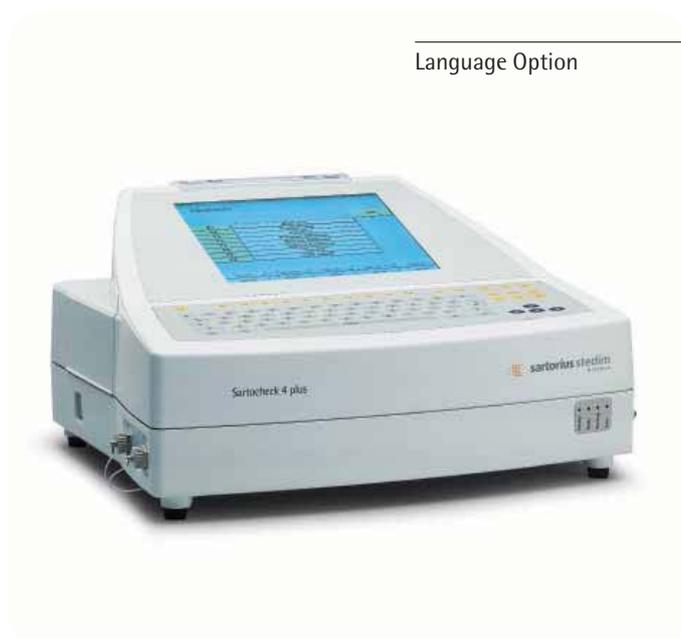
Equipment Supplied	Order No.
Sartocheck® 4 plus	26288
Inlet tubing for compressed gas	18104
Outlet tubing	18103
Ribbon cassette	6982141
Rolls of printer paper	6982142
Test certificate	
Calibration certificate	
Installation and operating instructions	
Validation package	26288---VP
Power cord	

Accessories

Barcode scanner	26288---BS	
Multiunit	16288---TU	
External pressure transducer	1ZE---0018	
Set for external venting (1 valve)	1ZE---0025	
Valve set for external filling (WIT)	1ZE---0026	
Serial Port Interface cable TU|TU	0.5 m	1ZE---0008
	2 m	1ZE---0009
	5 m	1ZE---0010
Network cable	2 m	1ZE---0029
	5 m	1ZE---0030
	10 m	1ZE---0031
	20 m	1ZE---0032
Cleaning kit	26288---CK	
Pressure tank for cleaning	26288---PV	
External reference vessel (10 l)	16288---RV	
Profibus interface	16288---PI	
Validation package	26288---VP	
Clean room venting adapter	1ZE---0021	
Midisart® test manifold 10 f	1Z-LB-0002	

1: Ext. reference tank
2: Venting 1
3: Out
4: Venting 2
5: Compressed Air In
A: External sensor
B: External valves

1: Main switch
2: SD card reader
3: Serial Port TU
4: PLC Port
5: RJ45 Network
6: Connection for optional barcode scanner

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 or Sartocheck® 4 plus is operated and controlled by this Sartocheck® 4 (plus) via a RS485 connection.

Efficiency
Up to 4 MultiUnits can be connected to one Sartocheck® 4 (plus) allowing to integrity test up to 5 different filter systems in parallel including the testing capabilities of the Sartocheck® 4 (plus) 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 (plus) and the connected MultiUnits. The MulitUnits can be placed all over your production facility and are centrally controlled and operated by the Sartocheck® 4 (plus). A printout of the test results of the MultiUnit is made by the printer of the Sartocheck® 4 (plus) 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 (plus) 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 (plus) test res ult 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.

Patent Pending Thermal Insulation
The Sartocheck® 4 (plus) 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 (plus) 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 Stedim Biotech Validation Package
The MultiUnit is delivered with a comprehensive validation package including an IQ & OQ protocol that can be accomplished by qualified Sartorius Stedim Biotech personnel. Assistance for PQ can also be provided from the Sartorius Stedim Biotech Technical Support team.

Specifications

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	100–8000 mbar|1.5–116 psi
Pressure drop	1–2000 mbar|0.01–29 psi
System net volume	
■ With int. reference vessel	14 l
■ With ext. reference vessel	150 l

Measuring Accuracy

Pressure	± 0.1% full scale, ± 9.5 mbar
Pressure drop	± 1 mbar
Volume determination	± 4%
Diffusion	± 5%
Water intrusion	± 5%
Bubble point	± 50 mbar|± 0.7 psi

Operating Conditions

Ambient temperature	+15 °C to +35 °C
Rel. humidity	10–80%
Max distance between SC4 and multiunit (RS485)	100 m

Order Information.

Order number	16288---TU

Equipment Supplied	Order No
MultiUnit	16288---TU
Tubing for compressed gas inlet	18104
Tubing for test gas	18103
Test certificate	
Calibration certificate	
Installation and operating instructions	
Validation package	16288---VPTU
Mains lead (country specific)	

Accessories	Order No
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	26288---CK
Clean room venting adapter	1ZE---0021

1. MultiUnit RS485 in\|out
2. MultiUnit RS485 in\|out
3. MultiUnit PLC in\|out
4. Sartocheck® 4 PLC in\|out
5. Sartocheck® 4 RS485 in\|out

A. Ext. sensor
B. Ext. valve
C. Ext. reference tank
D. Venting 1
E. Outlet (test gas)
F. Venting 2
G. Inlet comp. gas

WIT Trolley

Description

The WIT Trolley has been developed to make integrity testing of hydrophobic sterilizing grade filters safe and easy in the pharmaceutical industry. Both Water Intrusion and Water Flow tests can be performed. The Sartocheck® 4 (plus) pilots all the pneumatic valves via the integrated SIEMENS PLC. A PT100 sensor measures the water temperature in the water tank and avoids testing with water out of the predefined temperature range.

Installation

Due to its unique design and its fully automatic two step filling procedure the WIT Trolley can test all HIMA correlated hydrophobic sterilizing grade membrane filters at a horizontal distance of more than 100 m and a vertical distance of more than 15 m. The external thermal compensated pressure sensor is installed on the top of the housing and measures the pressure drop exactly where the intrusion|water flow take place. Moving the WIT Trolley during the measurement will have no incidence on the test value.

No Cross Contamination

The Trolley uses the principle of one way flow. Once the Sartocheck® 4 (plus) has pressurized the water tank and filled the housing to a stable pressure the filter housing is isolated by the filling valve. The gas overpressure in the water tank is vented directly at the water tank and does not go back via the Sartocheck® 4 (plus).

At the end of the integrity test the test water is drained via the draining valve directly at the housing and does not get in contact with neither the filling tubing nor the water tank.

In-line Steam Decontamination

The Trolley can be steamed at max temperature of 134 °C (266 °F). The SIEMENS PLC supervises the steaming temperature at the lowest point using a second PT100 sensor. If the steaming temperature increases too much the inlet valve is closed. If the steaming temperature decreases too much the steaming cycle is interrupted and an error message is given. An optional extended steaming version of the Trolley allows for steaming of the filling hose.

Test Flexibility

Although connected to the Trolley the Sartocheck® 4 (plus) can perform all types of standard integrity testing via the auxiliary output thus giving a total test flexibility. It can also be connected to up to four MultiUnits (please see separate data sheet) in order to perform an additional test in parallel.

PLC Connector and Integration

The Sartocheck® 4 (plus) may be triggered by a 24V dry signal from a PLC. The Sartocheck® 4 (plus) printout clearly shows the difference between an integrity test that has been started by an operator from the Sartocheck® 4 (plus) touch screen|key-board and via the PLC contact.

The WIT Trolley can thus be integrated into an automated process and deliver a "GO" or a "NO GO" for the following process steps.

Sartorius Stedim Biotech Validation Package

The Sartocheck® 4 (plus) and its Trolley are both delivered with a comprehensive validation package including an IQ & OQ protocol that can be accomplished by qualified Sartorius Stedim Biotech personnel. Assistance for PQ can also be provided from the Sartorius Stedim Biotech Technical Support team.

Specifications

Technical Specifications

Power requirements	110–230 V AC , 50|60 Hz
Maximum operating pressure	9999 mbar|145 psi
Minimum inlet pressure	4000 mbar|58 psi

Measuring Ranges

Test pressure	100–8000 mbar|1.5–116 psi
Pressure drop	1–2000 mbar|0.01–29 psi
System net volume	
▪ With int. reference vessel	9000 l
▪ With ext. reference vessel	100 l

Order Information

Order number	17005A---L--5301

Measuring Accuracy

Pressure	± 0.1% full scale, ± 9.5 mbar
Pressure drop	± 1 mbar
Volume determination	± 4%
Diffusion	± 5%
Water intrusion	± 5%
Bubble point	± 50 mbar|0.7 psi

Operating Conditions

Ambient temperature	+15 ℃ to +35 ℃
Rel. humidity	10-80%
Max distance between SC4 and filter housing (horizontal)	100 m
Max distance between SC4 and filter housing (SC4 below)	25 m
Max distance between SC4 and filter housing (SC4 above)	15 m

Equipment Supplied
▪ Trolley
▪ Hose with valve battery for filling
▪ Steam trap
▪ Installation and operating instructions
▪ Validation package
▪ Mains lead (country specific)

Accessories

External pressure transducer*	1ZE---0018
Sartocheck® 4 plus*	26288

Optional Version

Extended steaming version	17005A---L--5501

*To be ordered separately; not part of 17005A---L--5301

1: Sartocheck® 4
2: Pneumatic & hydraulic compartment
3: Electrical compartment
4: OP7 screen

Weighing Technology for Laboratories

Cubis®. Definition of a New Class.

Cubis® was developed for users who expect the best possible performance from a lab balance across the board, but only want to invest in what is necessary. Cubis® is the first lab balance to have an entirely modular design, which means that display and control units, weighing modules, draft shield models, interfaces, etc. can be freely combined.

The technological innovations and features included in this lab balance for the first time ever put the Cubis® far ahead of the current standards for premium lab balances. The user then has the option of configuring their lab balance to suit their own individual requirements. Every Cubis® represents an uncompromising implementation of the individual requirement profile.

Safe and Easy to Use with Q-Guide
The Q-Guide user interface eliminates the need for the user to carry out time-consuming tasks. Q-Guide is also an interactive way of defining and storing a task. After the task has been created, Q-Guide runs smoothly through the application processing. With three control units, Cubis® meets the demands of different operating philosophies and is suitable for all laboratory applications.
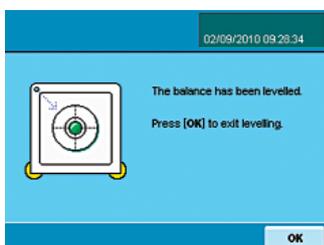
MSU – Classic and Universal
- High-resolution, monochrome graphical display
- Keys that feature positive click action and precise activation of functions
- Classic key-operated control with the widest possible range of performance features

MSA – The Ultimate Solution
- Top-of-the-line technology and information design
- Touch screen featuring high-resolution color TFT for brilliant reproduction of text and graphics
- Outstanding ease of use in complex applications

MSE – Weighing Pure and Simple
- Large, high-contrast liquid crystal display
- Easy-to-understand menu guidance with short text prompts
- Clearly structured keys for precise activation of functions

Consistently Precise Leveling with the Automatic Q-Level Function
Cubis® is the first lab balance with the option of automatically checking, performing and documenting its exact leveling. There's no easier way to ensure that a lab balance is set up properly. All Cubis® already have a manual leveling function with user guidance as standard.

More Safety, More Applications
As the premium laboratory balance, the Cubis® with Q-Pan significantly counteracts the loading error caused by off-center loading of the weighing pan.

Practical accessories are also part of the Cubis® application range. For example, Q-Grid has a grid pan for precision balances with readabilities of 10 and 100 mg. This makes unrestricted weighing possible for the first time ever in the laminar flow of safety weighing cabinets, workbenches and laboratory hoods, or with the Q-Grip accessory, a one-size-fits-all holder for bottles, test tubes, reaction containers and filters to help you work ergonomically.

All Cubis® draft shield models offer the user practical and tangible benefits: high mechanical stability, flexibility, an excellent view of the weighing chamber and shielding against external impact factors, such as electrostatic charge through a conductive coating.

Maximum Precision for Even the Smallest of Sample Quantities

The new Cubis® ultramicro and microbalances offer the user the highest level of safety in terms of both result reliability and standard conformity. Short measurement times result in time gained – for every single measurement. In particular, the motorized 100 % glass draft shield makes working with minimum sample sizes fast and effortless. An intelligent learning capability allows adaptation to every workflow.

Q-Com for Unlimited Communication

Three fixed (USB, RS-232C, Ethernet [not for MSE]) and three optional interface ports make almost all forms of bidirectional communication possible. Up to four interface ports can be used simultaneously. All data, such as the user's master data or tasks, can also be transferred easily and safely from one Cubis® to another using an SD card (not on the MSE).

Web services offer a new communication platform that allows external software systems to directly show and use information, entry fields, menus and complex operations on the touch screen of the MSA display and control unit. This eliminates the need to install PCs, laptops, or terminals in the area directly around the balance.

It is possible to connect Cubis® to external software systems. Using the balance's default standardized SICS communication protocol, it is also possible to communicate with software from other manufacturers.

Advanced Pharma Compliance for Use in Regulated Areas

Both test equipment monitoring as part of QM systems and the United States Pharmacopeia place very high demands on supervisors and laboratory devices. Cubis® Advanced pharma Compliance makes it possible to integrate Cubis® into processes and provides valuable support during the implementation of individually designed safety concepts.

Balance Monitoring:
- Automatic leveling "Q-Level"
- Fully automatic calibration|adjustment with isoCAL
- Linearization
- Reproducibility test reproTEST

Process Monitoring:
- User|Password Management
- Action Hierarchy – warning and reminder functions for leveling, minimal initial weighing and calibration|adjustment
- SQmin Function – monitoring minimal weight compliance according to USP
- DKD Measurement Uncertainty – display of the absolute or relative measurement uncertainty or process accuracy
- Task Management – interactive guidance through the weighing process

Compatibility and Retraceability:
- Cleaning validation – flat, untextured surfaces for fast deep cleaning
- Audit-Trail – all changes on the device are logged
- Alibi memory – for traceable transfer to a PC of weighing data subject to calibration requirements
- GLP certificate – models with the MSA control unit have been thoroughly tested and assessed.
- Risk analysis – available for certain models with the MSA control unit depending on the method set by the Failure Mode and Effect Analysis (FMEA).

Please use the adjacent fields to enter
the selection made with the icon.

Cubis® Display and Control Units
Select the display and contol unit and enter it in the field market with the icon.

Types	MSA	MSU	MSE
Operation	Touch screen, keys for central basic functions	Keys	Keys
Display	High-resolution color TFT, 5.7" graphic display	High-resolution black|white, 5.7" graphic display	Liquid crystal display, black|white
Adaptation of the display and control unit	Tiltable display, removable display and control unit	Tiltable display, removable display and control unit	Removable display and control unit
Standard data interfaces	■ USB (integrated into weighing module) ■ RS232C accessory interface, 25-pin (integrated into weighing module) ■ Ethernet (integrated into display and control unit) ■ Various data protocols available (can also be connected to software designed for external manufactures)		■ USB (integrated into weighing module) ■ RS232C accessory interface, 25-pin (integrated into weighing module)
SD card reader	Integrated as standard into display and control it	Integrated as standard into display and control it	–
Operation of motorized draft shield (only applies to DA or DI draft shields)	Actuation by side keys or touch-free using IR switch (optional); learning capability	Actuation by side keys or touch-free using IR switch (optional); learning capability	Actuation by keys or touch-free using IR switch (optional); learning capability
Applications	Unit conversion, SQmin function for minimum initial weight according to USP, isoCAL automatic calibration|adjustment function, individual identifiers, density determination, statistics, calculations, averaging, formulation, weighing in percent, time-controlled functions, totalizing, DKD measurement uncertainty, second tare memory, counting, checkweighing Alibi memory, audit trail	Unit conversion, SQmin function for minimum initial weight according to USP, isoCAL automatic calibration|adjustment function, individual identifiers, density determination, statistics, calculations, averaging, formulation, weighing in percent, time-controlled functions, totalizing, DKD measurement uncertainty, second tare memory, counting, checkweighing Alibi memory, audit trail	Unit conversion, isoCAL automatic calibration|adjustment function, density determination (buoyancy method only), calculations, averaging, net|total formulation, weighing in percent, counting

Cubis® Weighing Modules
Please enter the model name, starting from the left, in the field identified by the icon.

	Readability [mg]	Weighing Capacity [g]	Weighing Pan (W × D) [mm]	Typical Stabilization Time [≤ s]	Typical Measure- ment Time [s]	Repeatability [≤ ± mg]	Lin- earity [≤ ± mg]	Corner Load [mg]* (Test Load [g])	Minimum Initial Weight [g]**
Ultramicrobalances 0.0001 mg									
2.7S	0.0001	2.1	∅ 20	7	10	0.00025	0.0009	0.0025 (1)	0.001
Microbalances 0.001 mg									
6.6S	0.001	6.1	∅ 30	5	8	0.001	0.004	0.004 (2)	0.002
3.6S	0.0001|0.002 0.005	1.1|2.1| 3.1	∅ 30	5	8	0.003|0.004 0.005	0.004	0.005 (2)	0.004
Semimicrobalances 0.01 mg									
225S	0.01	220	85 × 85	2	6	0...60 g:0.015 60...220 g:0.025	0.1	0.15 (100)	0.02
225P	0.01|0.02| 0.05	60|120| 220	85 × 85	2	6	0...60 g:0.015 60...220 g:0.04	0.15	0.2 (100)	0.02
125P	0.01|0.1	60|120	85 × 85	2	6	0...60 g:0.015 60...120 g:0.06	0.15	0.15 (50)	0.02
Analytical Balances 0.1 mg									
524S	0.1	520	85 × 85	1	3	0.1	0.4	0.3 (200)	0.12
524P	0.1|0.2|0.5	120|240|520	85 × 85	1	3	0.15|0.2|0.4	0.5	0.4 (200)	0.12
324S	0.1	320	85 × 85	1	3	0.1	0.3	0.3 (200)	0.12
324P	0.1|0.2|0.5	80|160|320	85 × 85	1	3	0.1|0.2|0.4	0.5	0.4 (200)	0.12
224S	0.1	220	85 × 85	1	3	0.07	0.2	0.2 (100)	0.12
124S	0.1	120	85 × 85	1	3	0.1	0.2	0.2 (50)	0.12

* Position according to OIML R76 ** Typical minimum initial weight according to USP (United States Pharmacopeia), USP31–NF26

Cubis® Weighing Modules
Please enter the model name, starting from the left, in the field identified by the icon.

	Readability [mg]	Weighing Capacity [g]	Weighing Pan (W × D) [mm]	Typical Stabilization Time [≤ s]	Typical Measurement Time [s]	Repeatability [≤ ±mg]	Linearity [≤ ±mg]	Corner Load [mg]* (Test Load [g])	Minimum Initial Weight [g]**
Precision Balances									
5203S	1	5,200	140 × 140	1	2	1	5	2 (2,000)	1.5
5203P	1│2│5	1,200│2,400│5,200	140 × 140	1	2	1	5	2 (2,000)	1.5
3203S	1	3,200	140 × 140	1	2	1	5	2 (1,000)	1.5
2203S	1	2,200	140 × 140	1	1.5	1	3	2 (1,000)	1.5
2203P	1│10	1,010│2,200	140 × 140	1	1.5	1│6	5	3 (1,000)	1.5
1203S	1	1,200	140 × 140	1	1.5	0.7	2	2 (500)	1.5
623S	1	620	140 × 140	0.8	1	0.7	2	2 (200)	1.5
623P	1│2│5	150│300│620	140 × 140	0.8	1	1│2│4	5	4 (200)	1.5
323S	1	320	140 × 140	0.8	1	0.7	2	2 (200)	1.5
14202S	10	14,200	206 × 206	1	1.5	10	30	20 (5,000)	15
14202P	10│20│50	3,500│7,000│14,200	206 × 206	1	1.5	10│20│40	50	40 (5,000)	15
10202S	10	10,200	206 × 206	1	1.5	7	20	20 (5,000)	12
8202S	10	8,200	206 × 206	1	1.5	7	20	20 (5,000)	12
6202S	10	6,200	206 × 206	1	1.5	7	20	20 (2,000)	12
6202P	10│20│50	1,500│3,000│6,200	206 × 206	1	1.5	7│20│40	50	50 (2,000)	12
5202S	10	5,200	140 × 140	0.8	1	6	10	10 (2,000)	10
4202S	10	4,200	206 × 206	0.8	1	7	20	30 (2,000)	12
2202S	10	2,200	206 × 206	0.8	1	7	20	20 (1,000)	12
1202S	10	1,200	206 × 206	0.8	1	7	20	20 (500)	12
12201S	100	12,200	206 × 206	0.8	1	50	100	200 (5,000)	100
8201S	100	8,200	206 × 206	0.8	1	50	100	200 (5,000)	100
5201S	100	5,200	206 × 206	0.8	1	50	100	200 (2,000)	100

* Position according to OIML R76 ** Typical minimum initial weight according to USP (United States Pharmacopeia), USP31–NF26

Cubis® Leveling
Select the type of leveling and enter the identifier "∅" or "1" in the field marked by the icon.

∅	Cubis® shows the level indicator on the display and provides support for rapid leveling (a standard feature on MSA and MSU display and control units; for MSE units, only symbols are provided as an aid for manual leveling).
1	Fully automatic, motorized Q-Level leveling at the touch of a button (available for all Cubis® weighing modules with a weighing capacity > 6.1 g and ≤ 6,200 g).

Test Certificates and Permits
Select a test certificate|permit and enter the identifier in the field marked with the icon.

∅ ∅	Standard certificate of conformity to specifications
TR	Like ∅∅, but with a detailed test protocol
CE	Factory-calibrated with European calibration permit (not for models with DF draft shield)

Cubis® Draft Shields
Select a draft shield and enter the corresponding identifier in the field marked with the icon.

DO	No draft shield. Please always enter this identifier for weighing modules with the weighing pan size 206 + 206 mm.
DR	Flat stainless-steel weighing pan draft shield (removable, without glass components) for all precision balances with a readability of 1 mg and weighing module 5202s.
DE	Manual glass draft shield for precision balances with a readability of 1 mg and weighing module 5202S.
DU	Manual analytical balance draft shield with smooth-running, wide-opening doors, unimpeded access to the weighing chamber without interfering braces. For all models with 0.01 mg, 0.1 mg and 1 mg readability and weighing module 5202S.
DA	Automatic, motorized draft shield with learning capability for ergonomic working and individual adaptation to different applications. For all models with 0.01 mg, 0.1 mg and 1 mg readability and weighing module 5202S.
DI	Like the DA draft shield, but with the addition of an integrated ionizer to eliminate the impact of electrostatic charges in samples and containers.
DM	Automatic, motorized, round 100% glass draft shield with learning capability for ultramicrobalances and microbalances with a readability of 0.0001 mg and 0.001 mg (2.7S, 6.6S and 3.6P weighing modules).
DF	Manual draft shield for weighing filters with diameters of up to 50 mm (75 mm and 90 mm optionally) made from stainless steel. Reduction of electrostatic effects to the minimum (not for weighing module 3.6P).

Optional Interface Modules
Depending on the balance, it may be possible to select an additional interface module.

IR	RS232 interface, 25-pin
IB	Bluetooth® interface
IP	RS232 interface, 9-pin, incl. PS/2 interface

Premium Microbalance ME36S
Highest Precision – Even for the Smallest Sample Quantities

Design 3

The premium microbalances meet the most stringent requirements when it's necessary to achieve measurement results quickly and with exceptional accuracy
The balances also offer maximum support when used as testing equipment in the context of a QM system. This is ensured by performance features such as the

- SQmin function: Display of the permitted minimum initial weight according to the United States Pharmacopeia (can be activated by Sartorius Service)
- Fully automatic calibration and adjustment function (isoCAL)
- ISO|GLP-compliant logging
- Input of alphanumeric sample identifiers

Featuring a readability of 1 μg, the ME36S offers an exceptionally wide weighing range up to a capacity of 31 g and outstanding metrological specifications, making it ideal for highly accurate microweighing and for weighing microquantities into heavy tare containers.

Brilliant Readability
The backlit, high-contrast graphical display ensures excellent readability. Text-based user guidance allows the balance to be configured quickly and confidently "if you need to do more than just weighing".

Flexible
Every ultramicrobalance and microbalance has built-in application programs as standard features, such as air buoyancy correction, differential weighing program, and statistical evaluation.

All balance-generated data can be logged via the standard RS232Cdata interface.

Specifications

Modell	ME36S*
Weighing capacity [g]	31
Readability [μg]	1
Repeatability (±) [μg]	2
Linearity (≤ ±) [μg]	10
Response time (average) [s]	14–18
Weighing pan ∅ [mm]	30
Design	3

* Models SE2, ME5 and ME36S are available in calibrated versions

Standard Micro-, Semimicro-, Analytical and Precision Balances
The New Sartorius CPA: Unrivalled in Its Performance Class

As the successor to the Sartorius Competence series, which proves its reliability on a daily basis in practical use, the Sartorius CPA also sets standards for engineering, quality and features. If you want to avoid taking risks when you make the investment in a new balance, the new CPA is the best choice you can make.

Whether your samples are in the microgram range or up to 34 kg, the Sartorius CPA series offers the right instrument for practically every weighing task in the laboratory.

Engineering
All balances in the Sartorius CPA series are equipped with a monolithic weighing system available only from Sartorius. This system is not only extremely precise, but also exceptionally reliable and durable.

And the new Sartorius CPA scores winning points with further technical advantages that ensure continuous operation of the balance with the greatest possible accuracy:

Take the built-in, motorized adjustment weight: Just touch the CAL key, and the balance will automatically perform internal calibration and adjustment – whenever required in your process.

And there's the isoCAL function. When the ambient temperature changes by a specific value or once a defined time interval has elapsed, isoCAL performs internal calibration and adjustment fully automatically. Therefore, the balance ensures that calibration is carried out at regular intervals, and delivers consistently high accuracy.

On top of this, the high-contrast, backlit display is exceptionally easy to read under any room lighting conditions (non-backlit micro- and semi-microbalances available).

Quality
Not just the housing, but also the entire construction of the new Sartorius CPA with its powerful core, the monolithic weighing system, stand up to the abuse of tough daily use. The same goes for the control keys, the components on a balance that are most frequently used. Even after they have been pressed tens of thousands of times, they will continue to work precisely, just like they did from day one, with positive click action for reliable activation of their respective functions.

Features
The Sartorius CPA has precisely the features you need for fast and professional processing of weighing tasks in everyday laboratory routines. This includes ISO|GLP-compliant documentation. Connected to a Sartorius YDP20-0CE data printer or a computer, the new Sartorius CPA enables you to comply with documentation requirements for use in a quality management system.

The draft shield designs of the balance models featuring readabilities of 2 µg, 0.01 mg, 0.1 mg or 1 mg are also impressive. Both the construction and size are specially adapted to the particular readability, offering tangible assets in actual use:
- Excellent shielding from drafts
- Draft shield doors that glide open smoothly for optimal access to the weighing chamber
- Outstandingly easy-to-clean design.

A bidirectional RS232C data interface provides the ideal basis for communication, for example with a PC.

For advanced applications, such as weighing in percent, net-total formulation, dynamic weighing or animal weighing, mass unit conversion and counting, the CPA offers easy-to-run programs as standard features.
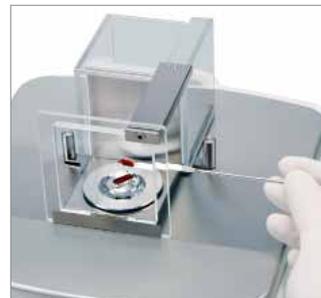
Design 1

Design 2

Design 3

Design 4

Design 5

Specifications

Model	Read–ability [mg]	Weighing Capacity [g]	Repeat–ability [≤ ± mg]	Linearity [≤ ± mg]	Response Time average [≤ s]	Weighing Pan [mm]	Design
Microbalances							
CPA2P	0.001|0.002|0.005	0.5|1|2	0.001|0.002|0.003	0.002|0.004|0.005	10	⌀ 20	1
CPA26P	0.002|0.01	5|21	0.004	0.008	10	⌀ 50	3
CPA2P-F Filter Balance	0.001|0.002|0.005	0.5|1|2	0.002|0.003|0.004	0.002|0.004|0.005	10	⌀ 20 ⌀ 125 Filter weighing pan	2
Semimicrobalance							
CPA225D	0.01|0.01|0.1	40|100|220	0,02|0,05|0.1	0.03|0,1|0.2	6|3	⌀ 80*	4
Analycal Balances							
CPA324S	0.1	320	0.2	0.3	3	⌀ 80*	5
CPA224S	0.1	220	0.1	0.2	2	⌀ 80*	5
CPA124S	0.1	120	0.1	0.2	2	⌀ 80*	5
CPA64	0.1	64	0.1	0.2	2	⌀ 80*	5

* Triangular weighing pan shape. ⌀ = Diameter of the inner circle.

Specifications

Model	Read–ability [mg]	Weighing Capacity [g]	Repeat–ability [≤ ± mg]	Linearity [≤ ± mg]	Response Time average [≤ s]	Weighing Pan [mm]	Design
Precision Balances							
CPA1003S**	0.001	1,000	0.001	0.002	2	∅ 110*	6
CPA623S	0.001	620	0.001	0.002	1.5	∅ 110*	7
CPA1003P**	0.001 | 0.01	500 | 1,000	0.001 | 0.01	0.002 | 0.02	2	∅ 110*	6
CPA423S	0.001	420	0.001	0.002	1.5	∅ 110*	7
CPA323S	0.001	320	0.001	0.002	1.5	∅ 110*	7
CPA223S	0.001	220	0.001	0.002	1.5	∅ 110*	7
CPA6202S	0.01	6,200	0.01	0.02	1.5	190 × 204	8
CPA5202S-DS**	0.01	5,200	0.01	0.02	1.5	∅ 130	9
CPA4202S	0.01	4,200	0.01	0.02	1.5	190 × 204	8
CPA3202S	0.01	3,200	0.01	0.02	1.5	190 × 204	8
CPA2202S	0.01	2,200	0.01	0.02	1.5	190 × 204	8
CPA2202S-DS**	0.01	2,200	0.01	0.02	1.5	∅ 130	9
CPA6202P	0.01 | 0.02 | 0.05	1,500 | 3,000 | 6,200	0.01 | 0.01 | 0.03	0.02 | 0.02 | 0.05	1.5	190 × 204	8
CPA34001S	0.1	34,000	0.1	0.2	2	400 × 300	10
CPA16001S	0.1	16,000	0.1	0.2	2	400 × 300	10
CPA12001S	0.1	12,000	0.1	0.2	2	400 × 300	10
CPA10001	0.1	10,000	0.1	0.2	1	190 × 204	8
CPA8201	0.1	8,200	0.1	0.2	1	190 × 204	8
CPA34001P	0.1 | 0.2 | 0.5	8,000 | 16,000 | 34,000	0.1 | 0.2 | 0.5	0.3 | 0.3 | 0.3	2	400 × 300	10
CPA5201	0.1	5,200	0.1	0.2	1	190 × 204	8
CPA34000	1	34,000	0.5	1	1.5	400 × 300	10

* Triangular weighing pan shape. ∅ = Diameter of the inner circle.
** = Equipped with the analytical balance draft shield as a standard feature.

All models are available in calibrated versions (excluding CPA2P, CPA2P-F, CPA2202S-DS, CPA5202S-DS, CPA1003P). Accessories available on request.

Design 6
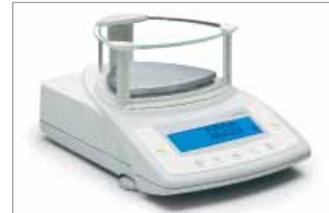
Design 7

Design 8

Design 9

Design 10

Standard Analytical and Precision Balances Extend
The New Achievers for Your Lab

On paper, many lab balances look the same. But in the real world, there's more to a lab balance than just its technical specifications.

The new Sartorius Extend series was 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.

Winning Technology
More versatility in high-resolution applications: 1 mg to 620 g and 10 mg to 6200 g. High-end technology made standard.

The monolithic weighing system, only available from Sartorius worldwide, offers unique prerequisites for permanently high measurement accuracy and reliability.

The latest powerful microprocessor technology ensures shorter response times for faster results. In an Extend balance with 1 mg readability, the typical response time is just 1 to 1.2 seconds. Reliable weighing results are achieved all 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. This is not the case with the Sartorius Extend. 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.

The backlit display with its 15-mm digits means the results of measurement are plain to see, under any lighting conditions.

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.
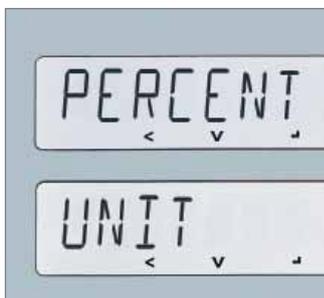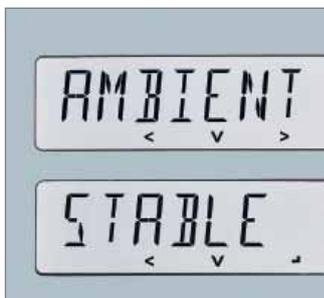
The Range of Features
Add up all features of the new Sartorius Extend, and you'll find all the advantages that only a genuine Sartorius lab balance can offer: features that pay for themselves, time and again.

A built-in, motorized calibration weight is standard in all analytical balances. Applied at a touch of a button, it ensures the highest weighing accuracy. The precision balances, depending on requirements, are available in two versions – with internal calibration (-CW) or external calibration.

Whenever you need ISO|GLP-compliant documentation of raw data or calibration| adjustment data, the Sartorius Extend balance provides it at the touch of a key (in combination with the optional YDP20-0CE data printer).

The easy-to-clean 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 as standard:

Weighing in percent, net-total-formulation, calculation (multiplication|division), dynamic weighing|animal weighing, mass unit conversion, and counting.

The bidirectional RS232C data interface is another standard feature. Alternatively, Sartorius can provide an adapter cable for connection to a USB port.

Specifications

Model	Read–ability [mg]	Weighing Capacity [g]	Repeat–ability [≤ ± mg]	Linearity [≤ ± mg]	Response Time average [≤ s]	Weighing Pan [mm]	Design
Analytical Balances							
ED224S	0.1	220	0.1	0.2	2.5	∅ 90	1
ED124S	0.1	120	0.1	0.2	2.5	∅ 90	1
Precision Balances							
ED623S-CW	0.001	620	0.001	0.002	1	∅ 115	2
ED623S*	0.001	620	0.001	0.002	1	∅ 115	2
ED423S-CW	0.001	420	0.001	0.002	1	∅ 115	2
ED423S*	0.001	420	0.001	0.002	1	∅ 115	2
ED323S-CW	0.001	320	0.001	0.002	1	∅ 115	2
ED323S*	0.001	320	0.001	0.002	1	∅ 115	2
ED153-CW	0.001	150	0.001	0.002	1.3	∅ 115	2
ED153*	0.001	150	0.001	0.002	1.3	∅ 115	2
ED6202S-CW	0.01	6,200	0.01	0.02	1.1	180 × 180	4
ED6202S*	0.01	6,200	0.01	0.02	1.1	180 × 180	4
ED4202S-CW	0.01	4,200	0.01	0.02	1.1	180 × 180	4
ED4202S*	0.01	4,200	0.01	0.02	1.1	180 × 180	4
ED3202S-CW	0.01	3,200	0.01	0.02	1.1	180 × 180	4
ED3202S*	0.01	3,200	0.01	0.02	1.1	180 × 180	4
ED2202S-CW	0.01	2,200	0.01	0.02	1.1	180 × 180	4
ED2202S*	0.01	2,200	0.01	0.02	1.1	180 × 180	4
ED822-CW**	0.01	820	0.01	0.02	1	∅ 150	3
ED822*	0.01	820	0.01	0.02	1	∅ 150	3
ED8201-CW	0.1	8,200	0.1	0.1	1	180 × 180	4
ED8201*	0.1	8,200	0.1	0.1	1	180 × 180	4
ED5201-CW	0.1	5,200	0.1	0.1	1	180 × 180	4
ED5201*	0.1	5,200	0.1	0.1	1	180 × 180	4
ED2201-CW	0.1	2,200	0.1	0.1	1	180 × 180	4
ED2201*	0.1	2,200	0.1	0.1	1	180 × 180	4

All models, except those marked with *, are devices available in calibrated versions.

** Weighing pan size for calibrated versions: 180 × 180 mm.

Design 1

Design 2

Design 3

Design 4

Budget–class Analytical and Precision Balances Talent
The Affordable Introduction to 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 number one choice.

19 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.

Ease of Use
When it comes to strictly weighing, ease of use is the top priority. The balances in the new series prove to be particularly talented in this area: Just set it up, switch it on, and start weighing. It couldn't be any easier.

Dependable and Accurate
Permanent reliability and weighing certainty are ensured by the innovative weighing system technology, and the robust construction of the balance housing.

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 service life of the battery. 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 and mass unit conversion.

RS232C Data Interface
Each model comes standard with a bidirectional RS232C data interface. 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	Readability [mg]	Weighing Capacity [g]	Repeatability [≤ ± mg]	Linearity [≤ ± mg]	Response Time average [≤ s]	Weighing Pan [mm]	Design
Analytical Balances							
TE214S	0.1	210	0.0001	0.0002	3	∅ 90	1
TE124S	0.1	120	0.0001	0.0002	3	∅ 90	1
TE64	0.1	60	0.0001	0.0002	3	∅ 90	1
Precision Balances							
TE313S	0.001	310	0.001	0.002	2.5	∅ 100	2
TE313S-DS*	0.001	310	0.001	0.002	2.5	∅ 100	1
TE153S	0.001	150	0.0015	0.003	2.5	∅ 100	2
TE153S-DS*	0.001	150	0.0015	0.003	2.5	∅ 100	1
TE3102S	0.01	3,100	0.01	0.02	2.5	174 × 143	4
TE1502S	0.01	1,500	0.015	0.03	2.5	174 × 143	4
TE612	0.01	610	0.01	0.02	2	∅ 116	3
TE412	0.01	410	0.01	0.02	2	∅ 116	3
TE212	0.01	210	0.01	0.02	2	∅ 116	3
TE6101	0.1	6,100	0.1	0.2	2	174 × 143	4
TE4101	0.1	4,100	0.1	0.2	2	174 × 143	4
TE2101	0.1	2,100	0.1	0.2	1.5	174 × 143	4
TE601	0.1	610	0.1	0.2	1.5	174 ×143	4
TE12000	1	12,000	1	2	1.5	174 × 143	4
TE6100	1	6,100	1	2	1.5	174 × 143	4
TE4100	1	4,100	1	2	1.5	174 × 143	4

* With analytical balance draft shield

Design 1

Design 2

Design 3

Design 4

Accessories

Cubis® Optional Accessories

Printers and Communication

Verifiable Data Printer for connection to RS-232, 25-pin accessory interface	YDP10-0CE
Verifiable Data Printer with Bluetooth® data transfermission (with YDO01MS-B or option IB)	YDP10BT-0CE
Color Ribbon for YDP10-0CE and YDP10BT-OCE	6906918
Paper Rolls for printer YDP10-0CE; 5 rolls 50 m each	6906937
Bluetooth® Data Interface, for wireless connection of data printer YDP10BT	YDO01MS-B
RS232C Data Interface, 9-pin including PS/2 for connecting a PC or keyboard	YDO01MS-P
RS232C Data Interface, 25-pin for connection of Cubis® accessories	YDO01MS-R
Display Cable 3 m for Cubis® MSA and MSU models, for separate setup of display and weighing unit (Installation by Sartorius Service or in factory [order VF4016])	YCC01-MSD3
Display Cable 3 m for Cubis® MSE models, for separate setup of display and weighing unit (Installation by Sartorius Service or ex works [order VF4016])	YCC01-MSED3
Cable 3 m between weighing module and electronics module for Cubis® models with 0.01 mg | 0.001 mg | 0.0001 mg readability	YCC01-MSM3
Installation Display Cable 3 m for Cubis® models, for separate setup of display and weighing unit	VF4016
RS232C Connection Cable to connect PC with 9-pin COM interface, length 1.5 m	7357314
SartoCollect Software for data communication between balance and PC	YSC02
Sartorius OPC Server for connecting all Sartorius Cubis® balances Requires 32-bit Microsoft Windows 2000 or XP with current service packs. (free download of a 30-day trial version from the Sartorius website) ▪ Initial license ▪ Each additional license within an order	6289OPC 6289OPC-L

Displays and Input\|Output Elements

MSA Control Unit with color TFT graphic display and touch screen YAC01MSA	
MSE Display Unit with backlit LC display and tactile keys YAC01MSE	
MSU Control Unit with backlit b|w graphic display and tactile navigation keys	YAC01MSU
Barcode Reader with connection cable, 120 mm reading range	YBR03PS2
Foot Switch for printing, taring, or using function keys, selection via menu, incl. T connector	YFS01
Infrared Sensor for touch-free activation of functions (e.g., draft shield control)	YHS01MS
Hand Switch for printing, taring, or using function keys, selection via menu, incl. T connector	YHS02
Foot Switch for the draft shield OPEN|CLOSED functions (only in combination with DA and DI draft shield), taring and printing	YPE01RC
Additional Display, LCD, figure size 13 mm, backlit	YRD03Z
3–segment Control Display, red – green – red, for plus|minus measurements, incl. T connector	YRD11Z

Pipette Calibration Hardware and Software

Pipette Calibration Kit (hardware) for models with 0.1 mg and 0.01 mg readability Consists of moisture trap and all required adapters	YCP04MS
Pipette Calibration Kit (hardware) for microbalance weighing modules 6.6S and 3.6P Consists of moisture trap and all required adapters	VF988
Pipette Tracker pipette calibration software. Software and user manual in English only.	YCP04-PT
Pipette Tracker Pro pipette calibration software, for use in regulated areas, networkable and validatable, according to the 21 CFR Part 11 regulations. Software and user manual in English only.	YCP04-PTPro
Documentation Basis for validation (IQ, OQ) of Pipette Tracker PRO version. All documents are in English only.	YCP04-VTK

Filter Weighing and Antistatic Accessories

Antistatic Weighing Pan, diameter 130 mm, for weighing modules with a readability of 0.1 mg or 0.01 mg	YWP01MS
Filter Weighing Pan $\varnothing$ 75 mm, for ultramicrobalance or microbalance models (weighing modules 6.6S, 2.7S; only together with DF draft shield)	VF2562
Filter Weighing Pan $\varnothing$ 90 mm, for ultramicrobalance or microbalance models (weighing modules 6.6S, 2.7S; only together with DF draft shield)	VF2880
Ionization Blower to eliminate electrostatic charges on sample containers and samples	YIB01-0DR
Stat-Pen Ionization Probe for discharging electrostatically charged samples and filters	YSTP01

Special Applications

Density Determination Kit for solids and liquids for weighing modules with a readability < 1 mg	YDK01MS
Density Determination Kit for solids and liquids for weighing modules with a readability of 1 mg	YDK02MS
Q-Grip, flexible holder for weigh-in containers and filters up to 120 mm diameter (replaces the original weighing pan, for Cubis® models with 0.01 and 0.1 mg readability)	YFH01MS
Q-Grid grid weighing pan for Cubis® models with a readability of 10 mg or 100 mg for weighing in laboratory hoods, safety weighing cabinets or workbenches (reduced wind attack surface of the weighing pan; replaces the standard weighing pan)	YWP03MS

Weighing Tables

Weighing Table made from synthetic stone, with vibration dampening	YWT03
Wall console	YWT04
Weighing Table made from wood with synthetic stone for precise, reliable measurements	YWT09

Weighing Accessories

Weighing Scoop made from chrome nickel steel , 90 × 32 × 8 mm	641214
Aluminum Weighing Scoop, 4.5 mg (250 pieces) for ultramicrobalance and microbalance models	6565-250
Aluminum Weighing Scoop, 52 mg (50 pieces) for ultramicrobalance and microbalance models	6566-50
Support Arm for 10/100 mg precision weighing modules for raising the control units MSE, MSU, MSA	YDH01MS

Accessories for all ME, SE, CPA, ED and TE Models

Data Printer, calibratable, with date, time, statistics	YDP20-0CE
Paper Rolls for printer YDP20-0CE; 5 × 40 m rolls	6906937
Color Ribbon for YDP20-0CE	6906918
Adhesive Labels on normal paper for YDP20-0CE (20 m continuous roll)	69Y03247
SartoCollect, data transfer and integration on computer	4SC02
Weighing Table for precise, reliable weighings	YWT09
Weighing Table made from synthetic stone, with vibration dampening	YWT03
Wall Console	YWT04
Additional Display LCD, figure size 13 mm, reflective	YRD03Z
Hand Switch, inc. T-connector	YHS02
Foot Switch, inc. T-connector	YFS01
Ionization Blower for electrostatically charged samples [220 V]	YIB01-0DR
Ionization Blower for electrostatically charged samples [110 V]	YIB01-0UR
Ionization Probe Stat-Pen for discharging electrostatically charged samples	YSTP01
T-connector for connection of 2 peripheral devices	YTC01
RS232C|USB Connection Cable, for connection to a PC via USB interface; length 1.5 m	YCC01-USBM2
RS232C Connection Cable, for connection to a PC with 25-pin COM interface; length approx. 2 m	7357312
RS232C Connection Cable, for connection to a PC with 9-pin COM interface; length approx. 2 m	7357314
Standard Operating Procedure (SOP)	YSL01D
LCD, figure size 13 mm, reflective	YRD03Z
3-segment Control Display, red – green – red, for plus|minus weighings, inc. T-connector	YRD11Z

Accessories for ME Models and SE2

Battery Set, external with optical charge control display for SE2, ME5 and all ME models	YRB05Z
Antistatic Weighing Pan for electrostatically charged samples for ME235S, ME235P, ME254S, ME414S, ME415S and ME614S for ME5	YWP01ME YWP01MC
Density Determination Kit for ME235S, ME235P, ME254S, ME414S, ME415S and ME614S	YDK01
Storage Plate, for acclimatization of materials to be weighed, for all ME models (excluding ME5)	YGS01ME
Weighing Scoop made from chrome nickel steel, 90 mm × 32 mm × 8 mm	641214
Foot Switch, inc. T-connectorfor all ME models and SE2	YPE01RC
Barcode Reader, for all ME models and SE2 (YCC01-0024M01 required)	YBR02FC
Cable with T-connector, for connection of the barcode reader	YCC01-0024M01
Bluetooth® RS232C Adapter with external antenna (only point-to-point connections)*	YBT01
Bluetooth® USB Adapter (point-to-multipoint capability)*	YBT02

* The operation of these devices is only permitted in the following countries: Austria, Belgium, Denmark, Finland, France (indoor use only), Germany, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Accessories for CPA and ED Models

Battery Set, external, with optical charge control display
up to 10 kg weighing capacity | YRB05Z
from 12 kg to 34 kg weighing capacity | YRB06Z

Analytical Balance Attachment | YDS01CP
for CPA623S, CPA423, CPA323S, CPA223S

Antistatic Weighing Pan | YWP01CP
for CPA225D, CPA324S, CPA224 S, CPA124S, CPA64, ED224S, ED124

Density Determination Kit
■ for CPA225D, CPA324S, CPA224S, CPA124S | YDK01
■ for ED224S, ED124S | YDK01LP

Draft Shield Cover with hole (∅ 30 mm) | YDS02CP
for CPA623S, CPA423S, CPA323S, CPA223S

Hook for Under-scale Weighing, screwable, for CPA12001S, CPA16001S, | 69EA0040
CPA34001S, CPA34001P, CPA34000

Bluetooth®-RS232C Adapter with external antenna
(only point-to-point connections)* | YBT01

Bluetooth®-USB Adapter (point-to-multipoint capability)* | YBT02

In-use Dust Cover
■ for display and control unit CPA34001S, CPA16001S, CPA12001S,
  CPA34001P, CPA34000 | 6960CP01
■ for CPA423S, CPA323S, CPA623S, CPA223S | 6960CP02
■ for CPA4202S, CPA3202S, CPA2202S, CPA8201, CPA6202S, CPA6202P,
  CPA5201, CPA10001 | 6960CP03
■ for display and control unit CPA225D, CPA324S, CPA224S, CPA124S, CPA64 | 6960CP04
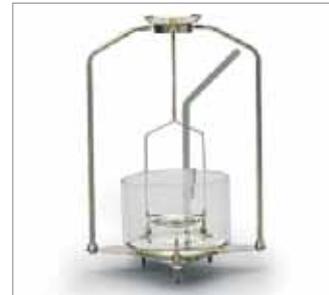
Accessories for TE Models

Battery Set, external (service life: 20 or 40 hours, depending on model) | YRB08Z

* The operation of these devices is only permitted in the following countries: Austria, Belgium, Denmark, Finland, France
(indoor use only), Germany, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, the Netherlands, Norway, Portugal,
Spain, Sweden, Switzerland, and the United Kingdom.

Safety Weighing Cabinet SWC
Safe Weighing of Toxic and Powdery Substances

Safety in weighing toxic, powdery substances and accuracy of weighing-in are requirements that have become inseparably linked in modern laboratory environments.

The Sartorius safety weighing station, consisting of the safety weighing cabinet SWC and Cubis® lab balance, is the professional solution to both of these requirements.

The safety weighing cabinet creates a contained area around the lab balance which prevents any air or finely powdered particulates from escaping into the breathing zone of the user. At the same time, due to the constant inlet air velocity of the air current and the low-turbulence flow within the cabinet, consistent and reproducible weighing results are guaranteed.

The balance and weighing cabinet are a coordinated system that meets both requirements – maximum user protection and secure weighing results.

The application-oriented performance features of Cubis lab balances make the entire system even more safe:

- The mechanical level indicator of a balance is often difficult or even impossible to see inside a cabinet. This leads to parallax errors in leveling and ultimately to incorrect measurement results. With Q-Level (optional, only for models with weighing capacity ≤ 6.2 kg and readability > 0.001 mg), leveling can be performed automatically in the cabinet with motorization.
- With the optional infrared sensor YHS01MS, the draft shield can be opened contactlessly and the balance can be tared. This reduces the risk of contamination.
- With the Bluetooth interface module, the printer YDP10BT can be operated wirelessly outside the cabinet, which limits the use of possibly contaminated cables.
- With the Q-Stat ionizer integrated into the draft shield DI, not only electrostatic influences on the weighing results are reduced. The "stubborn" behavior of the sample during handling with a spatula is reduced and contamination due to spilt samples is prevented.
- With the sample holder YFH01MS, you ensure the best ergonomics for weighing-in under the difficult conditions in the cabinet.
- With the grid weighing balance YWP03MS, even lab balances without draft shields (readability of 10 mg or 100 mg) can be operated in the air flow of the cabinet without any problems.

Sartorius Safety weighing cabinets are available in four different sizes:

SWC900	W 890 × D 750 × H 510 mm	
SWC1200	W 1230 × D 750 × H 510 mm	
SWC900T	W 890 × D 750 × H 770 mm	
SWC1200T	W 1230 × D 750 × H 770 mm	

All models consist of:
Safety weighing cabinet with a separate HEPA H14 filter unit, data logging alarm, lighting unit, waste disposal system, airflow smoke test kit and anti-static cleaning wipes.

Model with Filter Unit	Model without Filter Unit	Dimensions Width × Depth × Height [mm]
SWC900	SWC900NF	890 × 750 × 510
SWC1200	SWC1200NF	1230 × 750 × 510
SWC900T	SWC900TNF	890 × 750 × 770
SWC1200T	SWC1200TNF	1230 × 750 × 770

Accessories

YWCF02	Carbon filter for solvent vapors
YWCF03	Box for carbon filter; for attachment to the filter box
YWCG01	Disposal chute for attachment to the side of the cabinet
YWCG02	Disposable chute bags (100 pcs)
YWCG03	Muffler for attachment to fan filter box
YWCG04	Airflow smoke test kit
YWCG07	Antistatic decontamination wipes
YWCG16	Printer table for attachment to the cabinet
YWT10	Laboratory bench; fits SWC900, SWC900T and SWC900NF
YWT11	Laboratory bench; fits SWC1200, SWC1200T and SWC1200NF

Other accessories for our Safety Weighing Cabinets are available on request.

All of the balances listed below have been tested for use in the Safety Weighing Cabinet and achieved their typical repeatability with correspondingly extended response times.

Balance Series	Cubis®	ME	Sartorius CPA	Extend ED
Microbalances		ME5 ME36S	CPA2P	
Semimicrobalances	All Cubis® models with 0,01 mg readability and draft shield DU, DA or DI	ME235S ME235P	CPA225D	
Analytical balances	All Cubis® models with 0,1 mg readability and draft shield DU, DA or DI	ME614S ME414S ME254S	CPA324S CPA224S CPA124S CPA64	ED224S ED124S
Precision balances	All Cubis® models with 1 mg readability and draft shield DE, DU, DA or DI		CPA1003S CPA1003P CPA623S CPA423S CPA323S CPA223S CPA2202S-DS CPA5202S-DS	ED623S ED423S ED323S ED153 All models listed are also available in –CW versions

Sartorius Density Determination
The Optimal Equipment for All Methods

Whether you use the buoyancy method, the displacement principle or the pycnometer method for determining the density of solid, powdery or liquid samples – Sartorius offers you the technical equipment for performing these applications simply, quickly and precisely.

These Include:
- Analytical and precision balances
- The YDK01 or YDK01LP density determination kits
- 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 determination 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 buoyancy medium. 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 buoyancy medium – forget the extra work. The specially shaped weighing pan lets you immerse your sample effortlessly below the surface of the liquid.

And determination of the density of liquids couldn't be easier than 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 Cubis® 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 the entire evaluation 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 calculates 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, as an ISO|GLP-compliant record.

The printout includes the following data:
- Temperature and density of the buoyancy medium
- Weight value of the sample during weighings in air and immersed in the medium
- The volume and the density of the sample

Which Density Kit for Which Balance?
YDK01 density set for:
- ME models with 0.01 mg and 0.1 mg readability
- CPA324S, CPA224S, CPA124S, CPA225D

YDK01LP density set for:
- ED models with 0.1 mg readability

YDK01MS density set for:
- Cubis® models with < 1 mg readability

Eliminate Static Electricity Quickly and Reliably

Static electricity can block the entire work-flow of everyday lab routines. When samples are weighed, particularly non-conductive sample materials 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 StatPen 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, without any time delay.

Sartorius ionizing blowers can be used anywhere undesirable electrostatic charges are generated; for example, in production areas and photographic 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

	Power Connection [V|Hz]	AC Adapter [V|Hz]	Neutralization	Airflow [ccm/min]	Weight [kg]
Ionizing blower StatFan YIB01-0DR	230|50	18|50	Up to ± 20 V	Up to 1,000	Approx. 0.6
Ionizing blower StatFan YIB01-0UR	110|50	18|50	Up to ± 20 V	Up to 1,000	Approx. 0.6
StatPen YSTP01	100...230| 50...60		Up to ± 30 V		Approx. 0.8

Sartorius Pipette Calibration
Totally Accurate, Efficient and Independent

Save Time and Money

Pipettes are gauges used as inspection, measuring and test equipment. GLP guidelines and ISO 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. Backup pipettes must also be available to maintain routine operations. The equipment for performing the oft-required quick tests is not even available in many cases.

Now you can calibrate your pipettes yourself quickly and inexpensively with the GPC Pipette Calibration Balance or YCP04 Pipette Calibration Kit 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 balance transmits the weight value to the PC where all the required calculations are performed – Pipette Tracker. At the end of each measurement, the calibration results are printed as a GLP-compliant report. The installation of an evaporation trap maintains the humidity at 60–90 %, thus preventing loss of liquid from the pipetting vessel.

GPC Pipette Calibration Balances

Fast and User-friendly

The balances in the GPC series are ideally suited for gravimetric testing of the volume of any pipette size.

Because these balances do not require an additional draft shield, opening and closing of the draft shield doors is eliminated. This saves considerable time.

The calibration workstation's modular design can be optimally adapted to your lab staff's ergonomic needs.

"On the Go" Pipette Calibration

With the optional YDB01WZA carrying case, you can pack up your GPC pipette calibration balance along with the other accessories. Ambient conditions permitting, you have everything you need to calibrate your pipettes directly at the place of use.

Equipment Supplied

- Weighing cell with separate electronics box
- Display|service unit with 1 m cable (GPC65-CW: 0.3 m cable)
- Motorized calibration and adjustment function with built-in calibration weight
- Bidirectional RS232 data interface port
- Leveling feet and level indicator
- AC adapter
- Pipette calibration kit consisting of:
- Evaporation trap
- Pipetting vessels 6 ml and 21 ml (3 of each)
- Special adapter and reduction fittings for pipetting vessels
- Cable for connecting the balance (RS232) to a PC (USB)

GPC26-CW | GPC225-CW

YDB01WZA

Overview of GPC Models

Model	Readability Capacity	Weighing Capacity	Pipetting Weighing
GPC26-CW	0.001 mg	20 g	0.001 mg–8 g
GPC65-CW	0.01 mg	60 g	0.01 mg–35 g
GPC225-CW	0.01 mg	220 g	0.01 mg–195 g

Optional Accessories	Order Number
Draft Shield and 50 ml Stainless-steel Vessel (for GPC65-CW and GPC225-CW only)	YDS01WZA
Carrying Case for mobile use	YDB01WZA

Pipette Calibration Kit YCP04*

Optimize Your Pipette Calibration
With the YCP04 Pipette Calibration Kit, you can save time, money, and organizational effort. 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 solution for you. You can turn your balance into a pipette calibration workstation – and then back into an ordinary balance again – quickly and easily.

The Performance Features of the Pipette Tracker
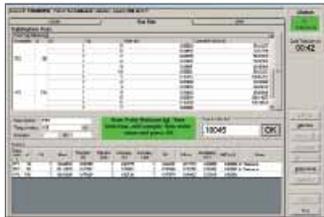
Article Number	Description	Weighing Capacity
YCP04–PT	Pipette Tracker	Pipette Tracker pipette calibration software. Software and user manual in English only.
YCP04–PTPro	Pipette Tracker Pro	Pipette Tracker PRO pipette calibration software, for use in regulated areas, networkable and validatable, according to the 21 CFR Part 11 regulations. Software and user manual in English only.
YCP04–PTProPlus	Pipette Tracker Pro Plus	Pipette Tracker Pro Plus pipette calibration software – for use with the Speedcal System.
YCP04–VTK	Validation Tool Kit for PTPro	Documentation basis for validation (IQ, OQ) of Pipette Tracker PRO version.All documents are in English only.
YCP04–VTKPlus	Validation Tool Kit for PTPro+	Documentation basis for validation (IQ, OQ) of Pipette Tracker Pro Plus version.

Pipette Tracker pipette calibration software

Overview of Balance Models

Model*	Readability [mg]	Weighing Capacity [g]
ME36S (VF3677 required)	0.001	31 (16 g**)
MS*6.6* (VF988 required)	0.001	5
CPA26P (VF3604 required)	0.002│0.01	5│21
MS*225S*	0.01	230
CPA225D (VF2396 required)	0.01│0.1	100│220
MS*225P*	0.01│0.02│0.05	60│110│230

Cubis®

Accessories	Order Number
Short-design draft shield and adaptation of YCP03–1 for CPA225D	VF2396
Adaptation of YCP03–1 for MS*6.6*	VF3677
Adaptation of YCP03–1 for CPA26P	VF3604
Special pipette calibration kit for ME5 consisting of: Draft shield, evaporation trap, vessel adapter and pipetting vessel (2.5 ml)	VF988
Pipette calibration kit Cubis*	YCP04MS
Pipette calibration kit CPA*	YCP04-HW

Cubis® with VF988

* Without Software and Cable
** Weighing capacity with pipette calibration kit installed: 16 g

OEM Products

Do You Need a Weighing Sensor for Your Applications?
Sartorius offers excellent and precise sensors for mass determination. Whether you need to count small parts or batch precise amounts of liquids and solids, we have the right sensors for your solution.

In addition to monitoring and filling, our weighing cells are used in a variety of application areas, from tensiometers and thermogravimetric systems to checkweighers and special balances, to name but a few.

The table below shows the range of OEM products available, with details on weighing capacities and readabilities. The possibilities go beyond what you see here – in close cooperation with you, we can also develop customer-specific solutions adapted to individual requirements.

Contact us and we'll advise you on all the possibilities.

Weighing Capacity [g]	Readability [mg]	Models					
		Individual components without CE marks	Encapsulated components with CE mark		Explosion-protected		Optional built-in calibration weight
			IP20	IP44	IP44	IP65	
0.5 ... 2	0.001...0.005		WZ2P-CW				
20	0.001		WZA26-CW				
60	0.01		WZA65-CW				
60	0.1	WZ64S					
60	0.1	WZ64-CW					
60	0.1			WZA64			...-CW
60	0.1				WZA64-X		
120	0.1	WZ124S					
120	0.1	WZ124-CW					
120	0.1			WZA124			...-CW
180	0.1			WZA224-ND			
210│80	0.01│0.1	WZ215-CW					
210	0.1	WZ214S					
220	0.01		WZA225-CW				
220	0.1	WZ224-CW					
220	0.1			WZA224			...-CW
600	0.1	WZ614-CW					
320	1	WZ323		WZA323			...-CW
520	1	WZ523		WZA523			...-CW
620	1				WZA623-X		
1,000	10					WZG1	
1,200	1	WZ1203		WZA1203			...-CW
2,000	20					WZG2	
6,200	10				WZA6202-X		
8,200	10	WZ8202		WZA8202			...-CW
10,000	100					WZG10	
12,000	100	WZ12001		WZA12001	WZA12001-X		
20,000	200			WZA224-ND		WZG20	

Examples of Order Number Combinations

WZ523	Weighing cell with individual components without built-in calibration weight
WZ523-CW	Weighing cell with individual components with built-in calibration weight
WZA523	Weighing cell with encapsulated components without built-in calibration weight

For more information on our weighing systems, visit our website:
http://www.sartorius.com/index.php?id=1215

Moisture & Water Content Measurement

The Right Equipment for Any Application

Foods, chemical|pharmaceutical products, building materials or animal feed - you name it, the moisture|water content has a decisive impact on price, processability and quality, ranging from raw materials to final products. Determining this moisture content is one of the most common analyses in product development and in the manufacturing process. Here, the most diverse requirements on speed, resolution of the values measured or on the operating design of the moisture analyzers must also be considered in all cases. As a leading provider of moisture analysis equipment, Sartorius is thoroughly familiar with the needs of its customers and thus offers a wide range of equipment that is continuously being enhanced.

Infrared Drying – Fast and Precise
A fast alternative to the classic oven drying method, infrared dryers from the Sartorius series of Moisture Analyzers. These analyzers are compact and designed for routine operation in production and in applications involving incoming inspection. They feature the resolution of an analytical balance, and are ideal for research and development. Moreover, these moisture analyzers are supplied in versions with an EC type-approval certificate for use in legal metrology. Sartorius offers a custom solution for nearly every requirement. A wide selection of infrared heat sources, such as a halogen lamp, a CQR quartz glass heater and a ceramic heating element, enable these moisture analyzers to be optimally adapted to the intended application.

Microwave Drying
If the sample contains a large amount of water, microwave drying is the fastest and most effective drying method. It takes just 40–120 seconds to vaporize the water out of the sample. The temperature of the escaping water vapor measures slightly over 100 °C during the heating process under normal pressure conditions. As such, this method is comparable to the 105°C setting in a classic oven dryer.

Oven Drying Method
As a reference system, the classic oven drying method is often indispensible. Sartorius offers a wide range of laboratory balances for this weighing task.

Microwave Resonance Technology

The microwave resonance method offers the advantage of particularly fast measurement, well below one second. At the same time, it is non-destructive, which means that this versatile method can be used in the laboratory and for online and offline applications. The basis of this new Sartorius product line is the LMA300P, a modular system that consists of a control and evaluation unit and a resonator module in which the moisture of a sample is measured. Applications for the system cover measurement of the moisture in pourable, granulated and viscous products with a moisture content between 0.1 and 60%. The new PMD300 series can analyze moisture levels online, meaning that the analysis is performed and the results passed to the processing unit continuously. Highly sensitive sensors integrated in the production line constantly analyze moisture content and send the information to the processing unit, which is directly connected to the controller, ensuring that the entire process is constantly controlled and documented – and 100% automatic.

NIR Technology

Optical or spectroscopic methods exploit the interaction between light and the sample. If light is directed onto a sample, part of that light is reflected, changing it characteristically. The resulting change in the light is then used to calculate the moisture content. NIR spectroscopy is a non-destructive technology, meaning that the samples can be used for further analyses. In addition, NIR spectroscopy is fast, reliable and precise.

The PMD500 is the basis for the new NIR spectroscopy product line at Sartorius. It can be used to determine moisture content as well as other parameters such as fat or protein content. It can also do on-site calibration, allowing adaptation of methods to the materials and processes being tested at any given time. The PMP500 is designed for pourable, granulated and liquid substances with a moisture content between 0.1% and 100%, depending on the sample.

Sartorius MA35
Easy ... Very Easy!

The MA35 is the 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.
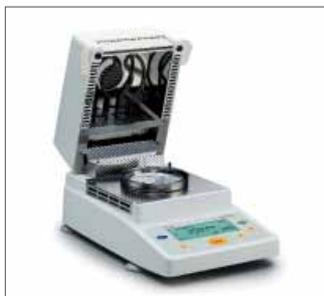
No Need for Programming
End-point determination is fully automatic. It is no longer necessary to program a shutoff parameter. The MA35 continuously monitors the drying process and stops the measurement as soon as the sample has reached a constant weight – i.e., when no more weight loss can be detected despite heating. A built-in weighing system provides the measurement accuracy required for this with 1-mg resolution that is optimized for use in high temperature ranges. For sample heating, the MA35 is equipped with two powerful metal tubular-shaped heating elements, providing 360 watts of power. These heating elements, also called dark radiators, are both rugged and durable. Compared to heating lamps made from glass, e.g. infrared lamps or halogen heaters, these are especially resistant to dirt and vibration. In addition, a special conversion kit wich is availiable as accessorie makes it possible that the MA35 can be used in accordance with the strict guidelines of the FDA and HACCP in cases where glass is prohibited in certain production processes.

Easy-to-understand and Error-free Moisture Analysis
The operating design focuses on accuracy and ease of use. The concise display shows the user all important information at a single glance. Easy-to-understand icons guide you in three steps from taring the sample pan to starting the measurement. The MA35 has done away with the regular Program Selection menu, opting instead for a limited number of drying routines that can be saved in the non-volatile memory. All important operating parameters can be accessed and changed in seconds, giving you more flexibility.

The optional printer, YDP20-0CE, enables you to print analysis results on a short report to save on paper usage. If you need comprehensive documentation, you can also print out the sample analysis results as well as the weighing system and temperature calibration as a detailed GLP report.

Sartorius MA150. The Compact Class with Maximum Performance and Minimum Space Requirements

For Routine Operation

A rugged design with low space requirements and easy operation are the major features of the MA150. Fully automatic drying of a sample until a constant weight is reached eliminates the need for programming an endpoint shutoff parameter. Twenty drying routines can be saved to give you the flex- ibility you need when the moisture content of additional, "out-of-the-ordinary" samples of material has to be measured.

Customizable and Fast

Sartorius offers you a choice of two different moisture analyzers that cover diverse requirements on moisture meas- urements. Whichever heat source you opt for, both analyzers deliver results within just minutes. For temperature- sensitive samples, a ceramic heating element ensures especially gentle heating over the entire surface. The other choice, a CQR quartzglass heater, optimizes the analysis time even further, which is already ultrafast for the analyzer featuring the ceramic heater.

Application-specific Solutions

Practical accessories round off the entire line-up of Sartorius moisture analyzers. These include, for instance, an in-use dust cover that is included with the standard equipment supplied and a special optional conversion kit to replace openly accessible glass components in compliance with the stringent FDA and HACCP requirements that ban the use of glass in production.

Halogen lamp

Ceramic heating element
CQR quartzglass heater
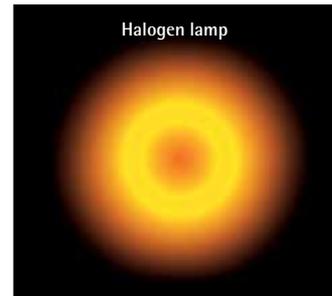
Sartorius MA100. Analytical Precision, Combined with Flexibility and Dynamics

As Accurate as an Analytical Balance
The **MA100** has a built-in wheighing system with 0.1-mg resolution wich provides you the highes accuracy availiable in a moisture analyzer. 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.
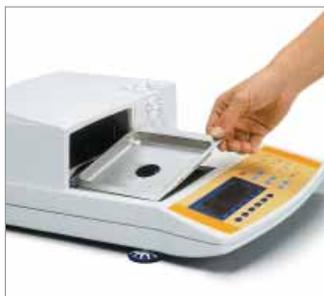
Automatic Adaptation to Reference Values
The acronym "SPRM" stands for "Swift Parameter Adjustment to a given Reference Method." This function enables the operating parameters of **MA100** to be adapted to the results of an available reference method and to be saved as a drying routine. Optimization 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 tangle of cables so typical of an external printer, and helps tidy up your work area.

A Clean Solution
Did you accidentally spill a sample? Are there spatters of grease inside the sample chamber? No problem with the MA 100. You can easily slide out the cover with the heater for thorough cleaning, without the risk of cleaning agent entering the inside of 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
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	●	●	●
■ % RATIO	●	●	●
■ g residue	●	●	●
■ g/kg residue		●	●
■ g/l residue			●
■ mg weight loss		●	
■ Calculated value (measured value × factor)		●	
Temperature range and settings (adjustable in 1-degree increments)	40–160 ℃	30–180/230 ℃* (*depending on the heat source)	40–180/220 ℃* (* depending on the heat source)
■ Ceramic heating element		30–180 ℃	40–180 ℃
■ Halogen lamp		30–180 ℃	–
■ CQR quartz glass heater		30–230 ℃	40–220 ℃
Heating mode			
■ Standard drying	●	●	●
■ Quick drying		●	
■ Gentle drying		●	●
■ Phase drying		1 × 0.1–999 min.	
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.	1 × 0.1–99 min.
■ Timer mode × fully│semi-automatic		2 × 0.1–999 min. + automatic	
SPRM® mode for parameter recognition		●	
Heating unit			
■ Ceramic IR heating element (infrared)		●	●
■ Halogen lamp (infrared)		●	
■ CQR heater (coiled quartz radiator)		●	●
■ Metal tubular-shaped heating element (infrared dark radiator)			
Later exchange of the heating unit by Plug & Dry®*		●	
Access to the sample chamber			
■ Via hinged flip-up cover	●		●
■ Via motorized cover		●	

	MA35	MA100	MA150
DLG Signam approved			•
Built-in calibration weight		•	
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)	•	•	•
Printout			
◾ GLP-compliant, 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		•	•
Power consumption (VA)	Max. 400	Max. 700	Max. 700
Housing dimensions W × D × H [mm]	224 × 366 × 191	350 × 453 × 156	213 × 320 × 180.5
Weight. approx. [kg]	5.8	8.0	5.5

* Does not apply to the CQR quartz heater

Accessories MA35│MA100│MA150

Accessories	MA35	MA100	MA150
Disposable sample pans, 80 units, aluminum, round, 90 mm ∅	6965542	6965542	6965542
Glass fiber filters, 90 mm ∅ for analysis of liquid, pasty and fatty samples ▪ Hard quality, for viscous samples, 80 units ▪ Soft quality with high suction force, 200 units	6906940 6906941	6906940 6906941	6906940 6906941
Panel replacement set Aluminum panel for replacing glass panels to meet FDA│HACCP regulations (conversion kit)	YDS05MA	YDS03MA	YDS04MA
SartoCollect, Software for communication between moisture analyzer and PC (including 25 Pin│9 Pin, 2 m) cable	YSC02	YSC02	YSC02
Carrying case			YDB05MA
Data printer ▪ Integratable ▪ External	YDP03-0CE	YDP01MA YDP03-0CE	YDP03-0CE
Ink ribbon cartridge for data printer	6906918	6906918	6906918
Paper rolls for data printer, ▪ 5 rolls, 50 m each	6906937	6906937	6906937
External calibration weight ▪ 100 g (E2) DKD Certificate ▪ 30 g ± 0.3 mg DKD Certificate ▪ 50 g (E2) DKD Certificate	YSS43-02	YCW4528-02	YCW5128-02
Temperature adjustment set with manufacturer's certificate	YTM05MA	YTM05MA	YTM05MA
500 disposable pipettes	YAT01MA	YAT01MA	YAT01MA

Sartorius LMA200PM
Speed Meets Analytical Precision

If the sample contains a high moisture content, microwave drying is the fastest and most effective thermogravimetric method (loss-on-drying principle) for moisture analysis. Developed for measuring moisture content ranging from approx. 8%–100%, the LMA200PM performs its measurements in a fraction of the time it takes other thermogravimetric methods. A typical measurement takes around 40–120 seconds. With a cylindrical sample chamber and a dual aperture, the microwave radiation is distributed evenly within the sample. This prevents hot and cold spots from occurring, a familiar problem with conventional microwave analyzers.

Built-in Analytical Balance
The moist and dry weight of the sample required for calculating the loss of moisture is measured by a built-in analytical weighing system featuring 0.1 mg resolution. Thanks to its monolithic design (the cell is robotically etched from a single block), this system is particularly suitable for use in a moisture analyzer, because it considerably reduces zero point drift during heat exposure when compared with classic weighing systems.

Intelligent Endpoint Determination
A moisture sensor integrated in the exhaust system of the sample chamber monitors the progress of drying. When the measurement begins, the moisture of the air inside the sample chamber continuously increases as water evaporates from the sample. Once the sample has dried and no longer releases water, the air moisture content drops back to its original level – a clear indication of the end point. At the same time, the built-in weighing system monitors the weight progression and confirms when the sample reaches a constant weight. This dual monitoring system ensures optimal moisture analysis results.

High Speed
Two factors play a major role for ultrafast measurements. First, the sample must absorb microwave energy within the shortest time possible and transform it into heat energy. For this purpose, the LMA200PM has a cylindrically shaped sample chamber that focuses the microwave radiation on the sample optimally. The sample to be measured absorbs the microwave radiation effectively by means of microwave injection through two areas in the floor of the measuring chamber and a rotating sample pan. Second, the resulting water vapor must be transported away from the sample as fast as possible to obtain rapid analysis results. To accomplish this, a sample is applied to a glass fiber pad that allows water vapor to evaporate not only from the top of the pad and upward through the sample, but also from the bottom of the pad. An exhaust system draws water vapor out of the sample chamber, thus preventing the effects of condensation.

Specifications│Accessories LMA200PM

Model	LMA200PM
Weighing capacity [g]	70
Measuring accuracy of the weighing system [g]	0.0001
Reproducibility, average from approx. 1 g of the initial weight [%]	± 0.05
Sample pan	∅ 90 mm glass fiber pad
Measurement value display	% moisture, ppm moisture, % volatile components, % dry weight (solids), ppm dry weight, g dry weight, mg loss on drying, % RATIO
Measuring range	Approx. 8–100 % moisture
Sample heating	Microwave generator with 1000 W input power
Power control for heating	2–100 %, adjustable in 1 % increments

Endpoint determination	■ Fully automatic, by means of weight and moisture sensors
	■ User-defined as loss of weight│time:
	  1–50 mg│1–99 sec.
	  0.1–9.9 %│1–99 sec.
	■ Timer mode: 0.1–99.9 min.

Analysis time (in seconds)	Approx. 40–120 (depends on sample and moisture)
Applications	320, saved to non-volatile memory
Data printer	Thermal printer, built-in
Moisture analysis report	■ User-configured GLP record ■ The report can be printed by the built-in therminal printer
Operator guidance	■ Menu-driven, alphanumeric dialogue text (English, French, German, Italian and Spanish selectable) ■ 5 pre-programmed function keys
Data interfaces	■ 1 × RS-232 port for PC ■ 1 × Ethernet port
Housing dimensions W × H × D [mm│inches]	510 × 304 × 535│20" × 12" × 21"
Weight, approx. [kg│lbs]	22│48.5
Power consumption [VA]	max. 1200

Accessories	Order No.
200 fiberglass pads	6906941
500 single-use pipettes	YAT01MA
5 rolls of printer paper, each 20 m long	69M30100

Sartorius LMA321 and 316
Moisture Analysis in a Fraction of a Second

LMA321PA

LMA316PA

Sartorius moisture analyzers of the LMA300 series are designed for fast moisture analysis and density determination in the lab or during at-line operation.

Thanks to their modular construction, these analyzers can be connected to a variety of different sensor types, depending on sample properties and moisture range.

Thanks to their microwave resonance technology, the overall moisture, i.e. both the surface moisture and core moisture are determined.

Their microwave resonance technology offers the advantage of extremely fast measurements that take less than a second. Measurement is non-destructive, which means that the samples can be 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, have no effect on the measured result.

Every sensor is equipped with a recognition chip that transmits all relevant sensor data to the electronics unit. That also means it is configured automatically (plug and play).

The proprietary biparametric measurement permits water content analysis of the sample that is independent of its density.

The user-friendly Moisture View software the analyzer, for presenting and managing measured values, not to mention its extensive statistics and export functions.

Moisture View features a hierarchical user administration with log files and context-sensitive help function.

With the novel calibration function, calibrations can be performed in different moisture ranges with a variety of regression coefficients (linear | high-order).

Additionally, calibrations can be issued easily and reliable with the built-in auto calibration feature. The software automatically establishes the appropriate regression type to match the moisture range.

Any temperature extremes in the sample are compensated for automatically.

Application Options
The moisture content of materials is one of the most important parameters involved in the production and processing of foods, chemicals and pharmaceutical products.

It has a critical effect on product quality, processing and stability.

By optimizing product water content during production, costs for raw materials and energy can be saved effectively.

That is why fast, reliable and precise moisture analysis is vital - from incoming goods inspection to outgoing goods inspection, in the lab or during at-line production. Moisture analyzers of the LMA300 series have been designed especially for such applications. The proprietary measuring method enables split-second moisture analysis without sample pretreatment and independent of the sample's density.

By this method, the production process can be monitored, controlled and optimized on a timely basis.

Specifications│Accessories LMA321 and 316

Technical Specifications

LMA321PA–000U (With Touch Display)

Operation by touch display (10.4")
or interfaced PC (not included
with the Equipment Supplied),
Moisture View operating software

LMA316PA–000U (Without Touch Display)

Operation via interfaced PC
or external monitor and keyboard
(not included with the Equipment
Supplied), Moisture View
operating software

Housing	Plastic and aluminum
Dimensions (W × H × D) [mm]	425 × 335 × 500
Weight [kg]	9.8
Voltage	110–230 V AC
Frequency	50...60 Hz
Interfaces	1 × Ethernet 3 × USB 1 × Analog input (0│4–20 mA) for optional IR temperature sensor Interface port for PT-100 temperature sensor Interface ports for PS2 mouse, keypad, printer, VGA monitor 1 × RS-232 serial interface (modem, service)
Automatic sensor recognition	Yes
Measuring range	0.05–approx. 60 % moisture, RATIO 0.05–150 % (sample-dependent)
Reproducibility	± 0.05 % standard deviation for a 10-fold determination (sample-dependent)
Measuring time	< 1 sec., (> 800 single measurements/sec.)
Temperature compensation	Automatic
Product data memory	Unlimited
Sample temperature	0–70 °C (automatic temperature compensation)
Ambient temperature	0–40 °C

Sartorius PMD320PA and PMD325PA
Online Moisture Analysis in a Fraction of a Second

Product Profile
Sartorius moisture analyzers of the PMD300 series are designed for online moisture analysis and density determination within production processes.

Thanks to their microwave resonance technology, the overall moisture, i.e. both the surface moisture and core moisture are determined.

Their microwave resonance technology offers the advantage of extremely fast measurements that take less than a few milliseconds. This feature also allows products conveyed at extremely high speeds to be analyzed accurately.

The individual measurements are averaged over a user-defined period to ensure that even minor fluctuations in moisture content are detected along the product flow.

Changes in the color and surface structure of the sample, as is frequently the case, for instance, in natural raw materials, have no effect on the measured result.

The proprietary biparametric measurement permits water content analysis of the sample that is independent of its density.

Thanks to their modular construction, these analyzers can be connected to a variety of different sensor types, depending on sample properties and moisture range.

The user-friendly Moisture View software offers a multitude of options for operating and configuring the analyzer, for presenting and managing measured values, not to mention its extensive statistics and export functions.

Moisture View features a hierarchical user administration with log files and context-sensitive help function.

With the novel calibration function, calibrations can be performed in different moisture ranges with a variety of regression coefficients (linear|high-order).

Calibrations can be issued easily and reliably with the built-in auto calibration feature. The software automatically establishes the appropriate regression type to match the moisture range.

Any temperature extremes in the sample are compensated for automatically.

Application Options
The moisture content of materials is one of the most important parameters involved in the production and processing of foods, chemicals and pharmaceutical products.

It has a critical effect on product quality, processing and stability. That is why fast, reliable and precise moisture analysis is vital - from incoming goods inspection to outgoing goods inspection, in the lab or at-line during production.

With inline moisture analyzers from Sartorius, key steps can be monitored, documented and controlled throughout the process.

This method minimizes fluctuations in the product's water content.

This also promotes strict compliance with legal regulations and their documentation; out-of-specification batches can be generally avoided.

Because the product's water content can be optimized, valuable resources like raw materials and energy are conserved. Savings on production costs are also achievable.

Moisture analyzers of the PMD300 series have been designed especially for such applications.

Upon request, every analyzer can be supplied in a version for use in hazardous environments and explosive atmospheres.

Thanks to the large number of different interfaces available, these analyzers can be seamlessly integrated into all electronic data-related processes.

Specifications│Accessories PMD320PA and PMD325PA

Technical Specifications

PMD320PA–000U

Operation via interfaced PC (not
included with the Equipment Supplied),
Integrated 5" LC display
Moisture View operating software

PMD325PA–000U

Operation by 10.4" touch display or
interfaced PC (not included with the
Equipment Supplied), Moisture View
operating software

PMD320PA and PMD325PA

Housing	Stainless steel
Dimensions (W × H × D) [mm]	410 × 460 × 210
Weight [kg]	19.0
Voltage	110–230 V AC
Power consumption	70 to 90 VA
Frequency	50...60 Hz│70 VA
Protection class	IP 54
Systems for use in hazardous environments and explosive atmospheres	Upon request
Interface data	1 × RS-422 (for PC, max. 1200 m cable length) 1 × Serial RS-232 (modem, service) 1 × Ethernet (max. cable length, 100 m) 1 × Analog input (0│4 – 20 mA) 3 × Analog output (SPS, process monitoring and control) (0│4 – 20 mA), active, potential-free 8 × Potential-free digital inputs (optokoppler, 24 V) 8 × Potential-free digital outputs (24 V, 0.25 A DC)
Automatic sensor recognition	Yes
Measuring range	0.1–approx. 60% moisture, RATIO 0.1–150% (sample-dependent)
Reproducibility	± 0.08% standard deviation for a 10-fold determination (sample-dependent)
Measuring time	< 1 sec., (> 800 single measurements/sec.)
Product data memory	Unlimited
Sample temperature	0 – 70 °C (automatic temperature compensation temperature sensor integrated in sensor)
Ambient temperature	0 – 40 °C
Maximum distance between electronics and sensor	3 m

PMD500 Series Process Analyzer with NIR Technology

Product Profile
The rugged online analyzers from the Sartorius PMD500 series are designed for process analysis and control.

These ultra-modern, high-tech optical analyzers feature a unique and flexible array of detectors for the UV|VIS and NIR spectra in compelling combination with a high-resolution digital camera and a comprehensive software package. Concentrations of ingredients, like water, moisture, fat, protein, solvent etc., can be determined accurately in online measurements. The process can be monitored and controlled in real time, thereby narrowly limiting fluctuations in concentration within the process. Valuable resources like raw materials and energy are conserved. Huge savings on production costs are also achievable.

Thanks to the extremely short integration times, products conveyed at extremely high speeds can also be analyzed.

All analyzers have ATEX approval and are rated with IP 65 protection class, their housings are made of stainless steel.

A comprehensive range of accessories guarantees that the hardware of the sensor systems is integrated into the process.

Thanks to the large number of different interfaces available, these analyzers can be seamlessly integrated into all electronic data-related processes.

Similarly, a comprehensive range of available tools enables flexible integration into your daily laboratory process.

Areas of Application
Completeness control of individual components is indispensable, particularly in mixing processes. Supported by the library of spectra storable in the PMD500 process analyzer, each individual component and ingredient is checked. If an ingredient stored in the formulation is found to be missing, a signal is automatically triggered which allows the process to be stopped in time.

End-point determination in a mixing process is equally as important, in other words, detecting the degree of homogeneity of a mixture. During this process, measurement of the variances in the mixture's spectrum using the PMD500 process analyzer takes place contact-free, i.e. at a distance of up to 50 cm. If these variances are within a predefined interval, the mixing process can be stopped. This method allows the process to be stopped at the exact time the ideal mixture has been produced, without waiting until a certain period has elapsed. That makes the process less time-consuming and thus more efficient. In addition, online monitoring gives more transparence to the mixing process and allows for easier documentation.

Identification and purity testing of materials is indispensable for incoming goods inspection. The current spectrum of the respective substance is compared with the spectra stored in the spectral library of the analyzer. If these spectra deviate, an alarm can be triggered and acceptance of the incoming goods is automatically interrupted. This ensures that only labelled goods are accepted that actually fulfill the specified degree of purity. Online analysis helps ensure process reliability in a major way.

The PMD500 process analyzer is additionally supplied with a high-resolution digital camera (optional). The camera detects optical features of a sample, for instance, black specks in flour, also called "bad spots" are identified in time.

Advantages
Online monitoring supplements many laboratory analyses by performing 100% in-process measurements. Calibration using the existing reference method produces consistent traceability within the scope of inspection equipment monitoring. With results being generated in split seconds, processes can be monitored and automatically controlled in real time. This makes many of the process steps more transparent and markedly minimizes fluctuations in the product. Efficiency is enhanced, production costs slashed and process reliability heightened.

Specifications PMD500

Technical Specifications

All

Dimensions (W × D × H) [mm]	220 × 220 × 135
Weight [kg]	7
Operating temperature range [°C]	–10.... +40
Humidity	Highest relative humidity < 90 %, non-condensing
Operating pressure [bar]	30
Vibrations	0.2 G at 0.1–150 Hz
Light source type│Lifetime	2 tungsten halogen light sources│MTBF > 18,000 h
Interfaces	Bluetooth® up to 10 m RS232 RS422 up to 2 km
Protection class	ATEX: EX II D 1/2 IP65 T80 Upon request: ATEX: EX II G 1/2 IP67 T80
Measuring time	10 ms, typical
Optical measuring surface (except for PMD beam, PMD light)	$\varnothing$ = 4 cm
Detector type (spectrometer)	Diode array
Special feature(s)	Automatic referencing black│white comparison

PMD511–000U	PMD One online system 950–1750 nm
Spectrometer	950–1750 nm; NIR

PMD510–000U	PMD One online system 350–920 nm
Spectrometer	350–920 nm; UV│VIS

PMD521–000U	PMD Two online system 950–1750 nm + CCD
Spectrometer	950–1750 nm; NIR
High-resolution CCD camera, resolution	80 μm

PMD520–000U	PMD Two online system 350–920 + CCD
Spectrometer	350–920nm; UV│VIS
High-resolution CCD camera, resolution	80 μm

PMD532–000U	PMD Three online system NIR, UV│VIS
Spectrometer	950–1750 nm; NIR
Spectrometer	350–920 nm; UV│VIS

PMD542–000U	PMD Four online system NIR, UV|VIS, CCD
Spectrometer	950–1750 nm; NIR
Spectrometer	350–920 nm; UV|VIS
High-resolution CCD camera, resolution	80 µm

PMD551–000U	PMD Beam online system NIR
Spectrometer	950–1750 nm; NIR
Max. distance to product	Approx. 40 cm
Optical measuring surface	ca. $\varnothing$ =10 cm
Special feature(s)	Variable distance between sample and optics: 0–40 cm

PMD552–000U	PMD Beam online system NIR, UV|VIS
Spectrometer	950–1750 nm; NIR
Spectrometer	350–920 nm; UV|VIS
Max. distance to product	Approx. ca. 50 cm
Optical measuring surface	ca. $\varnothing$ =10 cm
Special feature(s)	Variable distance between sample and optics: 0–40 cm

PMD503–000U	PMD View online system CCD
Without spectrometer	
High-resolution CCD camera, resolution	80 µm

PMD590–000U	PMD Light
For large-area measurements with internal reference	
Measuring distance	From 20 to 40 cm
Measuring spot	From 10 to 30 cm $\varnothing$
Appropriate for conveyor belts	
Automatic referencing	
For PMD One only	
Traverse frame, not included	

Mass Metrology

Automatic Mass Comparators and Robots

CCL1007

Load alternator CCL1007

CCR10-1000

Weight grabber CCR10-1000

The Fascination of Precision
International trade requires the worldwide standardization of certain measurements. Mass plays an important role, because the majority of commerce throughout the world is defined by the mass of substances. To make sure the same masses are used around the world, each country has a national metrology institute (NMI) that governs units of measurement. These institutes are the measure of all things.

Mass Determination to the Most Exacting Standards
On behalf of and in collaboration with the NMIs, Sartorius develops innovative mass comparators to the highest standards.

Sartorius has mastered the core disciplines of weighing like no other company, and sets new standards in mass metrology. In cooperation with the Bureau International des Poids et Mesures and the Institute for Process Measurement and Sensor Technology of the Technical University of Ilmenau, Sartorius has developed a mass comparator – the CCL1007 – that is capable of determining differences in mass to an accuracy of 0.1 µg for weights of 1 kg – even under high-vacuum conditions.

Our metrology experts will be happy to advise you, offering the best solution available to meet your needs.

Automatic Mass Comparators and Robots

Model	Maximum Load	Readability	Typical Repeatability*	R = Robot A = Automatic
CCL1007	1.031 g	0.1 µg	0.1 µg	A 8 positions
CCR10	10.5 g	0.1 µg	0.2 µg	R 39–104 positions
CCR1000	1.002 g	1 µg	2 µg	R 21–60 positions
CCR10-1000	10.5 g 1,002 g	0.1 µg 1 µg	0.2 µg 2 µg	R 39–104 positions R 21–60 positions
CCE1000S-L	1.002 kg	0.001 mg	0.001 mg	A 4 positions
CCE10000U-L	10.05 kg	0.01 mg	0.01 mg	A 4 positions
CCE10000S-L	10.05 kg	0.1 mg	0.1 mg	A 4 positions
CCE20000S-L	20.05 kg	0.1 mg	0.1 mg	A 4 positions
CCE50001S-L	51 kg	1 mg	1 mg	A 2 positions

* Repeatability is the standard deviation "s"; it is calculated from 6 ABBA cycles, after eliminating drift.

Manual Mass Comparators

Specifications

Model	Maximum Load [g]	Readability [mg]	Typical Repeatability [s in mg]*
Analytical Range			
CCE6	6.1	0.0001	0.00015
CCE36	31	0.001	0.001
CCE66	61	0.001	0.001
CCE106	111	0.001	0.001
CCE605	610	0.01	0.015
CCE1005	1,110	0.01	0.01
Universal Range			
CCE1004	1,200	0.1	0.05
CCE2004	2,500	0.1	0.1
CCE5004	5,100	0.2	0.3
CCE5003	5,100	1	0.5
CCE10000S	10,050	0.1	0.1
CCE10K3	11,000	1	1
CCE20000	20,050	1	1
CCE40K3	41,000	2	3
CCE60K3	64,000	2	4
CCE60K2	64,000	10	7
Researching and Testing Range			
CCI60K2	64,000	50	100
CCI100K2	151,000	50	200
CCI300K	303,000	1,000	500
CCS600K	605,000	1,000	2,000
CCT1000K	1,200,000	1,000	2,000
CCS1000K	1,510,000	5,000	5,000
CCT2000K	2,010,000	1,000	5,000
CCS3000K	3,010,000	1,000	10,000

* Repeatability is the standard deviation "s"; it is calculated from 6 ABA cycles, after eliminating drift.
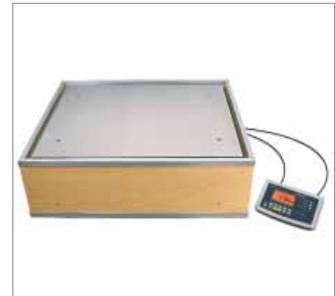
Accessories for Mass Determination
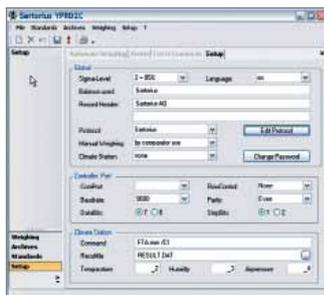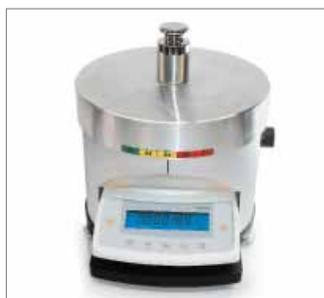
Density Determination

	Model	Maximum Load	Readability	Typical Repeatability
Volume comparator with 2 load alternators	VD1005	1,125 g	0.01 mg	0.02 mg
Volume comparator with load alternator	VL1005	1,125 g	0.01 mg	0.02 mg
Pycnometer for weights up to 50 kg	YP50K	50 kg		
Density reference: 1 kg silicon sphere	YDR1000SIC			
Density reference: 500 g silicon sphere	YDR500SIC			
Density reference: 200 g silicon sphere	YDR200SIC			

Analysis of Magnetic Properties

Susceptometer for weights up to 50 kg	YSZ01C	50 kg	10 µg	10 µg
Susceptometer for weights up to 50 kg	YSZ02C	50 kg	1 µg	5 µg
Calibration kit for susceptometer	YSZ01RMC			
Susceptibility reference (1 kg)	YSZ01RMC			
Permeability indicator	YAW61			

Software for Mass Determination

ScalesNet	SN01C
ScalesNet additional software licenses	YSN01LC
ScalesNet V4, license for mass dissemination	YSN01MC
Data Logger converter (RS232 → LAN)	YSN01DC
Evaluation program for mass metrology	YPR02C

Air Density Determination

Climate station for an E1 laboratory	YCM16C
Precision climate station for an E1 laboratory	YCM05C

Draft Shields

for CCE10000S–L, CCE10000U–L, CCE20000S–L	YDS01C
for CCE40K3, CCE60K3, CCE60K2	YDS03C
for CCE40K3, CCE60K3, CCE60K2	YDS05C
for CCE6, SE2, ME5	YDS20C
for CCE111	YDS22C
for CCE1004, CCE2004, CCE5004, CCE5003	YDS24C
for CCE36, CCE66, CCE505, CCE1005	YDS26C
for CCI60K2	YDS62C
for CCI100K2, CCI300K	YDS64C
for CCS600K, CCS1000K	YDS80C
for CC3000K	YDS82C
for CCT1000K	YDS85C
for CCT2000K	YDS87C

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 OIMLR111: 2004. They are therefore 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 ISO 9001:2000. These weights help support your quality management and quality assurance systems, and fulfill GLP and GMP requirements.

Your DKD Partner for Mass Units

Sartorius is a DKD calibration laboratory 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 and meet the DIN EN ISO IEC 17025 international standard for test laboratories.

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 check the graph below for the particular accuracy class that your test weight must have.

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.

Nominal Value Steps

n =	m:d
n =	resolution of your weighing instrument (digits)
max =	weighing capacity of your instrument
d =	readability of your instrument

1,000,000
500,000
100,000
50,000
10,000
5,000

M1 F2 F1 E2 E1* Class

* or E2, DKD-calibrated
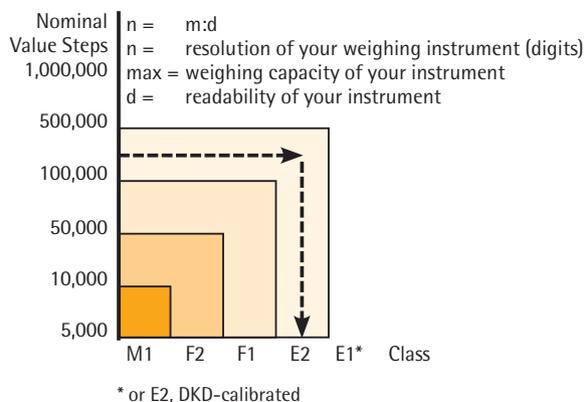
Metrological Weight Sets in Wooden Cases with Forceps*

Weight sets

Composition of the Weight Sets

• Weight without marking
○ Weight with marking

Range	Content	mg	g	kg
1 mg–5 g	1	●	●	
Total contents:	2	●○	●○	
11.11 g	5	●	●	
16 pieces	10	●		
	20	●○		
	50	●		
	100	●		
	200	●○		
	500	●		
1 mg–100 g	1	●	●	
Total contents:	2	●○	●○	
211.11 g	5	●	●	
21 pieces	10	●	●	
	20	●○	●○	
	50	●	●	
	100	●	●	
	200	●○		
	500	●		
1 mg–200 g	1	●	●	
Total contents:	2	●○	●○	
611.11 g	5	●	●	
23 pieces	10	●	●	
	20	●○	●○	
	50	●	●	
	100	●	●	
	200	●○	●○	
	500	●		
1 mg–1 kg	1	●	●	●
Total contents:	2	●○	●○	
2,111.11 g	5	●	●	
25 pieces	10	●	●	
	20	●○	●○	
	50	●	●	
	100	●	●	
	200	●○	●○	
	500	●	●	

Range	Content	mg	g	kg
1 mg–5 kg	1	●	●	●
Total contents:	2	●○	●○	●○
11,111.11 g	5	●	●	●
28 pieces	10	●	●	
	20	●○	●○	
	50	●	●	
	100	●	●	
	200	●○	●○	
	500	●	●	
1 g–1 kg	1		●	●
Total contents:	2		●○	
2,110 g	5		●	
13 pieces	10		●	
	20		●○	
	50		●	
	100		●	
	200		●○	
	500		●	
1 g–5 kg	1		●	●
Total contents:	2		●○	●○
11,110 g	5		●	●
16 pieces	10		●	
	20		●○	
	50		●	
	100		●	
	200		●○	
	500		●	
1 g–10 kg	1		●	●
Total contents:	2		●○	●○
21,110 g	5		●	●
17 pieces	10		●	●
	20		●○	
	50		●	
	100		●	
	200		●○	
	500		●	

* 1 kg and up: glove included

Weight Sets (YCS)

Features of Sartorius Weight Sets

The weights contained in Sartorius weight sets have the same features and properties as the individual weights in the corresponding maximum permissible errors. Sartorius weight sets are supplied in a wooden case, along with gloves, forceps and brushes.

Service weight sets come in a plastic case for mobile maintenance of balances and scales.

Class E1 and E2 weight sets come with wire weights up to 500 mg.

Class F1, F2 and M1 weight sets come 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 with DKD certificate in Sartorius's name (E2, F1, F2 – 50 kg)
X = 2: weights with DKD certificate in customer's name
YCW02: DKD calibration certificate with customer data

mg Weights (YCW)

Knob weights

Leaf weights

Wire weights

Features of Sartorius Weights
Class F1 leaf weights (F2, M1 in weight sets);
individual weights available on request
1–5 mg aluminum; density 2.7 g/cm³
10–500 mg nickel silver; density 8.6 g/cm³

Class E1 and E2 wire weights
1– 500 mg special steel, non–magnetizable
E1; density 8.0 g/cm³
E2; density 7.95 g/cm³

Nominal Mass	Wire Weights Class E1	Wire Weights Class E2	Leaf 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	YCW113-0X
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 with DKD certificate in Sartorius's name (E2, F1, F2 – 50 kg)
X = 2: weights with DKD certificate in customer's name
YCW02: DKD calibration certificate with customer data

Weights (YCW)

Class E1, E2, F1 and F2 knob weights
1 g to 50 kg, special steel, non-magnetizable
E1; density 8.0 g/cm^3
E2, F1, F2; density 7.95 g/cm^3

M1: 1–10 kg, brass│galvanized, shiny polished
Packaging of the weights:
up to 20 g in a plastic box
from 50 g in a wooden case
from 1 kg: glove included

Knob weights

Knob Weights (100 kg and up: 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*	YCW8157-0X		
200 kg		YCW823-00	YCW824-0X*	YCW8257-0X		
500 kg		YCW853-00	YCW854-0X*	YCW8557-0X		
1,000 kg		YCW913-00	YCW914-00*	YCW9157-0X		

* Cylindrical weight with lug

Block weights

Cylindrical weights

Nominal Mass	Block Weights[1] M1	Block Weights[4] M1	Block Weights[4] M2
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	YCW6569-0X
200 kg**		YCW8259-0X	YCW7169-0X
500 kg**		YCW8559-0X	YCW7269-0X
1,000 kg**		YCW9159-0X	YCW7569-0X

* Cylindrical weight with lug for crane   ** Cylindrical weight with lug for crane, stackable

Block weight, stainless steel

Material:
(1) stainless steel, (2) galvanized brass, (3) brass, precision lathed surface,
(4) Material: gray casting, painted black

Options:
X = 0: weights with DKD certificate in Sartorius's name (E2, F1, F2 – 50 kg)
X = 2: weights with DKD certificate in the customer's name
YCW02: DKD calibration certificate with customer data

Block weight

Test Weights (YCW...8)

Test weights

Features of Sartorius Test Weights
Stainless steel, non-magnetizable,
density 7.9 g/cm³, shiny polished;
packaging: in a plastic screw-top can with
DKD certificate in Sartorius's name

Nominal Mass	E2	F1	F2
1 g	YCW3128-00	YCW3138-00	
2 g	YCW3228-00	YCW3238-00	
5 g	YCW3528-00	YCW3538-00	
10 g	YCW4128-00	YCW4138-00	
20 g	YCW4228-00	YCW4238-00	
50 g	YCW4528-00	YCW4538-00	
100 g	YCW5128-00	YCW5138-00	YCW5148-00
200 g	YCW5228-00	YCW5238-00	YCW5248-00
500 g	YCW5528-00	YCW5538-00	YCW5548-00
1 kg	YCW6128-00	YCW6138-00	YCW6148-00
2 kg	YCW6228-00	YCW6238-00	YCW6248-00
5 kg	YCW6528-00	YCW6538-00	YCW6548-00
10 kg		YCW7138-00	YCW7148-00

Option:
YCW02: DKD calibration certificate with customer data

Accessories for Weights (YAW)

Accessories for Sartorius Weights
Sartorius offers glass bell jars with a support plate, plastic cases, 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.

Forceps

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
	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 forks	for 500 g	YAW41
	for 1 kg	YAW42
	for 2 kg	YAW43
Handles 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 (OIML R111: 2004) E1, E2, F1 and F2; supplied in a wooden case	YAW61
Susceptometer	Resolution 10 μg	YSZ01C
	Resolution 1 μg	YSZ02C
	For checking magnetic properties of weights of accuracy classes E1, E2, F1 and F2, field of application according to OIML R111: 2004 from 2 g to 50 kg.	
Standard susceptibility reference	1 kg	YSZ01RMC
Calibration kit for susceptometer		YSZ01RMC
Plastic screw-top can for individual weights* with closedpore insert; also suitable for clean rooms	for 50 g weights	YAW50GL
	for 100 g weights	YAW100GL
	for 200 g weights	YAW200GL
	for 500 g weights	YAW500GL
	for 1 kg weights	YAW1000GL
	for 2 kg weights	YAW2000GL
	for 5 kg weights	YAW5000GL
	for 10 kg weights	YAW10000GL

* For knob weights only; for information on cans for cylinder weights, please contact Sartorius

Weight forks

Handles for lifting weights

Permeability indicator
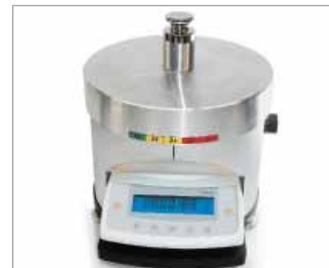
Susceptometer

Clean room weight case

Electroanalysis for Laboratories

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$^+_{Meter}$)
- Data storage capacity for 500 data records (Docu-pH$^+_{Meter}$)

Give your electrodes an 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-pHMeter to store essential electrode specifications over its entire service life.

Electrode data is logged 100% automatically in 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 measuring range [°C]	–5 ... 105	–5 ... 105
Readability [°C]	0.1	0.1
Accuracy [°C]	± 0.2	± 0.2
Temperature compensation	Automatic or manual from –5 ° to 105 °C	
Buffer recognition	Automatic: technical buffers, DIN|NIST buffers	
Calibration points, max. number	3	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 probes:		
NTC 10 kΩ, NTC 30 kΩ, Pt1000	2.5 mm male jack plug	2.5 mm male jack plug
RS232C interface	–	×
Dimensions [mm]	89 × 229 × 145	
Weight [kg]	1	1

Specifications

pH Measurement	Docu–pH$_{Meter}$	Docu–pH+$_{Meter}$
Measuring range	–2,000 … 20,000	–2,000 … 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 [mV]	–2,000 … 2,000	–2,000 … 2,000
Readability [mV]	0.1|1 configurable	0.1|1 configurable
Accuracy [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. electrode retainer arm, technical buffers, AC adapter, operating instructions	Docu-pH	Docu-pH+
… with electrodes and DocuClip® for unique, 100% traceable data recording pH electrodes with: ◼ Plastic body, refillable, fiber junction, NTC 10 kΩ	Docu-pH|PT10doc	Docu-pH+|PT10doc
◼ Glass housing, refillable, platinum junction, NTC 10 kΩ		Docu-pH+|P11doc
◼ Plastic body, gel electrolyte, fiber junction, NTC 10 kΩ	Docu-pH|P12doc	Docu-pH+|P12doc
◼ Plastic body, gel electrolyte, fiber junction	Docu-pH|P20doc	Docu-pH+|P20doc
◼ Glass housing, refillable, platinum junction		Docu-pH+|P21doc
… with conventional electrodes ◼ pH electrodes with plastic body, refillable, fiber junction, NTC 10 kΩ	Docu-pH|P10	Docu-pH+|P10
◼ Glass housing, refillable, platinum junction, NTC 10 kΩ		Docu-pH+|P11
◼ Plastic body, gel electrolyte, fiber junction, NTC 10 kΩ	Docu-pH|P12	Docu-pH+|P12
◼ Plastic body, gel electrolyte, fiber junction	Docu-pH|P20	Docu-pH+|P20
Glass housing, refillable, platinum junction		Docu-pH+|P21
DocuClip® … for unique, 100% traceable documentation of calibration for any pH electrodes Initialization by the user with Docu-pH$_{Meter}$ (Docu-pH+$_{Meter}$) required	DocuClip®	

Professional Meter: Multitalented 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 multifunctional graphical 5.7" VGA graphical display
- Measuring accuracy to ± 0.1 mV
- Automatic temperature compensation
- Menu-driven prompts in plain language
- Automatic recognition of 26 standard buffers (inc. NIST and DIN)
- Automatic checking of your combination electrode's functionality
- Automatic calibration prompt
- Stability indicator
- Help function always available through softkeys

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
Higher resolution to guarantee even greater accuracy in electro-chemical analysis.

PP-20|pH Meter and Conductivity Meter.
In addition to pH measurement, the high-end PP-20 Professional Meter offers research-grade conductivity measurements.

PP-25|pH-meter 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 Combined in a Single Unit.
The fully professional PP-50 combines all features of the models presented in this catalog. This convenient Professional Meter is designed for use in a broad range of applications in the electro-chemical analysis field.

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 points, max. number	5	5	5	5

mV Measurement				
Measuring range [mV]	±2,000	±2,000	±2,000	±2,000

Temperature Measurement				
Measuring range [°C]	–5 ... +105	–5 ... +105	–5 ... +105	–5 ... +105

Ion–selective Analysis				
Measuring range	–	–	1.00×10^{-9} ... 9.99×10^{9}	
Direct potentiometric measurement and incremental modes	–	–	×	×
Calibration points, max. number	–	–	7	7

Conductivity Measurement*				
Measuring range [µS/cm]	–	0.5 ... 20,000	–	0.5 ... 20,000
Specific electrical resistance Measuring range [$\Omega \times cm$]	–	$50 ... 2.0 \times 10^{6}$	–	$50 ... 2.0 \times 10^{6}$
Salinity Measuring range [ppt]	–	0.01 ... 42.0	–	0.01 ... 42.0
NaCl concent Measuring range [ppt]	–	0.01 ... 70.0	–	0.01 ... 70.0
TDS Measuring range [mg/l]	–	0.005 ... 300,000	–	0.005 ... 300,000
Calibration points, max. number	–	5	–	5
Manual temperature input	×	×	×	×
Inputs for pH combination electrodes and ISE	BNC	BNC	2 BNC	2 BNC
Input for conductivity measuring cells	–	DIN	–	DIN
Date & time, non-volatile memory	×	×	×	×
Memory for measuring data	620	620	620	620
Dimensions [mm]	265 × 200 × 100			

* Specifications based on a cell constant of 2.54 cm

pH|mV Meter – Reliability in All Applications

Basic Meter –
A Strong Basis Featuring Sartorius Quality
Four keys do it all!

The user-friendly prompts and messages guide you fast and reliably through laboratory routines.

PB–11
- Easy 1-key calibration of 1, 2 or 3 calibration points
- Automatic buffer recognition
- Automatic electrode test during calibration
- Automatic temperature compensation
- Clear readout with easy-to-understand symbols and LCD display

Three kits are available with different ranges of equipment:
Meter with electrode retainer arm, technical buffers, AC adapter and operating instructions, as well as:
- Refillable pH electrode, PY-P10, with plastic body and built-in temperature sensor PB-11-P10
- Refillable pH electrode, PY-P11, with glass body and built-in temperature sensor PB-11-P11
- Low maintenance pH electrode, PY-P20, with gel electrolyte PB-11-P20

Specifications

	Basic Meter PB–11
pH Measurement	
Measuring range	–1.99 ... 19.99
Calibration points, max. number	3

mV Measurement	
Measuring range in mV	–1,800 ... +1,800

Temperature Measurement	
Measuring range in °C	–5 ... +105
Input for pH combination electrodes	BNC
Protection class	–
Power supply	AC adapter
Dimensions [mm]	230 × 120 × 80
Weight [g]	1,390

Portable Meter –
Compact Design – Solid Performance
It's easy to operate anywhere in the field where you need accurate measurements on the spot.

Portable Meter PT–15|PT–20
- BNC connector (pH, mV, ORP) and DIN connector (conductivity)
- 3 point calibration
- Automatic recognition of buffer sets or cell constants
- Automatic temperature compensation and electrode testing
- Simultaneously displays the measured value and temperature
- Easy to toggle between the measurement modes
- Well protected against water splashes; waterproof rated to IP65
- High operating reliability during portable use thanks to battery indicating icon

Model	Measurement	Electrode Parameters
PT-15	pH, mV, Temp ORP (redox potential)	–
PT-15P	pH, mV, Temp ORP (redox potential)	pH combination electrode Gel electrolyte Plastic body Temperature sensor
PT-20	Conductivity, Temp Salinity, TDS	–
PT-20C	Conductivity, Temp Salinity, TDS	2 Band Conductivity Cell K=1.0 cm^{-1} with built in ATC

Sensors for the Highest Quality Measurements

**pH|ATC Combination Electrodes –
Glass Membrane Electrodes**
All pH combination electrodes have an
Ag|AgCl reference. The electrodes are sup-
plied with a fixed cable and BNC connector;
electrodes with a built-in temperature sen-
sor additionally have a 2.5 mm male jack. All
models are optionally available with DocuClip.

Figure No.	Order No.	Construction	Built-in Temperature Sensor	Applica-tion Range pH Value	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; are 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; are TRIS-compatible
4	PY-P22	Microelectrode (length 110 mm, diameter 5 mm); electrolyte: KCl 3 mol/l; free of silver ions; platinum junction; low-resistance glass	No	0 ... 14	Low 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
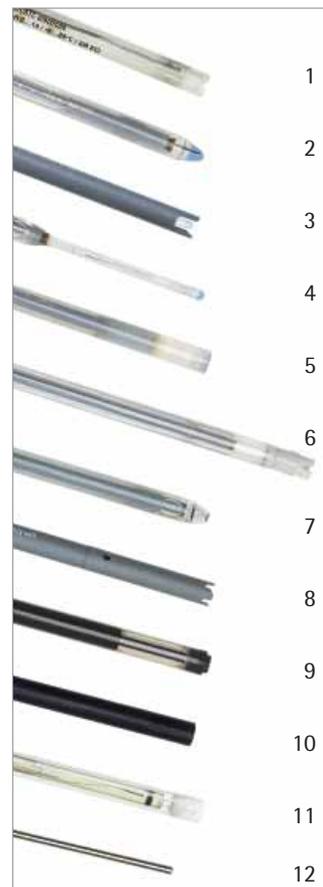
ORP Combination (Redox) Electrodes
This type of electrode has an Ag|AgCl reference. It is supplied with a permanently attached
cable and a BNC connector.

Figure No.	Order No.	Construction	Built-in Temperature Sensor	Application Range pH Value
7	PY-R01	Glass body; porous ceramic junction; Platinum disc (4 mm diameter); electrolyte: KCl 3mol/l; free of silver ions	No	0 ... 14

1 |
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10 |
11 |
12 |

Conductivity Cells and Multisensor Cell (pH, Conductivity, Temperature)
The conductivity cells are supplied with a permanently attached cord and an 8-pin DIN connector.

Figure No.	Order No.	Recommended Measuring Range	Construction	Application Range pH Value
8 |	PY-R01	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 value 0 ... 14	Combination electrode, 12 mm diameter; 120 mm length; 2-band cell (platinum); pH electrode with gel-filled electrode; temperature sensor	Yes

Ion-selective pH Combination Electrodes
All ion-selective electrodes are combination electrodes. They are supplied with a permanently attached cable and BNC connector.

Figure No.	Order No.	Ion	Measuring Range [ppm]	pH Application Range
9 |	PY-I01	Fluoride (F^-)	0.05 ... 500	5 ... 5.5
10 |	PY-I02	Ammonia (NH_3)	0.02 ... 17,000	≥ 11
11 |	PY-I03	Sodium (Na^+)	0.02 ... saturated solution	9 ... 12
9 |	PY-I04	Chloride (Cl^-)	2 ... 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 ... 12,000 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 cable and a 2.5 mm male jack.

Figure No.	Order No.	Recommended for	Construction
12 |	PY-T01	Temperature measurement and automatic temperature compensation – 120 mm length without built-in temperature sensor	Stainless steel body; 4.7 mm diameter

Accessories

	Order Number
Data Printer for Professional Meter and Docu–pH$_{Meter}$, Docu–pH$^+_{Meter}$	YDP20-PH
Paper rolls, 5 x 40 m rolls	6906937
Ink ribbon	6906918

pH Buffers

50 capsules per pack; dissolve contents of each capsule in 100 ml of distilled water	
pH = 4.01 ± 0.02 at 25 ℃	PY-Y01
pH = 7.00 ± 0.02 at 25 ℃	PY-Y02
pH = 9.00 ± 0.02 at 25 ℃	PY-Y03
pH = 10.00 ± 0.02 at 25 ℃	PY-Y04
Color-coded buffer solution in practical pump-bottle, eliminates the need for a beaker during calibration, traceable to NIST standards	
pH = 4.00 ± 0.01 at 25 ℃, 500 ml	PY-Y21
pH = 4.00 ± 0.01 at 25 ℃, 6+90 ml	PY-Y21-6
pH = 7.00 ± 0.01 at 25 ℃, 500 ml	PY-Y22
pH = 7.00 ± 0.01 at 25 ℃, 6+90 ml	PY-Y22-6
pH = 10.00 ± 0.01 at 25 ℃, 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 ℃ (KCl 0.0001 mol/l), 500 ml	PY-Y10
0.147 mS/cm ± 1.0% at 25 ℃, (KCl 0.001 mol/l), 500 ml	PY-Y11
1.413 mS/cm ± 1.0% at 25 ℃, (KCl 0.01 mol/l), 500 ml	PY-Y12
12.88 mS/cm ± 1.0% at 25 ℃, (KCl 0.1 mol/l), 500 ml	PY-Y13

Equipment Qualification – IQ\|OQ\|PQ

Qualification (IQ|OQ) pH Meter	8407pH
For each additional parameter	8407Para

Services

EXPAND® Technical Trainings

Instrument Services

Our Mission is Your Productivity

We are well aware of how important smoothrunning equipment is for efficient production processes and working routines. That is why we at Sartorius offer you our full-scale Instrument Service. This service covers a diverse range of instruments and equipment used in the different applications.

Adherence to cGMP requirements and our ISO 9001:2008 certified Quality Management System ensures that our customers receive services that meet the strictest quality requirements for reliable operation. In today's strongly competitive market, such services play a critical role and require a complex infrastructure to meet the current customer requirements. Accordingly, our organization places great emphasis on the core competence of our service offering. Sartorius has a local presence worldwide. A training department with vast practical experience, highly qualified specialists, well-versed technicians and fast delivery times on replacement parts are not just empty catchphrases, but practiced everyday with every customer by every member of our service staff.

Rely on people with an in-depth knowledge: Count on Sartorius and its Instrument Service Department.

Equipment

Single-source and Full-range. No matter whether a lab balance, a moisture analyser, an air sampler or a bioreactor, we service all of these systems for you.

- FAT and SAT
- Installation
- IQ|OQ support and documentation
- Calibration services
- Preventative maintenance
- Spare parts
- Instrument repairs
- Technical and application support
- Practical and technical operator training
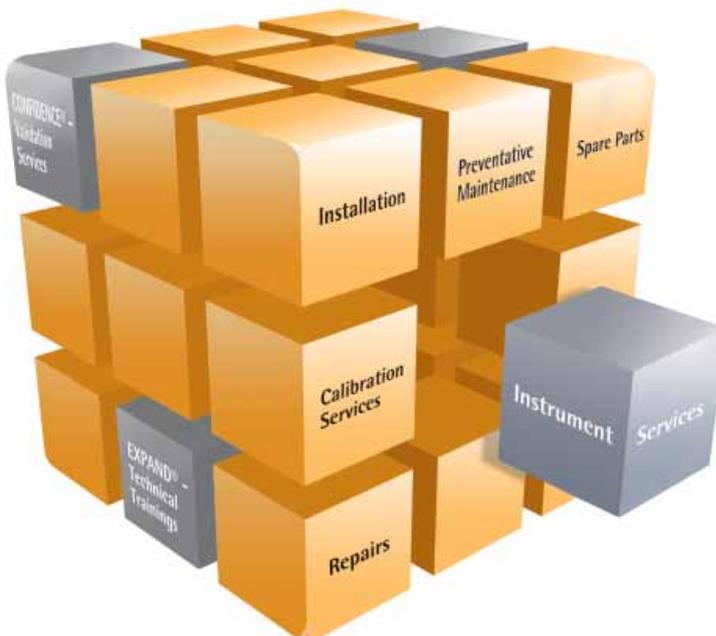
All Details & Global Contacts: www.sartorius-stedim.com/instrument-services

EXPAND®
Training Courses and Seminars

We call it the EXPAND® Technical Training Program. EXPAND® seminars, workshops and courses are integrated into the Sartorius Stedim Biotech service program. These training programs are designed to ensure that each course participant has a proper understanding of the theoretical subject matter and acquires the necessary hands-on, practical skills. The ultimate aim and purpose is to enable technicians and specialists to perform their work safely and efficiently. Continuing education of staff has become one of the many worldwide regulatory requirements. So, to help our customers keep up with the latest standards, we have created EXPAND®, a comprehensive series of technical training courses with a strong emphasis on hands-on, practical exercises. These training programs are essential for all supervisors, managers, operators, technicians and specialists working in R&D, Production and Quality Assurance Departments.

For our current trainings and seminar program please visit us at:
www.sartorius-stedim.com/expand

Cell Cultivation|Cell Biology
Animal Cell Culture; Mycoplasms; Flow Cytometry; Viability, Cytotoxicity and Proliferation; Virus Detection; Microscopy

Fermentation|Cell Culture
From Cryo Culture to Bioreactor; Production of Viruses; Monoclonal Antibodies; Serum-free Cultivation; Bioprocess Control

Downstream Processing
Downstream Processing; Virus|Prion Safety

Filtration
Sterilization and Integrity Testing; Filter Optimization and Scale-up; Crossflow Filtration; Single-Use Technologies

Microbiology
Microbiology in the Beverage Industry; Sterility Testing; Light Microscopy in the microbiological Quality Control

Molecular Biology
Cloning and Expression; RNA Technologies; Quantitative Real-time PCR

Proteomics
Protein Expression and Purification; ELISA Technologies; Immunhistochemistry and Immunofluorescence; Antibodies in Analysis

Lab–|Quality Management
Balances as test divices in QM; Gravimetric Pipette Calibration; Qualification and validation in the cell culture lab

Professional Education
Life Sciences Assistant
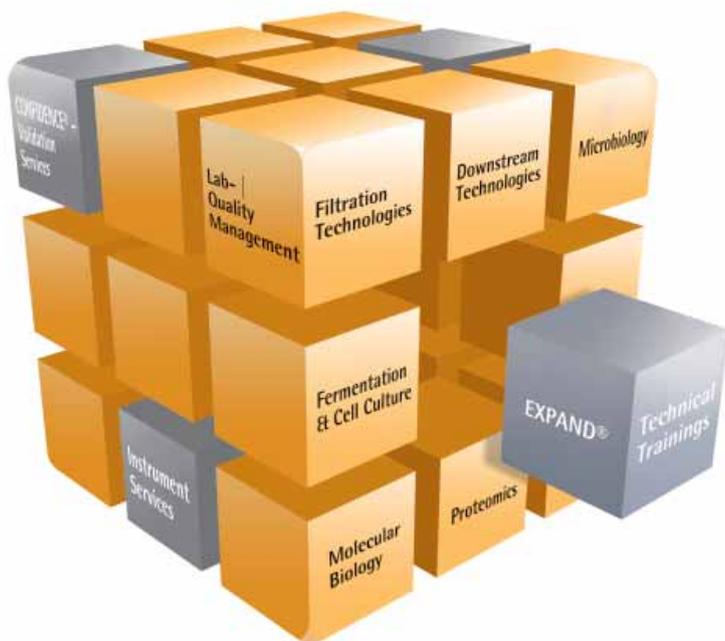
Complete Program & Online Registration: www.sartorius–stedim.com/expand

Abstract of Our Training Program

Cell Cultivation|Cell Biology

862055 Basics of Animal Cell Culture

Target group: Technicians and scientists without any or with little previous knowledge, career changers and those returning to work after a career break.

Beginners of cell cultivation often start by looking over the shoulders of their colleagues, who don't have the time during the busy day-to-day routine to teach all the basic principles and background information on each subject in depth. This seminar will teach you the fundamental prerequisites and techniques for everyday work with animal cells and let you establish, optimize and standardize your proprietary cell cultures.

Theoretical Aspects Include:
- Equipping and maintaining a cell culture lab
- Cell cultivation: Composition of media, required additives, culture vessels and disposables, origin of cell lines including the required documentation
- Routine methods in cell cultivation: Morphological cell evaluation, handling the microscope, passage|subcultivation, cell counting, viability tests, cryopreservation (freeze|thaw technologies)
- Aseptic techniques and biological contamination

Practical Exercises:
- Inverse microscopy of cells
- Passage|subcultivation, cell counting including viability testing
- Freezing|thawing cells
- Detection of contamination

862056 Advanced Course Animal Cell Culture|Trouble Shooting

Target group: Technicians and scientists with experience in cell cultivation.

Even in experienced cell culture labs, cell growth problems can crop up suddenly and apparently without reason and affect the sterility or reproducibility of results. This seminar will teach you how to use practicable methods to ensure the quality of your animal cell cultures over the short and long term and solve any emergent difficulties.

Theoretical Aspects Include:
- Detection of poor cell growth and cause analysis, e.g. physiological relationships in the cell culture, effect of media components, material surfaces and cell handling on cell growth
- Biological and chemical contamination: Sources, diagnosis, treatment and prevention
- Required documentation and standardization of cell lines, creating proprietary cell banks (cell banking), viability tests, check lists

Practical Exercises:
- Routine methods as causes for bad cell growth including cryopreservation and viability tests
- Detection of poor cell growth and contaminated cells

Complete Program & Online Registration: www.sartorius–stedim.com/expand

Abstract of Our Training Program

Fermentation｜Cell Culture Technologies

862077 Basic Course Fermentation｜Cell Culture

Target group: Technicians and scientists without any or with little previous knowledge.

This course teaches you the fundamentals of different fermentation systems and how to monitor fermentation to obtain the desired product.

This course covers:
- Chemical and microbiological principles of fermentation
- Basic principles of reactor technique and different fermentation systems (batch and continuous culture)
- Strain maintenance and testing organisms
- Cultivation conditions and growth kinetics
- Measurement and control during fermentation process
- Monitoring｜In-line controls

862021 High Cell Density Cultivation of Escherichia coli

Target group: Technicians and scientists with basic knowledge of microbiology, cultivation of microorganisms and of molecular biology and who are in charge of managing bioreactors or willing to do this in future.

Small groups will perform high cell density cultivation in the laboratory bioreactor and learn about the related theoretical and practical aspects.

The main aspects include efficient cultivation to obtain high cell densities (High Cell Density Cultivation, HCDC), safe handling of laboratory bioreactors, avoiding sterility problems. Consideration is given to dissolved nutrients and oxygen supply, to balancing equation fundamentals and realization in feeding strategies.

Theoretical and practical aspects include:
- Virtual bioreactor (simulation)
- Laboratory bioreactors, handling, preparation and cell harvesting
- Media composition for high cell density cultivation
- Cultivation strategies
- Feeding profile calculation
- Oxygen demand of growing cells
- Oxygen transfer aspects

862086 Animal Cell Culture Workshop: From Cryo Culture to Bioreactor (Part 1)

Target group: Technicians and scientists without any or with little previous knowledge.

This workshop provides you with hands-on training in various cell cultivation systems to enable you to perform every step of the process yourself – from thawing cell cultures (cryo culture) to fermentation in bioreactors (seed train).

Theoretical aspects include:
- Basic principles of cell cultivation and special features of production processes using animal cells
- Media for production
- Cultivation systems for production
- Monitoring and data analysis
- Strategies for scaling-up cultivation

Practical exercises:
- Preparation of re-usable and single-use bioreactors for cell cultivation (autoclaving, in situ-steam sterilization, disposable bioreactors)
- Thawing and cultivation of antibody-producing CHO cell lines in different cultivation systems
- Aseptic transfer of cell culture during the production process (seed train) and sterile sampling
- Monitoring cell cultivation

Complete Program & Online Registration: www.sartorius–stedim.com/expand

Abstract of Our Training Program

Downstream Processing

**# 862087 Animal Cell Culture Workshop:
Downstream Processing (Part 2)**
Target group: Technicians and scientists without any or with little previous knowledge.

This workshop provides you with hands-on training in different strategies and methods for purification of your products using an antibody producing CHO cell line.

Theoretical aspects include:
- Methods for product purification and critical process parameters
- Development of strategies for proprietary applications
- Virus inactivation and virus removal

Practical exercises:
- Cell harvesting and clarification of the fermentation product by depth filtration and crossflow filtration (microfiltration)
- Purification using column chromatography, membrane chromatography, ultrafiltration (crossflow filtration)
- Removal of contaminants by membrane chromatography
- Quantification and quality control
- Scale up strategies

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Abstract of Our Training Program

Filtration

862024 Sterilization and Integrity Testing of Membrane Filters

Target group: Technicians and scientists with or without previous knowledge.

In this training course, participants learn theoretical knowledge and practical skills in handling the filters employed for sterile filtration.

The theoretical aspects include:
- Basic principles of filtration
- Depth filters|membrane filters
- Hydrophobic|hydrophilic filters
- Retention mechanisms
- Integrity testing of membrane filters
- Regulatory requirements
- Integrity testing methods
- Testing equipment
- Physical theoretical principles of steam sterilization of filter lines

Practical exercises:
- Manual determination of bubble point|diffusion
- Automated integrity testing
- Bubble point test|diffusion test
- Integrity testing of hydrophobic filters using the water intrusion test (WIT)
- Trouble shooting
- Hands-on exercises for in-line steam sterilization of filter cartridges

862037 Filter Optimization and Scale-up

Target group: Technicians and scientists without any or with little previous knowledge.

There is always room for improvement in any process. Reducing costs per liter, improving yield and implementing efficient process times while increasing product and process reliability are the major success factors for any company. This course can help you to find the optimal process solution for your specific application.
Theoretical aspects include:
- Depth and membrane filter
- Construction and formats
- Filter clogging mechanisms
- Selection of pre- and final filter materials
- Evaluation of the test results

Practical exercises:
- Constant flow and constant pressure trials
- Pre- and final filter optimization trials
- Small scale filterability trials
- Confirmation of test results with small pleated filter elements
- Introduction to Zero-T software
- Scale up calculations

862008 Crossflow Filtration

Target group: Technicians and scientists with or without previous knowledge.

This course is designed to give participants state-of-the-art knowledge about GMP-compliant processing using crossflow filtration.

Theoretical aspects include:
- Crossflow filtration theory
- Membrane characterization|membrane selection
- Factors influencing performance
- Scale up
- Operating conditions
- Cleaning-in-place (CIP)
- Steaming-in-place (SIP)
- Integrity testing
- Applications in biotechnology

Practical exercises:
- Operational set-up of the systems
- Determination of clean water flux
- Cell retention by microfiltration (model solution)
- Concentration of a protein solution by ultrafiltration
- Removal of low-molecular weight contaminants by diafiltration
- Cleaning
- Demonstration of steaming-in-place (optional)

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Abstract of Our Training Program
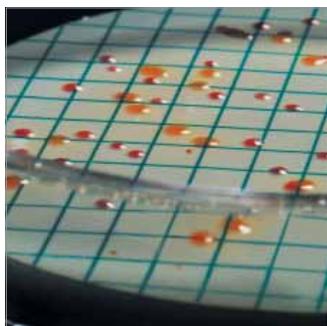
Microbiology

862001 Basic Course Microbiology
Target group: Technicians and scientists with-out any or with little previous knowledge, career changers and those returning to work after a career break.

Theoretical aspects include:
- Introduction to microbiology
- Growth conditions
- Microbiological detection methods
- The microbiological lab
- Microbiological examination of water and drinking water: Regulations and methods
- Introduction to personnel hygiene

Practical exercises:
- Introduction to microbiological work
- Pour plate, streak plate
- Sample filtration run with various media: water, particulate media, oil-containing media
- Evaluation of different growth samples

862034 Sterility Testing
Target group: Technicians and scientists with previous knowledge.

"Because sterility testing is a very exacting procedure, where asepsis of the procedure must be ensured for a correct interpretation of results, it is important that personnel be properly trained and qualified" USP <71>.

This workshop is designed to give participants theoretical knowledge and practical experi-ence in the handling of sterility testing in clean rooms and isolators.

Theoretical aspects include:
- Sterility testing
- Regulation and guidance
- Sterility test methods | test limitations
- Validation
- Interpretation of sterility test results
- Microbial identification of isolates recovered from a sterility test
- Microbiological monitoring
- Sterility test isolators
- Standards and regulations
- Design
- H_2O_2 decontamination

Practical exercises:
- Sterility testing of different sterile prod-ucts (LVPs|SVPs|ampoules|antibiotics| syringes|medical devices)
- Performing sterility test in isolators
- Visual inspection and evaluation of sterile test samples

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Abstract of Our Training Program

Molecular Biology

862042 Molecular Biology
Target group: Technicians and scientists without any or with little previous knowledge, career changers and those returning to work after a career break.

In this seminar, you will learn the basic theory and practice of molecular biological methods. After completing this seminar, you will know how the latest methods for DNA and RNA analysis work and be able to apply them in your own lab.

Practical exercises:
- DNA isolation and analysis: Isolation of DNA from different sources, concentration measurement, restriction digestion and analysis in agarose gel (gel electrophoresis)
- RNA isolation and analysis: handling and quality assessment of RNA
- Establishing and optimizing a PCR
- Controls and trouble shooting

Proteomics

862052 Proteins:
Isolation, Purification and Analysis
Target group: Technicians and scientists without any or with little basic knowledge, career changers and those returning to work after a career break.

Proteins have variable biochemical structures preventing them from being isolated and purified according to a standard protocol. This turns every new target protein into a new challenge for experimenters.

Theoretical aspects include:
- Biochemical properties of proteins like structure, function, modification and stability
- Protein isolation and purification techniques like ion exchange and affinity chromatography, gel filtration, protein precipitation, ultrafiltration and gel electrophoresis including staining
- Immunological methods like Western Blot and ELISA

Practical exercises:
- Liquid chromatographic purification methods
- Isolation of a recombinant fusion proteins
- Protein quantification
- Separation and analysis using SDS-PAGE, staining of polyacrylamide gels (e.g. Coomassie and silver), Western Blot

862053 Advanced Course Protein Expression and Purification
Target group: Technicians and scientists with previous knowledge.

Even the most experienced users repeatedly encounter unanticipated difficulties with the expression and purification of natural and recombinant proteins. In this course you will learn the important practical aspects in protein expression and purification, alternative strategies will be discussed.

This course covers:
- Production of native and recombinant proteins: Expression systems, their advantages and disadvantages (quantity and quality of proteins, glycosylation and other protein modifications)
- Biochemical characteristics of protein purification and processing, recombinant tags for purification
- Protein processing: How buffers, temperature and detergents influence the stability, solubility and aggregation behavior of purified proteins
- Optimization of process sequences including trouble shooting

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Abstract of Our Training Program
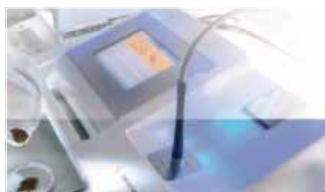
Lab-|Quality Management

 # 862601 Balances as Inspection, Measuring and Test Equipment in the QM System
Target group: Lab managers, users and quality assurance staff working in production and control.

The incorporation of balances into quality assurance systems (e.g. DIN EN 9000:2000, GMP, GLP, ISO 17025) is of key importance. Balances used as inspection, measuring and test equipment must be tested at appropriate intervals to ensure their proper functioning and process capability; test results must be documented in suitable form.

This course covers:
- Definition of terms, interpretation of metrological data
- Proper selection and correct handling of balances and calibration weights
- Detecting and minimizing factors affecting balances and weighing samples
- Practical measurements on laboratory balances and industrial scales under supervision
- Inspection, measuring and test equipment monitoring: the specific requirements of DIN EN ISO 10012
- Equipment qualification DQ, IQ, OQ, PQ
- The use of non-automatic balances and balances in legal metrology
- DKD weights, weight testing and certification
- Calculating the DKD measurement uncertainly on electronic balances
- Determining the minimum sample quality according to the USP

 # 862602 Calibrating Pipettes
Target group: Lab techs and staff responsible for quality assurance.

This course teaches practical knowledge on the subject of pipette calibration, weighing technology and volumetric measurement. After the course, participants will be able to calibrate piston-operated pipettes on their own. You can bring your own pipettes and calibrate them!

Gravimetric calibration of piston-operated pipettes within the scope of inspection, measuring and test equipment monitoring according to DIN EN ISO 8655.

This course covers:
- Basics of gravimetrical|pipette calibration
- DIN EN ISO 8655 – Implementing the standard
- Selection and proper handling of balances as inspection, measuring and test equipment
- Setting up a calibration workplace, minimizing interference factors
- Practical preparation and performance of calibrations
- Working with different types of calibration software
- Documenting and evaluating calibration results
- Criteria for inspection, measuring and test equipment monitoring
- Establishing test intervals, traceability, documentation
- Handling and cleaning pipettes

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CONFIDENCE®
Validation Services

Focus on regulatory compliance, time to market and cost efficiency with CONFIDENCE®.

We respect our customers' individuality. The diversity of today's manufacturing processes on a global scale requires an approach which considers the critical success factors for each company scenario.

You can relax knowing that your needs are being met with our risk-based validation strategies. We work in partnership with you to develop the appropriate test scope based on a risk assessment for processing and packaging materials used.

Whether you conduct conventional manufacturing in a stainless steel environment or implement single-use fluid management, we will test any and all process components, regardless of the manufacturer.

Various regulations for pharmaceutical products call for monitoring of impact factors on the drug product's safety and efficacy. This includes the evaluation of possible contaminants such as bacteria, toxic substances or particles but also verification of adsorption effects of drug product components to fluid contact surfaces.

We will help interpreting the regulatory documents which are the basis for your business and define applicable test conditions for your product formulation based on your actual process conditions.

Confidentiality is taken seriously when we interact with you regarding:
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- Grouping | bracketing support
- Customized validation protocol development
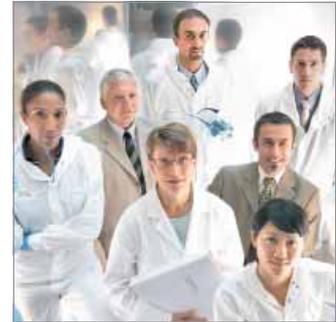
Complete Your Testing Requirements with CONFIDENCE® Validation Services
Our program includes but is not limited to:

Microbiological studies	▪ Filter elements ▪ Single-use fluid management containers ▪ Sterility Test Validation Support
Physico-chemical studies	▪ Filter elements ▪ Single-use fluid management containers
Extractables| Leachables studies	▪ Filter elements
Analytical Techniques used include e.g. NVR, TOC, HPLC-UV, GC-MS, LC-MS, LC-MS-MS, LC-Q-tof, FTIR, ICP-MS, ICP-OES	▪ Single-use fluid management containers and assemblies ▪ Freeze and thaw bags ▪ Mixing systems ▪ Transfer systems ▪ Tubing|connectors|gaskets ▪ Polymer-based syringes|vials|ampoules| bottles (including labels, ink or glue)

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Services | CONFIDENCE®   407

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Thinking globally and acting locally – we are where you need us with the same degree of competence, reliability and focus on your critical success factors.

Make the choice that helps bring your products to market rapidly – on time, every time. Ask us about our 30-day commitment program.

We continue to lead and innovate in the field of validation studies.

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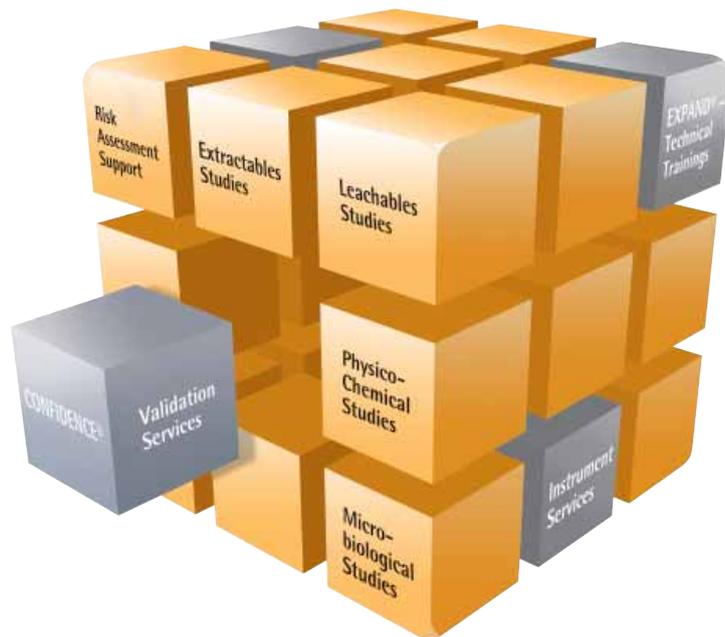
■ CONFIDENCE® │ **Services**

DISCOVER®
Plant, Process and System Survey

There is room for improvement in any process. Within the scope of our DISCOVER® service segment, the following areas|aspects are competently and critically analyzed:

- Quality management system
  Filter handling, ranging from incoming inspection, storage in the warehouse and use, to disposal
- Filtration systems and plants| Filtration processes
- System analysis for preventive maintenance
- Qualification|Validation status

The results of a DISCOVER® survey and analysis and specific suggestions for improvement will be documented in a comprehensive report for you.
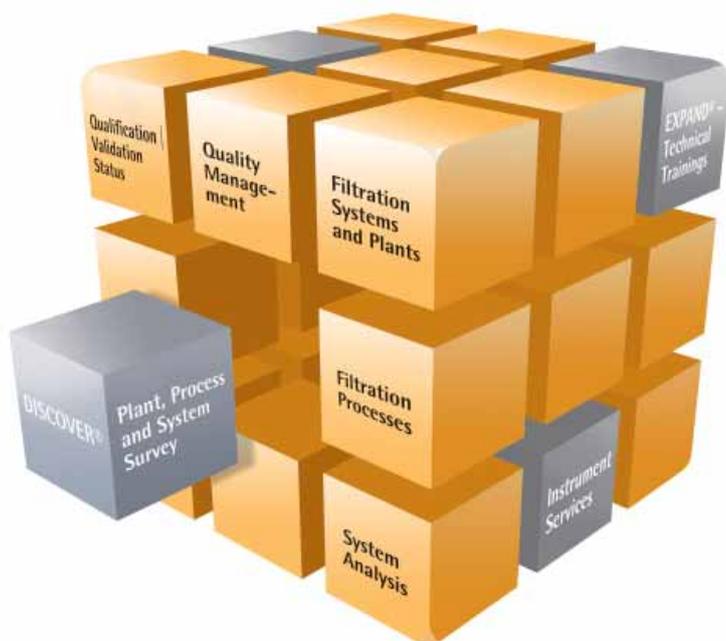
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INCREASE®
Process Optimization

There's always room for improvement in any process. An INCREASE® study will systematically implement the potential identified by process analysis to achieve maximum yields. Use the extensive application know-how of our specialists.

Process Development and Optimization
The INCREASE® process optimization program supports a wide variety of aspects of your business activities – technical, organizational and GMP compliance. Within the scope of technical process development and optimization, our specialists understand that achieving high yields and efficient process times are the key to success.

Benefit from the expertise provided by our specialists:
- Selection of the optimal filtration material
- Performance of filterability studies
- Development support for purification processes
- Sizing and designing of production-scale plants – scale-up
- Technical consultation for perfusion reactors

Scale-up|Technology Transfer
Converting from pilot to process scale and transferring technology to another location require considerable organizational and communication efforts for a certain time. Moreover, the requirements of the particular regulatory authorities and GMP standards have to be complied with.

Let Sartorius Stedim Biotech reduce your effort:
- You take a make-or-buy decision
- For all the rest of the details, we offer our full support together with our BioPharm-Alliance partners

GMP Compliance
Lack of familiarity or non-compliance with GMP requirements represents a business risk. Together with our BioPharm-Alliance partners, we can help to minimize your risk by offering support in the following areas:
- Optimization of quality or process control system
- Corrective actions guidance
- Optimization of approval procedures
- Post-approval change support
- Preparation for inspections
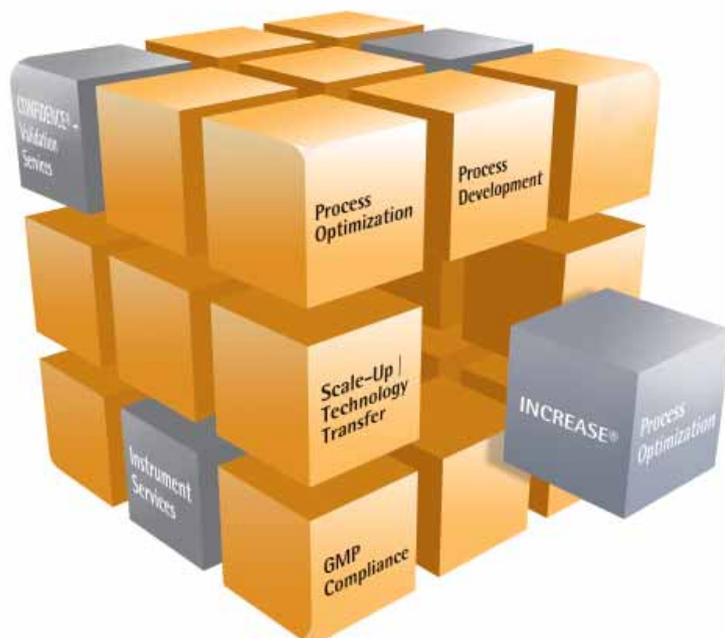
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